NTHETIC ORGANIC CHEMICALS

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UNITED STATES INTERNATIONAL TRADE COMMISSION

SYNTHETIC ORGANIC CHEMICALS

United States Production and Sales, 1978

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON: 1979

USITC PUBLICATION 1001

UNITED STATES INTERNATIONAL TRADE COMMISSION

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INTRODUCTION

This is the 62nd annual report of the U.S. International Trade Commission on Domestic production and sales of synthetic organic chemicals and the raw materials from which they are made. The report consists of 15 sections, each covering a specified group (based principally on use) of organic chemicals as follows: Tar and tar crudes; crude products from petroleum and natural gas for chemical conversion; cyclic intermediates; dyes; organic pigments; medicinal chemicals; flavor and perfume materials; plastics and resin materials; rubber-processing chemicals; elastomers; plasticizers; surface-active agents; pesticides and related products; miscellaneous end-use chemicals and chemical products; and miscellaneous cyclic and acyclic chemicals. Data have been supplied by approximately 800 producers.

Five of the 15 statistical sections are headed by a short paper on recent developments in part or all of the given end-use group. This is followed by a summary of the statistical data. The first table in each section gives statistics on products and groups of products in as great detail as is possible without revealing the operations of individual producers. Statistics for an individual chemical or group of chemicals are given only when there are three or more producers, no one or two of which may be predominant. Moreover, even when there are three or more producers, statistics are not given if there is any possibility that their publication would violate the statutory provisions relating to unlawful disclosure of information accepted in confidence by the Commission.[1]

Data are reported by producers for only those items where the volume of production or sales or value of sales exceeds certain minimums. Those minimums for all sections are 5,000 pounds of production or sales or $5,000 of value of sales with the following exceptions: Plastics and resin materials--50,000 pounds or $50,000; pigments, medicinal chemicals, flavor and perfume materials, rubber-processing chemicals, and elastomers--1,000 pounds or $1,000. They are usually given in terms of undiluted materials; however, products of 95 percent or more purity are considered to be 100 percent pure. Commercial concentrations are applied to dyes, certain plastics and resins, and a few solvents; such concentrations are specifically noted.

The statistics given in this report include data from all known domestic producers of the item covered and include the total output of each company's plants, i.e., the quantities produced for consumption within the producing plant, as well as the quantities produced for domestic and foreign sale. The quantities reported as produced, therefore, generally exceed the quantities reported as sold. Some of these differences, however, are attributable to changes in inventory.

The second table in each section lists all items for which data on production or sales have been reported, by primary manufacturers, identified by manufacturers' codes. Each code consists of not more than three capital letters which is assigned on a permanent basis.

The third table in each section is a directory, alphabetized by the codes of the manufacturers reporting in that section.

Table 1 of the Appendix is a directory, alphabetized by the names of the manufacturers reporting in all sections and includes their office addresses.

Table 2 of the Appendix summarizes and gives the competitive status of U.S. general imports in 1976 of benzenoid intermediates and finished benzenoid products, entered under schedule 4, parts 1B and 1C, of the Tariff Schedules of the United States.

Table 3 of the Appendix lists synonymous names for cyclic intermediates. Information on all synonymous names of the organic chemicals included in this report may be found in the *SOCMA Handbook: Commercial Organic Chemical Names*, published by the Chemical Abstracts Service of the American Chemical Society, or the *Colour Index* (Revised Third Edition), published jointly by the Society of Dyes and Colourists and the American Association of Textile Chemists and Colourists.

As specified in the reporting instructions sent to manufacturers, production and sales (unless otherwise specified) are defined as follows:

> *PRODUCTION is the total quantity of a commodity made available by ORIGINAL MANUFACTURERS ONLY within the customs territory of the United States (includes the 50 states, the District of Columbia, and Puerto Rico). It covers synthetic organic chemicals, specified crudes from petroleum and coal tar, and certain chemically described natural products, such as, alkaloids, enzymes, and perfume isolates. It is the sum--expressed in terms of 100% active ingredient unless otherwise specified in the reporting instructions--of the quantities:*
>
> *Produced, separated, and consumed in the same plant or establishment. A commodity is considered separated either when it is isolated from the reaction system or when it is not isolated, but weighed, analyzed, or otherwise measured. This includes byproducts and co-products that are not classifiable as waste materials;*

[1] Title 18, U.S.C. 1905 and Title 44, U.S.C. 3508.

Produced and not isolated, but directly converted to a finished or semifinished item not included in this report (e.g., polyester film, polyurethane tires, nylon fiber, bar soap, etc.). (See specific instructions in individual sections);
Produced and transferred to other plants or establishments of the same firm or 100%-owned subsidiaries or affiliates;
Produced and sold to, or bartered with, other firms (including less than 100% owned subsidiaries);
Produced for others under toll agreements (see general instructions);
Produced and held in stock.

PRODUCTION EXCLUDES:
Purification of a commodity, which is purchased by, or transferred from within, your company, unless inclusion of such processing is specifically requested in the reporting instructions for individual sections;
Intermediate products which are formed in the manufacturing process, but are not isolated from the reaction system--that is, not weighed, analyzed, or otherwise measured; except such products as described above as being produced and not isolated, but directly converted to a finished or semifinished item.
Materials that are used in the process but which are recovered for re-use or sale;
Waste products having no economic significance.

SALES are actual quantities of commodities sold by ORIGINAL MANUFACTURERS ONLY. Sales include the quantity and value of:
Shipments of a commodity for domestic use or for export, or segregation in a warehouse when title has passed to the purchaser in a bona fide sale;
Shipments of a commodity produced for you by others under toll agreements;
Shipments to subsidiary or affiliated companies, provided the ownership is less than 100%.

SALES EXCLUDES:
All intra-company transfers within a corporate entity;
All shipments to 100% owned subsidiary or affiliated companies;
All resales of imported or purchased material, including materials obtained by barter;
All shipments of a commodity produced for others under toll agreements.

VALUE OF SALES is the net selling price f.o.b. plant or warehouse, or delivered price. F.o.b. prices are preferred, but if they are not readily available from your records, delivered prices are acceptable.

Combined production of all synthetic organic chemicals, tar, and primary products from petroleum and natural gas in 1978 was 320,891 million pounds--an increase of 4.7 percent over the output in 1977 (see table 1). Sales of these materials in 1978, which totaled 170,488 million pounds, valued at $41,511 million, were 5.4 percent larger than in 1977 in terms of quantity and 8.5 percent larger in terms of value. These figures include data on production and sales of chemicals measured at several successive steps in the manufacturing process, and therefore, they necessarily reflect some duplication.

In 1978, production of all synthetic organic chemicals, including cyclic intermediates and finished products, totaled 186,657 million pounds, or 7.0 percent more than the output in 1977. All sections except those on dyes, rubber-processing chemicals, and elastomers, showed an increase in production in 1978 over 1977. Flavor and perfume materials (189 million pounds) led the increase with a gain of 26.0 percent; plasticizers (2,086 million pounds) increased 16.4 percent; plastics and resin materials (38,878 million pounds) increased 12.3 percent; medicinal chemicals (269 million pounds) and organic pigments (77 million pounds) each increased 11.6 percent; cyclic intermediates (19,936 million pounds) increased 6.5 percent; miscellaneous end-use chemicals and chemical products (20,589 million pounds) increased 6.4 percent; miscellaneous cyclic and acyclic chemicals (92,101 million pounds) increased 5.9 percent; pesticides and related products (1,416 million pounds) increased 2.0 percent; and surface-active agents (4,738 million pounds) increased 0.4 percent. Rubber-processing chemicals (366 million pounds) decreased 9.0 percent; dyes (251 million pounds) decreased 4.9 percent; and elastomers (5,761 million pounds) decreased 0.9 percent.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS AND THEIR RAW MATERIALS U.S. PRODUCTION AND SALES, 1977 AND 1978

	PRODUCTION			SALES					
				QUANTITY			VALUE		
	1977	1978	Increase, or decrease (-), 1978 over 1977[1]	1977	1978	Increase, or decrease (-), 1978 over 1977[1]	1977	1978	Increase, or decrease (-), 1978 over 1977[1]
	Million pounds	*Million pounds*	*Percent*	*Million pounds*	*Million pounds*	*Percent*	*Million dollars*	*Million dollars*	*Percent*
Grand Total[2]	[3]306,544	320,891	4.7	161,768	170,488	5.4	[3]38,258	41,511	8.5
Tar	5,929	5,405	-8.8	2,924	2,947	.8	...	...	...
Primary Crude products from Petroleum and Natural Gas	126,133	128,829	2.1	61,008	64,281	5.4	5,820	6,160	5.8
Synthetic organic chemicals total[2]	[3]174,482	186,657	7.0	97,836	103,260	5.5	[3]32,438	35,351	9.5
Cyclic intermediates	18,726	19,936	6.5	7,986	8,853	10.9	2,596	2,803	8.0
Dyes	264	251	-4.9	255	233	-8.6	690	734	6.4
Organic pigments	69	77	11.6	57	65	14.0	268	322	20.2
Medicinal chemicals	241	269	11.6	162	185	14.2	794	944	18.9
Flavor and perfume materials	150	189	26.0	108	140	29.6	207	212	2.4
Plastics and resin materials	34,623	38,878	12.3	29,799	33,527	12.5	10,882	12,349	13.5
Rubber-processing chemicals	[3]382	366	-9.0	238	228	-4.2	278	287	3.2
Elastomers (synthetic rubber)	5,813	5,761	-.9	4,177	3,640	-12.9	1,940	1,875	-3.4
Plasticizers	1,792	2,086	16.4	1,668	1,748	4.8	632	703	11.2
Surface-active agents	4,718	4,738	0.4	2,515	2,708	7.7	875	966	10.4
Pesticides and related products	1,388	1,416	2.0	1,263	1,300	2.9	2,808	3,041	8.3
Miscellaneous end-use chemicals and chemical products	19,348	20,589	6.4	10,855	11,698	7.8	2,547	2,713	6.5
Miscellaneous cyclic and acyclic chemicals	86,968	92,101	5.9	38,753	38,935	.5	7,919	8,582	8.4

[1] Percentages calculated from figures rounded to thousands.
[2] Because of rounding, figures may not add to the totals shown.
[3] Revised.

Note.--Data on total production and sales of tar crudes, which were published prior to 1977, are not available.

General

In this report synthetic organic chemicals are classified on the basis of their principal use as follows: cyclic intermediates, dyes, organic pigments, medicinal chemicals, flavor and perfume materials, plastics and resin materials, rubber-processing materials, elastomers, plasticizers, surface-active agents, pesticides and related products, miscellaneous end-use chemicals and chemical products, and miscellaneous cyclic and acyclic chemicals. Most of these groups are further subdivided either by use or by chemical composition. As intermediate chemicals are used in the manufacture of finished products, aggregate figures that cover both intermediates and finished products necessarily include considerable duplication.

Total production of synthetic organic chemicals (intermediates and finished products combined) in 1978 was 186,657 million pounds or 7.0 percent more than the output of 174,482 million pounds reported for 1977 and 78.3 percent more than the output of 104,711 million pounds reported for 1967 (see table 2). Sales of synthetic organic chemicals in 1978 amounted to 103,260 million pounds, valued at $35,531 million, compared with 97,836 million pounds, valued at $32,438 million in 1977 and 55,177 million pounds, valued at $10,438 million in 1967. Production of all cyclic products (intermediates and finished products combined) in 1978 totaled 45,826 million pounds or 9.3 percent more than the 41,9 2 million pounds reported for 1977 and 36.9 percent more than the 33,479 million pounds reported for 1967, however, the transfer of several items, in 1976, from the cyclic intermediates section to the section on primary production from petroleum and natural gas has caused the output of cyclic products to appear much lower in relation to 1967 than would otherwise have resulted. Production of all acyclic products in 1978 totaled 140,831 million pounds, or 6.2 percent more than the 132,560 million pounds reported for 1977 and 97.7 percent more than the 71,232 million pounds reported for 1967.

TABLE 2.--SYNTHETIC ORGANIC CHEMICALS: SUMMARY OF U.S. PRODUCTION AND SALES OF INTERMEDIATES AND FINISHED PRODUCTS, 1967, 1977, AND 1978

[Production and sales in thousands of pounds; sales value in thousands of dollars]

CHEMICAL	1967[1]	1977	1978	Increase, or decrease (-) 1978 over 1967	Increase, or decrease (-) 1978 over 1977
				Percent	*Percent*
Organic chemicals, cyclic and acyclic, Grand total:[2]					
Production	104,711,357	174,481,873	186,657,007	78.3	7.0
Sales	55,176,823	97,835,977	103,260,322	87.1	5.5
Sales value	10,438,453	32,437,521	35,530,776	240.4	9.6
Cyclic, total:					
Production	33,479,469	[2]41,921,778	45,825,737	36.9	9.3
Sales	19,328,628	26,041,307	26,527,904	37.2	1.9
Sales value	4,610,293	[2]14,173,377	14,743,163	219.8	4.0
Acyclic, total:					
Production	71,231,888	132,560,095	140,831,270	97.7	6.2
Sales	35,848,195	[2]71,794,670	76,732,418	114.0	6.9
Sales value	5,828,160	18,264,144	20,787,613	256.7	13.8
1. Cyclic Intermediates					
Production	20,793,132	18,725,626	19,935,769	-4.1	6.5
Sales	9,461,180	7,985,790	8,852,650	-6.4	10.9
Sales value	1,000,359	2,596,627	2,803,327	180.2	8.0
2. Dyes					
Production	206,240	264,369	250,780	21.6	-5.1
Sales	198,592	254,516	232,711	17.2	-8.6
Sales value	332,049	689,992	733,553	120.9	6.3
3. Organic Pigments					
Production	53,322	68,707	76,716	43.9	11.7
Sales	42,867	57,434	64,638	50.8	12.5
Sales value	108,354	267,747	321,882	197.1	20.2
4. Medicinal Chemicals					
Cyclic:					
Production	110,129	153,922	157,207	42.7	2.1
Sales	70,120	83,586	87,197	24.4	4.3
Sales value	348,873	718,392	850,199	143.7	18.3
Acyclic:					
Production	69,941	86,811	111,855	59.9	28.8
Sales	56,804	78,798	97,915	72.4	24.3
Sales value	36,402	75,626	93,915	158.0	24.2

See footnotes at end of table.

TABLE 2.--SYNTHETIC ORGANIC CHEMICALS: SUMMARY OF U.S. PRODUCTION AND SALES OF INTERMEDIATES AND FINISHED PRODUCTS, 1967, 1977, AND 1978--CONTINUED

[Production and sales in thousands of pounds; sales value in thousands of dollars]

CHEMICAL	1967[1]	1977	1978	Increase, or decrease (-) 1978 over 1967	1978 over 1977
5. Flavor and Perfume Materials				Percent	Percent
Cyclic:					
Production	57,978	58,452	101,175	74.5	73.1
Sales	47,285	46,809	83,565	76.7	78.5
Sales value	52,866	134,628	137,239	159.6	1.9
Acyclic:					
Production	53,558	91,964	88,271	64.8	-4.0
Sales	49,311	60,756	56,656	14.9	-6.8
Sales value	40,495	72,473	74,565	84.1	2.9
6. Plastics and Resin Materials					
Cyclic:					
Production	5,033,497	10,802,389	11,819,919	134.8	9.4
Sales	4,224,121	9,444,644	10,103,322	139.1	7.0
Sales value	1,036,940	4,275,111	4,969,197	379.2	16.2
Acyclic:					
Production	8,759,452	23,820,652	27,057,873	208.9	13.6
Sales	7,753,242	20,354,360	23,423,832	202.1	15.1
Sales value	1,635,690	6,606,712	7,380,227	351.2	11.7
7. Rubber-Processing Chemicals					
Cyclic:					
Production	220,139	335,549	325,001	47.6	-3.1
Sales	169,970	202,251	200,514	17.8	-0.9
Sales value	116,318	248,756	258,254	122.0	3.8
Acyclic:					
Production	43,994	46,464	40,802	-7.3	-12.2
Sales	30,878	35,833	27,935	-9.5	-22.0
Sales value	15,477	29,009	28,811	86.2	-0.7
8. Elastomers (Synthetic Rubber)					
Cyclic:					
Production	2,297,637	3,449,123	3,209,951	39.7	-6.9
Sales	1,940,099	2,157,680	1,760,624	-9.3	-18.4
Sales value	439,530	760,128	551,299	25.4	-27.5
Acyclic:					
Production	1,524,908	2,364,113	2,551,190	67.3	7.9
Sales	1,321,945	2,019,749	1,879,749	42.2	-6.9
Sales value	434,657	1,180,132	1,323,807	204.6	12.2
9. Plasticizers					
Cyclic:					
Production	929,871	1,407,084	1,781,612	91.6	26.6
Sales	865,084	1,390,319	1,470,534	70.0	5.8
Sales value	167,827	474,781	539,216	221.3	13.8
Acyclic:					
Production	332,908	384,956	304,172	-8.6	-21.0
Sales	296,767	277,308	277,035	-6.6	-0.1
Sales value	93,142	157,549	163,684	75.7	3.9
10. Surface-Active Agents					
Cyclic:[3]					
Production	1,418,444	989,564	1,099,120	-22.5	11.1
Sales	852,238	469,432	570,987	-22.5	21.6
Sales value	95,810	200,244	228,476	138.5	14.1
Acyclic:					
Production	2,060,851	3,728,608	3,638,733	76.6	-2.4
Sales	897,786	2,045,151	2,137,048	138.0	4.5
Sales value	220,877	674,778	737,184	233.8	9.2

See footnotes at end of table.

TABLE 2.--SYNTHETIC ORGANIC CHEMICALS: SUMMARY OF U.S. PRODUCTION AND SALES OF INTERMEDIATES AND FINISHED PRODUCTS, 1967, 1977, AND 1978--CONTINUED

[Production and sales in thousands of pounds; sales value in thousands of dollars]

CHEMICAL	1967[1]	1977	1978	Increase, or decrease (-)	
				1978 over 1967	1978 over 1977
11. Pesticides and Related Products				*Percent*	*Percent*
Cyclic:					
Production	823,158	829,537	795,836	-3.3	-4.1
Sales	681,532	691,136	747,054	9.6	8.1
Sales value	627,742	1,664,008	1,897,623	202.3	14.0
Acyclic:					
Production	226,505	557,932	620,648	174.0	11.2
Sales	215,831	571,821	553,057	156.2	-3.3
Sales value	159,301	1,144,265	1,143,579	617.9	-0.1
12. Miscellaneous End-Use Chemicals and Chemical Products[4]					
Cyclic:					
Production	(1,535,922)	2,761,320	4,002,939	160.6	145.0
Sales	(775,540)	2,213,649	1,221,617	57.5	-44.8
Sales value	(283,575)	1,479,800	718,464	153.4	51.4
Acyclic:					
Production	(58,159,771)	16,586,612	16,586,394	-71.5	0.0
Sales	(25,225,631)	8,641,594	10,476,649	-58.5	21.2
Sales value	(3,192,119)	1,067,681	1,994,612	-37.5	86.8
13. Miscellaneous Cyclic and Acyclic Chemicals[4]					
Cyclic:					
Production	...	2,076,136	2,269,712	...	9.3
Sales	...	[2]1,044,011	1,132,491	...	8.5
Sales value	...	[2]663,163	734,434	...	10.7
Acyclic:					
Production	...	84,891,933	89,831,332	...	5.8
Sales	...	37,709,300	37,802,542	...	0.2
Sales value	...	7,255,919	7,847,229	...	8.1

[1] Standard reference base period for Federal Government general-purpose index numbers.
[2] Revised 1977.
[3] Includes ligninsulfonates.
[4] Items in these two sections were previously included in the section named miscellaneous chemicals.

The following tabulation shows, by chemical groups, the number of companies that reported production in 1978 of one or more of the chemicals included in the groups listed in table 2:

Chemical group	*Number of companies*	*Chemical group*	*Number of companies*
Cyclic intermediates	162	Rubber-processing chemicals	26
Dyes	40	Elastomers (synthetic rubber)	30
Organic pigments	37	Plasticizers	57
Medicinal chemicals	95	Surface-active agents	166
Flavor and perfume materials	42	Pesticides and related products	83
Plastics and resin materials	247	Miscellaneous end-use chemicals and chemical products	133
		Miscellaneous cyclic and acyclic chemicals	269

STATISTICAL HIGHLIGHTS

Cynthia B. Foreso

Tar

Coal tar is produced chiefly by the steel industry as a byproduct of the manufacture of coke; water-gas tar and oil-gas tar are produced by the fuel-gas industry. Production of coal tar, therefore, depends on the demand for steel; production of water-gas tar and oil-gas tar reflects the consumption of manufactured gas for industrial and household use. Water-gas and oil-gas tars have properties intermediate between those of petroleum asphalts and coal tar. Petroleum asphalts are not usually considered to be raw materials for chemicals.

The quantity of coal tar produced in the United States in 1978 amounted to 540 million gallons (see table 1). Production in 1978 was 8.8 percent less than the 593 million gallons of coal tar produced in 1977. Sales of coal tar in 1978 amounted to 295 million gallons compared with 292 million gallons in 1977. U.S. production of water-gas and oil-gas tars was not reported to the Commission for 1977 or 1978; production of these tars in 1968 amounted to 21 million gallons, according to trade publications.

Tar Crudes

Tar crudes are obtained from coke-oven gas and by distilling coal tar, water-gas tar, and oil-gas tar. The most important tar crudes are benzene, toluene, xylene, creosote oil, and pitch of tar. Some of these products are identical with those obtained from petroleum. Data for materials obtained from petroleum are included, for the most part, with the statistics for like materials obtained from coke-oven gas and tars, and are shown in tables 1 and 1B.

Domestic production of industrial and specification grades of benzene reported by coke-oven operators and petroleum refinery operators in 1978 amounted to 1,488 million gallons--3.7 percent more than the 1,435 million gallons reported for 1977. These statistics include data for benzene produced from light oil and petroleum. Sales of benzene by coke-oven operators and petroleum refiners in 1978 amounted to 757 million gallons compared with 659 million gallons in 1977. In 1978 the output of toluene (including material produced for use in blending in aviation fuel) amounted to 1,054 million gallons--3.6 percent more than the 1,018 million gallons reported for 1977. Sales of toluene (Nitration grade, 1°) in 1978 were 695 million gallons compared with 457 million gallons in 1977. The output of xylene in 1978 (including that produced for blending in motor fuels) was 845 million gallons, compared with 811 million gallons in 1977. Over 99 percent of the 845 million gallons of xylene produced in 1978 was obtained from petroleum sources. Sales of xylene increased slightly to 446 million gallons in 1978 compared with 426 million gallons in 1977.

Production and sales figures on crude naphthalene from coal-tar oils in 1978 could not be published without disclosing the operations of individual companies. Production of petroleum-derived naphthalene in 1978 amounted to 157 million pounds, compared with 151 million pounds in 1977. Production figures on road tar for 1978 cannot be published; in 1972 production amounted to 30 million gallons.

Some of the products obtained from tar and included in the statistics in table 1 are obtained from other products for which data are also included in the table. The statistics, therefore, involve considerable duplication, and for this reason no group totals or grand totals are given.

Data for 1978 tar crudes were supplied by 8 companies and company divisions.

TABLE 1.--TAR AND TAR CRUDES: U.S. PRODUCTION AND SALES, 1978

[Listed below are all tar crudes for which any reported data on production or sales may be published, (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 Lists separately all products for which data on production and/or sales were reported and identifies the manufacturers of each]

TAR AND TAR CRUDES	UNIT OF QUANTITY	PRODUCTION	SALES		
			QUANTITY	VALUE	UNIT VALUE[1]
				1,000 dollars	
Coal tar:[2] Coke-oven operators	1,000 gal	540,452	294,672	...	...
Crude light oil:[3] Coke-oven operators	1,000 gal	164,744	102,810	...	...
Light-oil distillates:					
Benzene, all grades, total[4]	1,000 gal	1,488,429	756,922	558,389	$0.74
Coke-oven operators	1,000 gal	53,472	54,143	[5]40,066	.74
Petroleum refiners[6]	1,000 gal	1,434,957	702,779	518,323	.74
Toluene, all grades, total[4]	1,000 gal	1,053,962	694,508	382,109	.55
Coke-oven operators	1,000 gal	7,855	8,103	[5]4,700	.58
Petroleum refiners	1,000 gal	1,046,107	686,405	377,409	.55
Xylene, all grades, total[4]	1,000 gal	845,216	445,602	250,283	.56
Coke-oven operators	1,000 gal	1,434	1,514	[5]848	.56
Petroleum refiners	1,000 gal	843,782	444,088	249,435	.56
Solvent naphtha:[3] Coke-oven operators	1,000 gal	1,476	1,485	...	...
Crude tar-acid oils:[3] Coke-oven operators	1,000 gal	13,858	3,533	...	...
Creosote oil (Dead oil) (tar distillers)[7] (100% creosote basis), total	1,000 gal	86,304	62,557	...	...
Distillate as such (100% creosote basis)	1,000 gal	51,343	36,285	22,959	.63
Creosote content of coal tar solution (100% creosote basis)	1,000 gal	34,961	26,272	([8])	([8])
Tar, refined, for uses other than road tar	1,000 gal	17,854	14,357	10,903	.76
Pitch of tar (tar distillers)[7], total	1,000 tons	874	816	121,395	148.77
Hard (water softening point above 160° F)	1,000 tons	670	612	89,545	146.32
Other[9]	1,000 tons	204	204	31,850	156.13

[1]Unit value per gallon or ton as specified.

[2]Includes only data for coal tar reported to the Office of Energy Data and Interpretation, Energy Information Administration, Department of Energy (Energy Data Reports, Coke & Coal Chemicals, in December, 1978, February, 1979). At date of publication, sales value for coal tar was not available. Data on U.S. production of water-gas tar and oil-gas tar are not collected by the U.S. International Trade Commission, but according to trade publications, production of these tars amounted to 21 million gallons in 1968.

[3]Data reported by tar distillers are not included because publication would disclose the operations of individual companies. At date of publication, sales value for coke-oven operators was not available.

[4]Includes data for material produced for use in blending motor fuels. The annual production statistics for petroleum refiners on benzene, toluene, and xylene are not comparable with the combined monthly production figures because of fiscal year revisions.

[5]Sales value figures are estimated from Energy Data Reports, Coke & Coal Chemicals, in December, 1978, February, 1979.

[6]Benzene, specification grades (1°, 2°) only.

[7]Data from coke-oven operators was unavailable at time of publication.

[8]In 1978, production of coal-tar solution containing creosote (100% colution basis) amounted to 46,937 thousand gallons; sales were 34,411 thousand gallons, valued at 21,557 thousand dollars, with a unit value of $0.63 per gallon.

Footnotes--Continued

[9]Includes pitch emulsion, medium and soft pitch.

Note 1.--Statistics for materials produced in coke and gas-retort ovens are compiled by the Office of Energy Data and Interpretation, Energy Information Administration, Department of Energy. Statistics for materials produced in tar and petroleum refineries are compiled by the U.S. International Trade Commission.

Note 2.--Data for all other tars and tar crudes are not included in 1978 report because publication would disclose the operation of individual companies. Preliminary coke-oven operators data was obtained from cumulative totals reported in Energy Data Reports, Coke & Coal Chemicals in December, 1978, February, 1979, as the annual publication data was not available to include in this report.

TABLE 1A.--TAR: U.S. PRODUCTION AND CONSUMPTION, 1977 AND 1978

(In thousands of gallons)

TAR	1977	1978
PRODUCTION		
Coal tar from coke-oven byproduct plants, total[1]	592,935	540,452
CONSUMPTION		
Total	([2])	([2])
Tar consumed by distillation, total	([2])	([2])
Coal tar distilled or topped by coke-oven operators[1]	([2])	([2])
Coal tar and oil-gas tar distilled by tar distillers[3]	275,287	277,079
Tar consumed by the producers chiefly as fuel[1]	([2])	([2])
Coal tar consumed at coke-oven plants in miscellaneous uses[1]	([2])	([2])

[1]Reported to the Office of Energy Data and Interpretation, Energy Information Administration, Department of Energy.

[2]Department of Energy data were not available at time of publication.

[3]Reported to the U.S. International Trade Commission. Represents tar purchased from companies operating coke-ovens and gas-retort plants and distilled by companies operating tar-distillation plants. Statistics also include tar consumed other than by distillation by tar distillers.

TABLE 1B.--TAR AND TAR CRUDES: SUMMARY OF U.S. PRODUCTION OF SPECIFIED PRODUCTS, 1967, 1977, AND 1978

TAR AND TAR CRUDES	UNIT OF QUANTITY	1967[1]	1977	1978	INCREASE, OR DECREASE (-) 1978 OVER 1967	1978 OVER 1977
					Percent	*Percent*
Coal tar[2]	1,000 gal	780,334	592,935	540,452	-30.7	-8.9
Benzene:[3]						
Coke-oven operators	1,000 gal	90,642	64,571	53,472	-41.0	-17.2
Petroleum refiners	1,000 gal	878,704	1,371,176	1,434,957	63.3	4.7
Total	1,000 gal	969,346	1,435,747	1,488,429	53.5	3.7
Toluene:[3]						
Coke-oven operators	1,000 gal	19,357	9,618	7,855	-59.4	-18.3
Petroleum refiners	1,000 gal	[4]624,454	1,007,928	1,046,107	67.5	3.8
Total	1,000 gal	643,811	1,017,546	1,053,962	63.7	3.6
Xylene:[3]						
Coke-oven operators	1,000 gal	5,488	1,706	1,434	-73.9	-15.9
Petroleum refiners	1,000 gal	[4]449,349	809,349	843,782	87.8	4.3
Total	1,000 gal	454,837	811,055	845,216	85.8	4.2
Naphthalene:						
Crude[5]	1,000 lb	520,991	([6])	([6])	([6])	([6])
Petroleum naphthalenes, all grades	1,000 lb	376,679	150,737	156,801	-58.4	4.0
Total	1,000 lb	897,670	([6])	([6])	([6])	([6])
Creosote oil (Dead oil):[7]						
Distillate as such (100% creosote basis)	1,000 gal	108,832	[8]47,033	[8]51,343	([9])	([9])
Creosote content of coal tar solution (100% creosote basis)	1,000 gal	17,402	[8]36,019	[8]34,961	([9])	([9])
Total	1,000 gal	126,234	[8]83,052	[8]86,304	([9])	([9])

[1] Standard reference base period for Federal Government general-purpose index numbers.

[2] Includes only data for coal tar reported to the Office of Energy Data and Interpretation, Energy Information Administration, Department of Energy.

[3] Data reported by tar distillers are not included because publication would disclose the operations of individual companies.

[4] Includes data for material produced for use in blending motor fuels. Statistics are not comparable with monthly figures which include some o-xylene.

[5] Naphthalene solidifying at less than 79° C. Figures include production by tar distillers and coke-oven operators and represent combined data for the commercial grades of naphthalene. Beucase of conversion between grades, the figures may include some duplication. Statistics on naphthalene refined from domestic crudes are reported in the section on "Cyclic Internatiates."

[6] Statistics for 1977 and 1978 cannot be published; to do so would disclose the operations of individual companies.

[7] Includes data for creosote oil produced by tar distillers and coke-oven operators and used only in wood preserving.

[8] Includes data for creosote oil produced by tar distillers only in wood preserving.

[9] Comparison not possible because 1978 data from the Department of Energy was not available at time of publication for inclusion in report.

TABLE 2.--TAR CRUDES FOR WHICH U.S. PRODUCTION OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURERS, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED WITH AN ASTERISK (*); CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHWON BELOW ARE TAKEN FROM TABLE 3]

TAR CRUDES	MANUFACTUFERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
Light-oil distillates:	
*Solvent naphtha[1]	NEV.
Pyridine, crude bases	KPT.
Naphthalene, crude, solidifying at:	
Less than 74° C	COP.
74° C. to less than 79° C.:	
74° C. to less than 76° C	ASC, KPT.
76° C. to less than 79° C	ASC, KPT.
Methylnaphthalene	KPT.
*Crude tar-acid oils:[1]	
Tar-acid content 5% to less than 24%	KPT.
Tar-acid content 24% to 50%	ASC.
Cresylic acid, crude	FER, KPT.
*Creosote oil (Dead oil):	
*Distillate as such	ASC, COP, KPT, RIL, WTC.
*Creosote in coal tar solution	ASC, KPT, RIL, WTC.
All other distillate products:	
Carbon black oil	KPT.
Creosote tar acid oil	KPT.
Crude coal tar solvent	KPT.
Crude tetralin	KPT.
Priming and refractory oil	KPT.
All other	ASC, KPT.
Tar, road	ASC, KPT, RIL.
Tar for other uses:	
Crude	RIL.
*Refined	ASC, KPT, RIL.
*Pitch of tar:	
Soft (water softening point less than 110° F.)	ASC, KPT.
Medium (water softening point 110° F. to 160° F.)	ASC, COP, KPT, RIL.
*Hard (water softening point above 160° F.)	ASC, KPT, RIL, WTC.
Pitch emulsion	JEN.
Refined anthracene	ASC.

[1]Does not include manufacturers' identification codes for producers who report to the Office of Energy Data and Interpretation, Energy Information Administration, Department of Energy. Those producers are listed in the U.S. Department of Energy, Energy Data Report, Sept. 15, 1978, entitled "Coke Producers in the United States in 1977".

TABLE 3.--TAR AND TAR CRUDES: DIRECTORY OF MANUFACTURERS, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of tar and tar crudes to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in Table 2]

Code	Name of company	Code	Name of company
ASC	Allied Chemical Corp., Semet-Solvay Div.	KPT.	Koppers Co., Inc. & Roads Materials Div.
COP	Coopers Creek Chemical Corp.	NEV	Neville Chemical Co.
FER	Ferro Corp., Productol Chemical Div.	RIL	Reilly Tar & Chemical Corp.
JEN	Jennison-Wright Corp.	WTC	Witco Chemical Corp.

Note.--Complete names and addresses of the above reporting companies are listed in Table 1 of the appendix.

PETROCHEMICALS AND THE GASOLINE MARKET

Louis N. DeToro

"Primary products" derived from petroleum and natural gas are the raw material inputs for nearly every synthetic organic chemical. Some 25 percent of these primary products consist of benzene, toluene, and xylenes (so-called "aromatic" petrochemicals). About 65 percent of the primary products is aliphatic hydrocarbons such as ethylene, propylene, and butadiene. The remainder consists of naphthenes and miscellaneous petrochemicals such as butanes and cyclohexane.

Seventy-five companies produced primary products in 1978. The producers are oil companies and chemical companies, including some of the largest firms in both categories. It is not unusual for any of these large oil refiners or chemical companies to have the capacity to produce from 50 to 200 million gallons per year of a large volume primary petrochemical, such as benzene or ethylene.

Production of primary products from petroleum and natural gas in 1978 was about 129 billion pounds (table A), representing an average rate of increase of 7.2 percent per year since 1973. Sales quantities have grown from 50 billion pounds in 1973 to over 64 billion pounds in 1978, representing an average rate of increase of 5.1 percent per year. The difference in the growth rates indicates an increase in the relative share of captive consumption of the primary products being used to make other petrochemicals.

The primary products price index[1] more than doubled from 1973 to 1974 (table A), which was expected given the quadrupling of crude oil prices during that period. Employee wages contribute a relatively small part to the price increases in this capital-intensive industry. Since 1974, the price index has continued to increase, albeit at a much slower pace than that which occurred during the 1973-74 period of the Arab oil embargo. Preliminary estimates for 1978 indicate an increase of about 5 percent per year[2] in producer prices since 1974. Surprisingly, primary product price increases have been smaller than those of wholesale manufactured goods prices in general, and the price index for chemicals and allied products as a whole, since 1974.

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[1]This price index for primary products, as discussed herein, is based on selected individual chemicals which compose 60 percent of the value of sales of all primary products, i.e., benzene, butadiene, ethylene, propylene, tetra- and tripropylene, toluene, cumene, cyclohexane, o-xylene, p-xylene, and styrene monomer.

[2]This figure is supported by the 8.2 percent per year rise in petroleum refiners' costs for acquiring crude oil for the same period, coupled with the two-thirds passthrough indicative of crude oil cost increases passed on to the primary products producers.

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Of the primary products from petroleum and natural gas, the aromatics are among the most consequential, both as petrochemical building blocks and as fuel additives. These chemicals, benzene, toluene, and xylenes, and their markets are the subject of the remainder of this paper.

Aromatics and the Gasoline Market

The use of aromatics--benzene, toluene, and xylenes (BTX)[1]--as gasoline components as well as petrochemicals is a matter of serious concern to the chemical industry now that the energy shortage is likely to continue. Aromatics' primary use is in lead-free gasoline in which they are essential to improve the antiknock rating. The chemical industry fears that it might be denied BTX supply in a future period of gasoline shortage.

BTX are derived mainly from petroleum refinery streams[2] and pyrolysis gasoline[3] obtained during the manufacture of olefins such as ethylene. Benzene is also made by the hydrodealkylation (HDA) of toluene.[4] A minor source of aromatics is coal tar, a byproduct of coke-oven operations. Consisting of about one-quarter of the tonnage of raw materials from synthetic organic chemicals, aromatics are vital to the production of synthetic fibers, plastics, drugs, and other synthetic organic chemicals (i.e., petrochemicals). While irreplaceable in a number of chemical end uses, the high-octane rating of BTX also makes their use as an octane-raising component in gasoline extremely important, as noted in the following list of octane ratings of gasoline components:

Gasoline components	Research Octane No. (RON)
Tertiary-butyl alcohol (TBA)	108
Methyl tertiary-butyl ether (MTBE)	115
Benzene	106
Toluene	110
Xylene	114
Straight-run gasoline	70
Catalytic cracker gasoline	92

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[1]Benzene (C_6H_6) is a clear, colorless, flammable liquid of a characteristic odor (hence "aromatic") and it is both narcotic and toxic (which limits its use in gasoline). Toluene ($C_6H_5CH_3$) is a colorless, flammable liquid with a benzene- like odor. As compared with benzene, its vapors are less dangerously toxic and less flammable; it also has a lower rate of evaporation. Xylenes ($C_6H_4(CH_3)_2$) are a commercial mixture of 3 isomers, ortho-, meta-, and para-xylenes. The mixture is a clear liquid, toxic, and flammable.

[2]In refining petroleum, several products are extracted. Among these products is a stream known as catalytic reformate, of which aromatics are a part.

[3]"Pyrolysis" is the breaking down of complex materials into simpler units by use of heat. Pyrolysis gasoline is produced in steam-cracking operations during the manufacture of olefins from heavier feedstocks.

[4]Hydrodealkylation is a petroleum refining process by which hydrogen under pressure is used to convert the hydrocarbons in heavy reformates, catalytic cracking recycle stocks, or other streams of hydrocarbons, into other chemicals.

Aromatics for gasoline are contained in reformate itself (an integral part of oil refinery output) and also come from BTX which are separated from reformate and blended back into the gasoline "pool." This pool includes both petroleum and natural-gas liquid mixtures. About 20 percent of the pool is straight-run gasoline, natural-gas liquids, and other low-octane stocks; 40 percent is petroleum fractions resulting from other refinery operations such as catalytic cracking, hydrocracking, and isomerization (such fractions are of slightly higher octane ratings but still too low to run a modern gasoline engine efficiently);[1] 20-plus percent of the gasoline pool is reformate[2] which contains BTX; and the remainder is alkylates[3] and octane-raising compounds, including BTX which has been separated from refinery streams and then blended back into the gasoline pool.

The economics of the use of BTX as an octane-raising component of gasoline is influenced by three major factors: demand for motor gasoline; availability and use of antiknock agents (including substitutes for tetraethyl lead); and demand for BTX in petrochemicals. As stated above, the concern of the chemical industry is that the third named factor may have the lowest priority. Each of these factors is discussed in the following sections.

Demand for motor gasoline

The quantity of BTX which goes to the gasoline pool as an octane-raising agent is related to the nation's demand for motor gasoline, especially the unleaded type. Demand for gasoline in 1978 and 1979 has influenced BTX demand more strongly than any other single factor. Unleaded gasoline now requires a major fraction of BTX to maintain its antiknock rating; its usage in the United States is increasing as older cars are replaced by newer models that require unleaded gas because they are equipped with catalytic converters to decrease air pollution; lead would poison the catalysts in these converters. However, overall gasoline usage may decline somewhat through the early 1980's.

Calculation of recent trends in motor vehicle use, vehicle miles of travel, fuel consumed, and a constructed trend in miles per gallon of fuel consumption, all of which determine motor gasoline demand, show some surprising results. While the number of owned vehicles in the United States has increased, the rate of increase was only 3 percent per year, from 125.7 million to 143.8 million, during the mid-1970's. Vehicle miles of travel increased more than 2 percent

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[1] "Catalytic" gasoline is formed in the presence of certain catalysts. "Cracking" is decomposition by heat, with or without catalysis. "Isomerization" is a process for converting hydrocarbons into compounds whose molecules have a different arrangement of atoms, but the same numbers and kinds of atoms, Condensed Chemical Dictionary.

[2] "Reforming" is the use of controlled heat and pressure to cause cracking and isomerization of hydrocarbons, Condensed Chemical Dictionary.

[3] "Alkylation" is a process used in petrochemical refining which causes the chemical combination of "isoparaffin" hydrocarbons with olefins, such as ethylene, Condensed Chemical Dictionary.

annually to nearly 1.5 trillion miles from 1973 to 1978, and fuel consumed increased at about 2 percent per year to about 120 billion gallons. Fuel consumption figures, combined with numbers of miles driven, indicate that "miles per gallon of fuel" were nearly constant in the mid-70's, rising from 11.84 mpg in 1973 to just over 12 mpg by 1978.[1] An estimate of the declining demand for motor gasoline, based solely upon projected motor vehicle registrations, miles logged, and fuel efficiencies, is as follows:[2]

Projected U.S. motor gasoline demand
(million barrels per day)

1980	7.2
1981	7.1
1982	7.0

Because large amounts of the aromatics are going to the gasoline pool, chemical purchasers of BTX are facing a buying "squeeze." This competitive situation will be only partially eliminated if falling gasoline demand actually occurs in the early 1980's. Further easing of the BTX pinch is possible if the Environmental Protection Agency (EPA) eases restrictions on certain antiknock agents as substitutes for tetraethyl lead.

Availability and use of antiknock agents

There are many different types of antiknock agents, old and new. The traditional antiknock agent is tetraethyl lead (TEL). The present EPA lead limit on the gasoline pool is 0.8 grams per gallon. Since many producers are currently operating under waivers, the actual average is nearly 1.3 grams/gallon. Imposition of a 0.5 grams/gallon limit has been postponed from October 1, 1979, to October 1, 1980.

Methyl tertiary-butyl ether (MTBE), a new product, has a research octane number of 115, making it slightly better than toluene. The problem, however, is lack of present production capacity. New plants, approved by the EPA some time ago, are now due on stream but will add only 0.2 percent to the volume of the unleaded gasoline pool (and have little effect on releasing BTX for petrochemical use).

Tertiary butyl alcohol (TBA) is somewhat worse than toluene as a blend for octane-raising purposes. Moreover, the presently available quantity of TBA is too small to have any significant impact. Ethanol (ethyl alcohol) has a blending octane of about 100. Unfortunately, while much work has been done on "gasohol," a mixture of ethanol and gasoline, it still takes more energy to produce a gallon

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[1]All data are drawn from the Motor Vehicle Manufacturers Association's Motor Vehicle Facts and Figures '78. Figures on miles per gallon of fuel consumed were calculated from raw data.

[2]See appendix to this paper for details on the methodology used in forecasting motor gasoline demand.

of ethanol than it contains.

Most of the BTX blended into gasoline enters as reformate. Toluene, the principal high-ootane ingredient of BTX, has a research octane number of 110 and is the most common standard of comparison.

Methylcyclopentadienyl manganese tricarbonyl (MMT),[1] another newly developed agent, was used in unleaded and leaded gasoline until October 28, 1978, at which time the EPA banned its use in the unleaded gasoline pool. At that time its level of use was 1/16 grams/gallon in unleaded gas. At the expected future level of 1/32 grams/gallon in leaded gasolines, MMT will yield octane-improvement of 0.9 octane numbers; production capacity exists to produce quantities sufficient to fill the requirements of unleaded pools. Thus, if the EPA was to lift its MMT ban in unleaded gasoline, more than 2 billion gallons of toluene could be diverted, theoretically, for petrochemical use. That would be 2.5 times the amount of toluene currently used as a primary petrochemical in the production of synthetic organic chemicals. While there are other measures, such as conservation of gasoline, to free up the BTX necessary for chemical markets, removal of EPA restrictions on other octane improvers, such as MMT, is favored by the industry.

The increasing use of BTX in motor gasoline has caused an increase in contract prices and spiraling spot market prices for benzene in the petrochemical market; and benzene inventories have diminished markedly. Similar price movements have characterized toluene and xylenes. Industry observers are forecasting slower growth in the BTX petrochemical markets, partially owing to supply problems which in turn spring from the increasing market for aromatics in motor gasoline.

Demand for BTX in petrochemicals

Benzene used in gasoline was about 1,650 million gallons per year for the past several years, while production of benzene for chemical conversion in this period was approximately 1,400 million gallons. As a raw material for derivative chemicals, benzene is the major multiple-purpose aromatic. Strong markets exist for ethylbenzene/styrene (in polystyrene plastics), cyclohexane (in nylon), and cumene/phenol (in phenolic resins for construction, automobiles, appliances, and numerous other uses). The most substantial growth of benzene derivatives expected through 1985, however, will be in the aniline market (for urethanes and urethane elastomers which supply insulation for buildings).

Toluene through 1980 is expected to retain steady consumption in the chemical market at 900 million gallons. A much larger part of the total production of toluene will continue to go to the gasoline pool because of toluene's high-octane rating and because it is less carcinogenic than benzene. Currently, toluene's use in gasoline is running at 7.6 billion gallons per year, including material blended back into gasoline after separation.

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[1]About 1 gram of MMT equals 1.73 gallons of toluene as a blendstock.

The xylenes' total use in gasoline is currently 8.1 billion gallons per year while production for chemical conversion is about 860 million gallons.[1] Most of the xylene isomers' use in chemicals is shared between paraxylene and orthoxylene. Orthoxylene is used to make phthalic anhydride; its demand is likely to grow by about 2 percent per year through 1980. Paraxylene should increase at a 7 percent per year rate of growth.[2] Nearly all paraxylene goes to the manufacture of dimethyl terephthalate or terephthalic acid (for use in making polyester fibers).

U.S. exports of BTX in 1978 were 234 million gallons, which amounted to about 7 percent of U.S. production of 3,387 million gallons. U.S. imports of 179 million gallons amounted to about 5 percent of apparent U.S. consumption of BTX (tables B, C, and D). The ratio of exports to imports in 1978 was 1.3. Since 1974, exports have increased while imports have decreased; the ratio of exports to imports in 1974 was only 0.8. This change in the trade pattern is the result of the turmoil in the world energy markets that began with the OPEC oil embargo and price increases of 1973-74.

Prices for all the basic aromatics increased in 1978 and 1979, owing to several factors, mainly higher prices of crude oil and also plant mechanical difficulties. Projected declining demand for gasoline in the early 1980's would alleviate some of the price pressure on BTX. In the interim, however, the buying squeeze is on, with few options available to aromatics purchasers to alleviate a very tight market situation.

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[1] Xylenes as used here is composed of three isomers, ortho-, meta-, and para-xylene. The isomers have the same chemical formula, however, the chemical structure of each isomer is unique.

[2] "Aromatics Seen Entering Slow-Growth Era as Energy, Government Strictures Hobble Trade," Chemical Marketing Reporter, June 12, 1978, p.1.

APPENDIX

The motor gasoline demand extrapolation developed for this paper consists of the following mathematical formula:

$$G_D = \Sigma_v [N_v * MPV_v * (1/MPG_v)] \quad v = t_1, t_2, \ldots, t_n$$

Motor gasoline demand (G_D) is equal to the number of current vehicle registrations (N_v) multiplied by the miles driven per vehicle (MPV_v), yielding total miles logged, which in turn is multiplied by the reciprocal of vehicle miles per gallon ($1/MPG_v$), yielding gallons of motor gasoline demanded. The multiplication process is carried out for each of several vehicle types ($v = t_1, t_2, \ldots, t_n$) and the motor gasoline demanded for each vehicle type is summed (Σ_v) to yield overall demand for motor gasoline.

In this paper, statistics from the Motor Vehicle Manufacturers Association's <u>Motor Vehicle Facts and Figures '78</u> were used to arrive at current and past trends of motor vehicle registrations, miles logged, fuel consumed, and miles per gallon of fuel consumption, Using these trends, projections were made of future values for these factors. Separate gasoline demand forecasts for several vehicle types (cars, lightweight trucks, other trucks, buses, and motorcycles) were calculated and then summed according to the above equation to arrive at projections of total U.S. gasoline demand.

Table A.-- Primary products from petroleum and natural gas for chemical conversion

Item	1973	1974	1975	1976	1977	1978
Production----------million pounds--	91,250	94,353	78,089	[1]112,873	131,133	128,947
Sales:						
Quantity----------million pounds--	49,625	50,222	44,562	[1]59,083	61,008	64,281
Value------------million dollars--	1,451	5,500	2,988	[1]5,489	5,820	6,160
Producer Price Index[2]---------------	100	212	249	276	275	265

[1]Change in classification--some chemicals formerly classified as cyclic intermediates, listed in Section III of this report were transferred to this section beginning in 1976.

[2]Index of aggregate of Bureau of Labor Statistics average annual indexes for selected individual chemicals (benzene, butadiene, ethylene, propylene, tetra- and tri-propylene, toluene, cumene, cyclohexane, o-xylene, p-xylene, and monomeric styrene). These chemicals average more than 60 percent of the total value of the chemicals included in Section II (1973 base).

Source: U.S. International Trade Commission (production and sales data), Bureau of Labor Statistics (price indexes).

Table B --Benzene: U.S. production, imports, exports, and apparent consumption, 1974-78

(In thousands of gallons)

	Production	Imports	Exports	Apparent consumption
1974	1,488,264	102,258	23,454	1,567,068
1975	1,023,913	70,321	30,619	1,063,615
1976	1,425,222	52,523	35,754	1,441,991
1977	1,435,747	61,346	34,759	1,462,334
1978	1,488,429	67,559	45,391	1,510,597

Source: Production data are taken from Synthetic Organic Chemicals, U.S. Production and Sales. Data on imports and exports are official statistics of the U.S. Department of Commerce.

Table C --Toluene: U.S. production, imports, exports, and apparent consumption, 1974-78

(In thousands of gallons)

	Production	Imports	Exports	Apparent consumption
1974	921,959	54,477	71,940	904,496
1975	705,067	70,321	116,492	658,896
1976	998,976	39,298	143,935	894,339
1977	1,017,546	65,503	159,706	923,343
1978	1,053,962	58,364	110,992	1,001,334

Source: Production data are taken from Synthetic Organic Chemicals, U.S. Production and Sales. Data on imports and exports are official statistics of the U.S. Department of Commerce.

Table D.--Xylenes 1/: U.S. production, imports, exports, and apparent consumption, 1974-1978

(In thousands of gallons)

	Production	Imports	Exports	Apparent consumption
1974	802,111	61,651	47,985	815,777
1975	639,099	35,711	66,523	608,287
1976	722,014	36,409	80,199	678,224
1977	811,055	32,150	80,290	762,915
1978	845,216	52,547	77,233	820,530

1/ Mixed xylenes only (i.e., does not include isomers separately).

Source: Production data are taken from Synthetic Organic Chemicals, U.S. Production and Sales. Data on imports and exports are official statistics of the U.S. Department of Commerce.

II--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS

PETROCHEMICALS AND THE GASOLINE MARKET

Louis N. DeToro

Primary products that are derived from petroleum and natural gas[1] are related to the intermediates and finished products made from such primary materials in much the same way that crude products derived from the distillation of coal tar are related to their intermediates and finished products. Many of the primary products derived from petroleum are identical with those derived from coal tar (e.g., benzene, toluene, and xylene). Considerable duplication exists in the statistics on the production and sales of primary petroleum products because some of these primary chemicals are converted to other primary products derived from petroleum and because data on some production and sales are reported at successive stages in the conversion process. The statistics are sufficiently accurate, however, to indicate trends in the industry. Many of the primary products for which data are included in the statistics may be used either as fuel or as basic materials from which other chemicals are derived. In this report every effort has been made to exclude data on materials that are used as fuel; however, data are included on toluene and xylene which are used in blending aviation and motor fuel.

The output of primary products derived from petroleum and natural gas as a group amounted to 128,947 million pounds in 1978. Production in 1977 was 131,133[2] million pounds. The output of aromatic and naphthenic products from petroleum amounted to 54,638 million pounds in 1978, compared with 52,263 million pounds in 1977. Sales amounted to $2,663 million in 1978 and $2,469 million in 1977. Production of benzene, toluene, and xylene from petroleum increased marginally in 1978, while the unit values of these products remained within one cent per pound of last year's unit values (table 1).

Production of all aliphatic hydrocarbons and derivatives from petroleum and natural gas was 74,308 million pounds in 1978, compared with 78,870 million pounds in 1977. Sales of these products were valued at $3,497 million in 1978, compared with $3,351 million in 1977. Production of ethylene was 25,955 million pounds in 1978--2.1 percent more than the 25,426 million pounds reported in 1977. The output of 1,3-butadiene in 1978 (3,515 million pounds) increased from the production in 1977 (3,259 million pounds).

Data for 1978 crude products from petroleum and natural gas for chemical conversion were supplied by 75 companies or company divisions.

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[1] Statistics on chemicals from coal tar are given in Section I (Tar and Tar Crudes) of this report.

[2] Revised figure for 1977.

TABLE 1.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION: U.S. PRODUCTION AND SALES, 1978

[Listed below are the primary products from petroleum and natural gas for chemical conversion for which any reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists separately all primary products from petroleum and natural gas for chemical conversion for which data on production and/or sales were reported and identifies the manufacturers of each]

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Grand total	128,946,708	64,281,228	6,159,507	$0.096
AROMATICS AND NAPHTHENES[2]				
Total	54,638,320	27,293,434	2,662,844	.098
Benzene (1° and 2°)	10,503,883	5,144,345	518,323	.101
Cumene	3,380,322	1,579,161	174,249	.110
Cyclohexane	2,331,665	2,194,849	245,860	.112
Dicyclopentadiene (including cyclopentadiene)	60,060	53,064	5,020	.095
Ethylbenzene	8,385,482	365,102	38,616	.106
Naphthalene, all grades	156,801	84,642	13,234	.156
Naphthenic acid	26,253	21,740	3,021	.139
Styrene	7,186,193	2,882,387	500,786	.174
Toluene, all grades, total	7,542,434	4,948,978	377,409	.076
Nitration grade, 1°	5,288,631	3,654,158	279,145	.076
Pure commercial grade, 2°	896,976	838,988	63,935	.076
All other[3,4]	1,356,827	455,832	34,329	.075
Xylenes, mixed, total	6,412,745	3,375,066	249,435	.074
3° grade	2,858,247	1,183,012	85,149	.072
5° grade	2,568,433	1,534,991	112,498	.073
All other[4]	986,065	657,063	51,788	.079
o-Xylene	1,013,131	939,180	103,775	.110
p-Xylene	3,515,869	2,178,563	269,139	.124
All other aromatics and naphthenes[5]	4,123,482	3,526,357	163,977	.047
ALIPHATIC HYDROCARBONS				
Total	74,308,388	36,987,794	3,496,663	.095
C_2 Hydrocarbons, total	32,307,965	12,974,344	1,295,604	.100
Acetylene[6]	245,670	...	...	...
Ethane	6,107,668	4,190,167	199,980	.048
Ethylene	25,954,627	8,784,177	1,095,624	.125
C_3 Hydrocarbons, total	21,470,274	13,613,803	949,721	.070
Propane	8,456,745	7,933,845	423,193	.053
Propylene[7]	13,013,529	5,679,958	526,528	.093
C_4 Hydrocarbons, total	10,080,601	5,746,708	759,638	.132
Butadiene and butylene fractions	482,789	261,011	50,984	.195
1,3-Butadiene, grade for rubber (elastomers)	3,515,206	2,505,025	486,944	.194
n-Butane	2,058,513	960,876	48,293	.050
1-Butene	91,655	75,867	13,793	.182
1-Butene and 2-Butene, mixed[8]	1,162,931	817,826	58,410	.071
Isobutane	1,201,118	208,080	13,471	.065
Isobutylene, 2-butene and mixed butylenes	909,301	597,712	65,925	.110
All other[9]	659,088	320,311	21,818	.068
C_5 Hydrocarbons, total	3,234,022	698,329	62,472	.089
Amylenes and pentenes	159,595	105,436	13,675	.130

See footnotes at end of table.

TABLE 1.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION: U.S. PRODUCTION AND SALES, 1978--CONTINUED

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
ALIPHATIC HYDROCARBONS--Continued	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
C_5 Hydrocarbons--Continued				
Isoprene (2-Methyl-1,3-butadiene)	184,117	116,969	18,195	$0.156
All other[10]	2,890,310	475,924	30,602	.064
All other aliphatic hydrocarbons, derivatives, and mixtures, total	7,215,526	3,954,610	429,228	.108
Alpha olefins[11]	492,332	399,711	92,160	.231
Dodecene (Tetrapropylene)	359,705	97,144	12,018	.124
Heptenes, mixed	97,495	54,930	5,526	.101
Hexane	439,287	337,131	31,971	.095
Hydrocarbon derivatives[12]	389,591	...	...	...
Nonene (Tripropylene)	431,525	283,539	30,805	.109
n-Paraffins, total[13]	1,461,708	1,149,664	83,635	.073
All other[14]	3,543,883	1,623,491	173,113	.106

[1]Calculated from rounded figures.

[2]The chemical raw materials designated as aromatics are in some cases identical with those obtained from the distillation of coal tar; however, the statistics given in the table above relate only to such materials as are derived from petroleum and natural gas. Statistics on production and/or sales of benzene, toluene, and xylene from all sources are given in table 1 and 1B of the report on "Tar and Tar Crudes."

[3]Includes toluene, solvent grade, 90 percent.

[4]Includes toluene and xylene used as solvents, as well as that which is blended in aviation and motor gasolines.

[5]Includes data for alkyl aromatics, crude cresylic acid, refined cresylic acid, cyclohexene, cyclopentane and methylcyclopentane, crude sodium carbonate and phenate, meta-xylene, distillates, solvents, and miscellaneous cyclic hydrocarbons.

[6]Production figures for acetylene from calcium carbide for chemical synthesis are collected by the U.S. Bureau of the Census.

[7]Includes data for refinery propylene.

[8]The statistics represent principally the butene content of crude refinery gases from which butadiene is manufactured.

[9]Includes data for butanes, mixed C_4 streams.

[10]Includes data for C_5 hydrocarbon mixtures, dibutanized aromatic concentrate, pentanes, and piperylenes.

[11]Includes data for the following molecular weight ranges: C_6-C_7; C_8-C_{10}; C_{11}-C_{15}; C_{15}-C_{20}; and C_{16}-C_{18}.

[12]Includes data for methyl, ethyl, propyl, butyl, octyl, nonyl, decyl, hexadecyl, and miscellaneous mercaptans, and other hydrocarbon derivatives.

[13]Includes data for the following chain lengths: C_6-C_9; C_9-C_{15}; C_{10}-C_{14}; C_{10}-C_{16}; and others.

[14]Includes production and/or sales data for cyclooctadiene, di-isobutylene, di-isopropyl, dodecene, eicosane, methane, methyl acetylene propadiene, methylcyclopentadiene, mixtures of C_2 and C_3, C_5 and C_6, C_5 and C_7, C_5 and C_9, and C_6 and C_7 hydrocarbons, neohexane, n-heptane, polybutene, propylene tetramer, triisobutylene, and other hydrocarbons.

TABLE 2.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*); CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT]

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
AROMATICS AND NAPHTHENES	
ALKYL AROMATICS:	
Cyclosols	SHC.
Alkyl aromatics: all other	AMO.
*BENZENE:	
Benzene 1º (99-100 %)	AMO, APR, ASH, ATR, CCP, CPI, CSD, CSO, CSP, EKX, ENJ, GOC, GRS, HES, MOC, MON, PLC, PPR, QH, SHC, SKO, SM, SOG, SUN, SWR, TID, TOC, TX, UCC, UOC.
Benzene 2º (98-98.9%)	DOW, SOC.
Cresylic acid (Less than 75 percent distilling over 215°C)	FER.
Cresylic acid, refined	ATR, ENJ.
*Cumene (Isopropyl benzene)	AMO, ASH, CLK, CSP, DOW, GOC, GP, MOC, MON, SHC, SKO, SOC, SUN, TX, UCC.
*Cyclohexane	CSD, ENJ, GOC, GRS, PLC, PPR, SUN, SWC, TX, UOC.
Cyclohexene (Tetrahydrobenzene)	PLC, USR.
Cyclopentane	PLC.
Dicyclopentadiene (Including cyclopentadiene)	DOW, ENJ, GOC, MON.
*Ethylbenzene	AMO, ATR, CSD, DOW, ELP, GOC, HST, KPP, MCB, MON, OXI, SOG, SUN, TOC, UCC.
Methylcyclopentane	PLC.
*Naphthalene	ASH, MON, TID, UOC.
*NAPHTHENIC ACID:	
Naphthenic acid, acid number 150-199	FER, GOC, SOC, SUN.
Naphthenic acid, acid number 200-224	FER.
Naphthenic acid, acid number less than 150	ATR, SUN, TX.
Petroleum phenols	SKO.

TABLE 2.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
AROMATICS AND NAPHTHENES--Continued	
Sodium carbolate and phenate, crude	ATR.
*Styrene (Vinylbenzene)	AMO, CSD, DOW, ELP, GOC, HST, KPP, MCB, MON, OXI, SHC, SUN, TX, UCC.
*TOLUENE ALL GRADES, TOTAL:	
*Toluene, 1° (99.5-100%)	ASH, ATR, CPI, CSD, ENJ, GOC, GRS, KPP, MOC, MON, PLC, PPR, QH, SHC, SKO, SOG, SUN, SWR, TCC, TOC, TX, UCC, UOC.
*Toluene, 2° (98.5-99.4%)	ATR, DOW, ELP, HES, SUN.
*Toluene, 90-98.4% (Non-fuel)	CSP, HST, MON, PPR, PPX, SKO, SM.
*XYLENES, MIXED:	
*Xylene, 3° (99-100%)	AMO, CCP, CPI, CSO, SHC, SWR, UCC.
*Xylene, 5° (98-98.9 %)	ATR, CSD, ENJ, GOC, GRS, HCF, HES, MOC, PPR, QH, SOC, SOG, UOC.
*Xylene, 90-97.9% (Non-fuel)	AMO, ASH, CSP, MON, SUN, TOC.
*o-Xylene (90-100% Of o-xylene isomer)	ATR, CPI, ENJ, MON, PPR, SHC, SUN, TOC.
m-Xylene (90-100% Of m-xylene isomer)	AMO.
*p-Xylene (90-100% Of p-xylene isomer)	AMO, ATR, ENJ, HCR, PLC, PPX, SHC, SOC, SOG, STX, SUN, TOC.
ALL OTHER AROMATICS AND NAPHTHENES:	
Carbon black feedstock	ENJ.
Hydrocarbon polymer	JCC.
Polyethylbenzene	HST.
All other products from petroleum and natural gas, cyclic	AMO, CPI, DOW, EKX, ENJ, KPP, NWP, SHC, SOG, SUN, TNA, TX.
ALIPHATIC HYDROCARBONS	
C/1 HYDROCARBONS:	
Methane	MOC, MON, SHO.
C/2 HYDROCARBONS:	
*Acetylene (For chemical use only)	DOW, MNO, MON, RH, UCC.
*Ethane	ACU, AMO, ENJ, MOC, MON, OMC, PLC, SHO, SM, TX, USI.
*Ethylene	ACU, AMO, ATR, BAS, BFG, CBN, CO, CPX, DOW, DUP, EKX, ELP, ENJ, GOC, JCC, MCB, MOC, MON, NWP, OMC, PLC, PUE, SHC, SM, SNO, SUN, UCC, USI.
C/3 HYDROCARBONS:	
Hydrocarbons,C2-C3,mixtures	CSO.

TABLE 2.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ALIPHATIC HYDROCARBONS--Continued	
C/3 HYDROCARBONS--CONTINUED	
Methyl acetylene propadiene	MON.
*Propane (Commercial and hd-5)	AMO, ASH, ATR, CCP, CO, COR, CPI, CSD, CSO, CSP, ENJ, GRS, MOC, OMC, PLC, SHO, SM, SOG, SUN, TX, UCC, UOC, USI.
*Propylene	ACU, AMO, ASH, ATR, BFG, CBN, CLK, CO, CPX, CSD, CSO, DOW, DUP, EKX, ELP, ENJ, GOC, JCC, MCB, MOC, MON, NWP, PLC, PUE, SHC, SIO, SM, SOC, SOG, SUN, TX, UCC.
Propylene tetramer	SUN.
C/4 HYDROCARBONS:	
*Butadiene and butylene fractions	ACU, CO, CPX, CSD, DOW, EKX, GOC.
*1,3-Butadiene, grade for rubber (Elastomers)	AMO, ATR, BFG, CPY, DOW, ELP, ENJ, FRS, MON, NWP, PLC, PTT, PUE, SHC, SM, TUS, UCC.
*n-Butane	AMO, APR, COR, CSD, CSO, CSP, ELP, MOC, PLC, SHO, SM, SUN, UCC, USI.
Butanes,mixed	ENJ, OMC, SHO.
1-Butene	GOC, PLC, PTT, TNA.
*2-Butene	MON, PLC.
1-Butene and 2-butene, mixed	ATR, CSO, DOW, ENJ, GOC, MOC, PTT, SHC, SOG.
*Butylenes,mixed	MON, SM.
Chemical butane	SM.
Hydrocarbons, C4, fraction	JCC.
Hydrocarbons,C4,mixtures	GOC.
*Isobutane (2-Methylpropane)	AMO, CSD, CSO, CSP, ELP, ENJ, MOC, PLC, SHO, SM, SUN, TX, USI.
*Isobutylene (2-Methylpropene)	AMO, ATR, ENJ, OCC, PTT.
Hydrocarbons, C4, all other	BFG, CBN, ENJ, MCB, TNA.
C/5 HYDROCARBONS:	
*Amylenes	SHC, SHO.
Dibutanized aromatic concentrate	CO, CPX, DUP, JCC.
*Isoamylene	CBN.
Isopentane (2-Methylbutane)	PLC, SHO.
*Isoprene (2-Methyl-1,3-butadiene)	ATR, BFG, DOW, ENJ, MON.
n-Pentane	APR, MOC, PLC, SHO.
*Pentenes, mixed	CSO, DOW, ENJ, SHO, TX.
Piperylene (1,3-Pentadiene)	DOW, MON.
Hydrocarbons, C5, all other	ATR, CSO, PLC, SHC.

TABLE 2.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ALIPHATIC HYDROCARBONS--Continued	
ALL OTHER ALIPHATIC HYDROCARBONS, DERIVATIVES, AND MIXTURES:	
C/6 HYDROCARBONS:	
Di-isopropyl (2,3-Dimethylbutane)	PLC, SHO.
*Hexane	APR, ENJ, HMY, PLC, SHO, SOG, UOC.
Hydrocarbons, C5-C6, mixtures	COR.
Methylcyclopentadiene	ENJ.
Neohexane (2,2-Dimethylbutane)	PLC.
Hydrocarbons, C6, all other	PLC, SHO, SWC.
C/7 HYDROCARBONS:	
n-Heptane	EKX, SOG, UOC.
*Heptenes, mixed	AIP, AMO, ENJ, TID.
Hydrocarbons, C6-C7, mixtures	CPI.
Hydrocarbons, C7, all other	ENJ, PLC.
C/8 HYDROCARBONS:	
Cyclooctadiene	CBN.
Di-isobutylene (Di-isobutene)	PTT, TX, X.
Hydrocarbons, C8, all other	AIP, ENJ, TID.
C/9 AND ABOVE HYDROCARBONS (EXCEPT ALPHA OLEFINS):	
*Dodecene (Tetrapropylene)	ATR, CO, ENJ, SOC, SUN, TX, UOC.
Eicosane	HMY.
*Nonene (Tripropylene)	AIP, ATR, CSP, ENJ, TID, UOC.
*ALPHA OLEFINS:	
Alpha olefins,C6-C7	GOC, SHC, SOC, TNA.
Alpha olefins,C8-C10	GOC, SOC, TNA.
Alpha olefins,C11-C15	GOC, SOC, TNA.
Alpha olefins,C15-C20	SOC.
Alpha olefins,C16-C18	TNA.
Alpha olefins: all other	GOC.
*N-PARAFFINS - CARBON CHAIN LENGTH:	
n-Paraffins,C6-C9	ATR.
n-Paraffins,C9-C15	BFG, SHO.
n-Paraffins,C10-C14	ENJ, SHO.
n-Paraffins,C10-C16	CO.
n-Paraffins	ENJ, GOC.
Hydrocarbons, C5-C9, mixtures	PPR.

TABLE 2.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ALIPHATIC HYDROCARBONS--Continued	
Polybutene	AMO, CSD, SOC.
Tri-isobutylene	PTT, TX, X.
*HYDROCARBON DERIVATIVES:	
tert-Amyl mercaptan (2-Methyl-2-butanethiol)	PAS.
n-Butyl mercaptan (1-Butanethiol)	PLC.
tert-Butyl mercaptan (2-Methyl-2-propanethiol)	PAS, PLC.
Butyl mercaptans	PAS.
Decyl mercaptans	PAS.
Di-tert-butyl disulfide	PLC.
Ethyl mercaptan (Ethanolthiol)	PAS, PLC.
Hexadecyl mercaptans	PAS.
Isopropyl mercaptan (2-Propanethiol)	PAS.
Methyl mercaptan (Methanethiol)	DOW, PAS.
t-Nonyl mercaptan	PAS.
tert-Octyl mercaptan (2,4,4-Trimethyl-2-pentanethiol)	PAS.
Octyl mercaptans	PAS.
n-Propyl mercaptan (1-Propanethiol)	PAS, PLC.
n-Tetradecyl mercaptan	PAS.
Hydrocarbon derivatives: all other hydrocarbon derivatives	AMO, PAS, PLC, TX, UCC.
Hydrocarbons, C9 and above, all other, including mixtures	CO, ENJ, MOC, QH, SOC.

TABLE 3.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION: DIRECTORY OF MANUFACTURERS, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of crude products from petroleum and natural gas for chemical conversion to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ACU	Allied Chemical Corp., Union Texas Petroleum Div.	MCB	Borg-Warner Corp., Borg-Warner Chemicals
		MNO	Monochem, Inc.
AIP	Air Products & Chemicals, Inc.	MOC	Marathon Oil Co., Texas Refining Div.
AMO	Standard Oil Co. (Indiana)	MON	Monsanto Co.
APR	Atlas Processing Co.		
ASH	Ashland Oil, Inc.	NWP	Northern Petrochemical Co.
ATR	Atlantic Richfield Co., Arco Chemical Co.		
		OCC	Oxirane Chemical Co.
BAS	BASF Wyandotte Corp.	OMC	Olin Corp.
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Co. Div.	OXI	Oxirane Chemical Co. (Channelview)
		PAS	Pennwalt Corp.
CBN	Cities Service Co., Petrochemicals Div.	PLC	Phillips Petroleum Co.
CCP	Crown Central Petroleum Corp.	PPR	Phillips Puerto Rico Core, Inc.
CLK	Clark Oil & Refining Corp.	PPX	Phillips Paraxylene, Inc.
CO	Continental Oil Co.	PTT	Petro-Tex Chemical Corp.
COR	Commonwealth Oil & Refining Co., Inc.	PUE	Puerto Rico Olefins Co.
CPI	Commonwealth Petrochemicals, Inc.		
CPX	Chemplex Co.	QH	Quintana-Howell Joint Venture
CPY	Copolymer Rubber & Chemical Corp.		
CSD	Cosden Oil & Chemical Corp.	RH	Rohm & Haas Co.
CSO	Cities Service Co., Petroleum Products Group		
CSP	Coastal States Petrochemical Co.	SHC	Shell Oil Co., Shell Chemical Co. Div.
		SHO	Shell Oil Co.
DOW	Dow Chemical Co.	SIO	Standard Oil Co.
DUP	E. I. duPont de Nemours & Co., Inc.	SKO	Getty Refining & Marketing Co.
		SM	Mobil Oil Corp.:
EKX	Eastman Kodak Co., Texas Eastman Co. Div.		Gas Liquids Dept.
ELP	El Paso Products Co.		Mobil Chemical Co.
ENJ	Exxon Chemical Co. U.S.A.	SNO	SunOlin Chemical Co.
		SOC	Standard Oil Co. of California, Chevron Chemical Co.
FER	Ferro Corp., Productol Chemical Div.		
FRS	Firestone Tire & Rubber Co., Firestone Synthetic Rubber & Latex Co. Div.	SOG	Charter International Oil Co.
		STX	St. Croix Petrochemical Corp.
		SUN	Sun Company, Inc.
GOC	Gulf Oil Corp., Gulf Oil Chemicals Co.-U.S.	SWC	Corco Cyclohexane, Inc.
		SWR	Southwestern Refining Co.
GP	Georgia-Pacific Corp.		
GRS	Champlin Petroleum Co.	TCC	Tanatex Chemical Corp.
		TID	Getty Refining & Marketing Co.
HCF	Hercofina	TNA	Ethyl Corp.
HCR	Hercor Chemical Corp.	TOC	Tenneco Oil Co.
HES	Amerada Hess Corp. (Hess Oil Virgin Islands Corp.)	TUS	Texas-U.S. Chemical Co.
		TX	Texaco, Inc.
HMY	Humphrey Chemical Co.		
HST	American Hoechst Corp.	UCC	Union Carbide Corp.
		UOC	Union Oil Co. of California & Chemicals Div.
JCC	Jefferson Chemical Co., Inc.	USI	National Distillers & Chemicals Corp., U.S. Industrial Chemicals Co.
KPP	Arco/Polymers, Inc.	USR	Uniroyal, Inc., Uniroyal Chemical Div.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

IMPORTANT DEVELOPMENTS IN CYCLIC INTERMEDIATES IN 1978

Daniel F. McCarthy

While U.S. production, sales, and foreign trade in cyclic (benzenoid) intermediates in 1978 continued the upward trend established in 1973-77, the ratio of exports to imports remained almost the same (2 to 1).

More than 98 percent of the cyclic intermediates produced in the United States are benzenoid products, i.e., they have a chemical structure like or similar to that of a benzene or modified benzene ring. Almost all the benzenoid intermediates are produced from petroleum-derived aromatic compounds such as benzene, toluene, xylene, and naphthalene. A small amount of these aromatics, and thus some benzenoid intermediates, are produced from coal tar.

Cyclic (benzenoid) intermediates are used in the manufacture of products in all segments of the U.S. synthetic organic chemicals industry. The principal product classes derived from benzenoid intermediates and the percentage of benzenoids in each class in 1978 were dyes (100 percent); organic pigments (100 percent); rubber-processing chemicals (88 percent); plasticizers (85 percent); organic pesticides (56 percent); flavor and perfume materials (44 percent); medicinals (42 percent); and plastics (31 percent).

New Developments in 1978

In addition to increases in antipollution expenditures, a general increase in sales prices, and increased costs of raw materials, the changes in the classification of imports of benzenoid chemicals which were adopted during the Multilateral Trade Negotiations in Geneva will perhaps be judged to have been the most significant development in this industry in 1978. In conjunction with its proposal to eliminate the American selling price system for assessing duties on imports of benzenoid chemicals and products, the U.S. negotiating team presented, along with its offers list, a revised classification system for imports of benzenoid chemicals and products into the United States.[1] The new system segregates all benzenoid intermediates not specifically provided for in the existing Tariff Schedules of the United States (TSUS) into 20 major classes and many subclasses based on chemically functional groups of atoms within the molecule. Within each class, items which are now important in trade are specifically identified and provided for, and a number of residual or "basket" categories provide for products which may be imported in the future. This new system will allow a determination of the extent of domestic competition from imports of the thousands of benzenoid intermediates formerly classified in the TSUS "basket" item 403.60.

[1] The revised classification system is included in the Trade Agreements Act of 1979, which was signed by the President on July 26, 1979.

Government regulations

In 1978, environmental regulations continued to increase the processing costs of producing cyclic intermediates. Feedstock costs, the principal component of production expenditures, were also affected by environmental regulations. Industry estimates that 12 percent of annual production costs were related to worker safety and 10 percent of total capital expenditures went toward pollution abatement.

The supply and the prices of aromatic petrochemicals such as toluene and xylene depend greatly on their use as octane improvers in gasoline, which consumes about 40 percent of the isolated toluene and 25 percent of the xylene. Government regulations requiring the reduction of lead alkyls in gasoline have increased the demand for aromatics, especially toluene for use in unleaded gasoline. About 30 percent of the supply of benzene is derived from the dealkylation of toluene; therefore, increased demand for toluene in the auto-fuel market will be reflected not only in the prices of benzene and toluene, but also in the prices of their derivatives. Recent industry estimates indicate that a proposed or current increase of 10 cents per gallon in the price of toluene will be reflected in the following price increases: benzene (15.8 percent); cumene (12.0 percent); phenol (10.6 percent); and styrene (8.2 percent).

Price changes

In 1978, average domestic prices of cyclic (benzenoid) intermediates were approximately 7 percent less than those in the peak year of 1977 (table A). Industry price quotations for some of the large-volume intermediates reflect considerable price erosion between January and December 1978. For example, phenol prices decreased from 27.5 cents per pound in January to 19 cents per pound in December and maleic anhydride dropped from 37 cents per pound in January to 27 cents per pound in December. However, styrene monomer was quoted at 21 cents per pound in January, 17.5 cents in July, and 20.5 cents in December. Sluggish markets for end use organic chemical products and excess capacity to produce the intermediates were the most frequent explanations given for the price declines. There were small increases in 1978, however, in the selling prices of detergent alkylate (dodecylbenzene), cyclohexane, and caprolactam monomer. Price increases for detergent alkylate reflected the national and worldwide shortage of one of its major raw materials, normal paraffins.[1] The cyclohexane price increase reflects the increased cost of benzene, from which it is made. The caprolactam monomer price increased 2.5 cents per pound beginning in October 1978. However, other large-volume intermediates such as phthalic anhydride, aniline, ortho and paradichlorobenzenes, and isophthalic acid experienced no price increases or decreases in 1978.

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[1]This shortage was due primarily to a rise in demand for detergents and a shutdown of a large normal paraffin plant in Italy.

Trends in U.S. Production, Sales, and Consumption, 1973-78

The trends in U.S. production, sales, and consumption of products from the cyclic intermediates industry, which manufactured 1,060 chemicals in 1978, are briefly described below.

Industry profile

In 1978 there were 162 companies which produced 46 billion pounds of cyclic intermediates. About 58 percent of this production was captive (consumed in plant by the producer in the manufacture of more advanced chemicals). Sales amounted to 19 billion pounds, valued at $4.1 billion (table A and fig. 1).

Those cyclic intermediates used principally to make plastics and synthetic fibers are large-volume hydrocarbon petrochemicals, each produced by a large number of producers (from 8 to 14 each); however, in no instance is the bulk of the production controlled by a small number of companies. For those intermediates which are used to manufacture dyes, pigments, medicinals, pesticides, and so forth, the four largest producers accounted for less than 30 percent of the output.

Employment in the cyclic intermediates industry in 1978 amounted to 28,000, compared with 29,000 in the peak year 1977.

Although there is considerable double counting in the production data, i.e., one compound used in the manufacture of a second compound is reported again in its new structure, the gross value of such production in 1978 is estimated at $10 billion. Eight percent of that production was exported.

In 1978, exports of cyclic intermediates were two times as large as imports, yielding a trade balance of $383 million (table A and fig. 2). The increase in exports in 1978 over 1977 amounted to 22 percent and reflects the competitive advantage of U.S. exports in world markets because of the relatively lower cost of domestic feedstocks.

U.S. consumption

Domestic consumption of cyclic intermediates in 1978 amounted to $9.6 billion. The ratio of imports to apparent consumption in 1978 was 4.2 percent, the same ratio as in 1973; during 1974-77 the ratio ranges from 3.4 to 4.0 percent. Apparent consumption increased from $3.8 billion (measured in current dollars) in 1973 to $9.6 billion in 1978, or at an average annual growth rate of 20.6 percent. Another approach to the measurement of consumption is obtained by using the quantity of the production, which increased during that period at an average annual rate of 4.9 percent.

Foreign Trade

In 1978, both imports of cyclic intermediates at $407 million and exports of these chemicals at $790 million were 22 percent more than in 1977. Industry sources attribute the large volume of exports to "improved economic conditions in some industrialized countries, greater demand for U.S. products in the oil-exporting nations, and the declining value of the U.S dollar relative to several foreign currencies."[1]

U.S. imports

Imports of industrial organic chemicals (cyclic intermediates) amounted to $407 million in 1978, compared with $334 million in 1977. From 1973 to 1978, imports grew from $172 million to $407 million in 1978, or by an average annual growth rate of 18.8 percent, measured in current dollars (table A and fig. 2).

The principal sources of U.S. imports of cyclic intermediates during 1973-78 were Western Europe (principally the European Community (EC)) and Asia (principally Japan). In 1978, 72 percent of U.S. imports came from the EC and 23 percent, from Asia.

There were 824 benzenoid (cyclic) intermediates imported in 1978, compared with 819 imported in 1977. During 1978, imports from member countries of the Organization for Economic Cooperation and Development accounted for 95 percent of the total value of imports of cyclic intermediates, with 5 percent coming from developing countries. The nine EC countries accounted for 61 percent of the total benzenoid intermediates and Japan, for 21 percent. Imports of cyclic intermediates from eligible Generalized Systems of Preference countries in 1978 were valued at $5.5 million or 1 percent of the total.

In 1978, 76 percent of the imports of industrial organic chemicals were classified into 13 chemically functional groups; several individual chemicals were specified within these groups. About 80 percent of the compounds classified by function were in the following seven groups: amines having one or more oxygen functions; alcohols, phenols, ethers, and aldehydes; amines and their derivatives; sulfonamides; carboxylic acids; heterocyclic compounds; and nitrogen function compounds, not specifically provides for. In 1978, on the basis of an analysis of imports of benzenoid chemicals and products by the U.S. International Trade Commission, phthalic anhydride (40 million pounds) was the principal product imported. The principal sources of phthalic anhydride were Argentina, Canada, Italy, Venezuela, and the United Kingdom. Ethylbenzene (34 million pounds) was the second most important cyclic intermediate imported in 1978; it came from Canada and the Netherlands. Styrene monomer (31 million pounds) all came from Canada. Cyclohexane (10 million

[1]Chemical and Engineering News, June 11, 1979 p. 62.

pounds) came from Argentina and West Germany. Other imports of lesser volume in 1978 included para-cresol, copper phthalocyanine crude, 1-chloro-2-nitrobenzene, adipic acid, caprolactam, o-nitrophenol, hexamethylenediamine, 2-naphthol (B-naphthol), (m,p)-cresol, o-anisidine, and maleic anhydride. Imports of these 15 intermediates accounted for approximately 54 percent of the total quantity of intermediates imported and analyzed by the Commission in 1978.

U.S. exports

Exports of industrial organic chemicals (principally cyclic intermediates) in 1977 accounted for 19 percent of total sales. Although U.S. exports of cyclic intermediates increased from $345 million in 1973 to $790 million in 1978, the ratio of exports to imports remained fairly steady, ranging from 1.9 in 1977 to 2.6 in 1974.

According to industry sources, the U.S. chemical industry's advantage in low feedstock costs enabled it to increase exports to Western Europe by 25 percent in 1978 over those in 1977, despite the overcapacity that existed in European chemical plants. Exports to developing country markets also registered large increases. Approximately 40 percent of U.S. exports go to Western Europe and approximately 35 percent go to countries in the Western Hemisphere, principally Latin American. About 20 percent of U.S. exports go to countries in Asia. In Europe, the principal market for cyclic intermediates is the EC, whereas in the Western Hemisphere the principal market is Latin America (table B and fig. 2).

Industrial organic chemical products exported in the largest amounts in 1978 were styrene monomer, cyclohexane, phenol, detergent alkylate (dodecylbenzene), dimethyl terephthalate, toluene diisocyanates, caprolactam monomer, polyalkylbenzenes, dichlorobenzene, isophthalic acid, maleic anhydride, and phthalic anhydride. Exports of these products in 1978 amounted to $366 million and accounted for 46 percent of the total value of U.S. exports of industrial organic chemicals; principal markets were the Netherlands, Canada, Mexico, and Japan.

Table A.--Cyclic intermediates:[1] U.S. industry trends, 1973-78

Item	1973	1974	1975	1976	1977	1978
Production:						
Quantity----------million pounds--	35,863	38,147	31,413	40,534	43,726	45,565
Value[2]-----------million dollars--	3,945	7,629	6,597	8,917	10,056	10,002
Sales:						
Quantity----------million pounds--	17,915	17,638	14,780	16,827	17,139	19,016
Value------------million dollars--	1,899	3,514	3,169	3,746	3,925	4,138
Employment[3]--------------thousands--	29.5	27.6	27.8	27.8	29.0	28.0
Producer Price Index[4]---------------	100.0	192.2	240.0	253.2	257.1	238.9
Exports-----------million dollars--	345	706	506	647	649	790
Imports-----------------------do----	172	269	251	316	334	407
Apparent consumption[5]---------do----	3,772	7,192	6,345	8,586	9,741	9,619
Ratio of imports to consumption--------------percent--	4.2	3.7	4.0	3.7	3.4	4.2
Balance of trade---million dollars--	173	437	225	331	315	383
Ratio of export to imports----------	2.0	2.6	2.0	2.0	1.9	1.9

[1] Includes all benzenoid chemicals classified as industrial organic chemicals in schedule 4, pt. 1B, of the TSUS.

[2] Statistics include some duplication since some of the chemicals represent successive steps in production. Value of production calculated using the average unit value of sales of all products.

[3] Number of employees shown applies to the entire SIC product code 2865, which is principally cyclic intermediates.

[4] Producer Price Index applies to intermediates as shown under BLS code 061402; the base is December 1973.

[5] Apparent consumption equals value of production plus imports minus exports.

Source: Compiled from official statistics of the U.S. Departments of Commerce and Labor.

Table B.--Cyclic intermediates: U.S. imports for consumption and exports of domestic merchandise, by geographic areas, 1977 and 1978

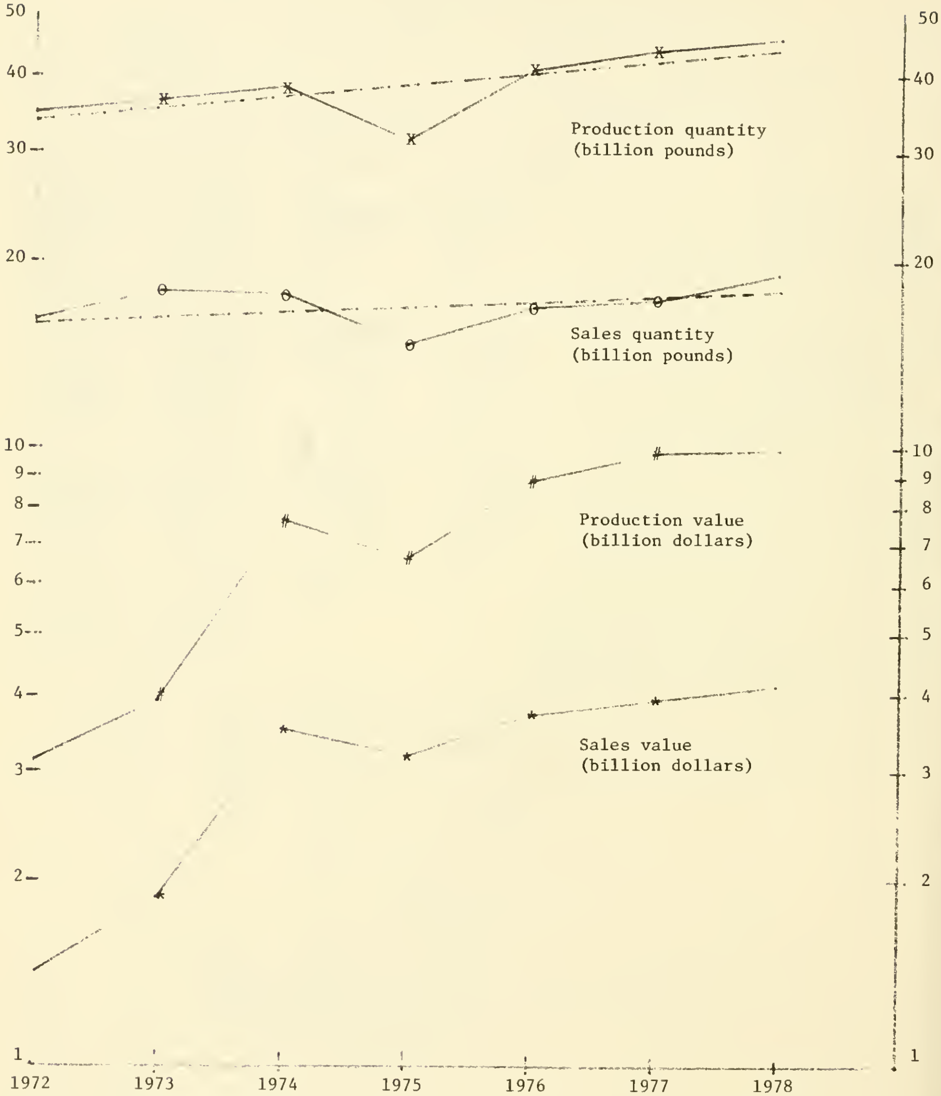
(In thousands of dollars)

Geographic area	Imports		Exports	
	1977	1978	1977	1978
Grand total	334,324	406,562	648,960	789,776
Western Hemisphere, total	17,865	19,188	242,824	275,665
Canada	7,637	13,596	58,763	79,316
Latin America	9,612	5,592	182,096	178,907
Other	616	-	1,965	17,442
Western Europe, total	230,832	[1] 293,161	256,370	320,035
EC, total	205,279	292,723	228,492	284,390
United Kingdom	29,020	([2])	20,585	56,577
West Germany	96,267	119,403	13,378	19,313
Other	79,992	([2])	194,529	208,500
Other Western Europe	25,553	([2])	27,878	35,645
Asia, total	81,787	94,208	108,337	157,719
Japan	67,821	86,603	24,320	53,874
Near East	10,322	([2])	4,763	7,193
Other	3,644	([2])	79,254	96,652
Australia and Oceania	39	5	24,519	18,842
Africa	-	-	11,787	14,501

[1] Includes Communist areas of Europe.
[2] Not available.

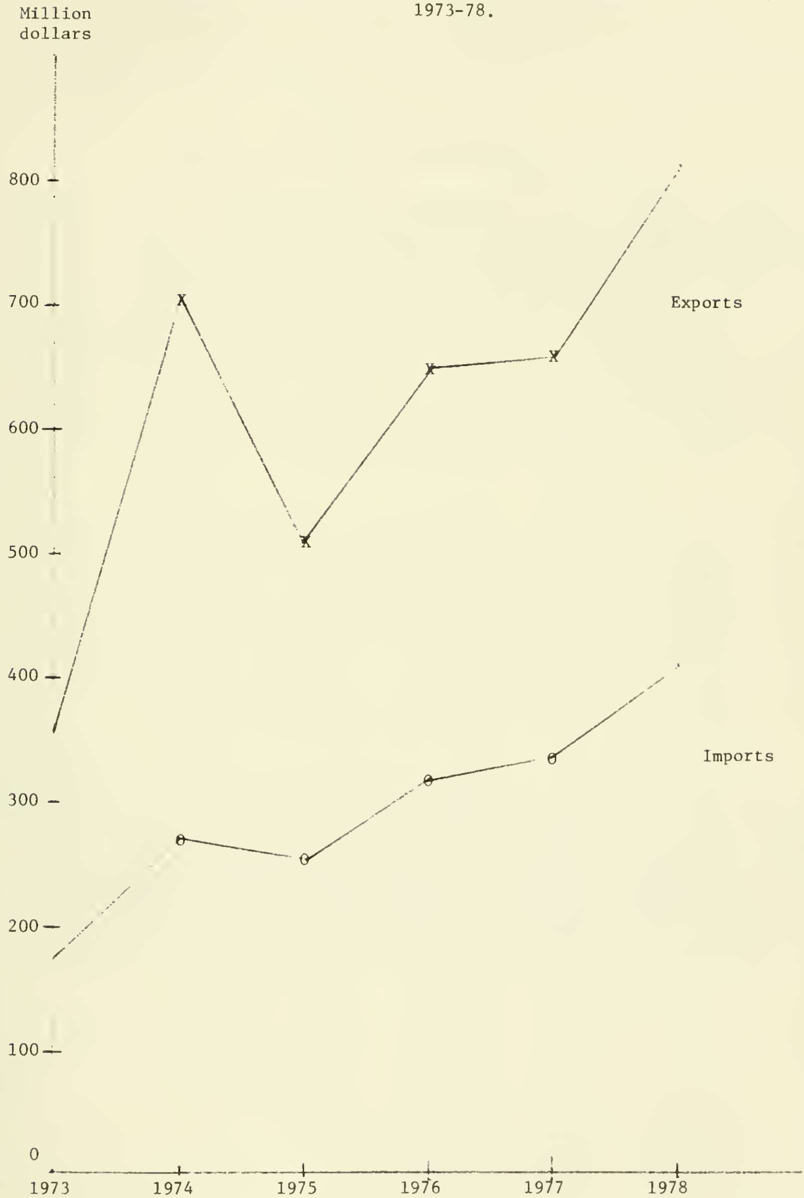
Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 1.--Cyclic intermediates: U.S. production and sales, 1972-78
(Semilogarithmic scale).



Source: U.S. International Trade Commission, Synthetic Organic Chemicals, U.S. Production and Sales. Prepared by Virginia R. Bailey.

Figure 2.--Cyclic intermediates: U.S. exports and imports, 1973-78.



Source: Official statistics of the U.S. Department of Commerce. Prepared by Virginia R. Bailey.

STATISTICAL HIGHLIGHTS

Daniel F. McCarthy and Bonnie Jean Noreen

Cyclic intermediates are synthetic organic chemicals derived principally from petroleum and natural gas and from coal-tar crudes produced by destructive distillation (pyrolysis) of coal. Most cyclic intermediates are used in the manufacture of more advanced synthetic organic chemicals and finished products, such as dyes, medicinal chemicals, elastomers (synthetic rubber), pesticides, and plastics and resin materials. Some intermediates, however, are sold as end products without further processing. For example, refined naphthalene may be used as a raw material in the manufacture of 2-naphthol or of other more advanced intermediates, or may be packaged and sold as a moth repellant or as a deodorant. In 1978 about 44 percent of the total output of cyclic intermediates was sold; the rest was consumed chiefly in the producing plants in the manufacture of more advanced intermediates and finished products.

Total production of cyclic intermediates in 1978 amounted to 19,936 million pounds, a 6 percent increase from the 18,726 million pounds produced in 1977. Sales of cyclic intermediates in 1978 were 8,853 million pounds, valued at $2,803 million, compared with 7,986 million pounds, valued at $2,597 million in 1977. These totals do not include the following cyclic intermediates: ethylbenzene, cyclohexane, cyclohexene, styrene, m-xylene, o-xylene, p-xylene, and cumene. Figures on U.S. production and sales of these eight cyclic intermediates are included in Section II, Primary Products from Petroleum and Natural Gas for Chemical Conversion.

Intermediates which were produced in excess of 2 billion pounds in 1978 were dimethyl terephthalate (5,954 million pounds), and phenol (2,682 million pounds). Other large-volume intermediates produced in 1978 were isocyanates (1,210 million pounds), cyclohexanone (1,162 million pounds), phthalic anhydride (978 million pounds), aniline (606 million pounds), nitrobenzene (576 million pounds), alkylbenzenes (526 million pounds), bisphenol A (471 million pounds). monochlorobenzene (295 million pounds), toluene-2,4-diamine (139 million pounds), nonylphenol (125 million pounds), and melamine (112 million pounds). The 13 chemicals noted above accounted for 74 percent of the total output of intermediates in 1978.

TABLE 1.--Cyclic intermediates: U.S. production and sales, 1978

[Listed below are all cyclic intermediates for which any reported data on production and sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all cyclic intermediates for which data on production and/or sales were reported and identifies the manufacturers of each]

CYCLIC INTERMEDIATES	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Grand total	19,935,769	8,852,650	2,803,327	$0.32
Alkylbenzenes[2]	526,185	503,689	143,430	.28
3'-Amino-p-acetanisidide	555	...	...	...
1-Amino-2-bromo-4-hydroxyanthraquinone	609	...	...	...
7-Amino-1,3-naphthalenedisulfonic (Amino G acid)	98	...	...	...
p-[(p-Aminophenyl)azo]benzenesulfonic acid	316	...	...	...
Aniline (Aniline oil)	605,772	187,767	41,865	.22
Anilinomethanesulfonic acid and salt	339	...	...	...
Benzoic acid, tech	85,175	36,822	8,686	.24
Biphenyl	63,527	17,450	4,224	.24
2-Bromo-4,6-dinitroaniline	1,827	...	...	...
Butylphenols, mixed	6,529	...	...	...
Chlorobenzene, mono-	295,426	96,428	21,200	.22
4-Chloro-3-nitrobenzenesulfonyl chloride	330	...	...	...
Cresols, total[3]	96,869	94,932	47,630	.50
o-Cresol	20,124	20,397	7,310	.36
All other[4]	76,745	74,535	40,320	.54
Cresylic acid, refined[3]	45,003	46,078	12,991	.28
Cyclohexanone	1,161,712	36,992	12,226	.33
1,4-Diamino-2,3-dihydroanthraquinone	481	...	...	...
o-Dichlorobenzene	41,140	44,028	11,810	.27
p-Dichlorobenzene	41,224	38,062	10,311	.27
2,4-Dichlorophenol	26,482	7,923	3,553	.45
N,N-Diethylaniline	2,359	1,518	1,521	1.00
1,4-Dihydroxyanthraquinone (Quinizarin)	1,309	...	...	...
N,N-Dimethylaniline	11,278	8,679	4,927	.57
N,N-Dimethylbenzylamine	348	265	534	2.02
2,4(and 2,6)-Dinitrotoluene	655,914	...	...	...
N-Ethylaniline, refined	1,886	1,853	1,612	.87
2-(N-Ethylanilino)ethanol	458	...	...	...
2-(N-Ethyl-N,β-cyanoethyl)-4-acetaminoanisole	612	...	...	...
3-(N-Ethyl-m-toluidino)propionitrile	115	94	276	2.93
Isocyanic acid derivatives, total	1,209,742	1,033,926	511,326	.49
Polymethylene polyphenylisocyanate	439,449	355,023	179,149	.50
Toluene-2,4- and 2,6-diisocyanate (80/20 mixture)	626,361	558,233	237,851	.43
Other isocyanic acid derivatives	143,932	120,670	94,326	.78
4,4'-Isopropylidenediphenol (Bisphenol A)	470,797	131,843	45,744	.35
Leuco quinizarin (1,4,9,10-Anthratetrol)	116	...	...	...
Melamine	112,158	79,411	28,701	.36
dl-p-Mentha-1,8-diene (Limonene)	14,007	6,116	809	.13
3-(N-Methylanilino)propionitrile	167	...	...	...
α-Methylstyrene	75,571	61,176	10,780	.18
o-Nitroaniline	16,225	...	...	...
p-Nitroaniline	15,220	...	...	...
Nitrobenzene	575,523	20,192	4,302	.21
Nonylphenol	125,167	49,294	11,177	.23
Phenol, total[3]	2,681,603	1,431,536	231,622	.16
From cumene	1,915,543	1,086,493	175,028	.16
Other	766,060	345,043	56,594	.16

See footnotes at end of table.

TABLE 1.--CYCLIC INTERMEDIATES: U.S. PRODUCTION AND SALES, 1978--CONTINUED

CYCLIC INTERMEDIATES	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
2,2'-[(Phenyl)imino]diethanol (N-Phenyldiethanol-amine)	628	351	251	$0.72
Phthalic anhydride	978,036	646,289	152,018	.24
Piperidine	780	...	...	...
Salicylic acid, tech	47,149	6,335	5,418	.86
Terephthalic acid, dimethyl ester[5]	5,954,216	...	...	...
Tetrahydrofuran	99,758	...	...	...
Toluene-2,4-diamine (4-m-Tolylenediamine)	139,250	...	...	...
7,7'-Ureylenebis[4-hydroxy-2-naphthalenesulfonic acid]	458	...	...	...
All other cyclic intermediates	3,745,320	4,263,601	1,474,383	.35

[1]Calculated from unrounded figures.
[2]Includes straight-chain dodecylbenzene, tridecylbenzene, and other straight-chain alkylbenzenes. Branched-chain alkylbenzenes are included in "All other cyclic intermediates."
[3]Does not include data for coke ovens and gas-retort ovens, reported to the Office of Energy Data and Interpretation, Energy Information Administration, Department of Energy.
[4]Figures include (o,m,p)-cresol from coal tar and some m-cresol and p-cresol.
[5]The figures for terephthalic acid, dimethyl ester (DMT) include both the acid itself and the dimethyl ester without double counting. The acid production figure was multiplied by the factor 1.16 to convert it to equivalent DMT.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*) CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT]

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
3-[(2-Acetamido-4-aminophenyl)azo]-1,5-naphthalenedisulfonic acid	TRC.
2,2'-[(3-Acetamido-6-ethoxyphenyl)imino]diethanol	HST, TCH.
2,2'-[(5-Acetamido-2-methoxyphenyl)imino]diethanol	TCH.
4-Acetamido-2-nitroanisole	EKT.
2,2'-[(3-Acetamidophenyl)imino]diethanol	TCH.
3-Acetamido-N-(2-succinimidoethyl)-N-ethylaniline	EKT.
Acetanilide, tech.	ARA, SAL.
p-Acetanisidide	EKT, SDC.
Acetoacetanilide	EKT, HST.
o-Acetoacetanisidide	EKT, HST.
o-Acetoacetotoluidide	EKT, HST.
2',4'-Acetoacetoxylidide	HST.
Acetoacet-m-xylidide	EKT.
Acetophenone, crude	ACS.
Acetophenone, tech.	MON, SKO, UCC.
p-Acetotoluidide	EK.
N-(2-Acetoxyethyl)-N-(2-cyanoethyl)aniline	EKT.
α-Acetylamino-p-toluenesulfonamine	SDW.
N-Acetylanthranilic acid	SW.
p-Acetylbenzenesulfonamide	LIL.
p-Acetylbenzenesulfonic acid, sodium salt	LIL.
p-Acetylbenzenesulfonylurethane	LIL.
N-Acetylsulfanilic acid, sodium salt	ALL.
N-Acetylsulfanilyl chloride	ACY, ARA.
2-Acetylthiophene	PD.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*ALKYLBENZENES:	
Alkylbenzene straight-chain (Except dodecyl and tridecyl)	MON, WTC.
DODECYLBENZENE (INCLUDING TRIDECYLBENZENE):	
Dodecylbenzene, straight-chain	CO, MON, UCC, WTC.
Dodecylbenzene, other	CO, SOC, WTC.
Alkylbenzene all other (Except dodecyl, tridecyl and straight-chain)	PLC, WTC.
Alkylphenols, mixed	FER.
Alkylpyridines, mixed	PIL.
1-Amino-4-(4-acetamino-anilino)-9,10-dihydro-9,10-dioxo-2-anthracene-sulfonic acid	VPC.
3'-Aminoacetanilide	AC, TRC.
4'-Aminoacetanilide (Acetyl-p-phenylenediamine)	DUP, TRC.
*3'-Amino-p-acetanisidide	EKT, HST, SDC.
3'-Aminoacetophenone	SDH.
5-Amino-2-(p-aminoanilino)benzenesulfonic acid	TRC.
2-(p-Aminoanilino)-5-nitrobenzenesulfonic acid	TRC.
3-Amino-p-anisanilide	PCW.
1-Aminoanthraquinone and salt	ACY, SDC, TRC.
6-Amino-3,4'-azodibenzenesulfonic acid (C.I. Acid Yellow 9)	TRC.
p-Aminobenzamide	SAL, SDH.
2-Aminobenzamide	SW.
1-Amino-4-benzamidoanthraquinone	ACY, TRC.
o-Aminobenzenethiol	FMT.
p-Aminobenzoic acid, tech.	PD, SAL.
2-Amino-6-benzothiazolecarboxylic acid	DUP.
2-Amino-6-benzothiazolecarboxylic acid, hydrobromide	SDH.
2-Amino-6-benzothiazolecarboxylic acid, monosodium salt	SDH.
2(4'-Aminobenzoylamino)-6-naphthol-8-sulfonic acid	TRC.
1-Amino-4-bromo-9,10-dihydro-9,10-dioxo-2-anthracenesulfonic acid and sodium salt	TRC, VPC.
*1-Amino-2-bromo-4-hydroxyanthraquinone	AC, DUP, GAF, VPC.
1-Amino-2-bromo-4-p-toluidinoanthraquinone	TRC.
2-Amino-1-chloroanthraquinone	EKT.
2-Amino-5-chlorobenzophenone	GNW.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
1-Amino-2-chloro-4-hydroxyanthraquinone	TRC.
3-Amino-6-chloropyridazine	ACY.
2-Amino-5-chloro-p-toluenesulfonic acid [SO_3H=1]	ACY, HSC.
6-Amino-5-chloro-m-toluenesulfonic acid [SO_3H=1] (2b Acid)	ACY, DUP.
2-Amino-p-cresol	SW, TRC.
1-Aminocyclohexanecarboxylic acid, chloride	KF.
1-Amino-2,4-dibromoanthraquinone	DUP, TRC, VPC.
1-Amino-2,4-dichloroanthraquinone	TRC.
2-Amino-5,6-dichlorobenzothiazole	SAL.
1-Amino-9,10-dihydro-9,10-dioxo-4-p-toluenesulfonamido-2-anthracenesulfonic acid, sodium salt	TRC.
4-Amino-N,N-di(β-hydroxyethyl)aniline sulfate	WAY.
5-Amino-4,5'-dihydroxy-3,4'-[(2-methoxy-5-methyl-p-phenylene)bis(azo)]-di-2,7-naphthalenedisulfonic acid, 5'-benzenesulfonate	TRC.
5-Amino-2,4-dimethylacetanilide	PD.
5-Amino-2,3-dimethylbenzenesulfethanolamide	TRC.
3-Amino-9-ethylcarbazole	SDC.
3-Amino-α-ethylhydrocinnamic acid	SDW.
4-Amino-N-ethyl-N-(β-methylsulfonamidoethyl)-m-toluidine phosphate	WAY.
2-Amino-4-hydrazinebenzothiazole	HXL.
3-Amino-4-hydroxy-benzenesulfonamide	VPC.
4-Amino-5-hydroxy-2,7-naphthalenedisulfonic acid, benzenesulfonate	TRC.
4-Amino-3-hydroxy-1-naphthalenesulfonic acid	ACY, TRC.
6-Amino-4-hydroxy-2-naphthalenesulfonic acid, sodium salt	TRC.
3-Amino-2-hydroxy-5-nitroacetanilide	TRC.
2-(2-Amino-5-hydroxy-7-sulfo-1-naphthylazo)-5-nitrobenzoic acid	TRC.
2-(6-Amino-3-imino-3H-xanthen-9-yl)-benzoic acid, hydrochloride	EK.
4-Amino-5-methoxy-2-methylbenzenesulfonic acid	ATL.
m-[(4-Amino-3-methoxyphenyl)azo]benzenesulfonic acid	AC, DUP, TRC.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
3-[(4-Amino-3-methoxyphenyl)azo]1,5-naphthalene disulfonic acid	TRC.
4-Amino-5-methoxy-o-toluenesulfonic acid	SDH.
4-[(4-Amino-5-methoxy-o-tolyl)azo]-4-hydroxy-2,7-naphthalenedisulfonic acid, benzenesulfonate	TRC.
3-Amino-4-methylbenzamide	HST.
1-Amino-4-(4-methyleneaminomethylanilino)-9,10-dihydro-9,10-dioxo-2-anthracenesulfonic acid	VPC.
1-Amino-4-(4-methyleneaminomethyl-2-sulfoanilino)-9,10-dihydro-9,10-dioxo-2-anthracenesulfonic acid	VPC.
1-Amino-4-(3 and 4-methylenedimethylamino-anilino)-9,10-dihydro-9,10-dioxo-anthracene-2-sulfonic acid	VPC.
4-Amino-4'-(3-methyl-5-oxo-2-pyrazolin-1-yl)-2,2'-stilbenedisulfonic acid	TRC.
2-Amino-6-methylpyridine	RIL.
2-Amino-4-(methylsulfonyl)phenol	TRC.
2-Amino-5-methyl-1,3,4-thiadiazole	ACY.
2-Amino-1,5-naphthalenedisulfonic acid	ACY.
3-Amino-1,5-naphthalenedisulfonic acid (C Acid)	TRC.
6-Amino-1,3-naphthalenedisulfonic acid (Amino I acid)	AC, TRC.
*7-Amino-1,3-naphthalenedisulfonic acid (Amino G acid)	AC, DUP, TRC.
2-Amino-1,5-naphthalenedisulfonic acid, sodium salt	SDH.
2-Amino-1-naphthalenesulfonic acid (Tobias acid)	ACY, SW.
6-Amino-2-naphthalenesulfonic acid (Broenner's acid)	AC, TRC.
5(and 8)-Amino-2-naphthol	BUC.
8-Amino-2-naphthol	BUC, TRC.
6-Amino-1-naphthol-3-sulfonic acid, sodium salt (7-Amino-4-hydroxy-2-naphthalenesulfonic acid, sodium salt)	AC, TRC.
2-Amino-4-nitroacetanilide	SDC.
4-Amino-4'-nitro-2,2'-stilbenedisulfonic acid	AC, TRC.
5-Amino-2-[2-(4-nitro-2-sulfophenyl)ethenyl]benzenesulfonic acid, disodium salt	ATL.
2-Amino-5-nitrothiazole	PCW.
3'-Aminooxanilic acid	ATL.
4'-Aminooxanilic acid	ATL.
3-Amino-2-oxazolidinone	NOR.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
6-Aminopenicillanic acid	TRD, WYT.
p-Aminophenol	MAL, SCN.
2-(p-Aminophenoxy)ethanol hydrochloride	EK.
m-[(p-Aminophenyl)azo]benzenesulfonic acid	AC, TRC.
*p-[(p-Aminophenyl)azo]benzenesulfonic acid	ACY, ATL, DUP, TRC.
7-[(4-Aminophenyl)azo]-1,3-naphthalenedisulfonic acid	ATL, TRC.
5-[(p-Aminophenyl)azo]salicylic acid	TRC.
2-(p-Aminophenyl)-6-methylbenzothiazole	DUP.
2-(p-Aminophenyl)-6-methyl-7-benzothiazolesulfonic acid and salt	DUP, TRC.
1-(m-Aminophenyl)-5-oxo-2-pyrazoline-3-carboxylic acid	TRC.
m-Aminophenylphosphonic acid	ICI.
4-Aminopyrazolo(3,4-d)pyrimidine	KF.
2-Aminopyridine	NEP, RIL.
4-Aminopyridine	RIL.
5-Aminosalicylic acid	HXL.
3-Amino-p-toluamide	SDH.
α-Amino-p-toluenesulfonamide	SDW.
4-Amino-m-toluenesulfonic acid [$SO_3H=1$]	ACY, DUP.
6-Amino-m-toluenesulfonic acid [$SO_3H=1$]	DUP.
m-[(4-Amino-3-tolyl)azo]benzenesulfonic acid	TRC.
7-[(4-Amino-o-tolyl)azo]-1,3-naphthalenedisulfonic acid	TRC.
*Aniline (Aniline oil)	AC, ACY, DUP, FST, MAL, MOB, RUC, USR.
Aniline hydrochloride	ACY.
2-Anilinoethanol	EKT, MIL, TCH.
7-Anilino-4-hydroxy-2-naphthalenesulfonic acid	TRC.
*Anilinomethanesulfonic acid and salt	ACY, DUP, TRC.
8-Anilino-1-naphthalenesulfonic acid (Phenyl peri acid)	EK, SDC.
o-Anisidine	AC, DUP.
o-Anisidinomethanesulfonic acid	TRC.
Anisole, tech.	LIL.
Anthra[1,9]pyrazol-6(2H)-one (Pyrazoleanthrone)	SW, TRC.
Anthraquinone, 100%	TRC.
1,1'-[1,5(and 1,8)-Anthraquinonylenediamino[-bisnaphth] 2,3-C]acridan-5,8,14-trione	EKT.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
N,N'-(1,5-Anthraquinonylene)dianthranilic acid	TRC.
Benzaldehyde, tech.	HN, KLM, MNR.
1-Benzamido-5-chloroanthraquinone	TRC.
7-Benzamido-4-hydroxy-2-naphthalenesulfonic acid	TRC.
Benzanilide	DUP.
7H-Benz[de]anthracen-7-one (Benzanthrone)	ACY, TRC.
p-Benzenedisulfonic acid, 2,5-dihydroxy-dipotassium salt	EK.
Benzenesulfinic acid	EK.
Benzenesulfonic acid	UPF.
Benzenesulfonic acid, propyl ester	CWN.
Benzenesulfonyl chloride	UPF, USR.
1,2,4-Benzenetricarboxylic acid 1,2-anhydride (Trimellitic anhydride)	AMO.
Benzhydrol (Diphenylmethanol)	UOP.
Benzilic acid	LEM.
1-(1,3-Benzodioxol-5-Xl)ethanone	LIL.
*Benzoic acid, tech.	HN, KLM, PFZ, VEL.
Benzoin	GNW, LEM, SFS.
Benzoin isobutyl ether	SFS.
Benzoin isopropyl ether	SFS.
Benzoinoxime	FSA.
Benzonitrile	VEL.
2-Benzothiazolethiol	USR.
2-Benzothiazolethiol, sodium salt	ACY, GYR, USR.
1H-Benzotriazole	SW.
2-Benzoxazolethiol	EK.
o-Benzoylbenzoic acid	ACY.
Benzoyl chloride	HK, VEL.
N-Benzylacetamide	SDW.
Benzylamine	ARS, HXL.
2-(Benzylamino)ethanol	HXL.
4-Benzyl-6-chloro-3-keto-2-methyl-7-sulfamyl-1,2,4-benzylthiadiazine-1,1-dioxide	ABB.
4-Benzyl-6-chloro-3-keto-7-sulfamyl-1,2,4-benzylthiadiazine-1,1-dioxide	ABB.
Benzyl ether (Dibenzyl ether)	UOP.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
3-(Benzylethylamino)acetanilide	EKT.
4,4'-Benzylidenedi-o-toluidine	ACY.
1-Benzyl-4-phenylisonipecotic acid	SDW.
1-Benzyl-4-phenylisonipecotonitrile	SDW.
Benzyltrimethylammonium hydroxide	HXL.
Benzyltrimethylammonium methoxide	HXL.
[3,3'-Bianthra[1,9-cd]pyrazole]-6,6'(2H,2'H)-dione (Pyrazoleanthrone Yellow)	TRC.
[3,3'-Bi-7H-benz[de]anthracene]-7,7'-dione	ACY.
[4,4'-Bi-7H-benz[de]anthracene]-7,7'-dione	TRC.
*Biphenyl	CHL, DOW, GOC, MON, SUN, TCC.
3'-[Bis(2-acetoxyethyl)amino]-p-acetoanisidide	TCH.
3-[N,N-Bis(2'-acetoxyethyl)]amino-4-methoxyacetanilide	MTL.
N,N-Bis-(2-acetoxyethyl)-aniline	VPC.
Bis(p-aminocyclohexyl)methane	DUP.
1,4-Bis[1-anthraquinonylamino]anthraquinone	TRC.
1,5-Bis[1-anthraquinonylamino]anthraquinone	TRC.
1,4-Bis[1-anthraquinonylamino]anthraquinone and 1,4-bis [5-Chloro-1-anthraquinonylamino]anthraquinone (Mixed)	TRC.
2,6-Bis(p-azidobenzylidene)-4-methylcyclohexanone	X.
4,5'-Bis-benzoylamino-1,1'-anthrimid-2,2'-carbazole	VPC.
5,5'-Bis-benzoylamino-1,1'-anthrimid-2,2'-carbazole	VPC.
4,4'-Bis-benzoylamino-1,1'-anthrimide-2,2'-carbazole	VPC.
Bis(chlorosulfonyl)phthalocyaninedisulfonic acid, copper derivative	TRC.
N-N-Bis[cyanoethyl]aniline	DUP.
4,4'-Bis[diethylamino]benzhydrol salt, 2,7-naphthalenedisulfonic acid mixture	TRC.
4,4'-Bis[diethylamino]benzophenone (Ethyl ketone base)	X.
4,4'-Bis[dimethylamino]benzhydrol (Michler's hydrol)	X.
Bis(β-dimethylaminoethyl)phenylacetonitrile	WYT.
1,5-Bis[2,4-dinitrophenoxy]-4,8-dinitroanthraquinone	VPC.
3'-[Bis(2-hydroxyethyl)amino]benzanilide, diacetate ester	DUP, TCH.
3'-[Bis(2-hydroxyethyl)amino]-4'-methoxyacetanilide	EKT.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
4,4'-Bis[(p-hydroxyphenyl)azo]-2,2'-stilbenedisulfonic acid (C.I. Direct Yellow 4)	TRC.
Bis(pentachloro-2,4-cyclopentadiene-1,-yl-	HK.
1,2-Bis(tribromophenoxy)ethane	VEL.
p-Bromoaniline	EK.
p-Bromoanisole	OPC.
3-Bromo-7H-benz[de]anthracen-7-one (3-Bromobenzanthrone)	ACY.
Bromobenzene,mono-	GTL.
2-Bromo-6-chloro-4-nitroaniline-	HST.
4-Bromo-3,5-dihydroxybenzamide	PCW.
*2-Bromo-4,6-dinitroaniline	AC, GAF, HST, SDC.
Bromoethylbenzene-	RSA.
2-Bromo-4'-nitroacetophenone	RSA.
α-Bromo-p-nitrotoluene (p-Nitrobenzyl bromide)	DUP.
(p-Bromophenyl)acetonitrile-	SFS.
2-Bromopyridine-	RIL.
4-Bromoresorcylic acid	PCW.
4-Bromoresorcylic acid, ethanolamide	PCW.
4-Bromoresorcylic acid, methyl ester	PCW.
8-Bromotheophyline	CHT.
o-Bromotoluene	RSA.
p-Bromotoluene	SFS.
2-Bromo-1,3,5-triethylbenzene-	DUP.
p-Butylaniline	HDW.
n-Butylaniline	HDW.
3-(N-Butylanilino)propionitrile-	MIL, TCH.
2-tert-Butylanthraquinone-	DUP.
p-tert-Butylbenzaldehyde	GIV.
tert-Butylbenzene-	UOP.
p-tert-Butylbenzoic acid	SHC.
o-(p-tert-Butylbenzoyl)benzoic acid-	DUP.
2-tert-Butyl-p-cresol-	ACY.
6-tert-Butyl-m-cresol-	KPT.
2'-tert-Butyl-4',6'-dimethylacetophenone	GIV.
2-tert-Butyl-4-ethylphenol	ACY.
tert-Butylhydroquinone	X.
2-tert-Butyl-5-methylanisole	GIV.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
o-sec-Butylphenol	TNA.
o-tert-Butylphenol	TNA.
p-tert-Butylphenol	DOW, PER, SCN.
*Butylphenols, mixed	DOW, PER, SCN, TNA.
p-tert-Butyltoluene	GIV, SHC.
5-tert-Butyl-1,2,3-trimethylbenzene	GIV.
5-tert-Butyl-m-xylene	GIV.
6-tert-Butyl-2,4-xylenol	PER, PIT, RH.
d-10-Camphorsulfonic acid	KF.
(3-Carbamoyl-3,3-diphenylpropyl)diisopropylmethylammonium iodide	SK.
2-(p-Carboxyphenoxy)-2-pivaloyl-2,(4)-dichloroacetanilide	EK.
Cedrene	GIV.
o-Chloranil	UPJ.
2-Chloroacetamido-5-chlorobenzophenone	WYT.
2'-Chloroacetoacetanilide	EKT, HST.
4'-Chloroacetophenone	LIL.
4'-(Chloroacetyl)acetanilide	DUP.
9-Chloroacridine	EK.
o-Chloroaniline	DUP.
m-Chloroaniline	DUP.
p-Chloroaniline	DUP, MON.
3-(o-Chloroanilino)propionitrile	DUP, TCH.
5-Chloro-o-anisidine [NH_3=1] (4-Chloro-o-anisidine [OCH_3=1])	ALL.
1-Chloroanthraquinone	ACY, TRC.
2-Chloroanthraquinone	ACY.
o-Chlorobenzaldehyde	HN, SDH.
p-Chlorobenzaldehyde	HN.
Chloro-7H-benz[de]anthracen-7-one (Chlorobenzanthrone)	TRC.
*Chlorobenzene, mono-	ACS, DOW, MON, MTO, PPG, SCC.
p-Chlorobenzenesulfinic acid	TRC.
p-Chlorobenzenesulfonic acid	UPF.
p-Chlorobenzenethiol	SFA.
o-Chlorobenzoic acid	HN, SDH.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
m-Chlorobenzoic acid, methyl ester	VEL.
p-Chlorobenzoyl chloride	HN.
Chloro(p-chlorophenyl)phenylmethane	OPC.
1-Chloro-2,5-dibutoxy-4-nitrobenzene	ALL.
1-Chloro-2,5-diethoxy-4-nitrobenzene	ALL.
7-Chloro-1,3-dihydro-3-hydroxy-5-phenyl-2H-1,4-benzodiazepin-2-one, acetate ester	WYT.
7-Chloro-1,3-dihydro-5-phenyl-2H-1,4-benzodiazepin-2-one-4-oxide	WYT.
4'-Chloro-2',5'-dimethoxyacetoacetanilide	HST, PCW.
4-Chloro-2,5-dimethoxyaniline	PCW.
5-Chloro-2,4-dimethoxyaniline	ALL, PCW.
2-Chloro-1,4-dimethoxybenzene	PCW.
4-Chloro-2,5-dimethoxynitrobenzene	PCW.
2-[p-Chloro-α-(2-dimethylaminoethyl)benzyl]pyridine	SK.
2-Chloro-10-[3-(dimethylamino)propyl]phenothiazine	SK.
1-Chloro-2,4-dinitrobenzene (Dinitrochlorobenzene)	SDC.
4-Chloro-3,5-dinitrobenzenesulfonic acid, potassium salt	SDC.
2-Chloro-1,3-dinitro-5-(trifluorotoluene)	GAF.
3-Chlorodiphenylamine	SK.
Chlorodiphenylmethane	OPC.
4-Chloro-5'-ethyl-2'-hydroxybenzanilide	LIL.
p-[(2-Chloroethyl)methylamino]benzaldehyde	ATL.
2-Chloro-4'-fluorobenzophenone	LIL.
2-Chloro-4-hydroxybenzoic acid	EK.
7-Chloro-4-hydroxyquinidine hydrochloride	PD.
4-Chloro-N-isopropyl-3-nitrobenzenesulfonamide	TRC.
4-Chlorometanilic acid	BCC.
1-Chloro-2-methylanthraquinone	ACY, TRC.
α-Chloromethylnaphthalene, crude	SFS.
4-Chloro-N-methyl-3-nitrobenzenesulfonamide	TRC.
2-Chloro-10-[3(4-methyl-1-piperazinyl)propyl]phenothiazine	SK.
ar-Chloromethylstyrene	DOW.
5-Chloro-2-(N-methyl)sulfamyl-4-sulfamyl-N-benzylaniline	ABB.
2-Chloro-4-nitroaniline (o-Chloro-p-nitroaniline)	DUP.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
4-Chloro-2-nitroaniline (p-Chloro-o-nitroaniline)	DUP, VPC.
1-Chloro-2-nitrobenzene (Chloro-o-nitrobenzene)	DUP, MON.
1-Chloro-3-nitrobenzene (Chloro-m-nitrobenzene)	SCC.
1-Chloro-4-nitrobenzene (Chloro-p-nitrobenzene)	DUP, MON.
4-Chloro-3-nitrobenzenesulfonamide	DUP, EKT, TRC.
4-Chloro-3-nitrobenzenesulfonanilide	TRC.
2-Chloro-5-nitrobenzenesulfonic acid	TRC.
*4-Chloro-3-nitrobenzenesulfonyl chloride	DUP, EKT, SDC, VPC.
2-Chloro-4-nitrobenzoic acid	SAL.
2-Chloro-5-nitrobenzoic acid	TRC.
5-Chloro-2-nitrobenzoic acid, methyl ester	EGR.
2-Chloro-4-nitrobenzoic acid, potassium salt	SAL.
4-Chloro-3-nitro-N,N-dimethylbenzenesulfonamide	EKT.
2-Chloro-5-nitrophenylmethyl sulfone	TRC.
4-Chloro-3-nitrophenylmethyl sulfone	TRC.
2-Chloro-4-nitrotoluene	DUP.
2-Chloro-6-nitrotoluene	DUP.
4-Chloro-3-nitrotoluene	GAF.
o-Chlorophenol	MON.
p-Chlorophenol	MON, RDA.
2-Chlorophenothiazine	SK.
(p-Chlorophenyl)acetonitrile	UOP.
4-Chloro-α-phenyl-o-cresol	MON.
o-Chlorophenylcyclopentyl ketone	ARA.
(m-Chlorophenyl)diethanolamine	HST.
o-Chlorophenyl-1-hydroxycyclopentyl-N-methylkitimine	PD.
2,2'-[(m-Chlorophenyl)imino]diethanol	TCH.
2,2'-[(m-Chlorophenyl)imino]diethanol, diacetate ester	SDC.
3-(o-Chlorophenyl)-5-methyl-4-isoxazole carboxylic acid, chloride	ARS.
1-(m-Chlorophenyl)-3-methyl-2-pyrazolin-5-one	TRC.
p-Chlorophenyl methyl sulfone	TRC.
(2-Chlorophenyl)thiourea	SDC.
4-Chlorophthalic acid	SW.
(3-Chloropropenyl)benzene	SDW.
1-(3-Chloropropyl)-4-methylpiperazine	SK.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
2-Chloropyridine	OMC.
7-Chloro-4-quinolinol	SDW.
4-Chlororesorcinol	AC, PCW.
5-Chlorosalicylic acid	PCW.
o-Chlorotoluene	HK, HN.
m-Chlorotoluene	HN.
p-Chlorotoluene	HN.
α-Chlorotoluene (Benzyl chloride)	MON, SFS.
3-Chloro-p-toluidine [NH_2=1]	DUP.
4-Chloro-o-toluidine [NH_2=1] and hydrochloride	ALL, PCW.
N-[(5-Chloro-o-tolyl)azo]sarcosine	ALL.
1-(6-Chloro-o-tolyl)-3-methyl-2-pyrazolin-5-one	TRC.
4-Chloro-α,α,α-trifluoro-3-nitrotoluene	ALL.
p-Chloro-α,α,α-trifluorotoluene	HK.
6-Chloro-α,α,α-trifluoro-m-toluidine	PCW.
4-Chloro-3,5-xylenol	FER.
Cholic acid	WIL.
Cinnamic acid	CGY.
Cinnamoyl chloride	EK.
Copper,[2,2',2'',2'''-[29H,31H-phthalocyaninepentylpentakis(methylene)]pentakis[1H-isoindole-1,3(2H)-dionato]]	SDH.
*CRESOLS:	
m-Cresol	KPT.
*O-CRESOL:	
o-Cresol, from coal tar	FER, KPT.
o-Cresol, from petroleum	FER, MER, SW.
p-Cresol	SW.
CRESOLS, MIXED:	
(M,P)-CRESOL:	
(m,p)-Cresol, from coal tar	FER, KPT.
(m,p)-Cresol, from petroleum	FER, MER, NPC.
(O,M,P)-CRESOL:	
(o,m,p)-Cresol, from coal tar	KPT.
Cresols, mixed	PIT.
*CRESYLIC ACID, REFINED:	
Cresylic acid, refined from coal tar	FER, KPT.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*CRESYLIC ACID, REFINED--Continued:	
Cresylic acid, refined from petroleum	PER, MER, NPC.
p-Cumylphenol	X.
2-[p-(Cyanoacetamido)phenyl]-6-methyl-7-benzo-thiazole-sulfonic acid	DUP.
4-(Cyanoacetyl)morpholine	PCW.
4-[(2-Cyanoethyl)ethylamino]-o-tolualdehyde	DUP.
p-[(2-Cyaneethyl)methylamino]benzaldehyde	DUP.
N-2-Cyanoethyl-m-toluidine	DUP.
N-Cyano-S-methyl-N-2(4-methyl-5-imidazolyl)-methylthio ethylisothiourea	SK.
1,5,9-Cyclododecatriene (CDDT)	DUP.
1,3-Cyclohexanedione	PD.
Cyclohexanol	ALP, DBC, DUP, MON.
*Cyclohexanone	ALP, CEL, CNP, DBC, DUP, MON, UCC.
Cyclohexanone oxime	CNP.
3-Cyclohexene-1-carboxaldehyde	UCC.
4-Cyclohexene-1,2-dicarboximide	SPC.
4-Cyclohexene-1,2-dicarboxylic anhydride	DKA.
Cyclohexene oxide	USR.
β-(1-Cyclohexenyl)ethylamine	HXL.
Cyclohexylamine	ABB, RBC, VGC.
2-Cyclopentanone-β-(2,5-dihydroxybenzene) ethyl ketone	X.
(2-Cyclopenten-1-yl)-2-propanone	LIL.
2-(N-Cyclopropylmethyl-N-phthalimidoacetyl)-amino-5-chlorobenzophenone	PD.
p-Cymene	HPC.
Deoxycholic acid	WIL.
Diacenaphtho[1,2-j:1',2'-l]fluoranthene (Decacyclene)	SDC.
3,5-Diacetamido-2,4,6-triiodobenzoic acid	SDW.
N,N-Diacetoxyethyl-3'-aminoacetanilide	TPC.
3'-[Di(2-acetoxyethyl)amino]-p-acetophenetidide	AC.
Dialkylbenzene	SOC.
Diallylphthalate	HDW.
1,4-Diaminoanthraquinone	TRC.
1,5(and 1,8)-Diaminoanthraquinone	AC.
2,4-Diaminobenzenesulfonic acid [$SO_3H=1$]	DUP, TRC.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
1,3 Diaminocyclohexane	DUP.
1,4-Diamino-2,3-dichloroanthraquinone	DUP.
1,4-Diamino-2,3-dicyanoanthraquinone	DUP.
*1,4-Diamino-2,3-dihydroanthraquinone	ACY, DUP, HSH, TRC.
4,8(and 4,5)-Diamino-9,10-dihydro-1,5(and 1,8)-dihydroxy-9,10-dioxo-2,6(and 2,7)-anthracenedisulfonic acid	TRC.
4,8-Diamino-9,10-dihydro-1,5-dihydroxy-9,10-dioxo-2,6-anthracenedisulfonic acid	TRC.
1,4-Diamino-9,10-dihydro-9,10-dioxo-2,3-anthracenedicarboximide	DUP.
1,5-Diamino-4,8-dihydroxyanthraquinone	VPC.
2,4-Diamino-6-phenyl-s-triazine	VEL.
2,6-Diaminopyridine	RIL.
4,4'-Diamino-2,2'-stilbenedisulfonic acid	CGY, GAF, SDH, TRC.
3,5-Diamino-2,4,6-triiodobenzoic acid	SDW.
2-Diazo-1-naphthol-5-sulfonic acid sodium salt	HST.
4,5'-Dibenzamido-1,1'-iminodianthraquinone	ACY, TRC.
Dibenzo(b,def)chrysene-7,14-dione	TRC.
1,5-Dibenzoylnaphthalene	TRC, VPC.
N,N'-Dibenzylethylenediamine	WYT.
N,N'-Dibenzylethylenediamine diacetate	WYT.
N',N'-Dibenzylidenetoluene-α,α-diamine	SDH.
4,10-Dibromo-anthantrone	VPC.
3,9-Dibromo-7H-benz[de]anthracen-7-one	TRC.
4,4'-Dibromobiphenyl	EK.
2,6-Dibromo-4-nitroaniline	HST, SDC.
2,6-Dibromo-4-nitrophenol	SW.
3,5-Dibromo-3'-trifluoromethylsalicylanilide (Fluorophene)	PCW.
p-Dibutoxybenzene (DBB)	ALL.
2,5-Dibutoxy-4-morpholinobenzenediazonium sulfate salt (DBB Sulfate)	ALL.
2,6-Di-tert-butyl-α-dimethylamino-p-cresol	TNA.
2,4-Di-tert-butylphenol	FER, HST, PIT.
2,6-Di-sec-butylphenol	TNA.
3,4-Dichloroaniline	DUP, MON.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
1,5-Dichloroanthraquinone	TRC.
2,6-Dichlorobenzaldehyde	DUP.
Dichlorobenzanthrone	ACY.
o(and p)-Dichlorobenzene	MTO, PPG.
*o-Dichlorobenzene	ACS, DOW, MON, SCC.
*p-Dichlorobenzene	ACS, DOW, DVC, SCC.
4,6-Dichloro-m-benzenedisulfonamide	ABB, PPG.
3,3'-Dichlorobenzidine base and salts	CWN, X.
4,4'-Dichlorobenzil	MTO.
Dichlorobenzyl chloride	SPS.
Dichlorodiphenylsilane	DCC.
cis(and trans)-3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid, methyl ester	X.
2,4-Dichloro-6-isopropylamino-s-triazine	VTC.
2,5-Dichloro-4-(3-methyl-5-oxo-2-pyrazolin-1-yl)benzenesulfonic acid	TRC.
Dichloromethylphenylsilane	DCC.
2,6-Dichloro-4-nitroaniline	BUC, CWN.
1,2-Dichloro-4-nitrobenzene	DUP.
1,4-Dichloro-2-nitrobenzene (Nitro-p-dichlorobenzene)	ALL, DUP.
*2,4-Dichlorophenol	DOW, MON, RDA.
2,6-Dichloropyrazine	ACY.
3,6-Dichloropyridazine	ACY.
4,7-Dichloroquinoline	PD, SDW.
2,5-Dichlorosulfanilic acid [$SO_3H=1$]	DUP, VPC.
2,5-Dichloro-4-sulfobenzenediazonium sulfate	TRC.
2,3-Dichloro-4-(2-thienyl-carbonyl)phenoxyacetic acid, sodium salt monohydrate	SK.
p,α-Dichlorotoluene	HK, HN.
α,α-Dichlorotoluene (Benzal chloride)	SPS.
2,6-Dichlorotoluene	DUP.
Dicyclohexylamine	ABB, VGC.
Dicyclopentadiene (includes Cyclopentadiene)	VEL.
Dicyclopentadiene diepoxide	X.
Dicyclopentadiene dioxide	VEL.
Didodecylbenzene	CO.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
3-Diethylaminoacetanilide	DUP.
p-(Diethylamino)benzaldehyde	ATL, DUP.
3'-[2-(Diethylamino)ethyl]-4'-hydroxyacetanilide	PD.
α-[(2-Diethylamino)ethyl]-α-phenylcyclohexanemethanol, hydrochloride	ACY.
2[4-Diethylamino-2-hydroxybenzylbenzoic acid]	SDH.
3-[(4'-N,N-Diethylamino)phenylazo]-1H-1,2,4-triazole	ACY, TRC.
3-(Diethylamino)propiophenone	ACY.
4-(Diethylamino)-o-tolualdehyde	DUP.
*N,N-Diethylaniline	ACY, BCC, DUP.
2,6-Diethylaniline	TNA.
N,N-Diethyl-m-anisidine	DUP.
Diethylbenzene	DOW.
N,N-Diethylcyclohexylamine	DUP.
N¹,N¹-Diethyl-4-methoxymetanilamide	PCW.
N,N-Diethyl-p-phenylenediamine oxalate	EK.
N,N-Diethyl-m-toluamide	HDW.
N,N-Diethyl-m-toluidine	DUP.
N,N-Diethyl-p-toluidine	RSA.
2,4-Difluoroaniline	OMC.
6,11-Dihydrodibenz(b,e)oxepin-11-one	SK.
9,10-Dihydro-9,10-dioxo-1,5-anthracenedisulfonic acid	TRC.
9,10-Dihydro-9,10-dioxo-1,8-anthracenedisulfonic acid, potassium salt	TRC.
9,10-Dihydro-9,10-dioxo-1-anthracenesulfonic acid and salt	ACY, TRC.
1,2-Dihydro-1-methyl-5H-tetrazole-5-thione	MPT.
1,2-Dihydro-2,2,4,7-tetramethylquinoline	EKT.
*1,4-Dihydroxyanthraquinone	AC, ACY, DUP, EKT, HSH, TRC.
1,5-Dihydroxyanthraquinone	TRC.
1,5(and 1,8)-Dihydroxyanthraquinone	TRC.
1,8-Dihydroxyanthraquinone	TRC.
2,5-Dihydroxybenzenesulfonic acid, potassium salt	EK.
2,4-Dihydroxybenzophenone	ACY, DUP.
1,5-Dihydroxy-4,8-dinitroanthraquinone	TFC, VPC.
1,8-Dihydroxy-4,5-dinitroanthraquinone	EKT, VPC.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
N,N-Di(β-hydroxyethyl)-m-chloroaniline	MIL.
3,5-Dihydroxy-N-(2-hydroxyethyl)benzamide	PCW.
6,7-Dihydroxy-2-naphthalenesulfonic acid	WAY.
3,3'-Dihydroxy-2-naphthanilide	WAY.
3-[(2,4-Dihydroxyphenyl)azo]-4-hydroxybenzenesulfonic acid, sodium salt-copper complex	ATL.
16,17-Dihydroxyviolanthrone (Dihydroxydibenzanthrone)	ACY, TRC.
Diisopropylbenzene	DOW.
2,5-Dimethoxyaniline	ALL, EKT.
1,5(and 1,8)-Dimethoxyanthraquinone	TRC.
2,5-Dimethoxybenzaldehyde	CWN, UPJ.
m-Dimethoxybenzene	ACY, ARS, GAF.
3,3'-Dimethoxybenzidine hydrochloride	CWN.
2,6-Dimethoxybenzoic acid	ARS.
3,3'-Dimethoxybenzoin	DUP.
2,5-Dimethoxy-α-methylphenethylamine	X.
1,4-Dimethoxy-2-nitrobenzene	EKT.
2,5-Dimethoxytetrahydrofuran	HEX.
p-(Dimethylamino)benzaldehyde	EK, TRC.
m-(Dimethylamino)benzoic acid	X.
6-Dimethylamino-2-[2-(2,5-dimethyl-1-phenyl-3-(pyrroyl)-vinyl]-1-methyl-1-quinolinium methyl sulfate	X.
2-[[2-(Dimethylamino)ethyl]-2-phenylamino]-pyridine	ABB.
2-Dimethylaminomethyl-4-nitro-6-ethoxyphenol	ARA.
6-Dimethylamino-1-methylquinaldiniummethyl sulfate	EK.
m-Dimethylaminophenol	ACY.
1-(3-Dimethylamino-propylamino)-4-(4-methyl-anilino)-9,10-dioxo-anthracene	VPC.
11-[3-(Dimethylamino)propyl]-11-hydroxy-dibenz(b,e)oxepin	SK.
6-(Dimethylamino)quinaldine	EK.
*N,N-Dimethylaniline	ACY, BCC, DUP.
7,12-Dimethylbenz[a]anthracene	EK.
3,3'-Dimethylbenzidine hydrochloride	EK.
*N,N-Dimethylbenzylamine	ARS, HXL, RH, SW.
α,α-Dimethylbenzyl hydroperoxide	USS.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
2,2'-Dimethyl-1,1'-bianthraquinone	ACY, TRC.
N,N-Dimethylcyclohexylamine	ABB.
5,5-Dimethylhydantoin	GLY.
2,3-Dimethylindole	DUP.
2,5-Dimethyl-4(2)-morpholinylmethylphenol, hydrochloride	WAY.
2,3-Dimethyl-5-nitrobenzenesulfethanolamide	TRC.
N,N-Dimethyl-p-nitrosoaniline	EK.
2,6-Dimethylol-p-cresol	SW.
N,N-Dimethyl-p-phenylenediamine monohydrochloride	EK.
1,4-Dimethylpiperazine	JCC.
3,5-Dimethylpyrazole	UPJ.
N,N-Dimethyl-o-toluidine	RSA.
N,N-Dimethyl-p-toluidine	EK, RSA.
2,4-Dinitroaniline	HST, SDC.
1,5(and 1,8)-Dinitroanthraquinone	TRC.
m-Dinitrobenzene	DUP.
2,4-Dinitrobenzenesulfonic acid	TRC.
3,5-Dinitrobenzoic acid	SAL.
3,5-Dinitrobenzoyl chloride	EK.
Dinitrocaprylphenol	RH.
4,4'-Dinitrodiphenyl ether	DUP.
2,6-Dinitro-4-isopropylphenol	SDC.
2,4-Dinitrophenol, tech.	SDC, VPC.
3,5-Dinitrosalicylic acid	SAL.
4,4'-Dinitrostilbene-2,2'-disulfonic acid	AC, CGY, GAF.
4,4-Dinitrostilbene-2,2'-disulfonic acid, sodium salt	SDH.
2,4-Dinitrotoluene	ACS, DUP, RUC.
*2,4(and 2,6)-Dinitrotoluene	DUP, MOB, UCC, X.
Dinonylphenol	GAF, JCC, MON.
2,4-Di-tert-pentylphenol	FER, PAS.
Di-tert-pentylphenoxyacetyl chloride	EK.
1,5-Diphenoxyanthraquinone	VPC.
Diphenylamine	ACY, DUP, ORO, RUC, USR.
2,5-Diphenyl-p-benzoquinone	EK.
N,N'-Diphenylethylenediamine	RPC.
Diphenylmethane	PD.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
2,5-Diphenyloxazole	EK.
2,8-Diphenylthiazol [(5',4':7,8)]anthra[(2,1-d)]thiazol-6,12-chinone	VPC.
4,4'-Dithiodianiline	ACY, SDC.
1,4-Di-p-toluidinoanthraquinone	HSH.
Divinylbenzene	DOW, HST.
Dodecylbenzyl chloride	SPS.
Dodecylmethylbenzyl chloride	RH.
p-Dodecylphenol	GAF, MCB, MON.
Doxepin base	SK.
Ethoxylated and propoxylated-m-toluidine	TCH.
4-Ethoxy-3-methoxybenzaldehyde	LIL.
6-(2-Ethoxy-1-naphthamido)penicillanic acid	WYT.
2-Ethoxy-1-naphthoic acid	WYT.
2-Ethoxy-1-naphthoyl chloride	WYT.
4-[(p-Ethoxyphenyl)azo]-m-phenylenediamine monohydrochloride	EK.
4-Ethoxy-o-phenylenediamine	TRC.
N¹-(6-Ethoxy-3-pyridazinyl)sulfanilamide	ACY.
3'-(Ethylamino)acetanilide	EKT.
N-Ethyl-N-(β-aminoethyl)-m-toluidine	X.
o-Ethylaniline	TNA.
*N-Ethylaniline, refined	ACY, BCC, DUP.
*2-(N-Ethylanilino)ethanol	DUP, MIL, TCH.
[2-(N-Ethylanilino)ethyl]trimethylammonium chloride	DUP, GAF.
3-(N-Ethylanilino)propionitrile	MIL, TCH.
α-(N-Ethylanilino)-m-toluenesulfonic acid	GAF, X.
α-(N-Ethylanilino)-p-toluenesulfonic acid	TRC.
Ethylbenzyl chloride	SPS.
d(-)Ethyl-3-(α-carboxybenzyl)amino crotonate, potassium salt	KF.
N-Ethyl-N-(2-chloroethyl)-3-toluidine	VPC.
*2-(N-Ethyl-N,β-cyanoethyl)-4-acetaminoanisole	SDC, TCH, VPC.
N-Ethylcyclohexylamine (Herbicide intermediate)	ABB.
N-Ethyl-N-(2,3-dihydroxypropyl)-m-toluidine	EKT.
3,3'-Ethylenedioxydiphenol	WAY.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
N-Ethylmaleimide	EK.
2-[N-Ethyl-p-[(6-methoxy-2-benzothiazoyl)azo]anilino] ethanol	TRC.
dl-13β-Ethyl-3-methoxy-8,14-secogona-1,3,5(10),9(11)-tetraene-14,17-dione	WYT.
6-Ethyl-2-methylaniline	TNA.
N-Ethyl-N-(2-methylsulfonamidoethyl)-m-toluidine	X.
9-Ethyl-3-nitrocarbazole	SDC.
α-Ethyl-3-nitrocinnamic acid	SDW.
p-Ethylphenol	ACY, SW.
N-Ethyl-N-phenylbenzylamine	DUP, GAF, X.
N-Ethyl-N-(3'-sulfobenzyl)aniline	VPC.
N-Ethyl-m-toluidine	DUP.
*3-(N-Ethyl-m-toluidino)propionitrile	DUP, MIL, TCH.
4-Fluoro-3-nitroaniline	OMC.
o-Formylbenzenesulfonic acid, sodium salt	SDH.
Furan	QKO.
Furfuryl acetate	EK.
Furfuryl alcohol	QKO.
Furfurylamine	HXL.
p-Heptylbenzoyl chloride	EK.
Hexachlorocyclopentadiene	VEL, X.
1,4,5,6,7,7-Hexachloro-5-norbornene-2,3-dicarboxylic anhydride (Chlorendic anhydride)	VEL.
Hexahydro-1-methyl-4-phenyl-1H-azepine-4-carbonitrile	WYT.
Hexahydro-1-methyl-4-phenyl-1H-azepine-4-carboxylic acid	WYT.
Hexamethylenimine	CEL, DUP.
p-Hydrazinobenzenesulfonic acid	STG.
Hydrazobenzene	LAK.
Hydroquinone, tech.	EKT, GYR.
p-Hydroxybenzaldehyde	DOW.
p-Hydroxybenzenesulfonic acid	FER, UPF.
p-Hydroxybenzoic acid	HN.
3'-Hydroxy-2-(N-benzyl-N-methylamino)acetophenone hydrochloride	SDW.
Hydroxycyclopentylphenylacetic acid	ARA.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
m-(β-Hydroxyethoxy)phenol	BJL.
3-[N-(2-Hydroxyethyl)anilino]propionitrile	MIL, TCH.
3-[N-(2-Hydroxyethyl)anilino]propionitrile acetate	MIL, TCH.
3-[N-(2-Hydroxyethyl)anilino]propionitrile benzoate	DUP, TCH.
N-(2-Hydroxyethyl)-o-chloroaniline	EKT.
N-(β-Hydroxyethyl)-N-ethyl-m-toluidine	MIL.
1-(2-Hydroxyethyl)-1,2,3,4-tetrahydro-2,2,4-trimethylquinoline	EKT.
3-[N-(2-Hydroxyethyl)-m-toluidino]propionitrile	DUP.
6'-Hydroxy-5'-[(2-hydroxy-5-nitrophenyl)azo]-m-acetotoluidide	TRC.
4-Hydroxymetanilamide	DUP, TRC.
4-Hydroxymetanilanilide	TRC.
3-Hydroxy-2-methylcinchoninic acid	DUP, TRC.
4-Hydroxy-N'-methylmetanilamide	TRC.
4(5)-Hydroxymethyl-5(4)-methylimidazole hydrochloride	PD, TNA.
4-Hydroxy-7-methyl-1,8-naphthyridine-3-carboxylic acid, ethyl ester	SDH.
3-Hydroxy-N-(3-N-morpholino-γ-propyl)-1-naphthimide	WAY.
3-Hydroxy-N-(3-N-morpholino-γ-propyl)-2-naphthimide	WAY.
7-Hydroxy-1,3-naphthalenedisulfonic acid	DUP, TRC.
3-Hydroxy-2,7-naphthalenedisulfonic acid, disodium salt	ACY, TRC.
7-Hydroxy-1,3-naphthalenedisulfonic acid, disodium salt	ACY.
6-Hydroxy-2-naphthalenesulfonic acid, sodium salt	ACY, TRC.
8-Hydroxy-1-naphthalenesulfonic acid, γ-sultone	TRC.
3-Hydroxy-2-naphthoic acid (B.O.N.)	ACY, PCW.
3-Hydroxy-2-naphthoic acid, aminopropylmorpholide	PCW.
3-Hydroxy-2-naphthoic acid, diethylenetriamineamide	PCW.
3-Hydroxy-2-naphthoic acid, ethanolamide	PCW.
3-Hydroxy-2-naphthoic acid, methyl ester	PCW.
3-Hydroxy-2-naphthoic acid, sodium salt	PCW.
2-Hydroxy-1,4-naphthoquinone	SAL.
N-(7-Hydroxy-1-naphthyl)acetamide	TRC.
1-(2-Hydroxy-1-naphthylazo)-6-nitro-2-hydroxynaphthalene-4-sulfonic acid	TRC.
4-Hydroxy-3-nitro-benzene-sulfonamide	VPC.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
3-Hydroxy-7-nitronaphthalenesulfonic acid	TRC.
1-Hydroxy-6-octadecyloxy-2-naphthoic acid	ARA.
2-Hydroxy-4-n-octoxybenzophenone	CCW.
3-[(4-(4-Hydroxyphenylazo)-2,5-dimethoxyphenyl)azo] benzenesulfamic acid	TRC.
11α-Hydroxyprogesterone	UPJ.
2-Hydroxy-4-sulfo-1-naphthalenediazonium hydroxide, inner salt	ACY.
1-Hydroxy-4-p-toluidinoanthraquinone	HSH.
1,1'-Iminobis[4-aminoanthraquinone]-	ACY, TRC.
1,1'-Iminobis[4-benzamidoanthraquinone]-	ACY.
1,1'-Iminobis[4-nitroanthraquinone]-	ACY, TRC.
Iminodianthraquinone (1,1'-Dianthrimide)	ACY, TRC.
2-Indolecarboxylic acid	ARA.
Indole-2,3-dione	DUP.
Indole-2,4-dione	TRC.
2-Iodoacetamido-5-chlorobenzophenone	WYT.
10-(p-Iodophenyl)undecanoic acid, ethyl ester	X.
Isatoic anhydride	SW.
Isobutylbenzene	PLC, TNA.
*ISOCYANIC ACID DERIVATIVES:	
Bitolylene diisocyanate (TODI)	CWN, UPJ.
Diphenylmethane-4,4'-diisocyanate (MDI)	MOB, UPJ.
Isocyanic acid,p-chlorophenyl ester	MOB.
1,1'-Methylenebis[4-isocyanatocyclohexane]	DUP.
Phenylisocyanate	MOB, UPJ.
*Polymethylene polyphenylisocyanate	MOB, RUC, UPJ.
*Toluene 2,4-diisocyanate	DUP, MOB.
Toluene 2,4-and 2,6-diisocyanate (80/20 Mixture)	ACS, BAS, DOW, DUP, MOB, OMC, RUC, UCC.
Toluene 2,4-and 2,6-diisocyanate (65/35 Mixture)	DUP, MOB.
Toluene 2,4-and 2,6-diisocyanate (65/35 Mixture) and (80/20 Mixture)	DUP.
Toluene diisocyanates, crude	DUP.
p-Toluenesulfonyl isocyanate	CWN.
Isocyanic acid derivatives, all other	BAS, UCC.
Isonicotinic acid, methyl ester	RIL.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
Isonicotinonitrile	RIL.
2-Isonitrosoacetanilide	DUP, TRC.
Isophthalic acid (Benzene-1,3-dicarboxylic acid)	AMO.
Isophthalic acid, diphenyl ester	BJL.
Isophthalonitrile	SW.
Isophthaloyl chloride	DUP.
N-Isopropylaniline	USR.
Isopropylbiphenyl	TCC.
5,5'-Isopropylidenebis(2-hydroxy-m-xylene-α,α'-diol)	ARK.
*4,4'-Isopropylidenediphenol (Bisphenol A)	DOW, GE, SHC, UCC.
4,4'-Isopropylidenediphenol, ethoxylated	ICI.
4,4'-Isopropylidenediphenol, propoxylated	ICI.
o-Isopropylphenol	PER, TNA.
p-Isopropylphenol	PER.
Isopropylphenol, mixed	PMP.
Isothiocyanic acid, phenyl ester	EK.
*Leuco quinizarin (1,4,9,10-Anthratetrol)	DUP, HSH, TRC.
2,4-Lutidine	KPT, RIL.
3,4-Lutidine	KPT, RIL.
Mandelonitrile	KF.
*Melamine	ACS, ACY, MLC.
p-Mentha-1,4(8)-diene	GIV.
*dl-p-Mentha-1,8-diene (Limonene)	ARZ, HPC, NCI.
p-Menth-1-ene (Carvomenthene)	GIV.
o-Mercaptobenzoic acid	AMB.
Metanilic acid (m-Aminobenzenesulfonic acid)	DUP, TRC, USM.
2-Methoxy-5-acetamino-N,N-bis(acetoxyethyl)aniline	HST.
4-Methoxymetanilic acid	AC.
Methoxymethyldiphenyl oxide	SPS.
(p-Methoxyphenyl)acetic acid	UOP.
N[4[1-[(2-Methoxyphenylamino)carbonyl]-2-oxopropylazo-phenyl]-4-[1[(2-methoxyphenylamino)carbonyl]-2-oxopropylazo]benzamide]	SDH.
6-Methoxyquinoline	DUP.
1-(Methylamino)anthraquinone	AC, ACY.
1-(Methylamino)-4-p-toluidinoanthraquinone	VPC.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
2-(N-Methylanilino)ethanol	TCH.
1-(4-Methylanilino)-4-methoxy-9,10-dihydro-9,10-dioxoanthracene	VPC.
*3-(N-Methylanilino)propionitrile	DUP, MIL, TCH.
5-Methyl-o-anisidinesulfonic acid	BCC, SW.
m-Methylanisole	GIV.
2-Methylanthraquinone	ACY.
3-Methylbenzo[f]quinoline	ACY.
2-Methylbenzothiazole	FMT.
4-Methylbenzothiazolone, hydrazone	LIL.
N-Methylbenzylamine	HXL, SDW.
Methyl biphenyl	DOW.
N-Methyl-N-carboxyanthranilic anhydride	SW.
1-Methyl-4-(3-chloropropyl)piperazine hydrochloride	SK.
Methylcyclohexane	PLC.
N-Methylcyclohexylamine	ABB.
N-Methyldicyclohexylamine	ABB.
4-Methyl-2,6-dinitrophenol	SW.
N-Methyleneaniline	PCW.
3,3'-Methylenebis[6-aminobenzoic acid], dimethyl ester	ADC.
4,4'-Methylenebis[2-chloroaniline]	ADC, DUP.
4,4'-Methylenebis[2-chloroaniline] and 4,4'-methylenebis(aniline), mixed	DUP.
4,4'-Methylenebis[2,6-dichloroaniline]	ADC.
4,4'-Methylenebis[N,N-diethylaniline]	ACY.
4,4'-Methylenebis[N,N-dimethylaniline] (Methane base)	ACY, DUP, X.
4.4'-Methylenebis[3-hydroxy-2-naphthoic acid], sodium salt	EK.
4,4'-Methylenedianiline	ACS, DUP, RUC.
5,5'-Methylenedisalicylic acid	HN.
Methylhydroquinone	EKT.
(2,4-Methyl-5-imidazolyl)methylthioethylamine dihydrochloride	SK.
6-Methyl-2-(2-methyl-6-quinolyl)-7-benzothiazole sulfonic acid	DUP.
N-Methyl-p-nitroaniline	ACY.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
4-Methyl-2-nitroanisole	SW.
4-Methyl-3-nitrobenzoic acid, methyl ester	SDH.
2-Methyl-5-nitroimidazole	RDA.
5-Methyl-5-norbornene-2,3-dicarboxylic anhydride	BCC.
m-(3-Methyl-5-oxo-2-pyrazolin-1-yl)benzenesulfonamide	VPC.
p-(3-Methyl-5-oxo-2-pyrazolin-1-yl)benzenesulfonic acid	ACY, TRC.
2-Methyl-5-phenylbenzoxazole	EK.
1-Methyl-4-phenylisonipecotic acid	SDW, WYT.
3-Methyl-1-phenyl-2-pyrazolin-5-one (Developer Z)	ACY.
4-Methylphthalic acid	EK.
4-Methylphthalic anhydride	EK.
3-(α-Methylpiperidino)propanol	LIL.
[(6-Methyl-2-pyridinyl)amino]methylenepropanedioic acid, diethyl ester	SDH.
4'-[(4-Methyl-2-pyrimidinyl)sulfamoyl]acetanilide	DUP.
*α-Methylstyrene	ACS, CLK, GP, SKO, UCC, USS.
2-(Methylsulfonyl)-4-nitroaniline	TRC.
1-Morpholino-2,5-diethoxy-4-nitrobenzene	ALL.
2,7-Naphthalenedisulfonic acid	TRC.
1-Naphthalenesulfonic acid	TRC.
2-Naphthalenesulfonic acid	AC, ACY, SDC.
1-Naphthalenesulfonic acid, sodium salt	TRC.
1,4,5,8-Naphthalenetetracarboxylic acid	TRC.
Naphthalimide	BCC, SDC.
1-Naphthol (α-Naphthol)	UCC.
2-Naphthol, tech. (β-Naphthol)	ACY.
Naphth[1,2-d][1,2,3]oxadiazole-5-sulfonic acid	TRC.
1-Naphthylamine (α-Naphthylamine)	DUP.
p-(2-Naphthylamino)phenol (N-(p-Hydroxyphenyl)-2-naphthylamine)	SDC.
1-Naphthylchloroformate	UCC.
Nicotinonitrile (3-Cyanopyridine)	NEP.
3'-Nitroacetanilide	EKT.
4'-Nitroacetanilide	TRC.
2'-Nitro-p-acetanisidide	DUP.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
3'-Nitro-p-acetanisidide	SDC.
4'-Nitro-o-acetanisidide	DUP.
4'-Nitro-4-amino-3-methoxyazobenzene	SDC.
*o-Nitroaniline	DUP, MON, X.
*p-Nitroaniline	AC, DUP, MON.
2-Nitro-p-anisidine [NH_2=1]	DUP.
4-Nitro-o-anisidine [NH_2=1]	DUP.
o-Nitroanisole	DUP.
5-Nitroanthranilic acid	TRC.
1-Nitroanthraquinone	ACY, TRC.
m-Nitrobenzaldehyde	SDH.
4-Nitrobenzamide	SDH.
*Nitrobenzene	ACY, DUP, FST, MOB, RUC.
m-Nitrobenzenesulfonic acid, sodium salt	DUP, USM.
p-Nitrobenzenesulfonyl chloride	EK.
o-Nitrobenzoic acid	SAL.
m-Nitrobenzoic acid	SAL, SDH.
p-Nitrobenzoic acid	DUP.
m-Nitrobenzoic acid, sodium salt	SAL.
2-(4'-Nitrobenzoylamino)-6-naphthol-8-sulfonic acid	TRC.
m-Nitrobenzoyl chloride	ARS.
2-Nitro-p-cresol	SW.
p-Nitro-N-(2-diethylamine)ethylbenzamide	PD.
Nitrodiphenylamine	MON.
4-Nitrodiphenyl ether	OMC.
4-Nitrodiphenyl ether, sodium salt	OMC.
5-Nitro-2-furanmethanediol, diacetate	NOR.
5-Nitroisatoic anhydride	SW.
5-Nitroisophthalic acid	SAL.
1-Nitronaphthalene	DUP.
3-Nitro-1,5-naphthalenedisulfonic acid	TRC.
7(and 8)-Nitronaphth[1,2-d][1,2,3]oxadiazole-5-sulfonic acid	TRC.
p-Nitrophenethyl alcohol	PCW.
o-Nitrophenol	MON.
p-Nitrophenol	DUP.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
p-Nitrophenol, sodium salt	DUP, SDC.
4'-(p-Nitrophenyl)acetophenone	ASH.
2-(o-Nitrophenylazo)-4,6-di-tert-pentylphenol (OH=1)	TRC.
4-Nitro-o-phenylenediamine	ASH, FMT.
2-(p-Nitrophenyl)-2H-naphtho[1,2-d]triazole-6,8-disulfonic acid	TRC.
4-Nitrosodiphenylamine	USR.
4-Nitroso-N-ethyl-N-(β-methylsulfonamidoethyl)-m-toluidine	X.
p-Nitrosophenol	ACY, SDC.
β-Nitrostyrene	CWN.
4-Nitro-4'-(5-sulfo-2H-naphtho[1,2-d]triazol-2-yl)-2,2'-stilbenedisulfonic acid	TRC.
3-Nitro-p-toluamide	X.
o-Nitrotoluene	DUP, FST.
m-Nitrotoluene	DUP, FST.
p-Nitrotoluene	DUP, FST.
Nitrotoluene mixtures	FST.
p-Nitrotoluene-o-sulfonic acid	AC, CGY, GAF, X.
3-Nitro-p-toluenesulfonic acid [SO_3H=1]	TRC.
5-Nitro-o-toluenesulfonic acid [SO_3H=1]	DUP.
2-Nitro-p-toluidine [NH_2=1]	SW.
5-Nitro-o-toluidine [NH_2=1]	BUC, PCW.
5-Nitro-o-toluidine hydrochloride	SDH.
2-Nitro-m-xylene	DUP.
4-Nitro-m-xylene	DUP.
Nonyl-dinonylphenol, mixture	USR.
Nonyl mercaptans	ACY.
*Nonylphenol	FER, GAF, JCC, KLM, MCB, MON, RH, SCN.
Norborene-2,3-dicarboxylic acid, monomethyl ester	BJL.
Octylphenol	FER, RH, SCN.
Octylphenoxydiethoxy chloride	RH.
Oxanilide	EK.
1-[(7-Oxo-7H-benz[de]anthracene-3-yl)amino]-anthraquinone	ACY, TRC.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
1,1'-[(7-Oxo-7H-benz[de]anthracen-3,9-ylene)-diimino]dianthraquinone	TRC.
5-Oxo-1-phenyl-2-pyrazoline-3-carboxylic acid, ethyl ester	STG, VPC.
5-Oxo-1-(p-sulfophenyl)-2-pyrazoline-3-carboxylic acid (Pyrazolone T)	ACY, STG, VPC.
4,4'-Oxydianiline	DUP.
Pentabromochlorocyclohexane	DOW.
Pentabromoethylbenzene	GTL.
Pentachloropyridine	DOW.
2-Pentylanthraquinone	DUP.
Pentylbenzene	UOP.
p-Pentylbenzoyl chloride	EK.
o-Pentylphenol (o-Amylphenol)	PAS.
p-tert-Pentylphenol	PAS.
3,4,9,10-Perylenetetracarboxylic acid	BCC.
3,4,9,10-Perylenetetracarboxylic 3,4:9,10-dianhydride	VPC.
3,4,9,10-Perylenetetracarboxylic-3,4:9,10-diimide	BCC, SDC, VPC.
o-Phenethylbenzoic acid	LIL.
*PHENOL:	
NATURAL:	
FROM COAL TAR:	
Phenol, natural, from coal tar, 39° C, M.P.	FER.
Phenol, natural, from coal tar, all other	KPT.
FROM PETROLEUM:	
Phenol, natural, from petroleum, all other	FER, MER, NPC.
SYNTHETIC:	
BY CAUSTIC FUSION:	
Phenol, synthetic, by caustic fusion, U.S.P.	RCI.
Phenol, synthetic, by caustic fusion, all other	SW.
Phenol, benzylated	MIL.
Phenol, styrenated	FER, MIL.
Phenol, synthetic, from chlorobenzene by liquid-phase hydrolysis, U.S.P.	DOW.
Phenol, synthetic, from chlorobenzene by vapor-phase hydrolysis, U.S.P.	GP.
*Phenol, synthetic, from cumene by oxidation, U.S.P.	ACS, CLK, MON, SHC, SOC, UCC, USS.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*PHENOL--Continued	
SYNTHETIC--Continued	
Phenol, synthetic, from toluene by oxidation, U.S.P.	KLM.
Phenolsulfonaphthalein, sodium salt	EK.
Phenolsulfonic acid, sodium salt	SAL.
Phenoxyacetic acid, sodium salt	SFS.
3-Phenoxybenzaldehyde	HDW.
3-Phenoxybenzenemethanol	HDW.
Phenylacetic acid, ethyl ester, tech.	OPC, SFS.
Phenylacetic acid, methyl ester	OPC.
Phenylacetic acid, potassium salt	OPC, SFS.
Phenylacetic acid, sodium salt	OPC.
Phenylacetonitrile (α-Tolunitrile)	OPC, UOP.
Phenylacetyl chloride	OPC.
2,2'-[(Phenyl)amino]diethanol, diacetic ester	TRC.
4-(Phenylazo)diphenylamine	EK.
2-Phenylbenzimidazole	SAL.
Phenyl-1,2,3-butanetrione-2-oxime	EK.
α-Phenyl-o-cresol	RBC.
1-Phenyl-4,4-dimethyl-3-pyrazolidinone	EK.
o-Phenylenediamine	DUP, EK, SW, TRC.
m-Phenylenediamine	DUP.
p-Phenylenediamine	DUP, SDC.
Phenyl ether (Diphenyl oxide)	DOW, MON.
dl-2-Phenylglycine (racemic)	KF.
d(-)-2-Phenylglycine	DUP, KF, UPJ.
Phenylglycine, potassium salt	BCC.
Phenylglycine, sodium salt	BCC, LIL.
d(-)-2-Phenylglycyl chloride hydrochloride	KF, UPJ.
5-Phenylhydantoin	ABB, PD.
*2,2'-[(Phenyl)imino]diethanol (N-Phenyldiethanolamine)	EKT, MIL, SDC, TCH.
3-Phenyl-5-methylisoxazole-4-carbonyl chloride	ARS.
Phenyl-α-naphthylamine	UCC.
o-Phenylphenol	DOW, RCI.
p-Phenylphenol	DOW.
o-Phenylphenol, sodium salt	DOW.
N-Phenyl-p-phenylenediamine	USR.
Phenylphosphinic acid	SFS.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
Phenylphosphonothioic dichloride	SFA.
Phenylphosphorous dichloride	SFA.
1-Phenyl-1,2-propanedione, 2-oxime	ORT, PD.
Phenyl-2-propanone	ORT, SK.
1-Phenyl-3-pyrazolidinone	EK.
dl-Phenylsuccinic acid	PD.
4-Phenylsulfinyl-1,2-phenylenediamine	ARA.
4-Phenylthiomorpholine-1,1-dioxide	EKT.
Phenylundecanoic acid	EK.
1(2H)-Phthalazinone	X.
Phthalic acid	EK.
*Phthalic anhydride	ACS, BAS, ENJ, HK, KPT, MON, PTO, SOC, STP, USS.
Phthalimide	SW, VPC.
Phthalimidoacetyl chloride	PD.
[Phthalocyaninato(2-)]copper	DUP.
Phthalocyaninetetrasulfonyl chloride, copper derivative	DUP.
PICOLINES:	
Picoline (3,4-mixture)	KPT, RIL.
2-Picoline (α-Picoline)	RIL.
3-Picoline (β-Picoline)	NEP, RIL.
4-Picoline (γ-Picoline)	RIL.
Picolinic acid	RSA.
Picolinonitrile (2-Cyanopyridine)	NEP.
3-Picolylamine	RIL.
Picric acid (Trinitrophenol)	SDC.
2-Pipecoline	LIL.
Piperazine mixture, crude	JCC.
*Piperidine	ABB, DUP, RIL.
3-Piperidinopropiophenone hydrochloride	ACY.
Polychlorobenzene	DOW.
Polyethylbenzene (80 percent diethylbenzene)	ELP, UCC.
Propiophenone	ORT, UOP.
3-[N-(2-Propoxyethyl)]anilinopropionitrile	MIL.
PYRIDINE, REFINED:	
2° Pyridine, refined	KPT, NEP, RIL.
Pyridine, refined all other grades	RIL.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
Pyridine hydrochloride	EK, RSA.
2-Pyridinethiol-1-oxide, sodium salt	OMC.
2-Pyridinethiol-1-oxide, zinc salt	OMC.
α-Pyridyl-α-thenylamine	ABB.
2-Pyrimidinol	CGY.
2-Pyrrolidinone	GAF.
Quinaldine	ACY.
QUINOLINE:	
Quinoline, 1° and 2°	KPT.
2,4-Quinolinediol	PCW.
Resorcinol, tech.	KPT.
β-Resorcylic acid	KPT.
β-Resorcylic acid, methyl ester	PCW.
Salicylaldehyde	DOW, RDA.
Salicylaldehyde oxime	EK.
Salicylanilide	PCW.
Salicylic acid, ammonium chromium complex	TRC.
Salicylic acid, phenyl ester	DOW.
*Salicylic acid, tech.	DOW, HN, MON, SDH.
Salicylideneaminoguanidine oleate	DUP.
Sodium-5-(2,4-difluorophenyl)salicylate	HXL.
Sulfanilic acid (p-Aminobenzenesulfonic acid) and salt	ACY, EK.
4-Sulfo-o-sec-butylphenol	VTC.
4,6-m-Sulfo-o-sec-butylphenol	VTC.
5-Sulfoisophthalic acid, 1,3-dimethyl ester	DUP.
5-Sulfoisophthalic acid, lithium salt	PCW.
5-Sulfoisophthalic acid, sodium salt	PCW.
4,4'-Sulfonyldiphenol (4,4'-Dihydroxydiphenyl sulfone)	UPF.
4-Sulfophthalic acid	CWN.
Terephthalic acid	AMO, HCF.
*Terephthalic acid, dimethyl ester	DUP, EKT, HCF, HST.
Terephthalic acid, diphenyl ester	BJL.
Terephthaloyl chloride	DUP.
Terphenyl (Phenylbiphenyl) (m-,o-,and p-isomers)	MON.
3,3',5,5'-Tetrabromo-m-cresolsulfonphthalein, sodium salt	EK.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
Tetrabromophthalic anhydride	VEL.
1,2,4,5-Tetrachlorobenzene	DOW, SCC.
1,2,4,5-Tetrachloro-3-nitrobenzene	SDH.
2,3,5,6-Tetrachloropyridine	DOW.
α,α,2,6-Tetrachlorotoluene	DUP.
Tetrahydrobenzyl alcohol	UCC.
*Tetrahydrofuran	DUP, GAF, QKO.
Tetrahydronaphthalene	UCC.
Tetrahydronaphthol-1, tetrahydronaphthone-1	UCC.
1,2,3,4-Tetrahydro-2,2,4,7-tetramethylquinoline	EKT.
1,4,5,8-Tetrahydroxyanthraquinone, leuco derivative	AC.
p-(1,1,3,3-Tetramethylbutyl)phenol	GAF.
N,N,N',N'-Tetramethyl-p-phenylenediamine, dihydrochloride	EK.
Tetrazolethiol	MRT.
3,3'-Thiobis[7h-benz[de]anthracen-7-one]	ACY.
2-Thiophenecarboxaldehyde	ABB.
2-Thiophenecarboxylic acid	PD.
Thiophenol	SFA.
s-Thymol	GIV.
Toluene-2,3-(and 3,4)-diamine (35/65 Mixture)	OMC.
*Toluene-2,4-diamine (4-m-Tolylenediamine)	ACS, OMC, RUC, UCC.
Toluene-2,4-(and 2,6)-diamine	X.
Toluene-2,4-(and 2,6)-diamine (80/20 Mixture)	OMC.
Toluene-3,4-diamine	EK.
p-Toluenesulfinic acid, sodium salt	NES.
o(and p)-Toluenesulfonic acid	NES.
p-Toluenesulfonic acid	SW, TEN, UPF.
p-Toluenesulfonic acid monohydrate	UPF.
p-Toluenesulfonic acid, sodium salt	SDH.
p-Toluenesulfonyl chloride	MON.
p-Toluic acid	SFS.
p-Toluic acid, methyl ester	DUP.
o-Toluidine	DUP, FST.
m-Toluidine	DUP.
p-Toluidine	DUP.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
Toluidines, mixed	DUP.
2-o-Toluidinoethanol	TCH.
o-Toluidinomethanesulfonic acid	TRC.
4-(o-Tolylazo)-o-toluidine hydrochloride	ATL.
1-p-Tolyldodecane	SDC.
p-Tolylhydroquinone	X.
2,2'-(o-Tolylimino)diethanol	TCH.
2,2'-(m-Tolylimino)diethanol	MIL, TCH.
2,2'-(m-Tolylimino)diethanol, diacetate ester	RH.
Tolyltriazole	SW.
2,4,6-Triamino-5-nitrosopyrimidine	SK.
1,2,4-Triazolidine-3,5-dione	EK.
N,N,N-Tribenzylamine	HXL.
2,4,6-Tribromophenol	VEL.
3,4',5-Tribromosalicylanilide	PCW.
1,2,3(and 1,2,4)-Trichlorobenzene	PPG, SCC.
1,2,4-Trichlorobenzene	DOW, SCC.
1,1,1-Trichloro-2,2-diphenylethane	CWN.
1,2,4-Trichloro-5-nitrobenzene	ALL, PCW.
Trichlorophenylsilane	DCC.
α,α,α-Trichlorotoluene (Benzotrichloride)	HK, VEL.
α,2,4-Trichlorotoluene	HN.
2,4,6-Trichloro-s-triazine	CGY, DGC, NIL.
2-(Trifluoromethyl)phenothiazine	SK.
α,α,α-Trifluoro-N-phenyl-m-toluidine (3-(Trifluoromethyl)diphenylamine)	SK.
α,α,α-Trifluoro-o-toluidine	OMC.
α,α,α-Trifluoro-m-toluidine	OMC.
4-4-Trifluoro-1-trifluoromethyl-ethylidene-diphenol	DUP.
2,4,3'-Trihydroxydiphenyl	PCW, PIT.
Trimesic acid	AMB.
3,4,5-Trimethoxybenzaldehyde	MON.
1,2,3-Trimethylbenzene (Hemimellitine)	SUN.
1,2,4-Trimethylbenzene (Pseudocumene)	SUN.
1,3,5-Trimethylbenzene (Mesitylene)	SUN.
2,3,3-Trimethyl-3H-indole	VPC.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
1,3,3-Trimethyl-δ^2, α-indolineacetaldehyde	DUP, TRC, VPC.
1,3,3-Trimethyl-2-methyleneindoline	DUP, VPC.
Trimethylphenylammonium chloride	X.
Trimethylphenylammonium iodide	TRC.
2,4,6-Trimethylpyridine	KPT.
Triphenylmethane	EK.
2,4,6-Tri-n-propoxybenzaldehyde	CWN.
1,3,5-Tri-n-propoxybenzene	CWN.
α,α',α''-Tris(dimethylamino)mesitol	RH.
tris(2-methyl-1-aziridinyl)phosphine oxide	ARS.
*7,7'-Ureylenebis[4-hydroxy-2-naphthalenesulfonic acid] (J-Acid urea)	AC, DUP, TRC.
Veratraldehyde (3,4-Dimethoxybenzaldehyde)	GIV.
Vinylcyclohexene monoxide	UCC.
5-Vinyl-2-picoline (MVP)	PLC.
2-Vinylpyridine	RIL.
4-Vinylpyridine	RIL.
Vinyltoluene	DOW.
Violanthrone (Dibenzanthrone)	BCC.
Xanthene-9-carboxylic acid	MAL.
2,4-Xylenesulfonic acid	NES.
Xylenesulfonic acid, mixed isomers	NES.
2,6-Xylenol	GE, KPT.
3,5-Xylenol	FER.
Xylenol crystals	PIT.
XYLIDINES:	
2,4-Xylidine (m-4-Xylidine)	DUP.
2,6-Xylidine	DUP.
Xylidine, original mixture	DUP.
Cyclic intermediates, all other	ACY, ALD, ALL, ARA, ARS, ATL, EK, EK, EKT, HDW, HK, HST, ICI, KPT, LIL, OMC, PD, RSA, SAL, SDC, SDH, SDW, SK, STC, SW, TCH, TNA, TRC, UCC, WYT, X, X, X.

TABLE 3.--Cyclic intermediates: Directory of manufacturers, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of cyclic intermediates to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of company
ABB	Abbott Laboratories
AC	American Color & Chemical Corp.
ACS	Allied Chemical Corp., Specialty Chemicals Div.
ACY	American Cyanamid Co.
ADC	Anderson Development Co.
ALD	Aldrich Chemical Co., Inc.
ALF	Allied Chemical Corp., Fibers Div.
ALL	Alliance Chemical Corp.
AMB	American Bio-Synthetics Corp.
AMO	Standard Oil Co. (Indiana)
ARA	Araphahoe Chemicals, Inc., Sub/Syntex U.S.A., Inc.
ARK	Armstrong Cork Co.
ARS	Arsynco, Inc.
ARZ	Arizona Chemical Co.
ASH	Ashland Oil, Inc.
ATL	Atlantic Chemical Corp.
BAS	BASF Wyandotte Corp.
BCC	Buffalo Color Corp.
BJL	Burdick & Jackson Laboratories, Inc.
BUC	Synalloy Corp., Blackman-Uhler Chemical Div.
CCW	Cincinnati Milacron Chemicals, Inc.
CEL	Celanese Corp., Celanese Chemical Co.
CGY	Ciba-Geigy Corp.
CHL	Chemol, Inc.
CHT	Chattem, Inc.
CLK	Clark Oil & Refining Corp.
CNP	Nipro, Inc.
CO	Continental Oil Co.
CWN	Upjohn Co., Fine Chemical Div.
DBC	Badische Co.
DCC	Dow Corning Corp.
DGC	Degussa Corp.
DKA	Denka Chemical Corp.
DOW	Dow Chemical Co.
DUP	E.I. duPont de Nemours & Co., Inc.
DVC	Dover Chemical Corp., Sub of ICC Industries, Inc.
EGR	Eagle River Chemical Corp.
EK	Eastman Kodak Co.:
EKT	Tennessee Eastman Co. Div.
ELP	El Paso Products Co.
ENJ	Exxon Chemical Co. U.S.A.
FER	Ferro Corp.:
	Ottawa Chemical Div.
	Productol Chemical Div.
FMP	FMC Corp., Industrial Chemical Div.
FMT	Fairmount Chemical Co., Inc.
FST	First Chemical Corp.
GAF	GAF Corp.
GE	General Electric Co.
GIV	Givaudan Corp.
GLY	Glyco Chemicals, Inc.
GNW	Greenwood Chemical Co.
GOC	Gulf Oil Corp., Gulf Oil Chemicals Co.-U.S.
GP	Georgia-Pacific Corp., Plaquemine Div.
GTL	Great Lakes Chemical Corp.
GYR	Goodyear Tire & Rubber Co.
HCF	Hercofina
HDW	Hardwicke Chemical Co.
HEX	Hexagon Laboratories, Inc.
HK	Hooker Chemical Corp.
HN	Tenneco Chemicals, Inc.
HPC	Hercules, Inc.
HSC	Chemetron Corp., Pigments Div., Sub. of Allegheny Ludlum Industries, Inc.
HSH	Harshaw Chemical Co.
HST	American Hoechst Corp.:
	Hoechst Fibers Industries Div.
	Industrial Chemicals Div.
HXL	Hexcel Corp., Hexcel Specialty Chemicals
ICI	ICI Americas Inc., Chemical Specialties Co.
JCC	Jefferson Chemical Co., Inc.
KF	Kay-Fries Chemicals, Inc.
KLM	Kalama Chemical, Inc.
KPT	Koppers Co., Inc.
LAK	Bofors Lakeway, Inc.
LEM	Napp Chemicals, Inc.
LIL	Eli Lilly & Co.
MAL	Mallinckrodt, Inc.
MCB	Borg-Warner Corp., Borg-Warner Chemicals
MER	Merichem Co.
MIL	Milliken & Co., Milliken Chemical Div.
MLC	Melamine Chemicals, Inc.
MNR	Monroe Chemical Co.
MOB	Mobay Chemical Co.
MON	Monsanto Co.
MRT	Morton-Norwich Products, Inc., Morton Chemical Co. Div.
MTO	Montrose Chemical Corp. of California
NCI	Union Camp Corp., Terpenes and Aromatics Div.
NEP	Nepera Chemical Co., Inc.
NES	Ruetgers-Nease Chemical Co., Inc.
NIL	Nilok Chemicals, Inc.
NOR	Morton-Norwich Products, Inc., Norwich Eaton Pharmaceutical Div.

TABLE 3.--CYCLIC INTERMEDIATES: DIRECTORY OF MANUFACTURERS, 1978--CONTINUED

Code	Name of company	Code	Name of company
NPC	Northwest Petrochemical Corp.	SKO	Getty Refining & Marketing Co.
		SOC	Standard Oil Co. of California, Chevron Chemical Co.
OMC	Olin Corp.		
OPC	Orbis Products Corp.	STC	American Hoechst Corp., Sou-Tex Works
ORO	Chevron Chemical Co.	STG	Stange Co.
ORT	Roehr Chemicals	STP	Stepan Chemical Co.
		SUN	Sun Company, Inc.
PAS	Pennwalt Corp.	SW	Sherwin-Williams Co.
PCW	Pfister Chemical, Inc.		
PD	Parke, Davis & Co., Sub. of Warner-Lambert Co.	TCC	Tanatex Chemical Corp.
		TCH	Emery Industries, Inc., Trylon Div.
PFZ	Pfizer, Inc. & Pfizer Pharmaceuticals, Inc.	TEN	Cities Service Co., Copperhill Operations
PIT	Pitt-Consol Chemical Co.	TNA	Ethyl Corp.
PLC	Phillips Petroleum Co.	TRC	Toms River Chemical Corp.
PPG	PPG Industries, Inc.	TRD	Manufacturing Enterprises, Inc., Squibb Manufacturing, Inc., Trade Enterprise, Inc., Ersana, Inc.
PTO	Puerto Rico Chemical Co., Inc.		
QKO	Quaker Oats Co.		
		UCC	Union Carbide Corp.
RBC	Fike Chemicals, Inc.	UOP	UOP, Inc., Chemical Div.
RCI	Reichhold Chemicals, Inc.	UPF	Jim Walter Resources, Inc.
RDA	Rhone-Poulenc, Inc.	UPJ	Upjohn Co.
RH	Rohm & Haas Co.	USM	USM Corp., Bostik Div.
RIL	Reilly Tar & Chemical Corp.	USR	Uniroyal, Inc., Uniroyal Chemical Div.
RPC	Millmaster Onyx Group, Refined Onyx Co. Div.	USS	USS Chemicals Div. of U.S. Steel Corp.
RSA	R.S.A. Corp.		
RUC	Rubicon Chemicals, Inc.	VEL	Velsicol Chemical Corp.
		VGC	Virginia Chemicals, Inc.
SAL	Salsbury Laboratories	VIK	Viking Chemical Co.
SCC	Standard Chlorine of Delaware, Inc.	VPC	Mobay Chemical Corp., Verona Dyestuff Div.
SCN	Schenectady Chemicals, Inc.	VTC	Vertac, Inc., Vicksburg Plant
SDC	Martin-Marietta Corp., Sodyeco Div.		
	Sterling Drug, Inc.:		
SDH	Hilton Davis Chemical Co. Div.	WAY	Philip A. Hunt Chemical Corp., Organic Chemical Div.
SDW	Winthrop Laboratories Div.		
	Stauffer Chemical Co.:	WCC	White Chemical Corp.
SFA	Agricultural Div.	WIL	Inolex Corp., Inolex Pharmaceutical Div.
SFC	Calhio Chemicals, Inc.	WTC	Witco Chemical Corp.
SFS	Specialty Div.	WYT	Wyeth Laboratories, Inc., Wyeth Laboratories Div. of American Home Products Corp.
SHC	Shell Oil Co., Shell Chemical Co. Div.		
SK	SmithKline Corp., SmithKline Chemicals Div.		

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix. The above codes identify those of the 162 reporting companies and company divisions for which permission to publish was not restricted.

STATISTICAL HIGHLIGHTS

Edmund Cappuccilli

Synthetic dyes are derived in whole or in part from cyclic intermediates. Approximately two-thirds of the dyes consumed in the United States are used by the textile industry to dye natural and synthetic fibers or fabrics; about one-sixth is used for coloring paper; and the rest is used chiefly in the production of organic pigments and in the dyeing of leather and plastics. Of the several thousand different synthetic dyes that are known, more than one thousand are manufactured by one or more domestic producers. The large number of dyes results from the many different types of materials to which dyes are applied, the different conditions of service for which dyes are required, and the costs that a particular use can bear. Dyes are sold as pastes, powders, lumps, and solutions; concentrations vary from 6 percent to 100 percent. The concentration, form, and purity of a dye are determined largely by the use for which it is intended.

Total domestic production of dyes in 1978 amounted to 251 million pounds, or 5.1 percent less than the 264 million pounds produced in 1977 (table 1). Sales of dyes in 1978 amounted to 233 million pounds, valued at $734 million, compared with 255 million pounds, valued at $690 million, in 1977. In terms of quantity, sales of dyes in 1978 were 8.6 percent less than in 1977 and in terms of value, 6.3 percent greater. The average unit value of sales of all dyes in 1978 was $3.15 per pound compared with $2.71 per pound in 1977.

The production of five classes of dyes continued to increase in 1977, while the remaining four major classes registered slight to large declines (vat dyes) in their production. Acid dyes increased by 28.4 percent from 30.7 million pounds in 1977 to 39.4 million in 1978. The other four classes of dyes increased by the following percentages: disperse dyes (2.5), fiber-reactive dyes (7.1), food, drug, and cosmetic colors (6.6), and solvent dyes (6.9).

TABLE 1.--DYES: U.S. PRODUCTION AND SALES, 1978

[Listed below are all dyes for which any reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all dyes for which data on production and/or sales were reported and identifies the manufacturers of each]

DYES	PRODUCTION	SALES QUANTITY	SALES VALUE	SALES UNIT VALUE[1]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Grand total	250,780	232,711	733,553	$3.15
ACID DYES				
Total	39,434	36,658	130,222	3.55
Acid yellow dyes, total	16,267	14,866	40,559	2.73
Acid Yellow 17	185	142	700	4.94
Acid Yellow 19	437	328	1,021	3.11
Acid Yellow 23	278	235	1,016	4.32
Acid Yellow 151	3,566	3,288	7,091	2.16
Acid Yellow 174	94	128	538	4.21
All other	11,707	10,745	30,193	2.81
Acid orange dyes, total	4,832	4,585	17,016	3.71
Acid Orange 7	455	448	1,213	2.71
Acid Orange 8	314	342	884	2.59
Acid Orange 10	145	149	462	3.10
Acid Orange 24	701	630	1,943	3.08
Acid Orange 60	657	602	2,340	3.89
All other	2,560	2,414	10,174	4.21
Acid red dyes, total	5,984	5,417	23,237	4.29
Acid Red 1	339	396	1,136	2.87
Acid Red 4	43	28	122	4.41
Acid Red 14	51	22	112	5.13
Acid Red 73	183	158	798	5.07
Acid Red 88	88	64	260	4.05
Acid Red 114	308	189	836	4.43
Acid Red 137	92	99	529	5.34
Acid Red 151	478	398	1,226	3.08
Acid Red 182	92	88	531	6.06
Acid Red 266	379	277	1,018	3.67
Acid Red 337	2,239	2,055	7,964	3.87
All other	1,692	1,643	8,705	5.36
Acid violet dyes	159	148	766	5.18
Acid blue dyes, total	7,010	6,928	30,973	4.47
Acid Blue 9	2,539	2,666	4,674	1.75
Acid Blue 40	899	883	4,776	5.41
All other	3,572	3,379	21,523	6.37
Acid green and brown dyes, total	2,041	1,785	7,738	4.34
Acid Brown 14	488	457	1,779	3.89
All other	1,553	1,328	5,959	4.48
Acid black dyes, total	3,141	2,929	9,933	3.39
Acid Black 1	340	393	1,444	3.67
Acid Black 52	895	700	2,269	3.24
All other	1,906	1,836	6,220	3.39
AZOIC DYES AND COMPONENTS				
Azoic Diazo Components, Salts (Fast Color Salts)				
Azoic Diazo Components, salts (Fast Color Salts)	1,690	1,340	1,806	1.35

See footnotes at end of table.

TABLE 1.--DYES: U.S. PRODUCTION AND SALES, 1978--CONTINUED

DYES	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
BASIC DYES				
Total	15,357	15,257	67,437	$4.42
Basic yellow dyes, total	4,324	4,461	16,492	3.70
Basic Yellow 11	628	744	2,216	2.98
Basic Yellow 28	716	762	1,961	2.57
Basic Yellow 29	491	689	1,768	2.57
All other	2,489	2,266	10,547	4.65
Basic orange dyes, total	1,757	1,629	4,991	3.06
Basic Orange 1	207	210	438	2.09
Basic Orange 2	614	583	1,558	2.67
Basic Orange 21	460	422	1,477	3.50
All other	476	414	1,518	3.67
Basic red dyes, total	2,349	2,351	10,491	4.46
Basic Red 14	551	511	1,155	2.26
Basic Red 15	315	274	799	2.92
Basic Red 18	324	307	913	2.97
Basic Red 49	137	117	487	4.17
All other	1,022	1,142	7,137	6.25
Basic violet dyes, total	3,312	3,184	10,963	3.44
Basic Violet 1	1,399	1,312	3,344	2.55
Basic Violet 16	328	310	1,070	3.46
All other	1,585	1,562	6,549	4.19
Basic blue dyes, total	2,556	2,624	17,150	6.54
Basic Blue 1	24	23	121	5.25
Basic Blue 3	456	498	1,795	3.60
All other	2,076	2,103	15,234	7.24
All other basic dyes	1,059	1,008	7,350	7.29
DIRECT DYES				
Total	28,386	26,816	80,545	3.00
Direct yellow dyes, total	11,894	10,762	28,174	2.62
Direct Yellow 4	846	717	1,776	2.48
Direct Yellow 6	275	279	975	3.49
Direct Yellow 11	3,564	3,373	4,280	1.27
Direct Yellow 28	57	50	313	6.33
Direct Yellow 34	130	73	275	3.79
Direct Yellow 44	228	253	867	3.44
Direct Yellow 50	603	363	890	2.45
Direct Yellow 105	295	243	804	3.31
Direct Yellow 106	681	596	1,637	2.75
All other	5,215	4,815	16,357	3.40
Direct orange dyes, total	1,553	1,569	4,916	3.13
Direct Orange 15	451	552	1,071	1.94
Direct Orange 39	184	151	450	2.97
Direct Orange 102	318	315	1,445	4.58
All other	600	551	1,950	3.54
Direct red dyes, total	4,760	4,513	15,761	3.49
Direct Red 2	...	128	625	4.87
Direct Red 23	118	123	646	5.25
Direct Red 24	163	172	693	4.04
Direct Red 72	391	386	1,788	4.63
Direct Red 80	439	425	1,552	3.65

See footnotes at end of table

TABLE 1.--DYES: U.S. PRODUCTION AND SALES, 1978--CONTINUED

DYES	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
DIRECT DYES--Continued	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
Direct red dyes--Continued				
Direct Red 81	1,962	1,818	3,873	$2.13
All other	1,687	1,461	6,584	4.50
Direct violet dyes	180	156	719	4.62
Direct blue dyes, total	6,119	5,563	18,742	3.37
Direct Blue 1	90	98	579	5.90
Direct Blue 15	...	327	866	2.64
Direct Blue 76	65	62	181	2.91
Direct Blue 80	293	280	970	3.46
Direct Blue 86	598	734	2,535	3.45
Direct Blue 98	271	195	640	3.27
Direct Blue 218	981	856	3,435	4.01
All other	3,821	3,011	9,536	3.17
Direct green and brown dyes	807	874	3,766	4.31
Direct black dyes, total	3,073	3,379	8,467	2.51
Direct Black 22	845	1,157	1,612	1.39
All other	2,228	2,222	6,855	3.08
DISPERSE DYES				
Total	44,347	39,721	156,758	3.95
Disperse yellow dyes, total	7,244	7,433	21,065	2.83
Disperse Yellow 23	546	571	1,378	2.41
Disperse Yellow 42	728	590	1,597	2.71
Disperse Yellow 54	1,189	1,157	3,999	3.46
All other	4,781	5,115	14,091	2.75
Disperse orange dyes, total	6,246	5,070	15,478	3.05
Disperse Orange 3	47	85	288	3.37
Disperse Orange 25	716	531	1,450	2.73
Disperse Orange 29	636	589	1,741	2.96
All other	4,847	3,865	11,999	3.10
Disperse red dyes, total	9,516	9,039	42,008	4.65
Disperse Red 1	383	389	1,156	2.97
Disperse Red 4	77	78	712	9.07
Disperse Red 5	80	72	187	2.60
Disperse Red 17	170	183	537	2.93
Disperse Red 55	561	566	4,788	8.45
Disperse Red 59	63	55	390	7.06
Disperse Red 60	1,446	1,789	6,848	3.83
Disperse Red 65	230	226	783	3.47
Disperse Red 86	331	309	2,569	8.32
All other	6,175	5,372	24,038	4.47
Disperse Violet dyes, total	549	510	2,259	4.43
Disperse Violet 1	...	65	328	5.09
Disperse Violet 27	50	60	183	3.03
All other	499	385	1,748	4.54
Disperse blue dyes, total	17,268	13,968	64,492	4.62
Disperse Blue 3	1,389	1,205	4,254	3.53
Disperse Blue 64	648	218	644	2.96
Disperse Blue 79	4,669	3,310	9,153	2.77
All other	10,562	9,235	50,441	5.46
Disperse green and brown dyes	1,131	1,264	4,333	3.42
Disperse black dyes	2,392	2,438	7,124	2.92

See footnotes at end of table.

TABLE 1.--DYES: U.S. PRODUCTION AND SALES, 1978--CONTINUED

DYES	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
FIBER-REACTIVE DYES	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
Fiber-reactive dyes, total	5,520	5,292	28,684	$5.42
Reactive yellow dyes	1,166	984	5,423	5.51
All other reactive dyes	4,354	4,308	23,261	5.40
FLUORESCENT BRIGHTENING AGENTS				
Fluorescent brightening agents, total	29,933	29,361	49,645	1.69
Fluorescent Brightening Agent 28	1,131	972	1,642	1.69
Fluorescent Brightening Agent 61	157	142	777	5.47
All other fluorescent brightening agents	28,645	28,247	47,226	1.67
FOOD, DRUG, AND COSMETIC COLORS				
Total	6,125	5,968	42,061	7.05
Food, Drug, and Cosmetic Dyes				
Total	5,693	5,536	36,887	6.66
FD&C Blue No. 1	205	255	2,727	10.71
FD&C Blue No. 2	31	39	612	15.73
FD&C Red No. 40	1,908	1,849	14,488	7.84
FD&C Yellow No. 5	1,606	1,421	7,408	5.21
FD&C Yellow No. 6	1,074	1,124	5,104	4.54
All other food, drug, and cosmetic dyes	869	848	6,548	7.72
Drug and Cosmetic and External Drug and Cosmetic Dyes				
Total	432	432	5,174	11.97
D&C Red No. 7	65	70	475	6.81
D&C Red No. 9	98	93	497	5.36
D&C Red No. 19	13	13	136	10.32
All other drug and cosmetic and external drug and cosmetic dyes	256	256	4,066	15.88
MORDANT DYES				
Total	376	375	1,665	4.44
SOLVENT DYES				
Total	13,892	10,298	32,630	3.17
Solvent yellow dyes, total	2,196	1,754	6,971	3.97
Solvent Yellow 14	381	335	1,033	3.08
All other	1,815	1,419	5,938	4.18
Solvent orange dyes, total	775	667	2,902	4.35
Solvent Orange 20	36	29	236	8.07
All other	739	638	2,666	4.18
Solvent blue dyes	3,894	1,346	7,102	5.28
All other solvent dyes	7,027	6,531	15,655	2.39
VAT DYES				
Total	37,752	36,890	102,211	2.77
Vat yellow dyes	825	2,155	5,946	2.76

See footnotes at end of table.

TABLE 1.--DYES: U.S. PRODUCTION AND SALES, 1978--CONTINUED

DYES	PRODUCTION	SALES: QUANTITY	SALES: VALUE	SALES: UNIT VALUE[1]
VAT DYES--Continued	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
Vat orange dyes, total	1,829	1,912	12,506	$6.54
Vat Orange 2, 12%	739	802	4,335	5.40
Vat Orange 15, 10%	177	...	...	...
All other	913	1,110	8,171	7.36
Vat red dyes	749	582	5,110	8.78
Vat violet dyes	409	514	2,373	4.62
Vat blue dyes, total	24,542	21,736	41,664	1.92
Vat Blue 6, 8-1/3%	1,092	967	2,548	2.64
All other	23,450	20,769	39,116	1.88
Vat green dyes, total	2,410	2,730	6,221	2.28
Vat Green 3, 10%	867	983	2,270	2.31
All other	1,543	1,747	3,951	2.26
Vat brown dyes	3,824	3,901	18,534	4.75
Vat black dyes, total	3,163	3,360	9,856	2.93
Vat Black 25, 12-1/2%	...	2,285	4,810	2.11
All other	3,163	1,075	5,046	4.69
All other dyes[3]	27,968	24,735	39,889	1.61

[1]Calculated from unrounded figures.
[2]The data include dyes which are similar to, but not chemically identical with, the indicated *Colour Index* name.
[3]The data include azoic compositions, azoic coupling components, azoic diazo components (bases), sulfur dyes, and miscellaneous dyes. Statistics for those groups of dyes may not be published separately because publication would disclose information received in confidence.

TABLE 1A.--DYES: U.S. PRODUCTION AND SALES, BY CLASS OF APPLICATION, 1978

CLASS OF APPLICATION	PRODUCTION	SALES: QUANTITY	SALES: VALUE	SALES: UNIT VALUE[1]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Total	250,780	232,711	733,553	$3.15
Acid	39,434	36,658	130,222	3.55
Azoic dyes and components: Azoic diazo components, salts (Fast Color salts)	1,690	1,340	1,806	1.35
Basic	15,357	15,257	67,437	4.42
Direct	28,386	26,816	80,545	3.00
Disperse	44,347	39,721	156,758	3.95
Fiber-reactive	5,520	5,292	28,684	5.42
Fluorescent brightening agents	29,933	29,361	49,645	1.69
Food, drug, and cosmetic colors	6,125	5,968	42,061	7.05
Mordant	376	375	1,665	4.44
Solvent	13,892	10,298	32,630	3.17
Vat	37,752	36,890	102,211	2.77
All other[2]	27,968	24,735	39,889	1.61

[1]Calculated from unrounded figures.
[2]The data include azoic compositions, azoic coupling components, azoic diazo components (bases), sulfur dyes, and miscellaneous dyes. Statistics for those groups of dyes may not be published separately because publication would disclose information received in confidence.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*) CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT]

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACID DYES	
*ACID YELLOW DYES:	
Acid Yellow 1	ACY.
Acid Yellow 3	ACY, BCC.
Acid Yellow 11	BDO.
Acid Yellow 14	TRC.
*Acid Yellow 17	ATL. BDO, SDH, TRC.
Acid Yellow 19	AC, ALT, ATL, ICI.
*Acid Yellow 23	AC, ACY, ALT, BAS, BCC, GAF, MRX, SDH, TRC, WJ.
Acid Yellow 25	AC.
Acid Yellow 29	TRC.
Acid Yellow 34	ATL, BDO.
Acid Yellow 36	BAS, DUP, TRC.
Acid Yellow 38	BAS.
Acid Yellow 40	ALT, ATL, TRC.
Acid Yellow 42	AC.
Acid Yellow 49	ALT, ATL, DUP, VPC.
Acid Yellow 54	AC, TRC.
Acid Yellow 59	VPC.
Acid Yellow 63	AC.
Acid Yellow 65	ATL, TRC.
Acid Yellow 73	SDH.
Acid Yellow 79	VPC.
Acid Yellow 99	BAS, GAF, TRC.
Acid Yellow 114	TRC.
Acid Yellow 121	BAS.
Acid Yellow 127	TRC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACID DYES--CONTINUED	
ACID YELLOW DYES--CONTINUED	
Acid Yellow 128	TRC.
Acid Yellow 129	AC, TRC.
Acid Yellow 135	BAS, GAF, ICI.
*Acid Yellow 151	AC, DUP, TRC, VPC.
Acid Yellow 159	ALT, TRC, VPC.
Acid Yellow 169	TRC.
*Acid Yellow 174	AC, DUP, VPC.
Acid Yellow 198	DUP.
Acid Yellow 199	ICI.
Acid Yellow 200	DUP.
Acid Yellow 216	VPC.
Acid Yellow 219	TRC.
Acid Yellow 221	BAS.
Acid yellow dyes, all other	ALT, TRC, VPC.
*ACID ORANGE DYES:	
Acid Orange 1	AC.
Acid Orange 5	ACY.
*Acid Orange 7	AC, ACY, ATL, BAS, BDO, GAF, PDC, TRC, VPC.
*Acid Orange 8	AC, ACY, ATL, TRC, VPC.
*Acid Orange 10	AC, ACY, ATL, BAS, GAF, TRC.
Acid Orange 12	PSC.
*Acid Orange 24	ACY, ALT, ATL, FAB, TRC.
Acid Orange 47	TRC.
Acid Orange 50	AC.
Acid Orange 51	TRC.
Acid Orange 52	ATL.
*Acid Orange 60	AC, ALT, ATL, DUP, TRC, VPC.
Acid Orange 63	TRC.
Acid Orange 64	ATL, DUP.
Acid Orange 72	ACY.
Acid Orange 74	GAF, TRC.
Acid Orange 86	TRC.
Acid Orange 116	AC, ALT, BAS, GAF.
Acid Orange 119	TRC.
Acid Orange 128	ALT, DUP, PDC.
Acid Orange 132	DUP.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACID DYES--CONTINUED	
*ACID ORANGE DYES--CONTINUED	
Acid Orange 152	DUP.
Acid Orange 156	ALT, TRC.
Acid Orange 161	ATL.
Acid orange dyes, all other	AC, ALT, TRC, VPC.
*ACID RED DYES:	
*Acid Red 1	AC, ACY, ATL, BDO, DUP, GAF, TRC, VPC.
*Acid Red 4	AC, BAS, BDO, GAF, PDC, TRC.
*Acid Red 14	ATL, BAS, GAF, PDC.
Acid Red 18	ATL, TRC.
Acid Red 26	ACY.
Acid Red 27	SDH.
Acid Red 33	BDO.
Acid Red 37	AC, TRC.
Acid Red 51	BDO.
Acid Red 52	ALT.
Acid Red 57	ICI, TRC.
Acid Red 66	AC.
*Acid Red 73	ACY, ALT, BAS, GAF, HSH, PSC, TRC.
Acid Red 85	BAS, FAB, GAF.
Acid Red 87	SDH.
*Acid Red 88	ATL, BAS, GAF, TRC.
Acid Red 97	ATL, BAS.
Acid Red 99	AC, FAB.
Acid Red 111	VPC.
*Acid Red 114	ALT, ATL, TRC.
Acid Red 115	ATL.
Acid Red 119	ALT.
Acid Red 134	TRC.
*Acid Red 137	ATL, BAS, DUP, GAF, TRC, VPC.
*Acid Red 151	AC, ACY, ALT, ATL, DUP, HSH, ICI, TRC, VPC.
Acid Red 167	ATL, TRC.
Acid Red 174	AC.
Acid Red 179	TRC.
*Acid Red 182	AC, ATL, DUP, VPC.
Acid Red 186	AC.
Acid Red 194	TRC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACID DYES--CONTINUED	
*ACID RED DYES--CONTINUED	
Acid Red 211	TRC.
Acid Red 213	TRC.
Acid Red 257	TRC.
*Acid Red 266	AC, ALT, ATL, BAS, DUP, GAF, ICI.
Acid Red 278	VPC.
Acid Red 299	ALT, ATL.
Acid Red 309	TRC.
Acid Red 324	VPC.
*Acid Red 337	ALT. ATL, DUP, HSH, TRC, VPC.
Acid Red 364	DUP.
Acid Red 384	DUP.
Acid Red 388	DUP.
Acid red dyes, all other	AC, ACY, ALT, ATL, DUP, TRC, VPC.
*ACID VIOLET DYES:	
Acid Violet 1	BDO.
Acid Violet 3	ACY, ATL, TRC.
Acid Violet 7	ATL, BDO.
Acid Violet 12	BDO.
Acid Violet 17	SDH.
Acid Violet 43	HSH.
Acid Violet 49	SDH, TRC.
*ACID BLUE DYES:	
Acid Blue 3	LVR.
Acid Blue 7	SDH.
*Acid Blue 9	BAS, GAF, WJ, X.
Acid Blue 15	BAS, GAF.
Acid Blue 23	TRC.
Acid Blue 25	ATL, DUP, HSH, ICI, TRC, VPC.
Acid Blue 27	ATL, BAS, BDO.
*Acid Blue 40	ATL, BAS, BDO, DUP, GAF, ICI, TRC, VPC.
Acid Blue 41	ATL, ICI.
Acid Blue 45	TRC.
Acid Blue 62	BDO.
Acid Blue 74	BDO.
Acid Blue 78	BDO, TRC, VPC.
Acid Blue 80	TRC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACID DYES--CONTINUED	
*ACID BLUE DYES--CONTINUED	
Acid Blue 92	ATL, FAB.
Acid Blue 104	ATL, BAS, GAF.
Acid Blue 113	AC, ALT, BAS, GAF, HSH, VPC.
Acid Blue 118	AC.
Acid Blue 122	DUP.
Acid Blue 145	ALT, HSH.
Acid Blue 158, 158:1, and 158:2	AC, TRC.
Acid Blue 172	VPC.
Acid Blue 215	AC.
Acid Blue 230	DUP.
Acid Blue 277	TRC.
Acid Blue 298	DUP.
Acid blue dyes, all other	AC, ALT, ATL, HST, TRC, VPC.
ACID GREEN DYES::	
Acid Green 1	ACY.
Acid Green 3	TRC.
Acid Green 5	WJ.
Acid Green 16	TRC.
Acid Green 20	ATL, BAS, BDO, TRC.
Acid Green 25	BAS, BDO, DUP, HSH, TRC.
Acid Green 35	TRC.
Acid Green 41	VPC.
Acid Green 70	TRC.
ACID BROWN DYES:	
*Acid Brown 14	AC, ACY, ALT, ATL, BAS, FAB, GAF, TRC.
Acid Brown 19	TRC.
Acid Brown 28	TRC.
Acid Brown 31	BAS.
Acid Brown 45	TRC.
Acid Brown 83	VPC.
Acid Brown 90	ACY.
Acid Brown 97	ACY.
Acid Brown 98	ACY, ATL, PDC, TRC.
Acid Brown 147	TRC.
Acid Brown 158	BAS, GAF.
Acid Brown 160	BAS.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACID DYES--CONTINUED	
ACID BROWN DYES--CONTINUED	
Acid Brown 161	BAS.
Acid Brown 163	BAS.
Acid Brown 165	BAS.
Acid Brown 223	VPC.
Acid Brown 239	TRC.
Acid Brown 354	ACY.
Acid brown dyes, all other	ALT, ATL, BAS, GAF, VPC.
*ACID BLACK DYES:	
*Acid Black 1	AC, ACY, ALT, ATL, BAS, BDO, GAF, HSH, PDC, TRC, VPC.
Acid Black 2	ACY.
Acid Black 24	AC.
Acid Black 29	BAS, GAF.
Acid Black 41	PDC.
*Acid Black 52	AC, ALT, ATL, BAS, FAB, TRC.
Acid Black 58	TRC.
Acid Black 60	TRC.
Acid Black 92	ACY.
Acid Black 107	ALT, BAS, TRC, VPC.
Acid Black 172	VPC.
Acid Black 194	BAS.
Acid black dyes, all other	AC, ALT, ATL, GAF, VPC.
AZOIC DYES AND COMPONENTS	
AZOIC COMPOSITIONS:	
AZOIC YELLOW COMPOSITIONS:	
Azoic Yellow 1	BUC.
AZOIC ORANGE COMPOSITIONS:	
Azoic Orange 1	ALL, BUC.
AZOIC RED COMPOSITIONS:	
Azoic Red 1	ALL, BUC.
Azoic Red 2	BUC.
Azoic Red 6	ALL, BUC.
Azoic red compositions, all other	ALL.
AZOIC VIOLET COMPOSITIONS:	
Azoic Violet 1	BUC.
AZOIC BLUE COMPOSITIONS:	
Azoic Blue 3	ALL, BAS, BUC, GAF.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
AZOIC DYES AND COMPONENTS--CONTINUED	
AZOIC COMPOSITIONS--CONTINUED	
AZOIC BROWN COMPOSITIONS:	
Azoic Brown 9	ALL, BUC.
Azoic brown compositions, all other	BAS, GAF.
AZOIC BLACK COMPOSITIONS:	
Azoic Black 4	BUC.
Azoic black compositions, all other	ALL, BAS, GAF.
AZOIC DIAZO COMPONENTS, BASES:	
Azoic Diazo Component 4, base	ALL, BUC.
Azoic Diazo Component 12, base	BUC, PCW.
Azoic Diazo Component 13, base	ALL, BUC.
Azoic Diazo Component 14, base	ALL.
Azoic Diazo Component 32, base	ALL.
Azoic Diazo Component 34, base	ALL.
Azoic diazo components, base, all other	ALL.
*AZOIC DIAZO COMPONENTS, SALTS:	
Azoic Diazo Component 1, salt	ALL, BUC.
Azoic Diazo Component 3, salt	ALL, BUC.
Azoic Diazo Component 5, salt	ALL, BUC.
Azoic Diazo Component 6, salt	ALL, BUC.
Azoic Diazo Component 8, salt	ALL, BUC.
Azoic Diazo Component 9, salt	ALL, BUC.
Azoic Diazo Component 10, salt	ALL, BUC.
Azoic Diazo Component 11, salt	ALL.
Azoic Diazo Component 12, salt	ALL, BUC.
Azoic Diazo Component 13, salt	ALL, BUC.
Azoic Diazo Component 14, salt	ALL.
Azoic Diazo Component 20, salt	ATL.
Azoic Diazo Component 32, salt	ALL, ATL.
Azoic Diazo Component 34, salt	ALL.
Azoic Diazo Component 41, salt	ALL.
Azoic Diazo Component 42, salt	ALL.
Azoic Diazo Component 44, salt	ALL.
Azoic Diazo Component 48, salt	ATL.
Azoic Diazo Component 49, salt	ALL, BUC.
Azoic diazo components, salt, all other	ALL.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
AZOIC DYES AND COMPONENTS--CONTINUED	
AZOIC COUPLING COMPONENTS:	
Azoic Coupling Component 2	PCW.
Azoic Coupling Component 3	BUC, PCW.
Azoic Coupling Component 7	BUC, PCW.
Azoic Coupling Component 8	BUC, PCW.
Azoic Coupling Component 10	PCW.
Azoic Coupling Component 11	BUC, PCW.
Azoic Coupling Component 12	BUC, PCW.
Azoic Coupling Component 14	BUC, PCW.
Azoic Coupling Component 15	BUC.
Azoic Coupling Component 17	BUC, PCW.
Azoic Coupling Component 18	BUC, PCW.
Azoic Coupling Component 19	PCW.
Azoic Coupling Component 20	BUC, PCW.
Azoic Coupling Component 21	BUC, PCW.
Azoic Coupling Component 29	BUC, PCW.
Azoic Coupling Component 34	BUC, PCW.
Azoic Coupling Component 35	PCW.
Azoic Coupling Component 43	ALL, BUC.
BASIC DYES (CLASSICAL AND MODIFIED)	
*BASIC YELLOW DYES:	
Basic Yellow 1	DUP.
Basic Yellow 2	ACY, LVR.
*Basic Yellow 11	ATL, DUP, TRC, VPC.
Basic Yellow 13	DUP, VPC.
Basic Yellow 15	DUP.
Basic Yellow 21	VPC.
Basic Yellow 23	BAS.
Basic Yellow 24	ACY, BAS.
*Basic Yellow 28	ATL, BAS, GAF, VPC.
*Basic Yellow 29	ATL, BAS, DUP, GAF, VPC.
Basic Yellow 31	DUP.
Basic Yellow 37	ACY.
Basic Yellow 41	ACY.
Basic Yellow 49	BAS.
Basic Yellow 53	DUP.
Basic Yellow 58	DUP.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
BASIC DYES (CLASSICAL AND MODIFIED)--CONTINUED	
*BASIC YELLOW DYES--CONTINUED	
Basic Yellow 64	BAS, GAF.
Basic Yellow 65	BAS.
Basic Yellow 78	ACY.
Basic Yellow 79	DUP.
Basic Yellow 83	DUP.
Basic yellow dyes, all other	GAF, SDH.
Basic yellow dyes, all other, modified	DUP, GAF, VPC.
*BASIC ORANGE DYES:	
*Basic Orange 1	ACY, GAF, PSC, TRC.
*Basic Orange 2	ACY, ATL, BAS, DUP, GAF, PSC, TRC.
*Basic Orange 21	ATL, BAS, DUP, GAF, TRC, VPC.
Basic Orange 24	DUP.
Basic Orange 26	DUP.
Basic Orange 28	VPC.
Basic Orange 31	ACY.
Basic Orange 39	DUP.
Basic Orange 40	BAS.
Basic orange dyes, all other	SDH.
Basic orange dyes, all other, modified	BAS, DUP, VPC.
*BASIC RED DYES:	
Basic Red 1	BAS, DUP.
Basic Red 12	ACY, DUP, VPC.
*Basic Red 14	ACY, ATL, BAS, DUP, GAF, VPC.
*Basic Red 15	BAS, DUP, GAF.
Basic Red 17	DUP.
*Basic Red 18	ATL, BAS, DUP, GAF, VPC.
Basic Red 22	TRC.
Basic Red 23	VPC.
Basic Red 29	BAS.
Basic Red 30	ACY.
*Basic Red 49	BAS, DUP, GAF, TRC, VPC.
Basic Red 51	BAS.
Basic Red 73	DUP.
Basic Red 101	BAS.
Basic red dyes, all other	SDH.
Basic red dyes, all other, modified	DUP, VPC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
BASIC DYES (CLASSICAL AND MODIFIED)--CONTINUED	
*BASIC VIOLET DYES:	
Basic Violet 1	ACY, BAS, BCC, DSC.
Basic Violet 3	DSC, DUP, SDH.
Basic Violet 4	DSC, DUP.
Basic Violet 7	ATL.
Basic Violet 10	ACY, BAS, DUP.
Basic Violet 14	VPC.
Basic Violet 15	DUP.
*Basic Violet 16	BAS, DUP, TRC, VPC.
Basic Violet 18	ACY.
Basic Violet 60	ATL.
Basic violet dyes, all other	ACY, BCC, SDH.
Basic violet dyes, all other, modified	DUP.
*BASIC BLUE DYES:	
*Basic Blue 1	BAS, DSC, GAF, SDH, VPC.
Basic Blue 2	DSC.
*Basic Blue 3	BAS, DUP, GAF, TRC.
Basic Blue 5	DSC.
Basic Blue 6	ACY.
Basic Blue 7	DSC, DUP, SDH.
Basic Blue 9	ACY, SDH.
Basic Blue 11	SDH.
Basic Blue 21	DUP.
Basic Blue 22	DUP.
Basic Blue 26	DSC.
Basic Blue 27	VPC.
Basic Blue 35	DUP.
Basic Blue 41	BAS, TRC.
Basic Blue 45	VPC.
Basic Blue 47	VPC.
Basic Blue 54	ACY, BAS, GAF.
Basic Blue 60	BAS, GAF.
Basic Blue 69	VPC.
Basic Blue 75	EKT.
Basic Blue 76	ACY.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
BASIC DYES (CLASSICAL AND MODIFIED)--CONTINUED	
*BASIC BLUE DYES--CONTINUED	
Basic Blue 77	DUP.
Basic Blue 78	BAS.
Basic Blue 94	DUP.
Basic blue dyes, all other	DUP, SDH.
Basic blue dyes, all other, modified	BAS, VPC.
BASIC GREEN DYES:	
Basic Green 1	DSC.
Basic Green 4	ACY, BAS, DSC.
Basic green dyes, all other	SDH.
BASIC BROWN DYES:	
Basic Brown 1	ACY, DUP, PSC, TRC.
Basic Brown 2	BAS.
Basic Brown 4	ACY, BAS, GAF, PSC, TRC.
BASIC BLACK DYES:	
Basic black dyes, all other	SDH.
Basic black dyes, all other, modified	ALT, DAS, VPC.
DIRECT DYES	
*DIRECT YELLOW DYES:	
*Direct Yellow 4	ACY, ATL, BAS, DUP, GAF, TRC.
Direct Yellow 5	ACY.
*Direct Yellow 6	AC, ACY, BAS, DUP, LVR, TRC.
*Direct Yellow 11	AC, ACY, BAS, DUP, GAF, SDH, TRC.
Direct Yellow 12	ACY, ATL, TRC.
Direct Yellow 27	ATL.
*Direct Yellow 28	ATL, BAS, DUP, GAF, PDC, TRC.
*Direct Yellow 34	AC, ALT, TRC.
Direct Yellow 39	TRC.
*Direct Yellow 44	AC, ALT, BAS, GAF, HSH, TRC.
*Direct Yellow 50	AC, ALT, BAS, FAB, HSH, TRC.
Direct Yellow 51	FAB.
Direct Yellow 84	BAS, GAF, TRC.
*Direct Yellow 105	AC, ALT, TRC.
*Direct Yellow 106	AC, ALT, BAS, GAF, TRC.
Direct Yellow 107	TRC.
Direct Yellow 114	ACY.
Direct Yellow 118	TRC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DIRECT DYES--CONTINUED	
*DIRECT YELLOW DYES--CONTINUED	
Direct Yellow 119	AC, DUP.
Direct Yellow 127	DUP, TRC.
Direct Yellow 131	DUP.
Direct Yellow 132	TRC.
Direct Yellow 137	DUP.
Direct Yellow 139	DUP.
Direct Yellow 147	ACY, DUP.
Direct Yellow 314	AC.
Direct yellow dyes, all other	ALT, ATL, GAF.
*DIRECT ORANGE DYES:	
Direct Orange 6	ATL.
Direct Orange 8	FAB.
*Direct Orange 15	AC, ACY, BAS, DUP, TRC.
Direct Orange 26	ALT, ATL, TRC.
Direct Orange 29	TRC.
Direct Orange 34	ATL, DUP.
Direct Orange 37	BAS.
*Direct Orange 39	AC, ACY, ALT, BAS, FAB.
Direct Orange 61	TRC.
Direct Orange 72	AC, FAB, HSH, TRC.
Direct Orange 73	TRC.
Direct Orange 74	DUP.
*Direct Orange 102	AC, ACY, ATL, BAS, DUP, GAF.
Direct Orange 118	TRC.
Direct orange dyes, all other	AC, ALT, VPC.
*DIRECT RED DYES:	
Direct Red 1	FAB.
*Direct Red 2	AC, ATL, FAB, TRC.
Direct Red 4	TRC.
Direct Red 16	ATL, TRC.
*Direct Red 23	AC, ACY, ALT, ATL, DUP, HSH, TRC.
*Direct Red 24	AC, ALT, ATL, HSH, TRC, VPC.
Direct Red 26	AC, ATL.
Direct Red 28	FAB.
Direct Red 31	ATL, TRC.
Direct Red 37	BAS, GAF.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DIRECT DYES--CONTINUED	
DIRECT RED DYES--CONTINUED	
Direct Red 39	BAS, GAF, TRC.
Direct Red 62	TRC.
*Direct Red 72	ALT, ATL, BAS, DUP, GAF, TRC.
Direct Red 73	AC, ATL.
Direct Red 76	BAS, GAF.
Direct Red 79	ALT, TRC.
*Direct Red 80	AC, ALT, ATL, HSH, TRC.
*Direct Red 81	AC, ACY, ALT, ATL, BAS, DUP, GAF, HSH, LVR, TRC, VPC.
Direct Red 83	AC, ALT.
Direct Red 122	TRC.
Direct Red 149	ATL.
Direct Red 209	TRC.
Direct Red 212	VPC.
Direct Red 236	DUP.
Direct Red 238	DUP.
Direct Red 239	TRC.
Direct Red 251	ATL.
Direct red dyes, all other	AC, ACY, ALT, ATL, VPC.
*DIRECT VIOLET DYES:	
Direct Violet 9	ATL, TRC.
Direct Violet 66	ATL, DUP, TRC.
*DIRECT BLUE DYES:	
*Direct Blue 1	AC, ATL, BAS, GAF, TRC.
Direct Blue 2	BAS, FAB, GAF.
Direct Blue 6	FAB.
Direct Blue 8	ATL.
Direct Blue 14	TRC.
*Direct Blue 15	BAS, DUP, GAF, VPC.
Direct Blue 25	ATL, TRC.
Direct Blue 67	ATL.
Direct Blue 75	TRC.
Direct Blue 76	AC, ALT, ATL.
Direct Blue 78	AC.
*Direct Blue 80	AC, ALT, ATL, BAS, GAF, TRC.
*Direct Blue 86	AC, ALT, ATL, BDO, DUP, FAB, TRC, VPC.
Direct Blue 91	TRC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DIRECT DYES--CONTINUED	
*DIRECT BLUE DYES--CONTINUED	
*Direct Blue 98	ALT, ATL, BAS, FAB, GAF, TRC.
Direct Blue 100	ALT, FAB.
Direct Blue 108	ATL.
Direct Blue 120, 120:1, 120:2, and 120:3	AC, ATL, TRC.
Direct Blue 126	HSH.
Direct Blue 151	ATL.
Direct Blue 160	ALT, TRC, VPC.
Direct Blue 189	TRC.
Direct Blue 191	ALT, BAS, GAF.
Direct Blue 199	BAS, DUP, GAF.
*Direct Blue 218	ALT, ATL, BAS, DUP, GAF, TRC.
Direct Blue 260	DUP.
Direct Blue 263	DUP.
Direct Blue 279	DUP.
Direct blue dyes, all other	AC, ALT, ATL, FAB, HSH, VPC.
DIRECT GREEN DYES:	
Direct Green 1	FAB.
Direct Green 6	FAB.
Direct Green 26	TRC.
Direct Green 27	TRC.
Direct Green 28	TRC.
Direct Green 47	FAB.
Direct Green 51	TRC.
Direct Green 69	TRC.
Direct green dyes, all other	DUP, FAB, TRC.
DIRECT BROWN DYES:	
Direct Brown 2	BAS, FAB, GAF.
Direct Brown 6	FAB.
Direct Brown 31	BAS, FAB, GAF.
Direct Brown 44	FAB.
Direct Brown 74	FAB.
Direct Brown 95	BAS, FAB, GAF.
Direct Brown 154	FAB.
Direct Brown 230	ATL.
Direct brown dyes, all other	AC, ALT, ATL, FAB.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DIRECT DYES--CONTINUED	
*DIRECT BLACK DYES	
Direct Black 4	FAB.
Direct Black 19	ATL, TRC.
*Direct Black 22	AC, ALT, ATL, TRC, VPC.
Direct Black 38	BAS, FAB, GAF.
Direct Black 78	AC.
Direct Black 80	AC, ALT, ATL, FAB.
Direct Black 190	AC.
Direct black dyes, all other	AC, ALT, ATL, FAB, GAF, TRC.
DISPERSE DYES	
*DISPERSE YELLOW DYES:	
Disperse Yellow 3	AC, ALT, EKT, HSH, TRC.
Disperse Yellow 4	VPC.
Disperse Yellow 14	HST.
*Disperse Yellow 23	ALT, ATL, DUP, EKT, HSH, TRC.
Disperse Yellow 33	AC, BAS, EKT, TRC.
Disperse Yellow 34	AC, EKT.
*Disperse Yellow 42	DUP, EKT, SDC, TRC.
*Disperse Yellow 54	AC, BAS, DUP, GAF, TRC, VPC.
Disperse Yellow 56	BAS.
Disperse Yellow 58	DUP, HST.
Disperse Yellow 64	BAS, DUP.
Disperse Yellow 67	BAS, DUP, GAF, VPC.
Disperse Yellow 74	VPC.
Disperse Yellow 77	VPC.
Disperse Yellow 86	AC, EKT.
Disperse Yellow 88	EKT.
Disperse Yellow 93	VPC.
Disperse Yellow 96	VPC.
Disperse Yellow 99	EKT.
Disperse Yellow 108	EKT.
Disperse Yellow 118	AC.
Disperse Yellow 125	SDC.
Disperse Yellow 126	ICI.
Disperse Yellow 131	DUP.
Disperse Yellow 136	DUP.
Disperse Yellow 137	DUP.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DISPERSE DYES--CONTINUED	
*DISPERSE YELLOW DYES--CONTINUED	
Disperse Yellow 138	DUP.
Disperse Yellow 198	BAS.
Disperse Yellow 200	EKT.
Disperse Yellow 207	SDC.
Disperse Yellow 208	SDC.
Disperse yellow dyes, all other	BAS, EKT, GAF, MAY, VPC.
*DISPERSE ORANGE DYES:	
*Disperse Orange 3	AC, ALT, ATL, TRC.
Disperse Orange 5	ATL, EKT.
Disperse Orange 17	AC, BAS, EKT, GAF, HSH.
Disperse Orange 21	TRC.
*Disperse Orange 25	ALT, DUP, EKT, TRC, VPC.
*Disperse Orange 29	AC, ALT, ATL, BAS, GAF, HSH, SDC, VPC.
Disperse Orange 30	ATL, FAB, TRC.
Disperse Orange 31	BAS.
Disperse Orange 33	BAS.
Disperse Orange 37	AC, ALT, EKT.
Disperse Orange 38	TRC.
Disperse Orange 41	AC, DUP.
Disperse Orange 44	DUP, TRC.
Disperse Orange 53	TRC.
Disperse Orange 55	GAF.
Disperse Orange 56	TRC.
Disperse Orange 57	EKT.
Disperse Orange 58	EKT.
Disperse Orange 59	ATL, HSH.
Disperse Orange 62	BUC, DUP.
Disperse Orange 66	VPC.
Disperse Orange 73	BAS, GAF.
Disperse Orange 75	BAS, DUP.
Disperse Orange 77	MAY.
Disperse Orange 78	MAY.
Disperse Orange 79	MAY.
Disperse Orange 88	SDC.
Disperse Orange 89	AC.
Disperse Orange 90	AC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DISPERSE DYES--CONTINUED	
*DISPERSE ORANGE DYES--CONTINUED	
Disperse Orange 94	SDC.
Disperse Orange 95	DUP.
Disperse Orange 98	DUP.
Disperse Orange 125	DUP.
Disperse Orange 129	SDC.
Disperse Orange 136	EKT.
Disperse orange dyes, all other	AC, ALT, BAS, BUC, EKT, FAB, HSH.
*DISPERSE RED DYES:	
*Disperse Red 1	AC, ALT, ATL, BAS, DUP, EKT, GAF, HSH, TRC.
*Disperse Red 4	BAS, GAF, TRC.
*Disperse Red 5	AC, ALT, HSH.
Disperse Red 7	AC.
Disperse Red 9	ATL.
Disperse Red 11	AC, BAS.
Disperse Red 13	ATL, BAS, GAF.
Disperse Red 15	ALT, HSH, TRC.
*Disperse Red 17	AC, ALT, BAS, EKT, GAF, TRC.
Disperse Red 30	EKT.
Disperse Red 35	EKT.
Disperse Red 50	ALT, TRC.
Disperse Red 54	BAS.
*Disperse Red 55	DUP, TRC, VPC.
*Disperse Red 59	BAS, DUP, GAF.
*Disperse Red 60	AC, BAS, DUP, EKT, TRC, VPC.
*Disperse Red 65	AC, ALT, EKT, TRC.
Disperse Red 73	BAS, TRC.
Disperse Red 76	BAS.
Disperse Red 82	TRC, VPC.
*Disperse Red 86	ALT, BAS, EKT, TRC.
Disperse Red 88	EKT.
Disperse Red 90	VPC.
Disperse Red 91	BAS.
Disperse Red 92	BAS.
Disperse Red 105	VPC.
Disperse Red 106	VPC.
Disperse Red 108	VPC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DISPERSE DYES--CONTINUED	
*DISPERSE RED DYES--CONTINUED	
Disperse Red 109	VPC.
Disperse Red 114	VPC.
Disperse Red 115	MAY.
Disperse Red 117	EKT.
Disperse Red 118	BAS.
Disperse Red 128	DUP.
Disperse Red 133	VPC.
Disperse Red 135	ALT, DUP.
Disperse Red 136	EKT.
Disperse Red 137	EKT.
Disperse Red 138	EKT.
Disperse Red 140	DUP.
Disperse Red 140	AC.
Disperse Red 153	SDC.
Disperse Red 159	VPC.
Disperse Red 161	DUP.
Disperse Red 163	EKT.
Disperse Red 167	BAS, TRC.
Disperse Red 177	ALT, SDC, VPC.
Disperse Red 178	TRC.
Disperse Red 179	BAS, GAF.
Disperse Red 193	SDC.
Disperse Red 195	SDC.
Disperse Red 214	BAS, GAF.
Disperse Red 217	DUP.
Disperse Red 219	DUP.
Disperse Red 220	DUP.
Disperse Red 263	BAS, GAF.
Disperse Red 271	DUP.
Disperse Red 273	BAS, GAF.
Disperse Red 274	SDC.
Disperse Red 275	SDC.
Disperse Red 305	EKT.
Disperse Red 307	EKT.
Disperse Red 309	EKT.
Disperse Red 313	SDC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DISPERSE DYES--CONTINUED	
*DISPERSE RED DYES--CONTINUED	
Disperse Red 316	SDC.
Disperse Red 319	ALT.
Disperse red dyes, all other	AC, ALT, BAS, BUC, DUP, EKT, FAB, GAF, HSH, HST, MAY, TRC, VPC.
*DISPERSE VIOLET DYES:	
*Disperse Violet 1	AC, ALT, BAS, HSH, TRC.
Disperse Violet 17	DUP.
Disperse Violet 26	DUP.
*Disperse Violet 27	AC, ACY, DUP, EKT.
Disperse Violet 28	DUP, TRC.
Disperse Violet 33	ICI.
Disperse Violet 36	SDC.
Disperse Violet 40	VPC.
Disperse Violet 41	EKT.
Disperse Violet 42	EKT.
Disperse Violet 43	EKT.
Disperse Violet 60	SDC.
Disperse Violet 64	DUP.
Disperse Violet 81	SDC.
Disperse violet dyes, all other	HST, MAY.
*DISPERSE BLUE DYES:	
*Disperse Blue 3	AC, ALT, EKT, HSH, TRC.
Disperse Blue 7	AC, TRC.
Disperse Blue 25	VPC.
Disperse Blue 27	EKT.
Disperse Blue 55	TRC.
Disperse Blue 56	VPC.
Disperse Blue 60	BAS, DUP.
Disperse Blue 62	DUP, EKT.
*Disperse Blue 64	AC, DUP, EKT, TRC.
Disperse Blue 73	ACY, TRC.
Disperse Blue 77	DUP, EKT.
*Disperse Blue 79	ALT, ATL, BAS, EKT, GAF, HSH, MAY, TRC.
Disperse Blue 81	VPC.
Disperse Blue 87	BAS.
Disperse Blue 94	BAS.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DISPERSE DYES--CONTINUED	
*DISPERSE BLUE DYES--CONTINUED	
Disperse Blue 95	HST.
Disperse Blue 102	EKT.
Disperse Blue 109	DUP.
Disperse Blue 112	EKT.
Disperse Blue 118	EKT.
Disperse Blue 121	EKT.
Disperse Blue 122	ICI.
Disperse Blue 125	TRC.
Disperse Blue 138	VPC.
Disperse Blue 139	VPC.
Disperse Blue 148	BAS.
Disperse Blue 165	DUP, HST, VPC.
Disperse Blue 174	AC.
Disperse Blue 175	SDC.
Disperse Blue 177	SDC.
Disperse Blue 192	DUP.
Disperse Blue 194	DUP.
Disperse Blue 281	SDC.
Disperse Blue 283	DUP.
Disperse Blue 291	SDC.
Disperse Blue 317	EKT.
Disperse blue dyes, all other	AC, BUC, DUP, EKT, HST, MAY, TRC, VPC.
DISPERSE GREEN DYES:	
Disperse Green 7	DUP.
Disperse green dyes, all other	ALT, VPC.
DISPERSE BROWN DYES:	
Disperse Brown 1	AC, ALT, ATL, BUC, HST, ICI, SDC, TRC.
Disperse Brown 2	BAS, EKT, SDC.
Disperse Brown 10	SDC.
Disperse Brown 18	SDC.
Disperse brown dyes, all other	EKT, TRC.
*DISPERSE BLACK DYES:	
Disperse Black 9	AC, EKT.
Disperse Black 33	AC, EKT.
Disperse black dyes, all other	ALT, BAS, EKT, VPC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
FIBER-REACTIVE DYES	
*REACTIVE YELLOW DYES:	
Reactive Yellow 1	ICI.
Reactive Yellow 2	TRC.
Reactive Yellow 3	TRC.
Reactive Yellow 4	ICI.
Reactive Yellow 6	TRC.
Reactive Yellow 7	ICI.
Reactive Yellow 15	HST.
Reactive Yellow 17	HST.
Reactive Yellow 18	ICI.
Reactive Yellow 22	ICI.
Reactive Yellow 24	HST.
Reactive Yellow 25	VPC.
Reactive Yellow 27	VPC.
Reactive Yellow 37	HST.
Reactive Yellow 42	HST.
Reactive Yellow 86	ICI.
Reactive Yellow 132	ICI.
Reactive Yellow 133	ICI.
Reactive yellow dyes, all other	HST, ICI.
REACTIVE ORANGE DYES:	
Reactive Orange 1	ICI.
Reactive Orange 4	FAB, ICI.
Reactive Orange 12	ICI.
Reactive Orange 13	ICI.
Reactive Orange 14	ICI.
Reactive Orange 16	HST.
Reactive Orange 78	HST.
Reactive Orange 84	ICI.
Reactive Orange 86	ICI.
Reactive orange dyes, all other	HST.
REACTIVE RED DYES:	
Reactive Red 1	ICI.
Reactive Red 2	FAB, ICI.
Reactive Red 5	ICI.
Reactive Red 8	ICI.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
FIBER-REACTIVE DYES--CONTINUED	
REACTIVE RED DYES--CONTINUED	
Reactive Red 11	FAB, ICI.
Reactive Red 21	HST.
Reactive Red 29	ICI.
Reactive Red 31	ICI.
Reactive Red 33	ICI.
Reactive Red 40	VPC.
Reactive Red 41	VPC.
Reactive Red 43	ICI, TRC.
Reactive Red 49	HST.
Reactive Red 58	ICI.
Reactive Red 120	ICI, TRC.
Reactive red dyes, all other	VPC.
REACTIVE VIOLET DYES:	
Reactive Violet 1	ICI.
Reactive Violet 5	HST.
Reactive violet dyes, all other	HST.
REACTIVE BLUE DYES:	
Reactive Blue 3	ICI.
Reactive Blue 4	ICI.
Reactive Blue 5	ICI.
Reactive Blue 7	TRC.
Reactive Blue 19	HST.
Reactive Blue 21	HST.
Reactive Blue 25	ICI.
Reactive Blue 29	VPC.
Reactive Blue 38	HST.
Reactive Blue 71	ICI.
Reactive Blue 89	HST.
Reactive Blue 109	ICI.
Reactive Blue 173	ICI.
Reactive Blue 174	ICI.
Reactive blue dyes, all other	HST, ICI.
REACTIVE GREEN DYES:	
Reactive Green 19	ICI.
Reactive green dyes, all other	HST.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
FIBER-REACTIVE DYES--CONTINUED	
REACTIVE BROWN DYES	
Reactive Brown 1	ICI.
Reactive Brown 10	ICI.
Reactive Brown 17	ICI.
Reactive Brown 18	HST.
Reactive brown dyes, all other	HST.
REACTIVE BLACK DYES::	
Reactive Black 5	HST.
Reactive Black 9	ICI.
Reactive black dyes, all other	HST.
FLUORESCENT BRIGHTENERS	
Fluorescent Brightener 22	CGY.
Fluorescent Brightener 24	CGY.
*Fluorescent Brightener 28	CCW, CGY, VPC, X.
Fluorescent Brightener 46	CGY.
Fluorescent Brightener 49	S.
Fluorescent Brightener 52	S.
*Fluorescent Brightener 61	ACY, BAS, CCW, DGO, GAF.
Fluorescent Brightener 68	PCW.
Fluorescent Brightener 71	CGY.
Fluorescent Brightener 126	X.
Fluorescent Brightener 127	SDH.
Fluorescent Brightener 128	X.
Fluorescent Brightener 129	SDH.
Fluorescent Brightener 134	CGY.
Fluorescent Brightener 135	CGY.
Fluorescent Brightener 148	VPC.
Fluorescent Brightener 159	ACY.
Fluorescent Brightener 191	VPC.
Fluorescent Brightener 200	VPC.
Fluorescent brighteners, all other	ACY, CCW, DGO, S, SDH, VPC.
FOOD, DRUG, AND COSMETIC COLORS	
*FOOD, DRUG, AND COSMETIC DYES:	
*Food, Drug, and Cosmetic Blue 1	BCC, KON, SDH, WJ.
Food, Drug, and Cosmetic Blue 2	ALT, BCC, KON, SDH.
Food, Drug, and Cosmetic Green 3	BCC, WJ.
Food, Drug, and Cosmetic Red 2	KON.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
FOOD, DRUG, AND COSMETIC COLORS--CONTINUED	
*FOOD, DRUG, AND COSMETIC DYES--CONTINUED	
Food, Drug, and Cosmetic Red 3	ALT, KON, SDH, STG.
Food, Drug, and Cosmetic Red 4	ALT, BCC.
*Food, Drug, and Cosmetic Red 40	ALT, BCC, KON, SDH. WJ.
Food, Drug, and Cosmetic Yellow 3	WJ.
*Food, Drug, and Cosmetic Yellow 5	ALT, BCC, KON, SDH, STG, WJ.
*Food, Drug, and Cosmetic Yellow 6	ALT, BCC, KON, SDH, STG, WJ.
Food, drug, and cosmetic dyes, all other	STG, WJ.
DRUG AND COSMETIC DYES:	
Drug and Cosmetic Green 5	BCC, KON.
Drug and Cosmetic Green 6	KON.
Drug and Cosmetic Green 8	X.
Drug and Cosmetic Orange 4	BCC, KON.
Drug and Cosmetic Orange 5	SDH, SNA, TMS.
Drug and Cosmetic Orange 10	KON, SDH, TMS.
Drug and Cosmetic Orange 17	SNA.
Drug and Cosmetic Red 3	KON.
Drug and Cosmetic Red 6	KON, SDH, SNA, TMS.
*Drug and Cosmetic Red 7	KON, SDH, SNA, TMS.
Drug and Cosmetic Red 8	SNA.
*Drug and Cosmetic Red 9	KON, MRX, SDH, SNA, TMS.
Drug and Cosmetic Red 10	SNA.
Drug and Cosmetic Red 17	KON.
*Drug and Cosmetic Red 19	BCC, KON, SDH, SNA, TMS.
Drug and Cosmetic Red 21	SDH, SNA.
Drug and Cosmetic Red 22	SDH.
Drug and Cosmetic Red 27	MRX, SDH, TMS.
Drug and Cosmetic Red 28	SDH.
Drug and Cosmetic Red 30	KON, SDH, SNA.
Drug and Cosmetic Red 33	BCC, KON.
Drug and Cosmetic Red 34	SNA.
Drug and Cosmetic Red 36	KON, SNA.
Drug and Cosmetic Red 37	BCC.
Drug and Cosmetic Violet 2	BCC.
Drug and Cosmetic Yellow 5	KON.
Drug and Cosmetic Yellow 6	KON.
Drug and Cosmetic Yellow 8	SDH.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
FOOD, DRUG, AND COSMETIC COLORS--CONTINUED	
DRUG AND COSMETIC DYES--CONTINUED	
Drug and Cosmetic Yellow 10	BCC, KON, WJ.
Drug and Cosmetic Yellow 11	BCC, KON.
DRUG AND COSMETIC DYES, EXTERNAL:	
External Drug and Cosmetic Violet 2	KON.
External Drug and Cosmetic Yellow 1	KON.
External Drug and Cosmetic Yellow 7	KON.
MORDANT DYES	
MORDANT YELLOW DYES:	
Mordant Yellow 1	PDC.
Mordant Yellow 8	PDC.
Mordant Yellow 20	PDC.
MORDANT ORANGE DYES:	
Mordant Orange 1	PDC, TRC.
Mordant Orange 6	BAS, PDC, TRC.
MORDANT RED DYES::	
Mordant Red 7	ACY, ATL, BDO, PDC.
Mordant Red 9	SDH.
Mordant Red 11	ACY.
MORDANT VIOLET DYES:	
Mordant Violet 5	PDC.
MORDANT BLUE DYES:	
Mordant Blue 79	BAS.
MORDANT BROWN DYES:	
Mordant Brown 1	TRC.
Mordant Brown 18	PDC.
Mordant Brown 33	PDC, TRC.
Mordant Brown 40	PDC.
Mordant Brown 70	PDC.
MORDANT BLACK DYES:	
Mordant Black 11	BAS, TRC.
Mordant Black 13	HSH.
Mordant Black 17	BAS, TRC.
SOLVENT DYES	
*SOLVENT YELLOW DYES:	
Solvent Yellow 1	HSH.
Solvent Yellow 3	PSC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
SOLVENT DYES--CONTINUED	
*SOLVENT YELLOW DYES--CONTINUED	
Solvent Yellow 13	ACY, BAS, GAF.
*Solvent Yellow 14	ACY, ATL, DUP, PSC, VPC.
Solvent Yellow 16	PSC.
Solvent Yellow 19	BAS.
Solvent Yellow 29	BAS, GAF.
Solvent Yellow 30	PSC.
Solvent Yellow 33	AC, ACY, BCC.
Solvent Yellow 40	BCC.
Solvent Yellow 42	ATL, BCC.
Solvent Yellow 43	DGO.
Solvent Yellow 47	BAS, DUP.
Solvent Yellow 56	ACY, PSC.
Solvent Yellow 71	ACY.
Solvent Yellow 72	AC, ACY.
Solvent Yellow 77	AC.
Solvent Yellow 87	ACY.
Solvent Yellow 94	SDH.
Solvent Yellow 107	ACY, MRT.
Solvent Yellow 131	DGO.
Solvent Yellow 135	DGO.
*SOLVENT ORANGE DYES:	
Solvent Orange 2	PSC.
Solvent Orange 3	ACY, PSC.
Solvent Orange 7	ACY, ATL, PSC.
*Solvent Orange 20	ACY, BAS, GAF.
Solvent Orange 23	ATL, BCC.
Solvent Orange 25	ACY, DUP.
Solvent Orange 31	PSC.
Solvent Orange 60	AC.
Solvent Orange 74	MRT.
Solvent orange dyes, all other	AC, DUP.
SOLVENT RED DYES:	
Solvent Red 1	PSC.
Solvent Red 8	BAS.
Solvent Red 19	MRT.
Solvent Red 22	BAS.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
SOLVENT DYES--CONTINUED	
SOLVENT RED DYES--CONTINUED	
Solvent Red 24	AC, ACY, ATL, PSC.
Solvent Red 26	AC, ACY, PSC.
Solvent Red 27	PSC.
Solvent Red 33	DUP.
Solvent Red 49	ACY, BAS, DUP, GAF.
Solvent Red 68	ATL, BCC.
Solvent Red 74	ATL, BCC.
Solvent Red 80	BCC.
Solvent Red 105	ACY.
Solvent Red 108	ACY.
Solvent Red 111	AC, ACY.
Solvent Red 126	ACY.
Solvent Red 164	MRT.
Solvent Red 165	MRT.
Solvent Red 168	MRT.
Solvent red dyes, all other	AC, ACY.
SOLVENT VIOLET DYES:	
Solvent Violet 8	ACY, DSC.
Solvent Violet 9	DSC.
Solvent Violet 13	AC.
Solvent Violet 26	AC.
*SOLVENT BLUE DYES:	
Solvent Blue 3	ACY, LVR, SW.
Solvent Blue 4	DSC, DUP, SDH.
Solvent Blue 5	DSC.
Solvent Blue 6	DUP.
Solvent Blue 11	BDO.
Solvent Blue 16	AC.
Solvent Blue 23	HSC.
Solvent Blue 35	MRT.
Solvent Blue 36	AC, MRT.
Solvent Blue 37	DUP.
Solvent Blue 38	ACY, DUP, TNI.
Solvent Blue 58	ACY.
Solvent Blue 59	AC, ACY.
Solvent Blue 98	MRT.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
SOLVENT DYES--CONTINUED	
*SOLVENT BLUE DYES--CONTINUED	
Solvent Blue 99	MRT.
Solvent Blue 100	MRT.
Solvent blue dyes, all other	AC, ACY, DUP.
SOLVENT GREEN DYES:	
Solvent Green 1	ACY, DSC.
Solvent Green 3	AC.
SOLVENT BROWN DYES:	
Solvent Brown 11	BAS.
Solvent Brown 12	ACY, PSC.
Solvent Brown 19	DUP.
Solvent Brown 20	ACY, DUP.
Solvent Brown 22	PSC.
Solvent Brown 38	ACY.
SOLVENT BLACK DYES:	
Solvent Black 5	ACY.
Solvent Black 7	ACY, PSC.
Solvent Black 13	ATL, BCC.
Solvent Black 26	ACY.
Solvent black dyes, all other	BAS, GAF, PSC.
SULFUR DYES	
SULFUR YELLOW DYES:	
Leuco Sulfur Yellow 1	SDC.
Leuco Sulfur Yellow 17	SDC.
Leuco Sulfur Yellow 21	SDC.
Leuco Sulfur Yellow 22	SDC.
SULFUR ORANGE DYES:	
Leuco Sulfur Orange 1	SDC.
SULFUR RED DYES:	
Leuco Sulfur Red 10	SDC.
Leuco Sulfur Red 14	SDC.
Sulfur Red 10	SDC.
SULFUR BLUE DYES:	
Leuco Sulfur Blue 7	SDC.
Leuco Sulfur Blue 9	SDC.
Leuco Sulfur Blue 13	ACY, SDC.
Sulfur Blue 7	ACY.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
SULFUR DYES--CONTINUED	
SULFUR GREEN DYES:	
Leuco Sulfur Green 2	SDC.
Leuco Sulfur Green 3	SDC.
Leuco Sulfur Green 16	SDC.
Leuco Sulfur Green 34	SDC.
Leuco Sulfur Green 35	SDC.
Leuco Sulfur Green 36	SDC.
SULFUR BROWN DYES:	
Leuco Sulfur Brown 1:1	SDC.
Leuco Sulfur Brown 3	SDC.
Leuco Sulfur Brown 10	SDC.
Leuco Sulfur Brown 31	SDC.
Leuco Sulfur Brown 37	SDC.
Leuco Sulfur Brown 52	SDC.
Leuco Sulfur Brown 92	SDC.
Leuco Sulfur Brown 95	SDC.
Sulfur brown dyes, all other	ACY.
SULFUR BLACK DYES:	
Leuco Sulfur Black 1	ACY, SDC.
Leuco Sulfur Black 2	SDC.
Leuco Sulfur Black 11	SDC.
Leuco Sulfur Black 11:1	SDC.
Leuco Sulfur Black 18	SDC.
Solubilized Sulfur Black 1	SDC.
Sulfur Black 1	ACY, SDC.
Sulfur Black 2	SDC.
Sulfur Black 10	ACY.
Sulfur Black 11	SDC.
VAT DYES	
*VAT YELLOW DYES:	
Vat Yellow 2, 8-1/2%	AC, TRC, VPC.
Vat Yellow 4, 12-1/2%	HST.
Vat Yellow 14 12-1/2%	TRC.
Vat Yellow 15, 11-1/2%	ACY.
Vat Yellow 22, 10%	DUP.
Vat Yellow 33, 15%	TRC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
VAT DYES--CONTINUED	
*VAT ORANGE DYES:	
Vat Orange 1, 20%	HST, TRC, VPC.
*Vat Orange 2, 12%	ACY, BAS, TRC.
Vat Orange 3, 13-1/2%	HST.
Vat Orange 4, 6%	DUP.
Vat Orange 5, 10%	HST.
Vat Orange 7, 11%	HST, TRC.
Vat Orange 9, 12%	ACY, TRC.
*Vat Orange 15, 10%	ACY, TRC, VPC.
*VAT RED DYES:	
Vat Red 1, 13%	ACY, HST.
Vat Red 10, 18%	BAS.
Vat Red 13, 11%	TRC.
Vat Red 14, 10%	HST.
Vat Red 15, 10%	HST, TRC.
Vat Red 32, 20%	BAS, DUP.
Vat Red 41, 20%	HST.
*VAT VIOLET DYES:	
Vat Violet 1, 11%	DUP, TRC.
Vat Violet 2, 20%	ACY, HST.
Vat Violet 3, 15%	BAS, HST.
Vat Violet 9, 12%	TRC.
Vat Violet 13, 6-1/4%	BAS, TRC.
Vat Violet 21	VPC.
*VAT BLUE DYES:	
Vat Blue 1, 20%	BAS, BCC.
*Vat Blue 6, 8-1/3%	ACY, BAS, TRC.
Vat Blue 16, 16%	BAS.
Vat Blue 18, 13%	AC, ACY, TRC.
Vat Blue 19	BAS.
Vat Blue 20, 14%	ACY, TRC.
Vat Blue 43	SDC.
Vat Blue 66	BAS.
Vat blue dyes, all other	BCC, HST, SDC.
*VAT GREEN DYES:	
Vat Green 1, 6%	ACY, BAS, DUP.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

DYES	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
VAT DYES--CONTINUED	
*VAT GREEN DYES--CONTINUED	
*Vat Green 3, 10%	AC, ACY, DUP, TRC.
Vat Green 7	SDC.
Vat Green 8, 8-1/2%	DUP.
Vat Green 9, 12-1/2%	ACY, BAS, TRC.
Vat Green 32	VPC.
Vat green dyes, all other	ACY.
*VAT BROWN DYES:	
Vat Brown 1, 11%	ACY, DUP, TRC.
Vat Brown 3, 11%	AC, ACY, TRC, VPC.
Vat Brown 5, 13%	ACY.
Vat Brown 11, 12%	TRC.
Vat Brown 13, 17%	TRC.
Vat Brown 14, 12%	AC.
Vat Brown 57, 12.8%	HST, TRC.
Vat brown dyes, all other	AC, ACY, VPC.
*VAT BLACK DYES:	
Vat Black 14, 11-1/2%	AC.
Vat Black 16	BCC.
Vat Black 21, 18-1/2%	ACY.
Vat Black 22, 19%	ACY, TRC.
*Vat Black 25, 12-1/2%	AC, ACY, DUP, TRC.
Vat Black 27, 12-1/2%	ACY, DUP, TRC.
Vat black dyes, all other	AC, ACY.
MISCELLANEOUS DYES:	
Dyes, all other	DUP.

TABLE 3.--Dyes: Directory of manufacturers, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of dyes to the U.S. International Trade Commission for 1978 are listed below in order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
AC	American Color & Chemical Corp.	KON	H. Kohnstamm & Co., Inc.
ACY	American Cyanamid Co.		
ALL	Alliance Chemical Corp.		
ALT	Crompton & Knowles Corp., Dyes & Chemical Div.	LVR	C. Lever Co., Inc.
ATL	Atlantic Chemical Corp.		
		MAY	Otto B. May Co. Div. of Cone Mills Corp.
BAS	BASF Wyandotte Corp.	MRT	Morton Norwich Products Inc., Morton Chemical Co. Div.
BCC	Buffalo Color Corp.		
BDO	Benzenoid Organics, Inc.	MRX	Max Marx Color & Chemical Co.
BUC	Synalloy Corp., Blackman-Uhler Chemical Div.		
		PCW	Pfister Chemical Works
CCW	Cincinnati Milacron Chemicals, Inc.	PDC	Berncolors-Poughkeepsie, Inc.
CGY	Ciba-Geigy Corp.	PSC	Passaic Color & Chemical Co.
DGO	Day-Glo Color Corp.		
DSC	Dye Specialties, Inc.	S	Sandoz, Inc.
DUP	E. I. duPont de Nemours & Co., Inc.	SDC	Martin-Marietta Corp., Sodyeco Div.
		SDH	Sterling Drug, Inc., Hilton Davis Chemical Co. Div.
EKT	Eastman Kodak Co., Tennessee Eastman Co. Div.	SNA	Sun Chemical Corp., Pigments Div.
		STG	Stange Co.
		SW	Sherwin-Williams Co.
FAB	Fabricolor Manufacturing Corp.		
		TMS	Sterling Drug, Inc., Thomasset Colors Div.
GAF	GAF Corp.	TNI	Gillette Co., Chemical Div.
		TRC	Toms River Chemical Corp.
HSC	Chemetron Corp., Pigments Div., Sub. of Allegheny Ludlum Industries, Inc.		
HSH	Harshaw Chemical Co.	VPC	Mobay Chemical Corp, Verona Dyestuff Div.
HST	American Hoechst Corp. Industrial Chemicals Div.		
ICI	ICI Americas, Inc., Chemical Specialties Co.	WJ	Warner-Jenkinson Co.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

PROFILE OF THE DOMESTIC ORGANIC PIGMENTS INDUSTRY

Bonnie Jean Noreen

In 1978, U.S. production, sales, apparent consumption, and foreign trade in synthetic organic pigments continued the upward trend from the economic setback of 1974-75. The United States enjoys a positive balance of trade in the organic pigments; exports in 1978 were 2.5 times greater than imports on the basis of quantity and 1.4 times greater on the basis of value.

All the organic pigments reported here are benzenoid products, i.e., they have a chemical structure like or similar to that of a benzene or modified benzene ring.

Description and Uses

Organic pigments comprise approximately 10 percent of the total volume and 30 percent of the total value of all pigments. Although more expensive than their inorganic counterparts, they are available in brighter and more varied colors. Organic pigments are usually transparent and can be dissolved by organic solvents while inorganic pigments are usually opaque and insoluble in such solvents. The volume of organic pigments as a percent of the total pigments output is not expected to change significantly, but their percent of the value is expected to increase in the next several years partly because of the increased costs of the petrochemical raw materials.

Organic pigments can be derived from synthetic or natural dyestuffs. For economic reasons, the natural products have been almost completely replaced by synthetics. These pigments are generally derived from dyes or pigment intermediates closely related to dyes. Color lakes are prepared by the precipitation of a water-soluble dye on an insoluble inorganic compound or substrate. In contrast, toners, or full-strength colors, do not require a substrate or base. Toners are by far the more commercially important of the two pigments and are marketed either full-strength or extended, i.e., diluted by the addition of a solid diluent.[1]

The largest use of organic pigments is in printing inks. The second largest use is in paints and other coatings. Lesser amounts are employed to color plastics, textiles, and many other products. When used in inks and paints, pigments must be readily dispersible in such mediums as oils, organic solvents, varnishes, and resins.

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[1]Although extended toners are provided for under TSUS item 406.70, analysis of import data indicates that imports have also been entered under TSUS item 409.00 as mixtures.

The Domestic Industry

The number of companies reporting production and/or sales of organic pigments in 1978 was 37--one more than in 1977. Concentration in the industry in 1978 was similar to the previous year. In both years, 5 of the reporting companies accounted for 59 percent of the total sales value; in 1978, 10 companies accounted for 82 percent of total sales value compared with 83 percent in 1977.

For the third consecutive year both production and sales of organic pigments has increased. In 1978, the production of organic pigments was 76.7 million pounds, which represents an increase of 7.0 million pounds (10.0 percent) more than the 69.7[1] million pounds produced in 1977. The sales quantity in 1978 increased by 7.2 million pounds (12.5 percent) and sales value increased by $54.1 million (20.2 percent) more than the previous year. In 1978 both production and sales quantities exceeded the previous highs recorded before the economic setback of 1974-75. The sales unit value in 1978 was $4.98 per pound, $0.32 per pound (6.9 percent) higher than the previous year and $0.17 per pound (3.5 percent) higher than the unit value set in 1976, the next highest year (table A).

Over the past 10 years, toners have increasingly become more important than lakes. In 1978, toner production was 75.3 million pounds, which was 55 times as great as the 1.4 million pounds of lakes produced. Ten years earlier, in 1969, the 57.3 million pounds of toners produced were only 15 times as great as the 3.7 million pounds of lakes produced that year. Sales of toners in 1978 were 63.7 million pounds valued at $318.9 million; this is 69 times as great as lakes on the basis of quantity, and 105 times as great as lakes on the basis of value. Over the past 10 years, production of lakes has decreased by 63 percent while production of toners has increased by 31 percent. The sales unit values of both have increased in the past 10 years, toners by 83 percent (from $2.73 to $5.00 per pound), and lakes by 193 percent (from $1.12 to $3.28 per pound) (table A).

The apparent U.S. consumption of organic pigments in 1978 was 64.7 million pounds, representing a 3.3 percent increase over the 62.6 million pounds apparently consumed in 1977. Apparent U.S. consumption, like production, has been increasing since the economic setback of 1974-75.

In 1978, foreign companies continued to purchase domestic organic pigments firms. In early 1978 the pigments division of GAF was bought by BASF Wyandotte. The proposed sale of the pigments division of Allegheny Ludlum Industries, Inc. (formerly the pigments division of Chemetron Corp.) to Bayer A.G. was withdrawn during an antitrust investigation by the U.S. Federal Trade Commission. The company was eventually purchased in early 1979 by BASF Wyandotte. Seven of the 37 companies reporting production and/or sales of organic pigments in 1978 were German or Swiss subsidiaries. (The sale of the pigments division of Allegheny Ludlum is not included in this report, since the sale of that division was not completed until 1979.)

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[1]Revised figure for 1977.

Industry Outlook

The effect that the elimination of the American selling price and other negotiations of the Tokyo round will have on the domestic organic pigment industry is uncertain. At the present time, the ad valorem equivalent duty rates range from 20 to 31.3 percent of transaction values. The new rates negotiated in the recent multilateral trade negotiations will range from 8.3 to 20 percent ad valorem. Little immediate effect is anticipated from the negotiated lower rates of duty on imports of synthetic organic pigments; these imports in 1978 accounted for about one-eighth of the domestic market.

Environmental Protection Agency regulations continue to have an effect on the domestic pigment industry. The registration and testing of new pigments under the Toxic Substances Control Act, and solid waste control, are perhaps two of the more unexplored areas at present. The increased testing required for all pigments may prove to be beneficial to the organic pigment industry because the pigments suspected of being carcinogenic are more heavily concentrated among the inorganic pigments and Government control of these pigments (such as some chromium and cadmium compounds) could lead to broader use of their organic counterparts.

In the foreseeable future, the cost of raw materials and energy for the organic pigments industry is expected to continue to rise because of international pressure on oil prices and changes in the U.S. Government price controls on oil and gas. Ultimately, any significant increases in petroleum prices will probably be passed on to the consumer. The unit value dip of 1977 is not expected to repeat itself in the immediate future, and the average unit value for pigments in 1979 will probably exceed $5.00 per pound.

Foreign Trade

U.S. exports of organic pigments in 1978 registered an increase for the third consecutive year in both quantity and value. The total quantity of exports, 20.0 million pounds, was 5.2 million pounds (35.5 percent) greater than the quantity exported in 1977. The total value of exports in 1978 was $56.4 million, an increase of $16.2 million (40.2 percent) more than the $40.3 million recorded in 1977. Canada, Japan, the United Kingdom, Belgium, West Germany, Italy, the Netherlands, Mexico, France, Venezuela, and Australia made up 69 percent of the quantity and 75 percent of the value of these exports (table C).

U.S. imports of organic pigments in 1978 also registered an increase for the third consecutive year in both quantity and value, but the quantity was still 210,000 pounds less than the alltime high reached in 1974. The total quantity of imports, 7.9 million pounds, was 0.3 million pounds greater than it was in 1977, representing an increase of 3.8 percent. The total value of imports in 1978 was $41.7 million, an increase of $5.3 million (14.5 percent) more than the $36.4 million recorded in 1977. U.S. imports of organic pigments are primarily from West Germany and Switzerland. In 1978 these two countries accounted for 61.0 percent of the quantity and 74.5 percent of the value of these imports (table D). Data on annual imports of benzenoid chemicals are examined by the U.S. International Trade Commission. In 1978 the Commission examined 62 percent of the total quantity reported in the official statistics of the U.S. Department of Commerce.

Imports of Pigments Blue 15 (α form), Red 144, Yellow 93, Red 57:1, Green 36, and Yellow 73 accounted for 41 percent on the basis of quantity of the total U.S. organic pigments imports examined by the Commission in 1978.[1] Imports of organic pigments in 1978 accounted for 12.3 percent of apparent U.S. consumption on the basis of quantity and 11.4 percent on the basis of value (table B).

The United States has had a positive trade balance in organic pigments for the past several years. In 1978, exports exceeded imports by 12.0 million pounds on the basis of quantity and $14.7 million on the basis of value. U. S. exports of organic pigments are, on the average, of lower unit value than imports. In 1978, imports of organic pigments averaged $5.26 per pound whereas exports averaged only $2.82 per pound.

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[1] Imports of Benzenoid Chemicals and Products, 1978; USITC Publication #990, pp. 73-76.

Table A.--Organic pigments (toners and lakes): U.S. production and sales, 1969-78

Year	Production	Sales		
		Quantity	Value	Unit value[1]
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Toners:				
1969	57,310	47,375	129,310	$2.73
1970	52,547	43,754	119,353	2.73
1971	55,086	44,247	126,564	2.86
1972	62,878	50,506	145,941	2.89
1973	66,949	58,991	178,583	3.03
1974	67,464	56,318	222,805	3.96
1975	47,723	40,779	182,067	4.46
1976	66,020	52,818	256,707	4.86
1977	[2]68,134	56,037	263,671	4.71
1978	75,348	63,714	318,852	5.00
Lakes:				
1969	3,701	3,419	3,839	1.12
1970	3,977	3,412	3,612	1.06
1971	3,240	2,805	3,449	1.23
1972	3,019	2,709	3,402	1.26
1973	2,446	2,473	3,583	1.45
1974	2,334	2,163	5,007	2.31
1975	1,930	1,593	3,923	2.46
1976	1,707	1,393	4,382	3.15
1977	1,573	1,397	4,076	2.92
1978	1,368	924	3,030	3.28
Total:				
1969	61,011	50,794	133,149	2.62
1970	56,524	47,166	122,965	2.61
1971	58,326	47,052	130,013	2.76
1972	65,897	53,215	149,343	2.81
1973	69,395	61,464	182,166	2.96
1974	69,798	58,481	227,812	3.90
1975	49,653	42,372	185,990	4.39
1976	67,727	54,211	261,089	4.81
1977	[2]69,707	57,434	267,747	4.66
1978	76,716	64,638	321,882	4.98

[1] Calculated from rounded figures.
[2] Revised figures for 1977.

Source: U.S. International Trade Commission, Synthetic Organic Chemicals, United States Production and Sales.

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Table B.--Organic pigments: U.S. production, imports, exports, and apparent consumption, 1974-78

Year	Production[1]	Imports	Exports[2]	Apparent consumption	Ratio (percent) of imports to consumption
	Quantity (1,000 pounds)				
1974--	69,798	8,142	14,716	63,224	12.9
1975--	49,653	5,319	12,120	42,852	12.4
1976--	67,727	6,888	14,504	60,111	11.5
1977--	[3]69,707	7,645	14,746	[3]62,606	[3]12.2
1978--	76,716	7,932	19,974	64,674	12.3
	Value (1,000 dollars)				
1974--	272,212	27,305	33,147	266,370	10.3
1975--	217,977	20,278	25,062	213,193	9.5
1976--	325,767	32,346	36,497	321,616	10.1
1977--	[3]324,835	36,437	40,255	[3]321,017	[3]11.4
1978--	382,046	41,721	56,426	367,341	11.4

[1] Value of production estimated, based on unit value of sales.
[2] The export data shown are the official U.S. Department of Commerce statistics. Export statistics for 1968 through 1973, published in the Synthetic Organic Chemicals, United States Production and Sales, 1977, p. 139, were estimated percentages of the official U.S. Department of Commerce statistics.
[3] Revised figures for 1977.

Source: Production, U.S. International Trade Commission, Synthetic Organic Chemicals, United States Production and Sales; imports and exports compiled from official statistics of the U.S. Department of Commerce.

Table C.--Organic pigments: U.S. exports, by principal markets, 1974-78

Market	1974	1975	1976	1977	1978
	Quantity (1,000 pounds)				
Canada	2,736	2,624	2,696	1,873	3,666
Japan	719	655	1,391	1,058	1,370
United Kingdom	1,132	756	720	1,157	1,540
Belgium	398	250	595	807	1,255
West Germany	492	508	366	827	1,145
Italy	1,089	577	1,200	829	1,270
Netherlands	969	1,063	1,309	1,474	1,231
Mexico	254	126	219	356	835
France	498	267	597	412	505
Venezuela	372	268	417	676	648
Australia	675	580	708	413	414
All other	5,382	4,446	4,286	4,864	6,095
Total	14,716	12,120	14,504	14,746	19,974
	Value (1,000 dollars)				
Canada	6,037	5,007	6,839	5,199	9,620
Japan	4,215	2,637	4,952	4,015	5,479
United Kingdom	3,253	1,878	2,071	3,284	4,892
Belgium	1,236	933	1,904	2,570	3,846
West Germany	1,190	889	1,208	2,251	3,670
Italy	2,431	1,430	2,877	1,840	3,641
Netherlands	1,643	1,738	3,218	3,817	3,610
Mexico	654	528	682	1,058	2,372
France	1,425	1,044	1,646	2,037	1,932
Venezuela	988	817	1,352	2,176	1,912
Australia	1,400	985	1,341	1,293	1,180
All other	8,675	7,176	8,407	10,715	14,272
Total	33,147	25,062	36,497	40,255	56,426

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table D.--Organic pigments: U.S. imports, by principal sources, 1974-78

Source	1974	1975	1976	1977	1978
	Quantity (1,000 pounds)				
West Germany	3,225	2,009	2,407	2,722	3,097
Switzerland	2,891	1,243	2,326	2,135	1,742
Japan	437	527	819	738	953
Italy	224	126	300	524	552
Denmark	30	8	43	247	409
Canada	395	796	527	709	571
United Kingdom	269	299	204	205	242
All other	671	311	262	365	366
Total	8,142	5,319	6,888	7,645	7,932
	Value (1,000 dollars)				
West Germany	12,553	8,281	13,488	16,246	20,645
Switzerland	9,179	6,303	12,618	11,409	10,446
Japan	1,500	1,422	2,330	2,604	3,964
Italy	741	404	800	1,452	1,632
Denmark	93	34	123	679	1,312
Canada	835	981	1,343	1,621	1,213
United Kingdom	1,056	1,789	700	1,041	1,109
All other	1,348	1,064	944	1,385	1,400
Total	27,305	20,278	32,346	36,437	41,721

Source: Compiled from official statistics of the U.S. Department of Commerce.

STATISTICAL HIGHLIGHTS

Bonnie Jean Noreen

Organic pigments are toners and lakes derived in whole or in part from benzenoid chemicals and colors.

Statistics on production and sales of all organic pigments in 1978 are given in table 1.[1] For a few important pigments already reported in table 1, supplemental data on sales by commercial forms are reported in table 1A. Individual toners and lakes are identified in this report by the names used in the third edition of the Colour Index.

Total production of organic pigments in 1978 was 76.7 million pounds--10.0 percent more than the 69.7[2] million pounds produced in 1977. Total sales of organic pigments in 1978 amounted to 64.6 million pounds, valued at $321.9 million compared with 57.4 million pounds, valued at $267.7 million, in 1977. In terms of quantity, sales of organic pigments in 1978 were 12.5 percent greater than in 1977; in terms of value, sales in 1978 were 20.2 percent greater than in 1977.

Production of toners in 1978 amounted to 75.3 million pounds--10.6 percent more than the 68.1[2] million pounds reported in 1977. Sales in 1978 were 63.7 million pounds, valued at $318.9 million, compared with 56.0 million pounds, valued at $263.7 million, in 1977. Sales in 1978 were 13.7 percent greater than those of 1977 in terms of quantity, and 20.9 percent greater in terms of value. The individual toners listed in the report which were produced in the largest quantities in 1978 were Pigment Yellow 12, 11.9 million pounds; Pigment Blue 15:3, beta form, 7.3 million pounds; Pigment Red 49:1,barium toner, 5.6 million pounds; Pigment Red 53:1, barium toner, 3.9 million pounds; Pigment Red 57:1, calcium toner, 3.4 million pounds; and Pigment Blue 15, alpha form, 3.3 million pounds.

Production of lakes totaled 1.4 million pounds in 1978--13.0 percent less than the 1.6 million pounds reported for 1977. Sales of lakes in 1978 amounted to 0.9 million pounds, valued at $3.0 million. In terms of quantity, sales of lakes in 1978 were 33.9 percent less than in 1977; in terms of value, sales in 1978 were 25.7 percent greater than in 1977.

For each of 10 selected pigments, or groups of pigments, table 1A gives data on sales by commercial forms. Pigment Yellow 14, all other diarylide yellows (with the exceptions of Pigments Yellow 12 & 14), Pigment Red 3, Pigment Red 48:2, calcium, Pigment Blue 15, alpha form and Pigment Green 7 were sold principally in the dry full-strength form. The remaining 4 pigments for which statistics are published were sold principally in the flushed form.

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[1] See also table 2 which lists these products and identifies the manufacturers by codes. These codes are listed in table 3.

[2] Revised figures for 1977.

TABLE 1.--ORGANIC PIGMENTS: U.S. PRODUCTION AND SALES, 1978

[Listed below are all organic pigments for which any reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published.) Table 2 lists all organic pigments for which data on production and/or sales were reported and identifies the manufacturers of each]

ORGANIC PIGMENTS	PRODUCTION	SALES		
		QUANTITY	VALUE[1]	UNIT VALUE[2]
	1,000 pounds dry basis[3]	*1,000 pounds dry basis*[3]	*1,000 dollars*	*Per pound*
Grand total	[4]76,716	64,638	321,882	$4.98
TONERS				
Total	[4]75,348	63,714	318,852	5.00
Yellow toners, total	22,641	15,582	65,993	4.24
Acetoacetarylide yellows:				
Pigment Yellow 1, C.I. 11 680	439	381	1,543	4.05
Pigment Yellow 3, C.I. 11 710	146	150	623	4.15
Pigment Yellow 65, C.I. 11 740	...	49	272	5.53
Pigment Yellow 73, C.I. 11 738	540	435	1,672	3.85
Pigment Yellow 74, C.I. 11 741	1,294	1,257	7,130	5.67
Diarylide yellows, total	...	12,195	44,886	3.68
Pigment Yellow 12, C.I. 21 090	11,860	7,537	24,720	3.28
Pigment Yellow 13, C.I. 21 100	511	386	1,528	3.96
Pigment Yellow 14, C.I. 21 095	3,130	2,475	8,571	3.46
Pigment Yellow 17, C.I. 21 105	1,370	816	3,419	4.19
All other diarylide yellows	...	981	6,648	6.78
All other	3,351	1,115	9,867	8.85
Orange toners, total	1,702	1,643	8,813	5.36
Pigment Orange 5, C.I. 12 075	680	586	2,161	3.69
Pigment Orange 13, C.I. 21 110	237	238	1,296	5.44
Pigment Orange 16, C.I. 21 160	465	468	2,128	4.55
Pigment Orange 34, C.I. 21 115	83	68	364	5.37
All other	237	283	2,864	10.12
Red toners, total	25,858	23,162	112,747	4.87
Naphthol reds, total	1,211	963	6,900	7.16
Pigment Red 2, C.I. 12 310	51	53	334	6.36
Pigment Red 5, C.I. 12 490	57	47	362	7.71
Pigment Red 9, C.I. 12 460	...	18	161	9.20
Pigment Red 17, C.I. 12 390	91	46	316	6.84
Pigment Red 22, C.I. 12 315	78	84	621	7.37
Pigment Red 23, C.I. 12 355	440	294	2,164	7.35
All other naphthol reds	494	421	2,942	6.99
Pigment Red 1, light, C.I. 12 070	35	48	177	3.69
Pigment Red 3, C.I. 12 120	1,069	1,178	4,758	4.04
Pigment Red 4, C.I. 12 085	109	137	500	3.64
Pigment Red 6, C.I. 12 090	23	20	88	4.46
Pigment Red 48:1, barium toner, C.I. 15 865	549	519	2,370	4.57
Pigment Red 48:2, calcium toner, C.I. 15 865	1,707	1,619	7,361	4.55
Pigment Red 48:4, manganese toner, C.I. 15 865	238	167	808	4.83
Pigment Red 49:1, barium toner, C.I. 15 630	5,612	5,051	13,806	2.73
Pigment Red 49:2, calcium toner, C.I. 15 630	1,316	...	...	...
Pigment Red 52:1, calcium toner, C.I. 15 860	1,358	1,379	6,561	4.76
Pigment Red 52:2, manganese toner, C.I. 15 860	399	541	1,982	3.66
Pigment Red 53:1, barium toner, C.I. 15 585	3,856	3,178	10,952	3.45
Pigment Red 57:1, calcium toner, C.I. 15 850	3,390	2,684	12,734	4.74
Pigment Red 63, C.I. 15 880	57	54	248	4.59
Pigment Red 81, PMA, C.I. 45 160	527	518	5,122	9.85
Pigment Red 81, PTA, C.I. 45 160	35	38	536	14.16
All other	4,367	5,068	37,844	7.47

See footnotes at end of table.

TABLE 1.--ORGANIC PIGMENTS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

ORGANIC PIGMENTS	PRODUCTION	SALES		
		QUANTITY	VALUE[1]	UNIT VALUE[2]
TONERS--Continued	*1,000 pounds dry basis*[3]	*1,000 pounds dry basis*[3]	*1,000 dollars*	*Per pound*
Violet toners, total	[4]2,465	2,203	30,119	$13.67
Pigment Violet 1, PMA, C.I. 45 170	82	86	897	10.42
Pigment Violet 1, PTA, C.I. 45 170	44	50	603	12.15
Pigment Violet 3, fugitive, C.I. 42 535	150	185	803	4.33
Pigment Violet 3, PMA, C.I. 42 535	470	451	2,907	6.45
Pigment Violet 3, PTA, C.I. 42 535	57	49	426	8.67
Pigment Violet 19, C.I. 46 500	1,212	1,042	17,302	16.60
Pigment Violet 23, C.I. 51 319	425	307	6,610	21.52
All other	[4]25	33	571	17.30
Blue toners, total	18,844	17,679	77,964	4.41
Pigment Blue 1, PMA, C.I. 42 595	74	69	710	10.28
Pigment Blue 15, alpha form, C.I. 74 160	3,317	2,951	18,045	6.11
Pigment Blue 15:3, beta form, C.I. 74 160	7,259	6,605	31,870	4.82
Pigment Blue 15:1 & 2, alpha forms, C.I. 74 160 and Pigment Blue 15:4, beta form, C.I. 74 160	573	...	...	...
All other	7,621	8,054	27,339	3.39
Green toners, total	3,451	3,117	21,996	7.06
Pigment Green 1, PMA, C.I. 42 040:1	8	9	79	9.08
Pigment Green 2, PMA, C.I. 42 040 and 49 005	15	15	182	11.99
Pigment Green 2, PTA, C.I. 42 040 and 49 005	22	26	362	14.01
Pigment Green 7, C.I. 74 260	3,004	2,711	18,271	6.74
Pigment Green 36, C.I. 74 265	227	189	1,642	8.69
All other	175	167	1,460	8.74
Brown toners	175	108	534	4.93
Black toners	212	220	686	3.12
LAKES				
Total	1,368	924	3,030	3.28
Yellow lake	88	...	...	...
Red lakes:				
Pigment Red 60:1, C.I. 16 105	300	305	1,263	4.13
Pigment Red 83, C.I. 58 000	38	42	281	6.75
Violet lake: Pigment Violet 5:1, C.I. 58 055	101	91	491	5.39
Blue lakes	361	...	...	...
All other lakes	480	486	995	2.05

[1]The value of sales from toners are reported on a dry full-strength basis and the value of sales for lakes are reported on a dry form basis. All sales value data exclude the additional costs of processing or packaging in commercial forms other than the dry full-strength or dry form.

[2]Calculated from unrounded figures, except "All other."

[3]Quantities for toners are reported as dry-full strength toner content, excluding the weight of any dispersing agent, vehicle, or extender. Quantities for lakes are reported as dry lake content, excluding the weight of any dispersing agent or vehicle.

[4]Incorrectly reported in 1977 report--should have been 1 million pounds greater than reported.

Note.--The C.I. (*Colour Index*) numbers shown in this report are the identifying numbers given in the third edition of the *Colour Index*.

The abbreviations PMA and PTA stand for phosphomolybdic and phosphotungstic (including phosphotungstomolybdic) acids, respectively.

TABLE 1A.--U.S. SALES OF SELECTED DRY FULL-STRENGTH TONERS, DRY EXTENDED TONERS, DRY DISPERSIONS, AQUEOUS DISPERSIONS, AND FLUSHED COLORS, 1978

[Listed below are supplemental sales data, by commercial forms, of selected pigments that have been reported in table 1]

SELECTED PIGMENTS BY COMMERCIAL FORMS	SALES[1] QUANTITY	VALUE	UNIT VALUE[2]
	1,000 pounds dry basis[3]	*1,000 dollars*	*Per pound*
Pigment Yellow 12, C.I. 21 090, total	7,537	24,720	$3.28
Dry full-strength toner	3,518	10,893	3.10
Flushed color	3,838	13,316	3.47
Dry dispersions and aqueous dispersions[4,5]	181	511	2.82
Pigment Yellow 14, C.I. 21 095, total	2,475	8,571	3.46
Dry full-strength toner	1,468	5,166	3.52
Aqueous dispersions[4]	883	2,931	3.32
Flushed color	109	417	3.83
Dry extended toner and dry dispersions[5]	15	57	3.80
Pigment Yellow 13, C.I. 21 100; Pigment Yellow 17, C.I. 21 105; and other diarylide yellows, total	2,183	11,595	5.31
Dry full-strength toner	1,459	8,248	5.65
Aqueous dispersions[4]	454	2,148	4.73
Dry dispersions and flushed color[5]	270	1,199	4.44
Pigment Red 3, C.I. 12 120, total	1,178	4,758	4.04
Dry full-strength toner	730	2,918	4.00
Aqueous dispersions[4]	65	307	4.68
Dry extended toner and flushed color[5]	383	1,533	4.01
Pigment Red 48:2, calcium toner, C.I. 15 865:2, total	1,619	7,361	4.55
Dry full-strength toner	1,443	6,447	4.47
Dry extended toner and dry dispersions[5]	52	266	5.09
Aqueous dispersions[4] and flushed color[5]	124	648	5.21
Pigment Red 53:1, barium toner, C.I. 15 585, total	3,178	10,952	3.45
Flushed color	2,070	7,270	3.51
Dry full-strength toner, dry dispersions, and aqueous dispersions[4,5]	1,108	3,682	3.32
Pigment Red 57:1, calcium toner, C.I. 15 850, total	2,684	12,734	4.74
Flushed color	2,160	10,529	4.88
Dry full-strength toner, dry extended toner, and aqueous dispersions[4,5]	524	2,205	4.21
Pigment Blue 15, alpha form, C.I. 74 160, total	2,951	18,045	6.11
Dry full-strength toner	1,196	7,672	6.41
Aqueous dispersions[4]	797	3,846	4.83
Dry extended toner, dry dispersions, and flushed color[5]	958	6,527	6.81
Pigment Blue 15:3, beta form, C.I. 74 160, total	6,605	31,870	4.82
Dry full-strength toner	2,194	11,579	5.28
Aqueous dispersions[4]	1,159	4,907	4.23
Flushed color	3,213	15,139	4.71
Dry extended toner and dry dispersions[5]	39	245	6.14
Pigment Green 7, C.I. 74 260, total	2,711	18,271	6.74
Dry full-strength toner	1,543	10,721	6.95
Aqueous dispersions[4]	669	4,032	6.03
Flushed color	294	1,994	6.78
Dry extended toner and dry dispersions[5]	205	1,524	7.45

[1]Sales quantities and values are identical in table 1 and 1A.

Footnotes--Continued

[2]Calculated from unrounded figures.
[3]Quantity of the various commercial forms is given in terms of dry full-strength toner content.
[4]Includes presscake.
[5]Separate data on these commerical forms may not be published without revealing the operation of individual companies.

Note.--The C.I. (*Colour Index*) numbers shown in this report are the identifying numbers given in the third edition of the *Colour Index*.
The abbreviations PMA and PTA stand for phosphomolybdic and phosphotungstic (including phosphotungstomolybdic) acids respectively.

TABLE 2.--ORGANIC PIGMENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*) CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT]

ORGANIC PIGMENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
TONERS	
*YELLOW TONERS:	
ACETOACETARYLIDE YELLOWS:	
*Pigment Yellow 1	AMS, DUP, GLX, HPC, HRC, HSC, HSH, HST, KCW, KON, S, SDH, SNA.
Pigment Yellow 2	KCW.
*Pigment Yellow 3	BNS, HPC, HRC, HSC, HSH, HST, KCW, KON.
Pigment Yellow 5	HPC, KCW.
Pigment Yellow 6	HPC.
Pigment Yellow 9	HST.
Pigment Yellow 49	S.
Pigment Yellow 60	HSH, KON.
*Pigment Yellow 65	HRC, HSH, SNA.
*Pigment Yellow 73	HPC, HRC, HSH, HST, SNA.
*Pigment Yellow 74	DUP, GLX, HPC, HRC, HSC, HSH, HST, SDH, SNA, VPC.
Pigment Yellow 75	HPC.
Pigment Yellow 98	HST.
Acetoacetarylide yellows, all others	KCW.
*DIARYLIDE YELLOWS:	
*Pigment Yellow 12	AMS, APO, BOR, GLX, HPC, HRC, HSC, HSH, HST, ICC, IDC, ROM, SDH, SNA, X.
*Pigment Yellow 13	APO, BUC, GLX, HPC, HSC, HST, IDC, ROM, SDH, SNA, X.
*Pigment Yellow 14	AMS, APO, BNS, BUC, GAF, GLX, HPC, HRC, HSC, HSH, HST, ICC, IDC, ROM, S, SDH, SNA, X.
*Pigment Yellow 17	AMS, APO, BUC, GLX, HPC, HRC, HSC, HSH, HST, ICC, IDC, IND, ROM, SDH, SNA.
Pigment Yellow 55	HPC, ICC.

TABLE 2.--ORGANIC PIGMENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

ORGANIC PIGMENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
TONERS--CONTINUED	
*YELLOW TONERS--CONTINUED	
*DIARYLIDE YELLOWS--CONTINUED	
Pigment Yellow 83	AMS, GLX, HRC, HSC, HST, ICC, S, X.
Diarylide yellows, other	ROM.
YELLOW PIGMENTS, OTHER:	
(Basic Yellow 2), fugitive	MRX.
Pigment Yellow 16	RST.
Pigment Yellow 24	HRC.
Pigment Yellow 97	HST.
Pigment Yellow 110	CGY.
Pigment Yellow toners, all other	HRC.
*ORANGE TONERS:	
Pigment Orange 1	HRC, KCW.
Pigment Orange 2	HPC, KCW, UHL.
*Pigment Orange 5	ACY, HPC, HSC, HSH, HST, SDH, SNA.
*Pigment Orange 13	AMS, GLX, HPC, HRC, HSC, HSH, ICC, KON, S, SNA.
Pigment Orange 15	HRC.
*Pigment Orange 16	BNS, GLX, HPC, HRC, HSH, HST, ROM, SDH, USM, X.
*Pigment Orange 34	BUC, GLX, HRC, IND, ROM, S, SDH.
Pigment Orange 38	HST.
Pigment Orange 43	HRC, RST.
Pigment Orange 46	HSC.
Pigment Orange 47	DUP.
Pigment Orange 48	DUP.
Pigment Orange 49	DUP.
Pigment Orange toners, all other	ROM.
*RED TONERS:	
*NAPHTHOL REDS:	
*Pigment Red 2	HPC, RRC, HSH, KCW, S.
*Pigment Red 5	GAF, GLX, HPC, HSH, ROM, S.
Pigment Red 7	HST, S.
*Pigment Red 9	HPC, HST, MRX.
Pigment Red 13	HPC, KCW.
Pigment Red 15	HST.
*Pigment Red 17	ACY, BNS, HPC, ICC, ROM, SNA, UHL.
Pigment Red 21	BNS.
*Pigment Red 22	ACY, DUP, GLX, HPC, KCW, MRX, SNA.
*Pigment Red 23	ACY, BUC, DUP, GLX, HPC, HSH, IND, KCW, ROM, SDH, UHL.

TABLE 2.--ORGANIC PIGMENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

ORGANIC PIGMENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
TONERS--CONTINUED	
*RED TONERS--CONTINUED	
*NAPHTHOL REDS--CONTINUED	
Pigment Red 31	ROM, SDH.
Pigment Red 32	GLX, IND.
Pigment Red 112	HPC, HST.
Pigment Red 146	HST, X.
Naphthol reds, all other	DUP, HRC, KCW, ROM, SDH, SNA, VPC, X.
RED PIGMENTS, OTHER:	
Pigment Red 1, (dark)	HPC, HSH.
*Pigment Red 1, (light)	HPC, HSH, SDH.
*Pigment Red 3	ACY, CIK, DUP, HPC, HSC, HSH, KCW, KON, MRX, SDH, SNA, UHL.
*Pigment Red 4	ACY, AMS, HPC, HSC, KON, MRX, SDH, UHL.
*Pigment Red 6	DUP, HSH, KCW, KON.
Pigment Red 38	HRC, HSH, SNA.
Pigment Red 41	HRC.
Pigment Red 48	HPC, ICC.
*Pigment Red 48:1, (barium)	ACY, AMS, BOR, DUP, HPC, HSC, HSH, S, SNA.
*Pigment Red 48:2, (calcium)	ACY, AMS, BOR, DUP, HPC, HRC, HSC, HSH, MGR, MRX, SNA, UHL.
Pigment Red 48:3, (strontium)	HSH, S.
*Pigment Red 48:4, (manganese)	ACY, DUP, HPC, HRC, HSH.
Pigment Red 49, (sodium)	BNS, SDH.
*Pigment Red 49:1, (barium)	ACY, AMS, BNS, BOR, CIK, HSC, ICC, IDC, KON, SDH, SNA, UHL.
*Pigment Red 49:2, (calcium)	ACY, AMS, BNS, BOR, CIK, HSC, SDH.
*Pigment Red 52:1, (calcium)	ACY, AMS, HPC, HSC, MGR, MRX, SNA, UHL.
*Pigment Red 52:2, (manganese)	ACY, HPC, HSC, HSH.
*Pigment Red 53:1, (barium)	ACY, AMS, APO, BOR, CIK, HSC, HSH, ICC, IDC, KON, MGR, MRX, SDH, SNA.
Pigment Red 54, (calcium)	HSH.
*Pigment Red 57:1, (calcium)	ACY, AMS, APO, BNS, BOR, CIK, DUP, HPC, HSC, HSH, ICC, IDC, KON, MGR, SNA, UHL.
Pigment Red 58	DUP, HPC.
*Pigment Red 63	HSC, HSH, KON, SNA.
*Pigment Red 81, (PMA)	DUP, GAF, HPC, KON, MGR, MRX, SNA, UHL.
*Pigment Red 81, (PTA)	DUP, HPC, HSC, KON, MGR, MRX, UHL.
Pigment Red 88	HRC.

TABLE 2.--ORGANIC PIGMENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

ORGANIC PIGMENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
TONERS--CONTINUED	
*RED TONERS--CONTINUED	
RED PIGMENTS, OTHER--CONTINUED	
Pigment Red 90	AMS, BOR, ICC, SDH.
Pigment Red 122	HRC, HST, SNA.
Pigment Red 123	HRC, HSC.
Pigment Red 149	HST.
Pigment Red 168	HRC, HST.
Pigment Red 170	HST, S.
Pigment Red 179	HRC.
Pigment Red 181	HST.
Pigment Red 188	HST.
Pigment Red 190	HRC, HSC.
Pigment Red 202	DUP, HRC.
Pigment Red 206	DUP.
Pigment Red 207	DUP.
Pigment Red 224	HRC.
Pigment Red toners, all other	DUP, HSC, HST, IND, SDH, UHL, X.
*VIOLET TONERS:	
Pigment Violet 1, (fugitive)	KCW, UHL.
*Pigment Violet 1, (PMA)	HPC, MGR, MRX, SNA, UHL.
*Pigment Violet 1, (PTA)	DUP, HPC, MGR, MRX, SNA.
*Pigment Violet 3, (fugitive)	ACY, HSC, KCW, KON, MGR, UHL.
*Pigment Violet 3, (PMA)	DUP, GAF, HPC, HSC, KON, MGR, MRX, UHL.
*Pigment Violet 3, (PTA)	ACY, HPC, HSC, KON, MRX, SDH.
Pigment Violet 4, (fugitive)	KCW.
*Pigment Violet 19	DUP, HRC, SNA.
*Pigment Violet 23	BUC, HRC, HSC, HST, SDC, SNA.
Pigment Violet 31	DUP.
Pigment Violet 42	DUP.
Pigment Violet toners, all other	ACY, BUC, HPC, ROM.
*BLUE TONERS:	
(Basic Blue 7)	KCW.
*Pigment Blue 1, (PMA)	BNS, DUP, HPC, KON, MGR, MRX, UHL.
Pigment Blue 1, (PTA)	MRX, SDH.
Pigment Blue 2, (PMA)	GAF, LVR.
Pigment Blue 2, (PTA)	KON.
Pigment Blue 9, (PMA)	UHL.
Pigment Blue 10, (PTA)	SDH.

TABLE 2.--ORGANIC PIGMENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

ORGANIC PIGMENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
TONERS--CONTINUED	
*BLUE TONERS--CONTINUED	
Pigment Blue 14, (PMA)	DUP, GAF, LVR.
*Pigment Blue 15, (α form)	ACY, DUP, HPC, HSC, HSH, HST, SDH, TMS, USM.
*Pigment Blue 15:1, (α form)	HRC, HSC, HST, SNA.
*Pigment Blue 15:2, (α form)	HRC, HSC, SNA.
*Pigment Blue 15:3, (β form)	ACY, AMS, APO, BAS, BOR, BUC, CIK, DUP, HPC, HSC, ICC, IDC, MGR, POP, ROM, SNA, USM.
*Pigment Blue 15:4, (β form)	HSC, SNA.
Pigment Blue 19	SW.
Pigment Blue 22	DUP, HRC.
Pigment Blue 25	GLX, ICC.
Pigment Blue 61	HSC.
Pigment Blue toners, all other	GAF, IND, SDH, UHL, VPC.
*GREEN TONERS:	
*Pigment Green 1, (PMA)	KON, LVR, MRX, S, UHL.
Pigment Green 2, (fugitive)	UHL.
*Pigment Green 2, (PMA)	KON, MGR, MRX, UHL.
*Pigment Green 2, (PTA)	ACY, HPC, KON, MRX, UHL.
Pigment Green 4, (fugitive)	MRX.
Pigment Green 4, (PMA)	MGR.
Pigment Green 4, (PTA)	ACY.
*Pigment Green 7	ACY, BAS, CIK, DUP, HPC, HRC, HSC, HST, POP, SDH, SNA, TMS.
Pigment Green 8	HPC, KCW.
Pigment Green 10	DUP, HPC.
*Pigment Green 36	ACY, DUP, HRC, HST, SNA.
Pigment Green toners, all other	UHL, VPC.
*BROWN TONERS:	
Pigment Brown 1	S.
Pigment Brown 3, (PMA)	KCW, KON.
Pigment Brown 5	GLX, HRC, ICC, ROM.
Pigment Brown toners, all other	SDH.
*BLACK TONERS:	
Pigment Black toners, all other	DUP, IND, UHL.

TABLE 2.--ORGANIC PIGMENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

ORGANIC PIGMENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
LAKES	
*YELLOW LAKES:	
(Acid Yellow 1)	KCW.
(Acid Yellow 23)	KON, MRX.
(Basic Yellow 37)	BNS.
ORANGE LAKES:	
Pigment Orange 17	KCW, KON.
RED LAKES:	
(Acid Red 26)	HPC, KCW.
(Basic Red 1)	BNS.
*Pigment Red 60:1	HSH, KON, MRX, SDH, SNA.
*Pigment Red 83	HPC, HSH, KON, MRX, UHL.
VIOLET LAKES:	
(Basic Violet 1)	BNS.
(Basic Violet 4)	DNS.
(Basic Violet 10)	BNS.
*Pigment Violet 5:1	HPC, HRC, HSH, KON, MRX, UHL.
*BLUE LAKES:	
(Basic Blue 7)	BNS.
Pigment Blue 17:1	GAF.
Pigment Blue 24	BOR, KON, SDH.
GREEN LAKES:	
(Acid Green 3)	KCW.
Pigment Green lakes, all other	KON.
BROWN LAKES:	
Pigment Brown lakes, all other	KON.
BLACK LAKES:	
Pigment Black lakes, all other	KON.

TABLE 3.--ORGANIC PIGMENTS: DIRECTORY OF MANUFACTURERS, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of organic pigments to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ACY	American Cyanamid Co.	KCW	Keystone Color Works, Inc.
AMS	Ridgway Color & Chemicals	KON	H. Kohnstamm & Co., Inc.
APO	Apollo Colors, Inc.		
		LVR	C. Lever Co., Inc.
BAS	BASF Wyandotte Corp.		
BNS	Binney and Smith, Inc.		
BOR	Borden, Inc., Printing Ink Div., Pigments Div.	MGR	Magruder Color Co., Inc.
		MRX	Max Marx Color & Chemical Co.
BUC	Synalloy Corp., Blackman-Uhler Chemical Div.		
		POP	Pope Chemical Corp.
CIK	Flint Ink Corp., Cal/Ink Div.		
		ROM	United Merchants & Manufacturers, Inc., Roma Chemical Div.
DUP	E. I. duPont de Nemours & Co., Inc.		
		S	Sandoz, Inc., Colors & Chemicals Div.
GAF	GAF Corp.	SDC	Martin-Marietta Corp., Sodyeco Div.
CGY	Ciba-Geigy Corp.	SDH	Sterling Drug, Inc., Hilton Davis Chemical Co. Div.
GLX	Galaxie Chemical Corp.		
		SNA	Sun Chemical Corp., Pigments Div.
		SW	Sherwin-Williams Co.
HPC	Hercules, Inc.		
HRC	Harmon Colors Corp.		
HSC	Chemetron Corp., Pigments Div., Sub. of Allegheny Ludlum Industries, Inc.	TMS	Sterling Drug, Inc., Thomasset Colors Div.
HSH	Harshaw Chemical Co.		
HST	American Hoechst Corp., Industrial Chemicals Div.		
		UHL	Paul Uhlich & Co., Inc.
		USM	USM Corp., Bostik Div.
ICC	Inmont Corp.		
IDC	Industrial Color, Inc.	VPC	Mobay Chemical Corp., Verona Dyestuff Div.
IND	Indol Chemical Co., Inc.		

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

IMPORTANT DEVELOPMENTS IN MEDICINAL CHEMICALS IN 1978, AND A CASE STUDY OF THE PENICILLINS

Tedford C. Briggs

The principal developments involving medicinal chemicals in 1978 were mostly the result of U.S. Government actions. For example, the Drug Regulatory Reform Act was debated during 1978 but was not enacted. The Food and Drug Administration (FDA) delayed plans to place restrictions on the use of penicillins and tetracyclines in animal feeds. The FDA proposed labeling changes and other regulatory changes to warn of hazards associated with the use of certain drugs.

Several new drugs were introduced in 1978; their therapeutic properties are summarized below. The penicillins are examined below in detail because they were the next major class of anti-infective agents developed after the anti-infective sulfonamides, which were discussed in the 1977 SOC report.

Government Actions

After lengthy subcommittee hearings in both the House and Senate the proposed Drug Regulatory Reform Act of 1978 failed to be enacted in the 95th Congress. The same legislation has, however, been reintroduced in the 96th Congress.

The basic thrust of the proposed legislation is to accelerate the introduction into the market of valuable new drugs, while at the same time insuring that excessively toxic or dangerous drugs will be removed from the market. The drug industry reportedly supports features of the legislation that would speed up the introduction of new drugs, but opposes provisions that would make public the safety and efficacy data that companies in the industry feel could disclose trade secrets to their competitors. On the other hand, industry critics want access to the data so that they can ferret out any industry deceptions in the drug approval process. This difference of opinion about safety and efficacy data disclosure is, therefore, the central issue in the continuing debate on the merits of the drug reform legislation.

On July 14, 1978, the House Agriculture Committee unanimously approved a resolution urging the FDA to await completion of scientific studies before making a final decision on proposed regulations that would curtail the use of penicillins and tetracyclines as animal feed additives. The FDA regulations were proposed because of the fear that bacterial drug resistance developed in animals receiving treated feeds could be transferred to other animals or humans, thus reducing the effectiveness of the drugs involved in treating human disease. The resolution called on the FDA to delay action until completion of studies being conducted by the National Academy of Sciences, the Congressional Office of Technology Assessment, and the U.S. Department of Agriculture. It stated that antibiotics have been used at low levels in feeds for about 30 years without proof that human health has been adversely affected. At the same time, the resolution stated, the treated feeds have promoted faster and healthier growth of mass-fed animals and have reduced the cost of producing food.

Subsequently, the FDA postponed implementation of the proposed regulations, reportedly because of procedural questions that were raised during public hearings and because of concern about whether there was a sufficient number of veterinarians to have handled the workload that would have been imposed by the regulations. There was no indication that it had changed its views about the possible long-term adverse effects of antibiotics in animal feeds.

In other actions the FDA, along with the National Bureau of Standards and the Joint Commission on Prescription Drug Use, took the first steps to develop an improved system for monitoring unexpected side effects from newly approved drugs. The FDA says that if useful new drugs are to be approved quickly, a postmarketing drug-monitoring system is needed for removing drugs from the market if they are found to be dangerous.

The FDA implemented requirements in labeling of birth control pills to warn that, in women using birth control pills, cigarette smoking greatly increases the risk of heart attacks, strokes, and other cardiovascular disorders. Five independent studies agree on the hazardous association between the use of birth control pills and smoking.

The FDA took a number of steps toward banning certain hormone-based animal health products that have been used to stimulate growth in livestock and poultry. Products that would be affected by the proposed ban include those containing estradiol, progesterone, or testosterone.

An advisory panel to the FDA recommended restrictions on the labeling of vitamin and mineral products sold as over-the-counter drugs. The panel recommended that labeling should be restricted to promotion of the products only for the treatment of physician-identified deficiencies. Also, the panel recommended restrictions on the use of the term "natural" in the labeling as there is no evidence that so-called natural forms of vitamins and minerals are better than synthetic ones.

New Drugs in 1978

Each year many new drugs are developed and tested by chemical and pharmaceutical manufacturers. Some of these drugs eventually gain FDA approval and reach the marketing stage. The following list of new drugs, although not a comprehensive list, covers new treatments for a wide range of diseases.

Tamoxifen--was approved for sale and distribution in the United States as an antiestrogen drug for palliative treatment of advanced breast cancer in women. The drug is said to have fewer serious side effects than other anticancer drugs.

Urokinase--was approved for treatment of massive pulmonary embolism; i.e., it works by dissolving blood clots that cause pulmonary embolism. Urokinase is an enzyme produced by the kidneys and normally found in minute quantities in urine. The drug can be obtained by extraction from urine or produced from human kidney cells grown in tissue culture.

Metoprolol tartrate--was approved for treatment of high blood pressure. The exact way in which the drug acts in controlling high blood pressure is unknown.

Trimolol maleate--was approved for use in lowering the high internal eye pressure of glaucoma. Trimolol maleate is the first of the beta-adrenergic blocking agents to be approved for treatment of glaucoma.

Vidarabine--was approved for the treatment of herpes simplex encephalitis. This disease is a life-threatening inflammation of the brain caused by a herpes virus. Test data indicate that treatment with vidarabine can significantly reduce the fatalities and neurological damage caused by this disease.

Cefoxitin, sodium--was approved for use against a wide range of serious infections, including some that are resistant to other antibiotics.

Natamycin--was approved for treatment of a fungal infection of the eye that can cause blindness. Because of the small number of people affected, natamycin has little commercial potential, but it is expected to be vitally important to those individuals who suffer from fungal keratitis.

Butorphanol tartrate--was approved for the relief of moderate-to-severe pain. Unlike many other potent prescription pain relievers, butorphanol tartrate is not classified as a narcotic. Advantages claimed for this analgesic are low addictive potential and limited respiratory depressant effects.

Penicillins

The penicillins are a highly important group of anti-infective agents which were developed a few years after another class of anti-infective agents known as sulfonamides.

Discovery and development

Penicillin was discovered by Alexander Fleming, professor of bacteriology, at Saint Mary's Hospital, London. In 1929, a spore of the mold *Penicillium notatum* lodged in a culture dish which harbored pathogenic staphylococcus bacteria. It soon became apparent to Professor Fleming that the penicillin mold was inhibiting growth of the staphylococci, and he was quick to grasp the significance of this discovery. However, it was not until 1939 that a group at Oxford University under the leadership of H. W. Florey prepared a sufficient quantity of material for clinical tests, which were encouraging enough to warrant further work. England was under siege at that time, and Professor Florey moved to the United States to continue development work on penicillin at the Northern Regional Research Laboratory (NRRL), Bureau of Agricultural and Industrial Chemistry, U.S. Department of Agriculture. That laboratory was selected because of the extensive experience of the NRRL staff in mold fermentations.

When sufficient quantities of penicillin were prepared, a clinical testing program was organized and, by 1943, the combined efforts of the many people involved in the penicillin program had established the medicinal value of penicillin.

Once the therapeutic value of penicillin had been established and laboratory production methods developed, large-scale production became the next formidable problem. The problem was referred to the War Production Board, which made decisions as to the required number of plants, plant capacity, allocation of supplies, and so forth. By 1944, 21 plants were producing penicillin in the United States at a rate of approximately 200 billion units of penicillin per month.

The technical knowledge and skills accumulated during the early years of penicillin development led directly to the discovery and production of many valuable antibiotics other than the penicillins.

There are six naturally occurring penicillins, but of these only penicillin G has found wide application as an anti-infective agent. A. J. Moyer and R. D. Coghill discovered in 1947 that the addition of phenylacetic acid to the fermentation media increased the yield of penicillin G. This discovery prompted research into the addition of other chemicals to the penicillin fermentation media, which resulted in a "second generation" of biosynthetic penicillins. About 40 or 50 compounds of this type were developed, but only a few had any advantage over penicillin G.

The most important of the biosynthetic derivatives is penicillin V, which is obtained by adding phenoxyacetic acid or phenoxyethanol to the fermentation media. This penicillin is relatively acid stable, and hence can be administered in oral doses without destruction of the penicillin by the acid content of the stomach.

The "third generation" penicillins are chemical derivatives or modifications of 6-aminopenicillanic acid. Literally thousands of semisynthetic penicillins have been made, and many of them possess desirable properties such as stability toward acids and resistance to the enzyme produced by some bacteria that destroys most penicillins. The semi-synthetic penicillins are used to treat a wide range of bacterial infections.

Manufacture of penicillins

There are many technical problems associated with the commercial production of penicillin, and it was a major advancement in fermentation technology when substantial quantities of penicillin were first made. Since many organisms produce an enzyme which destroys penicillins, penicillin fermentation must be conducted under aseptic conditions. Maintaining aseptic conditions during industrial-scale fermentation processes is, at best, difficult. Since the penicillin-producing organisms are aerobic, submerged-culture techniques were developed to supply oxygen to the mold. Batch processes are used, in most instances, in which the fermentor is filled with culture medium, sterilized, cooled, then inoculated with penicillin culture. Fermentation is then allowed to proceed until the penicillin concentration reaches a maximim, at which time the batch is harvested and the procedure repeated.

Considerable work has been done to develop strains of the penicillin microorganisms that produce the maximum amount of penicillin during the fermentation process. Strain development has been enhanced by the use of radiation, neutron bombardment, heat, and chemical agents. Once a high-producing strain has been developed it can be maintained and propagated for months or even years. Inoculum from the strain is then used in successive fermentation batches to produce penicillin.

Statistical measurement problems associated with the penicillins

Early in the development of the penicillin industry, problems arose in determining the amount of penicillin in the fermentation mixtures and in the final products and, as a result, an arbitrary standard unit of measurement based on a quantity of penicillin G was adopted. The testing methods have changed over the years so that test results are now more reproducible. However, the antibiotic activity of penicillin is still measured in arbitrary units and varies according to the type of penicillin measured.

Data on production, imports, and exports of the penicillins have been reported in various units, i.e., international units, grams, and pounds; data are also reported without a unit of quantity. Thus, when statistics are given for various groups of penicillins (as is usually the case), the data cannot be translated to another measurement of quantity or used to track the growth of consumption or trade over a period of years. For these reasons, a historical presentation of penicillin trade data is not included here.

U.S. International Trade in Bulk Medicinals, 1973-78

U.S. production of bulk medicinals increased 15 percent during 1973-78. Sales quantity increased only 3.4 percent, but sales value increased 62 percent, to $944 million. Domestic employment increased 72 percent, from 8,200 to 14,200 (see the following table).

The value of U.S. exports increased 86 percent, from $311 million in 1973 to $580 million in 1978. The value of U.S. imports increased threefold, from $43 million in 1973 to $172 million in 1978.

The Producer Price Index increased 37 percent.

Bulk medicinal chemicals: U.S. industry trends, 1973-78

Item	1973	1974	1975	1976	1977	1978
Production----------million pounds--	234	246	208	236	241	269
Sales:						
Quantity--------------------do----	179	178	149	161	162	185
Value-------------million dollars--	582	815	772	742	794	944
Employment[1]-------------thousands--	8.2	12.8	13.5	14.1	14.2	14.2
Producer Price Index[2]----------------	99.6	105.2	117.0	122.8	129.0	137.7
Exports[3]------------million dollars--	311	413	452	548	612	580
Imports[3]----------------------do----	43	124	105	123	166	172
Balance of trade----million dollars--	268	286	347	425	446	408
Ratio of exports to imports----------	7.2	3.3	4.3	4.5	3.7	3.4

[1]Includes all employees in establishments classified under SIC product code 2833. However, medicinals in sec. VI of the SOC correspond to SIC 5-digit code 28331 but not to the entire product code 2833.

[2]Base--Dec. 31, 1971=100.0.

[3]Does not include "all other" categories for import or export data based on SIC product code 2833.

Source: Official statistics of the U.S. Bureau of the Census; U.S. International Trade Commission, Synthetic Organic Chemicals, United States Production and Sales; U.S. Bureau of Labor Statistics, Producers Price & Price Indexes.

STATISTICAL HIGHLIGHTS

Tedford C. Briggs

Medicinal chemicals include the medicinal and feed grades of all organic chemicals having therapeutic value, whether obtained by chemical synthesis, by fermentation, by extraction from naturally occurring plant or animal substances, or by refining a technical grade product. They include antibiotics and other anti-infective agents, antihistamines, autonomic drugs, cardiovascular agents, central nervous system depressants and stimulants, hormones and synthetic substitutes, vitamins, and other therapeutic agents for human or veterinary use and for animal feed supplements.

The table shows statistics for production and sales of medicinal chemicals grouped by pharmacological class. The statistics shown are for bulk chemicals only. Finished pharmaceutical preparations and products put up in pills, capsules, tablets, or other measured doses are excluded.[1] The difference between production and sales reflects inventory changes, processing losses, and captive consumption of medicinal chemicals processed into ethical and proprietary pharmaceutical products by the primary manufacturer. In some instances, the difference may also include quantities of medicinal grade products used as intermediates, for example, penicillin G salts used as intermediates in the manufacture of semi-synthetic penicillins. All quantities are given in terms of 100-percent content of the pure bulk drug.

Total U.S. production of bulk medicinal chemicals in 1978 amounted to 269.1 million pounds, or 11.8 percent more than the 240.7 million pounds produced in 1977 and 14.1 percent more than the 235.8 million pounds produced in 1976. Total sales of bulk medicinal chemicals in 1978 amounted to 185.1 million pounds, valued at $944.1 million, compared with sales in 1977 of 162.4 million pounds, valued at $794.0 million, and sales in 1976 of 160.8 million pounds, valued at $741.5 million. In terms of quantity, sales in 1978 were 14.0 percent more than in 1977 and 15.1 percent more than in 1976. In terms of value, sales in 1978 were 18.9 percent more than in 1977 and 27.3 percent more than in 1976.

Production of the more important groups of medicinal chemicals in 1978 was as follows: Antibiotics, 25.7 million pounds (11.2 percent more than in 1977), of which 13.4 million pounds was for medicinal use and 12.3 million pounds was

[1] Complementary statistics on the dollar value of manufacturers' shipments of finished pharmaceutical preparations, except biologicals, are published annually by the U.S. Department of Commerce, Bureau of the Census, in Current Industrial Reports, Series MA-28G. Many pharmaceutical manufacturers who report to the Bureau of the Census are excluded from the U.S. International Trade Commission report because they are not primary producers of medicinal chemicals, that is, they do not themselves produce the bulk drugs which go into their pharmaceutical products but purchase their drug requirements from domestic or foreign producers.

for other uses; anti-infective agents other than antibiotics, 28.6 million pounds (2.3 percent more than in 1977); central nervous system depressants and stimulants, 49.3 million pounds (6.1 percent less); and vitamins, 37.8 million pounds (1.8 percent more).

Production of some of the more important individual products listed in the table was as follows: Methionine and its salts, choline chloride, 50.7 million pounds (5.3 percent larger than in 1977); aspirin, 32.2 million pounds (2.6 percent more); Penicillins (except semi-synthetic), 7.7 million pounds (3.5 percent more); tetracyclines, 5.9 million pounds (5.3 percent more); and vitamin E, 5.8 million pounds (10.4 percent more).

TABLE 1.--Medicinal chemicals: U.S. production and sales, 1978

[Listed below are all synthetic organic medicinal chemicals for which any reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all medicinal chemicals for which data on production and/or sales were reported and identifies the manufacturers of each]

MEDICINAL CHEMICALS	PRODUCTION[1]	SALES[1] QUANTITY	SALES[1] VALUE	SALES[1] UNIT VALUE[2]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Grand total	269,065	185,112	944,114	$5.10
Acyclic	111,855	97,915	93,915	.96
Benzenoid[3]	111,878	61,803	473,191	7.66
Cyclic nonbenzenoid[4]	45,332	25,394	377,008	14.85
Antibiotics, total[5]	25,705	9,170	303,593	33.11
Penicillins, semisynthetic, total	1,708	523	39,378	75.29
Amoxicillin	332	...	...	...
Ampicillin	915	...	...	...
All other (semisynthetic)[6]	461	523	39,378	75.29
Penicillins (except semisynthetic), total	7,723	1,907	23,287	12.21
Penicillin G, potassium, for medicinal use	2,073	...	...	...
Penicillin V	3,029	...	...	...
All other, for all uses[7]	2,621	1,907	23,287	12.21
Tetracyclines, for all uses	5,912	3,411	68,941	20.21
Other antibiotics, total	10,362	3,329	171,987	51.66
For medicinal use[8]	4,777	1,315	149,233	113.49
For nonmedicinal uses	5,585	2,014	22,754	11.30
Antihistamines, total	486	244	7,931	32.50
Antinauseants	75	...	...	...
Chlorpheniramine maleate	47	...	...	...
All other[9]	364	244	7,931	32.50
Anti-infective agents (except antibiotics), total	28,619	9,572	45,718	4.78
Anthelmintics, total	9,770	3,402	4,994	1.47
Piperazine dihydrochloride	1,225	1,364	1,864	1.37
All other	8,545	2,038	3,130	1.54
Antiprotozoan agents, total	10,568	2,961	24,404	8.24
Arsenic and bismuth compounds	4,650	...	...	...
All other[10]	5,918	2,961	24,404	8.24
Sulfonamides	4,585	511	3,588	7.02
Urinary antiseptics	281	181	864	4.77
Other anti-infective agents	3,415	2,517	11,868	4.72
Autonomic drugs, total	1,015	852	16,463	19.32
Sympathomimetic (adrenergic) agents, total	917	814	12,653	15.54
Phenylpropanolamine hydrochloride	451	457	3,684	8.06
All other	466	357	8,969	25.12
Other autonomic drugs	98	38	3,810	100.26
Central depressants and stimulants, total	49,260	39,324	135,966	3.46
Analgesics, antipyretics, and nonhormonal anti-inflammatory agents, total	43,024	34,543	70,146	2.03
Acetaminophen	6,748	...	...	...
Aspirin	32,247	...	...	...
All other[11]	4,029	34,543	70,146	2.03
Anticonvulsants, hypnotics, and sedatives	1,326	509	5,007	9.84
Antidepressants	139	...	...	...
Antitussives	197	197	41,035	208.30
Skeletal muscle relaxants	141	171	1,269	7.42
Tranquilizers	459	...	...	...
Other central depressants and stimulants[12]	3,974	3,904	18,509	4.74
Dermatological agents	3,335	3,814	3,683	.97

See footnotes at end of table.

TABLE 1.--MEDICINAL CHEMICALS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

MEDICINAL CHEMICALS	PRODUCTION[1]	SALES[1]		
		QUANTITY	VALUE	UNIT VALUE[2]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Expectorants and mucolytic agents, total	1,834	1,722	7,088	$4.12
Ethylenediamine dihydriodide	1,137	1,099	3,752	3.41
All other	697	623	3,336	5.35
Gastrointestinal agents, total	106,684	94,446	81,850	.87
Choline chloride, all grades	50,706	43,293	18,678	.43
Methionine and its salts	55,006	49,662	60,315	1.21
All other	972	1,491	2,857	1.92
Hormones and synthetic substitutes, total	1,154	168	104,108	619.69
Estrogens	2	1	1,648	1,648.00
Synthetic hypoglycemic agents	980	...	...	...
All other[13]	172	167	102,460	613.53
Local anesthetics, total	161	45	1,443	32.07
Lidocaine	61	...	...	...
All other	100	45	1,443	32.07
Renal-acting and edema-reducing agents, total	1,507	269	7,654	28.45
Theophylline derivatives	193	...	...	...
All other[14]	1,314	269	7,654	28.45
Vitamins, total	37,800	23,749	188,005	7.92
Vitamin D	32	12	3,362	280.17
Vitamin E	5,839	3,461	56,738	16.39
All other vitamins[15]	31,929	20,276	127,905	6.31
Miscellaneous medicinal chemicals, total	11,505	1,737	40,612	23.38
Sodium heparin	4	2	2,181	1,090.50
All other[16]	11,501	1,735	38,431	22.15

[1]The data on production and sales are for bulk medicinal chemicals only.

[2]Calculated from rounded figures.

[3]Benzenoid, as used in this report, describes any cyclic medicinal chemical whose molecule contains either a six-membered carbocyclic ring with conjugated double bonds or a six-membered heterocyclic ring with 1 or 2 hetero atoms and conjugated double bonds, except the pyrimidine ring.

[4]Includes antibiotics of unknown structure.

[5]Production of all antibiotics for medicinal use amounted to 13,390,000 pounds, and sales amounted to 3,763,000 pounds, valued at $206,915,000. Production of all antibiotics for animal feed and other nonmedicinal uses amounted to 12,315,000 pounds, and sales amounted to 5,407,000 pounds, valued at $96,678,000.

[6]Includes sales quantity and value of amoxicillin and ampicillin.

[7]Includes sales quantity and value of penicillin V.

[8]Includes production and sales of antifungal, antituberculer, cephalosporin, and antibiotics.

[9]Includes sales quantity and value of antinauseants and chlorpheniramine maleate.

[10]Includes sales quantity and value of arsenic and bismuth compounds.

[11]Includes sales quantity and value of acetaminophen and aspirin.

[12]Includes sales quantity and value of antidepressants and tranquilizers. Also includes production and sales of amphetamines, general anesthetics, and respiratory and cerebral stimulants.

[13]Includes sales quantity and value of synthetic hypoglycemic agents.

[14]Includes sales quantity and value of theophylline derivatives.

[15]Includes production and sales of vitamin A, vitamin B, vitamin C, and vitamin K.

[16]Includes production and sales of antineoplastic agents, cardiovascular agents, diagnostic agents, hematological agents (except sodium heparin), therapeutic nutrients, smooth muscle relaxants, and unclassified medicinal chemicals.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*) CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT]

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*ANTIBIOTICS:	
*PENICILLINS, SEMISYNTHETIC:	
*Amoxicillin	BEE, BOC, BRS, TRD.
*Ampicillin	BEE, BOC, BRS, TRD, WYT.
Ampicillin, sodium	BEE, BRS, WYT.
Carbenicillin, disodium	BEE, PFZ.
Carbenicillin indanyl, sodium	PFZ.
Cloxacillin, sodium	BEE, BRS.
Cyclacillin	WYT.
Dicloxacillin, sodium	BEE, BRS, WYT.
Epicillin	TRD.
Hetacillin	BRS.
Hetacillin, potassium	BRS.
Methicillin, sodium	BEE, BRS.
Nafcillin, sodium	WYT.
Oxacillin, sodium	BEE, BRS.
Ticarcillin, disodium	BEE.
*PENICILLINS (EXCEPT SEMISYNTHETIC):	
FOR MEDICINAL USE:	
*Penicillin V	BRS, LIL, PFZ.
Penicillin G, benzathine	WYT.
*Penicillin G, potassium	LIL, OMS, PFZ, WYT.
Penicillin V, potassium	BRS, LIL.
Penicillin G, procaine (medicinal grade)	LIL, PFZ, WYT.
Penicillin G, sodium	PFZ.
FOR NONMEDICINAL USES:	
Penicillin G, procaine (animal feed grade)	MRK, OMS, PFZ.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*ANTIBIOTICS--Continued	
*TETRACYCLINES:	
FOR MEDICINAL USE:	
Chlortetracycline (medicinal grade)	ACY.
Demeclocycline	ACY.
Doxycycline	PFZ.
Methacycline	PFZ.
Minocycline	ACY.
Oxytetracycline (medicinal grade)	PFZ.
Tetracycline	ACY, UPJ.
FOR NONMEDICINAL USES:	
Chlortetracycline (animal feed grade)	ACY, RLS.
Oxytetracycline (animal feed grade)	PFZ.
*OTHER ANTIBIOTICS:	
*FOR MEDICINAL USE:	
ANTIFUNGAL ANTIBIOTICS:	
Amphotericin B	OMS, TRD.
Candicidin	PEN.
Nystatin (medicinal grade)	OMS, TRD.
ANTITUBERCULAR ANTIBIOTICS:	
Dihydrostreptomycin	PFZ.
Streptomycin (medicinal grade)	MRK, PFZ.
CEPHALOSPORINS:	
Cefazolin	LIL, SK.
Cefoxitin	MRK.
Cephalexin	LIL.
Cephaloridine	LIL.
Cephalothin	LIL.
Cephapirin	BRS.
Cephapirin, sodium	BRS.
Cephradine	SK, TRD.
OTHER ANTIBIOTICS FOR MEDICINAL USE:	
Amikacin sulfate	BRS.
Bacitracin (medicinal grade)	IMC, PEN.
Chloramphenicol	PD, RLS.
Clindamycin	UPJ.
Erythromycin	ABB, LIL, UPJ.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*ANTIBIOTICS--Continued	
*OTHER ANTIBIOTICS--Continued	
*FOR MEDICINAL USE--Continued	
OTHER ANTIBOTICS FOR MEDICINAL USE--Continued	
Erythromycin estolate	LIL.
Erythromycin stearate	UPJ.
Gentamycin	SCH.
Kanamycin	BRS.
Lincomycin (medicinal grade)	UPJ.
Neomycin (medicinal grade)	OMS, PEN, PFZ, UPJ.
Novobiocin (medicinal grade)	UPJ.
Polymyxin B	PFZ.
Spectinomycin (medicinal grade)	ABB, UPJ.
Thiostrepton	OMS.
Tiamulin	OMS.
Tyrothricin	PEN.
Vancomycin	LIL.
*FOR NONMEDICINAL USES:	
Bacitracin (animal feed grade)	IMC.
Cycloheximide	UPJ.
Hygromycin B	LIL.
Lasalocid	HOF.
Lincomycin (animal feed grade)	UPJ.
Monensin, sodium	LIL.
Neomycin (animal feed grade)	PFZ, UPJ.
Novobiocin (animal feed grade)	UPJ.
Nystatin (animal feed grade)	OMS.
Spectinomycin (animal feed grade)	UPJ.
Streptomycin	MRK, PFZ.
Tylosin	LIL.
*ANTIHISTAMINES:	
*ANTINAUSEANTS:	
Cyclizine hydrochloride	BUR.
Dimenhydrinate	GAN, SRL.
Meclizine hydrochloride	PFZ.
Trimethobenzamide hydrochloride	HOF.
*OTHER ANTIHISTAMINES:	
Bromodiphenhydramine hydrochloride	PD.
Brompheniramine maleate	HEX, SCH.
Carbinoxamine	SCH.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*ANTIHISTAMINES--Continued	
*OTHER ANTIHISTAMINES--Continued	
Chlorcyclizine hydrochloride	BUR.
*Chlorpheniramine maleate	HEX, SCH, SK.
Chlorpheniramine tannate	MAL.
Cyproheptadine hydrochloride	MRK.
Dexbrompheniramine maleate	SCH.
Dexchlorpheniramine maleate	SCH.
Dimethindene maleate	CGY.
Diphenhydramine hydrochloride	GAN, PD.
Doxylamine succinate	BJL, BKC.
Methapyrilene fumarate	ABB, MON.
Methapyrilene hydrochloride	ABB, MON.
Methdilazine hydrochloride	BJL.
Phenindamine tartrate	HOF.
Pheniramine maleate	HEX, SCH.
Phenyltoloxamine citrate	BKL, BRS, GAN.
Pyrilamine maleate	HEX.
Pyrilamine resin adsorbate	MRK.
Pyrilamine tannate	MAL.
Pyrrobutamine phosphate	LIL.
Tripelennamine	CGY.
Tripelennamine citrate	CGY.
Tripelennamine hydrochloride	CGY.
Triprolidine hydrochloride	BUR.
*ANTI-INFECTIVE AGENTS (EXCEPT ANTIBIOTICS):	
*ANTHELMINTICS:	
Dichlorvos	SHC.
Diethylcarbamazine citrate	ACY.
Hexylresorcinol	MRK.
Phenothiazine	WAG.
Piperazine	DOW, JCC.
Piperazine citrate	BUR, JCC.
*Piperazine dihydrochloride	DOW, FLM, JCC, WHL.
Piperazine hexahydrate	JCC.
Piperazine hydrochloride	DOW, FLM, JCC.
Piperazine phosphate	JCC.
Piperazine sulfate	JCC.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*ANTI-INFECTIVE AGENTS (EXCEPT ANTIBIOTICS)--Continued	
*ANTHELMINTICS--Continued	
Pyrantel pamoate	PFZ.
Pyrantel tartrate	PFZ.
Pyrvinium pamoate	PD.
Rafoxanide	MRK.
Thiabendazole	MRK.
*ANTIPROTOZOAN AGENTS:	
*ARSENIC AND BISMUTH COMPOUNDS:	
Arsanilic acid	FLM, WHL.
Bismuth subsalicylate	MAL, NOR, PEN.
Carbarsone	RSA, WHL.
Glycobiarsol	SDW, X.
Nitarsone	SAL.
Roxarsone	SAL.
Roxarsone, sodium	SAL.
*OTHER ANTIPROTOZOAN AGENTS:	
Aklomide	SAL.
Amodiaquin hydrochloride	PD.
Amprolium	MRK.
Chloroquine phosphate	SDW.
Cinchonidine	ARA.
Clopidol	DOW.
Diiodohydroxyquin	RSA.
Dimetridazole	RDA.
Dinitolmide	SAL.
Ethopabate	MRK.
Furazolidone	NOR.
Hydroxychloroquine sulfate	SDW.
Iodochlorhydroxyquin	CGY.
Metronidazole	RDA.
Nifuroxime	NOR.
Nitromide	SAL.
Nitrophenide	ACY.
Primaquine phosphate	SDW.
Pyrimethamine	BUR.
Ronidazole	MRK.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*ANTI-INFECTIVE AGENTS (EXCEPT ANTIBIOTICS)--CONTINUED	
*SULFONAMIDES:	
Acetyl sulfisoxazole	HOF.
Dinsed	SAL.
Mafenide acetate	SDW.
Mafenide hydrochloride	SDW.
Phthalylsulfacetamide	LEM.
Phthalylsulfathiazole	MRK.
Sulfabenzamide	ACY.
Sulfabenzamide, sodium	ACY.
Sulfabromomethazine, sodium	ARA.
Sulfacetamide	LEM.
Sulfachloropyrazine, sodium	ACY.
Sulfachlorpyridazine	ACY.
Sulfacytine	PD.
Sulfadiazine	ACY.
Sulfadimethoxine	HOF.
Sulfamerazine	ACY.
Sulfamerazine, sodium	ACY.
Sulfamethazine	ACY, RLS.
Sulfamethazine, sodium	LEM, SAL.
Sulfamethizole	ACY.
Sulfamethoxazole	HOF.
Sulfanitran	SAL.
Sulfapyridine	ACY, LEM.
Sulfaquinoxaline	MRK.
Sulfasalazine	SAL.
Sulfathiazole	MRK.
Sulfathiazole, sodium	MRK, SAL.
Sulfisoxazole	HOF.
*OTHER ANTI-INFECTIVE AGENTS:	
ANTIFUNGAL AGENTS:	
Benzoic acid	MON.
Calcium undecylenate	WTL.
Chlordantoin	ARA.
Sodium caprylate	LEM.
Zinc undecylenate	NTL, WTL.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*ANTI-INFECTIVE AGENTS (EXCEPT ANTIBIOTICS)--Continued	
*OTHER ANTI-INFECTIVE AGENTS--Continued	
ANTILEPROTIC AND ANTITUBERCULAR AGENTS:	
Aminosalicylic acid	HXL.
Sodium aminosalicylate	HXL.
Sodium sulfoxone	ABB.
ANTIVIRAL AGENTS:	
Amantadine hydrochloride	ARA.
MERCURY COMPOUNDS:	
Merbromin	HYN.
Nitromersol	ABB.
Thimerosal	LIL.
*URINARY ANTISEPTICS:	
Methenamine	PD.
Methenamine hippurate	LKL, RIK.
Methenamine mandelate	ARN, NEP.
Nitrofurantoin	NOR.
Phenazopyridine hydrochloride	NEP.
GENERAL ANTISEPTICS AND ANTIBACTERIAL AGENTS:	
Aminacrine hydrochloride	SDW.
Bromoform	DOW.
Camphor, monobromated	PEN.
Carbadox	PFZ.
Cetalkonium chloride	SDW.
Cetylpyridinium chloride	HEX, HXL, LKL.
Chlorhexidine gluconate	ICI.
Chlorobutanol	SPS.
Chlorothymol	OPC.
m-Cresyl acetate	ADC.
8-Hydroxy-5-quinolinesulfonic acid	MRK.
Iodoform	MAL, PEN.
Nalidixic acid	X.
Nitrofurathiazide	SCH.
Ormetoprim	HOF.
Oxyquinoline	ASH.
Oxyquinoline benzoate	LEM.
Oxyquinoline citrate	ASH.
Oxyquinoline sulfate	ASH, LEM.
Povidone - iodine complex	GAF.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*ANTI-INFECTIVE AGENTS (EXCEPT ANTIBIOTICS)--Continued	
*OTHER ANTI-INFECTIVE AGENTS--Continued	
GENERAL ANTISEPTICS AND ANTIBACTERIAL AGENTS--Con.	
Resorcinol	KPT, LEM.
Thymol	GIV.
Thymol iodide	MAL.
Trimethoprim	BUR.
*AUTONOMIC DRUGS:	
*SYMPATHOMIMETIC AGENTS:	
Cyclopentamine hydrochloride	LIL.
Ephedrine	UPJ.
Isoetharine hydrochloride	SDW.
Isoproterenol sulfate	ABB.
Levarterenol bitartrate	SDW.
Mephentermine	ARA.
Mephentermine sulfate	ARA.
Methoxyphenamine hydrochloride	HXL.
Naphazoline hydrochloride	CGY.
Nordefrin hydrochloride	SDW.
Phenylephrine	SDW.
Phenylephrine bitartrate	GAN.
Phenylephrine hydrochloride	GAN, SDW.
*Phenylpropanolamine hydrochloride	ARS, GAN, HXL, NEP, ORT, X.
Propylhexedrine	SK.
Pseudoephedrine hydrochloride	BUR, GAN.
Pseudoephedrine sulfate	GAN.
Terbutaline sulfate	CGY.
Tetrahydrozoline hydrochloride	PFZ.
*OTHER AUTONOMIC DRUGS:	
PARASYMPATHOLYTIC QUATERNARY AMMONIUM COMPOUNDS (EXCEPT TROPANE DERIVATIVES):	
Diphemanil methylsulfate	SCH.
Isopropamide iodide	SK.
Mepenzolate bromide	LKL.
Methantheline bromide	SRL.
Pipenzolate bromide	LKL.
Propantheline bromide	SRL.
Tridihexethyl iodide	ACY.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*AUTONOMIC DRUGS--Continued	
*OTHER AUTONOMIC DRUGS--Continued	
PARASYMPATHOLYTIC TERTIARY AMINES (EXCEPT TROPANE DERIVATIVES):	
Adiphenine hydrochloride	CGY.
Dicyclomine hydrochloride	BKC.
Orphenadrine citrate	RIK.
Oxybutynin chloride	X.
Oxyphencyclimine hydrochloride	PFZ.
Piperidolate hydrochloride	LKL.
Thiphenamil hydrochloride	BJL.
Trihexyphenidyl hydrochloride	ACY, SDW.
PARASYMPATHOLYTIC TROPANE DERIVATIVES:	
Anisotropine methylbromide	ARA.
Benztropine mesylate	ARA.
Homatropine hydrobromide	ARA.
Homatropine methylbromide	ARA.
PARASYMPATHOMIMETIC AGENTS:	
Bethanechol chloride	MRK.
Carbachol	MRK.
Neostigmine bromide	HEX.
Neostigmine methylsulfate	HOF.
Pyridostigmine bromide	HOF.
SYMPATHOLYTIC AGENTS:	
Ergonovine maleate	LIL.
Timolol maleate	MRK.
*CENTRAL DEPRESSANTS AND STIMULANTS:	
*ANALGESICS, ANTIPYRETICS, AND NONHORMONAL ANTI-INFLAMMATORY AGENTS:	
SALICYLIC ACID DERIVATIVES:	
*Aspirin	DOW, MON, NOR, SDG.
Choline magnesium salicylate	LEM.
Diflunisal	MRK.
Phenyl salicylate	DOW.
Potassium salicylate	HN.
Salicylamide	PEN.
Salicylsalicylic acid	PD, RIK.
Sodium salicylate	HN.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*CENTRAL DEPRESSANTS AND STIMULANTS--Continued	
*ANALGESICS, ANTIPYRETICS, AND NONHORMONAL ANTI-INFLAMMATORY AGENTS--Continued	
OTHER ANALGESICS AND ANTIPYRENTICS:	
*Acetaminophen	MAL, MON, NOR, PEN, SDH.
Aminobenzoic acid	GAN.
Aurothioglucose	SCH.
Butorphanol tartrate	BRS.
Ethoheptazine citrate	WYT.
Ibuprofen	TNA.
Indomethacin	MRK.
Meclofenamic acid, sodium salt	PD.
Mefenamic acid	PD.
Meperidine hydrochloride	PEN, SDW, WYT.
Methadone hydrochloride	LIL, MAL, PEN.
Morphine sulfate	MAL, MRK, PEN.
Naproxen	ARA.
Oxycodone hydrochloride	REM.
Oxyphenbutazone	CGY.
Phenacetin	MON.
Phenylbutazone	CGY.
Potassium aminobenzoate	GAN.
Propoxyphene hydrochloride	GAN, LIL.
Propoxyphene napsylate	LIL.
Sodium aminobenzoate	GAN.
Sulindac	MRK.
*ANTICONVULSANTS, HYPNOTICS, AND SEDATIVES:	
ANTICONVULSANTS (EXCEPT BARBITURATES):	
Carbamazepine	CGY.
Ethosuximide	PD.
Ethotoin	ABB.
Methsuximide	PD.
Phenacemide	ABB, PD.
Phensuximide	PD.
Phenytoin, sodium	PD.
Valproic acid	ARA.
BARBITURATES:	
Amobarbital	GAN, LIL.
Amobarbital, sodium	GAN.
Barbital	GAN.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*CENTRAL DEPRESSANTS AND STIMULANTS--Continued	
*ANTICONVULSANTS, HYPNOTICS, AND SEDATIVES--Continued	
BARBITURATES--Continued	
Barbital, sodium	GAN.
Butabarbital	ABB, GAN.
Butabarbital, sodium	ABB, GAN.
Butalbital	GAN.
Butalbital, sodium	GAN.
Hexobarbital	GAN.
Mephobarbital	SDW.
Metharbital	ABB.
Methohexital, sodium	LIL.
Pentobarbital	ABB, GAN.
Pentobarbital, sodium	ABB, GAN.
Phenobarbital	GAN.
Phenobarbital, sodium	GAN.
Secobarbital	GAN.
Secobarbital, sodium	GAN.
Thiamylal, sodium	PD.
Thiopental, sodium	ABB.
HYPNOTICS AND SEDATIVES (EXCEPT BARBITURATES):	
Carbromal	PD.
Ethchlorvynol	ABB.
Flurazepam hydrochloride	HOF.
Glntethimide	CGY, GAN.
Methaqualone	X.
Methaqualone hydrochloride	X.
Methyprylon	HOF.
Triclofos, sodium	LKL.
PSYCHOTROPIC AGENTS:	
*ANTIDEPRESSANTS:	
Amitriptyline hydrochloride	MRK, PD.
Desipramine hydrochloride	LKL.
Doxepin hydrochloride	PFZ, SK.
Imipramine hydrochloride	CGY.
Nortriptyline	LIL.
*TRANQUILIZERS:	
PHENOTHIAZINE DERIVATIVES:	
Acetophenazine maleate	SCH.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*CENTRAL DEPRESSANTS AND STIMULANTS--Continued	
PSYCHOTROPIC AGENTS--Continued	
*TRANQUILIZERS--Continued	
PHENOTHIAZINE DERIVATIVES--Continued	
Chlorpromazine hydrochloride	SK.
Fluphenazine hydrochloride	SCH.
Perphenazine	SCH.
Prochlorperazine edisylate	SK.
Prochlorperazine maleate	SK.
Promazine hydrochloride	WYT.
Promethazine hydrochloride	WYT.
Trifluoperazine hydrochloride	SK.
OTHER TRANQUILIZERS:	
Buclizine hydrochloride	PFZ.
Chlordiazepoxide hydrochloride	HOF, PD.
Chlormezanone	SDW.
Clorazepate dipotassium	ABB.
Diazepam	HOF.
Ethoxybutamoxane	LIL.
Hydroxyzine hydrochloride	PFZ.
Hydroxyzine pamoate	PFZ.
Meprobamate	BKL.
Molindone hydrochloride	X.
Oxazepam	WYT.
Prazepam	PD.
Thiothixene hydrochloride	PFZ.
*OTHER CENTRAL DEPRESSANTS AND STIMULANTS:	
AMPHETAMINES:	
Amphetamine (racemic)	ARN, SK.
Amphetamine sulfate (racemic)	ARN, SK.
Dextroamphetamine	ARN, SK.
Dextroamphetamine sulfate	ARN, SK.
Methamphetamine (levo)	ARN.
Methamphetamine hydrochloride (dextro)	ARN.
Amphetamines, all other	ARN.
*ANTITUSSIVES:	
Benzonatate	CGY.
Caramiphen edisylate	SK.
Carbetapentane citrate	PFZ.
Codeine	MAL, MRK, PEN.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*CENTRAL DEPRESSANTS AND STIMULANTS--Continued	
*OTHER CENTRAL DEPRESSANTS AND STIMULANTS--Continued	
*ANTITUSSIVES--Continued	
Dextromethorphan hydrobromide	HOF.
Ethylmorphine hydrochloride	MRK.
Hydrocodone bitartrate	MRK, PEN.
Noscapine	MRK.
Thebaine	MAL, MRK, PEN.
GENERAL ANESTHETICS:	
Ketamine hydrochloride	PD.
RESPIRATORY AND CEREBRAL STIMULANTS:	
Benzphetamine hydrochloride	UPJ.
Caffeine, natural	CNT, GNF.
Caffeine, synthetic	PFZ.
Deanol acetamidobenzoate	RIK.
Diethylpropion hydrochloride	BKC.
Methylphenidate hydrochloride	CGY.
Nikethamide	CGY.
Phendimetrazine tartrate	GAN.
Phentermine	HEX.
*SKELETAL MUSCLE RELAXANTS:	
Carisoprodol	BKL.
Chlorphenesin carbamate	UPJ.
Cyclobenzaprine hydrochloride	MRK.
Methocarbamol	PEN.
Succinylcholine chloride	ABB, BUR.
Tubocurarine	ABB.
DERMATOLOGICAL AGENTS AND LOCAL ANESTHETICS:	
*DERMATOLOGICAL AGENTS:	
Allantoin	RFT.
Aluminum phenolsulfonate	SAL.
Ammonium phenolsulfonate	SAL.
Bismuth subgallate	MAL, PEN.
Glycol salicylate	RDA.
Podophyllum resin	PEN.
Salicylic acid	DOW, MON.
Sodium phenolsulfonate	SAL.
Zinc phenolsulfonate	MAL, SAL.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DERMATOLOGIGAL AGENTS AND LOCAL ANESTHETICS--Continued	
*LOCAL ANESTHETICS:	
Benzocaine	PD, SAL.
Butamben	ABB, RSA.
Butamben picrate	ABB.
Chloroprocaine hydrochloride	ARA.
Cocaine	MRK.
Dibucaine	CGY.
Dibucaine hydrochloride	CGY.
Dyclonine hydrochloride	BJL.
*Lidocaine	AST, LEM, SDW.
Lidocaine hydrochloride	SDW.
Oxethazaine	ARA, WYT.
Phenacaine hydrochloride	SDW.
Pramoxine hydrochloride	ABB.
Procaine hydrochloride	PFZ.
Proparacaine hydrochloride	OMS.
Tetracaine	SDW.
Tetracaine hydrochloride	SDW.
*EXPECTORANTS AND MUCOLYTIC AGENTS:	
*Ethylenediamine dihydriodide	HFT, MAL, WAG, WHL.
Guaiacol	PEN.
Guaifenesin	GAN, HEX, PEN.
Iodinated glycerol	X.
Potassium guaiacolsulfonate	HN.
*GASTROINTESTINAL AGENTS:	
*CHOLINE CHLORIDE (ALL GRADES):	
Choline chloride (animal feed grade)	DA, HFT, IMC, TMH.
Choline chloride (medicinal grade)	HFT.
*METHIONINE AND ITS SALTS:	
Methionine (animal feed grade)	DGC.
Methionine, hydroxy analogue, calcium salt	DUP, MON.
*OTHER GASTROINTESTINAL AGENTS:	
Apomorphine hydrochloride	MRK.
Betaine base	HFT.
Betaine hydrochloride	HFT.
Bile acids, oxidized	WIL.
Bisacodyl	PD.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*GASTROINTESTINAL AGENTS--Continued	
*OTHER GASTROINTESTINAL AGENTS--Continued	
Choline bicarbonate	IMC.
Choline bitartrate	HFT.
Choline citrate	HFT.
Choline dihydrogen citrate	HFT.
Cimetidine	SK.
Cimetidine hydrochloride	SK.
Colestipol hydrochloride	X.
Dehydrocholic acid	WIL.
Dextrothyroxine, sodium	BAX.
Gemfibrozil	X.
Iron bile salts	LIL, WIL.
Magnesium citrate	MAL.
Ox bile extract	ABB, SRL, WIL.
Pectin	SKG.
Phenolphthalein	SCH.
Sitosterols	UPJ.
Sodium dehydrocholate	WIL.
*HORMONES AND SYNTHETIC SUBSTITUTES:	
ANABOLIC AGENTS AND ANDROGENS:	
Fluoxymesterone	UPJ.
Methyltestosterone	SRL, UPJ.
Testosterone	UPJ.
Testosterone cypionate	UPJ.
Zeranol	IMC.
CORTICOSTEROIDS:	
Betamethasone	SCH.
Betamethasone dipropionate	SCH.
Betamethasone sodium phosphate	SCH.
Betamethasone valerate	SCH.
Cortisone acetate	UPJ.
Dexamethasone	MRK, SCH.
Dexamethasone sodium phosphate	MRK.
Fludrocortisone acetate	UPJ.
Fluorometholone	UPJ.
Fluprednisolone	UPJ.
Halcinonide	TRD.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*HORMONES AND SYNTHETIC SUBSTITUTES--Continued	
CORTICOSTEROIDS--Continued	
Hydrocortisone	UPJ.
Hydrocortisone acetate	UPJ.
Medrysone	UPJ.
Methylprednisolone	UPJ.
Prednisolone	UPJ.
Prednisolone acetate	UPJ.
Prednisone	UPJ.
Triamcinolone	TRD, X.
Triamcinolone acetonide	TRD.
Triamcinolone diacetate	TRD.
ESTROGENS AND PROGESTOGENS:	
*ESTROGENS:	
Chlorotrianisene	BKC, LKL.
Diethylstilbestrol diphosphate	ARA.
Estrogenic substances, conjugated	ORG.
Natural estrogenic substance	ORG.
Piperazine estrone sulfate	ABB.
PROGESTOGENS:	
Dinoprostone	X.
Ethisterone	SRL.
Hydroxyprogesterone caproate	UPJ.
Medroxyprogesterone acetate	UPJ.
Megestrol acetate	UPJ.
Norgestrel	WYT.
Progesterone	UPJ.
*SYNTHETIC HYPOGLYCEMIC AGENTS:	
Acetohexamide	LIL.
Chlorpropamide	PFZ.
Tolazamide	UPJ.
Tolbutamide	UPJ.
THYROID HORMONE AND ANTITHYROID AGENTS:	
Propylthiouracil	ARA.
2-Thiouracil	ACY.
Thyroglobulin	NEP.
Thyroid	LIL.
Thyroxine (levo), sodium	BAX.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*HORMONES AND SYNTHETIC SUBSTITUTES--Continued	
OTHER HORMONES AND SYNTHETIC SUBSTITUTES:	
Corticotropin	ARP, ORG.
Danazol	SDW.
Epinephrine bitartrate	SDW.
Glucagon	LIL.
Insulin	ARP, LIL.
Oxytocin	PD.
*RENAL-ACTING AND EDEMA-REDUCING AGENTS:	
BENZOTHIADIAZINE DERIVATIVES:	
Benzthiazide	PFZ.
Chlorothiazide	MRK, PD.
Hydrochlorothiazide	ABB, CGY, MRK, PD.
Methyclothiazide	ABB.
Trichlormethiazide	SCH.
*THEOBROMINE AND THEOPHYLLINE DERIVATIVES:	
Aminophylline	GAN, SRL.
Oxtriphylline	NEP, PD.
Theophylline sodium glycinate	CHT.
OTHER RENAL-ACTING AND EDEMA-REDUCING AGENTS:	
Acetazolamide	ACY.
Amiloride	MRK.
Dichlorphenamide	MRK.
Ethacrynic acid	MRK.
Probenecid	GAN, MRK.
Spironolactone	SRL.
Ticrynafen	SK.
Triamterene	ACY, SK.
*VITAMINS:	
VITAMIN A:	
β-Carotene (provitamin A)	HOF.
Tretinoin (vitamin A acid)	EK, HOF.
Vitamin A acetate (animal feed grade)	HOF.
Vitamin A acetate (medicinal grade)	HOF.
Vitamin A alcohol	EK, HOF.
Vitamin A palmitate (animal feed grade)	HOF.
Vitamin A palmitate (medicinal grade)	HOF.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*VITAMINS--Continued:	
VITAMIN A--Continued:	
Vitamin A propionate	HOF.
VITAMIN B-COMPLEX:	
NICOTINIC ACID AND DERIVATIVES:	
Niacin (animal feed grade)	NEP, RIL.
Niacin (medicinal grade)	MRK.
Niacinamide (medicinal grade)	NEP, RIL.
Niacinamide (animal feed grade)	NEP.
PANTOTHENIC ACID AND DERIVATIVES:	
Calcium pantothenate (racemic) (animal feed grade)	HFT.
Calcium pantothenate (racemic) (medicinal grade)	HFT.
Calcium pantothenate - calcium chloride complex (animal feed grade)	HFT.
Calcium pantothenate - calcium chloride complex (medicinal grade)	MAL.
Dexpanthenol	HOF.
Panthenol	HOF, PD.
OTHER B-COMPLEX VITAMINS:	
Biotin	HOF.
Cyanocobalamin (animal feed grade)	MRK.
Cyanocobalamin (medicinal grade)	MRK.
Cyanocobalamin (U.S.P. crystalline)	MRK.
Inositol	STA.
Pyridoxine	HOF.
Riboflavin (animal feed grade)	HOF, MRK.
Riboflavin (medicinal grade)	HOF, MRK.
Riboflavin-5-phosphate, sodium	HOF.
Thiamine hydrochloride	HOF, PD.
Thiamine mononitrate	HOF.
VITAMIN C:	
Ascorbic acid	HOF, PFZ.
Calcium ascorbate	PFZ.
Sodium ascorbate	HOF, PFZ.
*VITAMIN D:	
Cholecalciferol (vitamin D_3)	DA, TMH, VTM.
7-Dehydrocholesterol (provitamin D_3)	DA, DLI.
Ergocalciferol (vitamin D_2)	VTM.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*VITAMINS--Continued	
*VITAMIN E:	
d-α Tocopherol	EKT, SCP.
dl-α Tocopherol	HOF.
d-α Tocopheryl acetate	EKT, SCP.
dl-α Tocopheryl acetate (animal feed grade)	DA, HOF, SCP.
dl-α Tocopheryl acetate (medicinal grade)	HOF, SCP.
d-α Tocopheryl acid succinate	EKT, SCP.
VITAMIN K:	
Menadione	ABB.
Menadione sodium bisulfite	ABB, HET.
Phytonadione	MRK.
*OTHER MEDICINAL CHEMICALS:	
ANTINEOPLASTIC AGENTS:	
Azathioprine	BUR.
6-Azauridine	PD.
Cytarabine	UPJ.
Mercaptopurine	BUR.
Methotrexate	PFN.
Streptozocin	PFN, UPJ.
Vinblastine sulfate	LIL.
Vincristine sulfate	LIL.
CARDIOVASCULAR AGENTS:	
ANTIHYPERTENSIVE AGENTS:	
Diazoxide	SCH.
Guanethidine sulfate	CGY.
Hydralazine hydrochloride	CGY.
Methyldopa	MRK.
Prazosin hydrochloride	PFZ.
Rauwolfia serpentina	PEN.
Reserpine	PEN.
BIOFLAVONOIDS:	
Hesperidin	SKG.
Lemon bioflavonoid complex	SKG.
Naringin	SKG.
Bioflavonoids, all other	SKG.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*OTHER MEDICINAL CHEMICALS--Continued	
CARDIOVASCULAR AGENTS--Continued	
VASODILATORS:	
Dioxyline phosphate	LIL.
Nicotinyl alcohol tartrate	HOF.
OTHER CARDIOVASCULAR AGENTS:	
Disopyramide phosphate	SRL.
Procainamide hydrochloride	OMS, PD.
DIAGNOSTIC AGENTS:	
ROENTGENOGRAPHIC CONTRAST MEDIA:	
Diatrizoate, meglumine	OMS, SDW.
Diatrizoate, sodium	OMS, SDW.
Iodipamide, meglumine	OMS.
Iopanoic acid	SDW.
Iothalamate, meglumine	MAL.
Iothalamate, sodium	MAL.
Methiodal, sodium	SDW.
Tyropanoate, sodium	SDW.
OTHER DIAGNOSTIC AGENTS:	
Indocyanine green (cardiac output test)	X.
Metyrapone (pituitary function test)	CGY.
Xylose (intestinal malabsorption test)	PFN.
HEMATOLOGICAL AGENTS:	
Ammonium heparin	ABB, RIK, WIL.
Anisindione	SCH.
Bishydroxycoumarin	ABB, RSA.
Cellulose, oxidized	EKT.
Dextran	PHR.
Diphenadione	UPJ.
Lithium heparin	ABB, RIK, WIL.
Potassium warfarin	RSA.
*Sodium heparin	ABB, RIK, SPR, WIL.
Sodium warfarin	PEN.
Warfarin	SDW.
SMOOTH MUSCLE RELAXANTS:	
Alverine citrate	ARA.
Alverine hydrochloride	ARA, SDW.
Flavoxate hydrochloride	SK.
Papaverine hydrochloride	LIL.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--Continued

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*OTHER MEDICINAL CHEMICALS--Continued	
THERAPEUTIC NUTRIENTS:	
AMINO ACIDS AND SALTS:	
Amino acid mixtures	BRS, MDJ.
Glutamic acid	LEM.
Glutamic acid hydrochloride	LEM.
Potassium glutamate	LEM.
Tyrosine	BRS, MDJ.
OTHER THERAPEUTIC NUTRIENTS:	
Calcium gluceptate	PFN.
Copper gluconate	PFZ.
Ferrous gluconate	SDW.
Magnesium gluconate	PFZ.
Manganese gluconate	PFZ.
Potassium gluconate	PFZ.
Zinc gluceptate	PFN.
Zinc gluconate	PFZ.
UNCLASSIFIED MEDICINAL CHEMICALS:	
Allopurinol (xanthine oxidase inhibitor)	BUR.
Carbidopa (decarboxylase inhibitor)	MRK.
Clomiphene citrate	LKL.
Ethoxzolamide (carbonic anhydrase inhibitor)	ARA.
Levodopa (antiparkinsonian)	MON.

TABLE 3.--Medicinal chemicals: Directory of manufacturers, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of medicinal chemicals to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ABB	Abbott Laboratories	MAL	Mallinckrodt Chemical Works
ACY	American Cyanamid Co.	MDJ	Mead Johnson & Co.
ADC	Anderson Development Co.	MON	Monsanto Co.
ARA	Arapahoe Chemicals, Inc., Sub/Syntex U.S.A., Inc.	MRK	Merck & Co., Inc.
ARN	Arenol Chemical Corp.	NEP	Nepera Chemical Co., Inc.
ARP	Armour Pharmaceutical Co.	NOR	Morton-Norwich Products, Inc., Norwich Eaton Pharmaceutical Div.
ARS	Arsynco, Inc.		
ASH	Ashland Oil, Inc.	NTL	NL Industries, Inc.
AST	Astra Pharmaceutical Products, Inc.		
		OMS	E.R. Squibb & Sons, Inc.
BAX	Baxter Travenol Laboratories, Inc.	OPC	Orbis Products Corp.
BEE	Beecham, Inc., Beecham Laboratories, Inc.	ORG	Organics, Inc.
BJL	Burdick & Jackson Laboratories, Inc.	ORT	Roehr Chemicals, Inc.
BKC	J.T. Baker Chemical Co.		
BKL	Millmaster Onyx Group, Millmaster Chemical Co. Div.	PD	Parke, Davis & Co., Sub. of Warner-Lambert Co.
BOC	Biocraft Laboratories, Inc.	PEN	CPC International, Inc., Penick Corp.
BRS	Bristol-Myers Co.	PFN	Pfanstiehl Laboratories, Inc.
BUR	Burroughs-Wellcome Co.	PFZ	Pfizer, Inc. and Pfizer Pharmaceuticals, Inc.
CGY	Ciba-Geigy Corp. and Ciba Pharmaceutical Co.	PHR	Pharmachem Corp.
CHT	Chattem Corp.		
CPR	Certified Processing Corp.	RDA	Phone-Poulenc, Inc.
		RIK	Riker Laboratories, Inc., Sub. of 3M Co.
DA	Diamond Shamrock Corp.	RIL	Reilly Tar & Chemical Corp.
DGC	Degusso Corp.	RLS	Rachelle Laboratories, Inc.
DLI	Dawe's Laboratories, Inc.	RSA	R.S.A. Corp.
DOW	Dow Chemical Co.		
DUP	E.I. duPont de Nemours & Co., Inc.	SAL	Salsbury Laboratories
		SCH	Schering Corp.
EK	Eastman Kodak Co.:	SCP	Henkel Corp.
EKT	Tennessee Eastman Co. Div.		Sterling Drug Corp.:
EN	Endo Laboratories, Inc.	SDG	Glenbrook Laboratories Div.
		SDH	Hilton Davis Chemical Co. Div.
FLM	Fleming Laboratories, Inc.	SDW	Winthrop Laboratories Div.
		SFS	Stauffer Chemical Co., Specialty Div.
GAF	GAF Corp.	SHC	Shell Oil Co., Shell Chemical Co. Div.
GAN	Gane's Chemical Inc.	SK	SmithKline Corp., SmithKline Chemicals Div.
GIV	Givaudan Corp.		
GNF	General Foods Corp., Maxwell House Div.	SKG	Sunkist Growers, Inc.
		SPR	Scientific Protein Laboratories, Inc.
HET	Heterochemical Corp.	SRL	G.D. Searle & Co., Searle Pharmaceuticals, Inc.
HEX	Hexagon Laboratories, Inc.		
HFT	Syntex Agribusiness, Inc.	STA	A.E. Staley Manufacturing Co.
HN	Tenneco Chemicals, Inc.		
HOF	Hoffmann-LaRoche, Inc.	TMH	Thompson-Hayward Chemical Co.
HXL	Hexcel Corp., Hexcel Specialty Chemicals	TNA	Ethyl Corp.
HYN	Hynson, Westcott & Dunning, Inc.	TRD	Manufacturing Enterprises, Inc., Squibb Manufacturing Inc., Trade Enterprises, Inc., Ersana, Inc.
ICI	ICI Americas, Inc., Chemical Specialties Co.		
IMC	International Minerals & Chemical Corp.	UPJ	Upjohn Co.
JCC	Jefferson Chemical Co., Inc.	VTM	Vitamins, Inc.
KPT	Koppers Co., Inc.	WAG	West Agro-Chemicals, Inc.
		WHL	Whitmoyer Laboratories, Inc.
LEM	Napp Chemicals, Inc.	WIL	Inolex Corp., Inolex Pharmaceutical Div.
LIL	Eli Lilly & Co. and Puerto Rico	WTL	Pennwalt Corp., Lucidol Div.
LKL	Richardson-Merrell, Inc., Merrell-National Laboratories Div.	WYT	Wyeth Laboratories, Inc., Wyeth Laboratories Div. of American Home Products Corp.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

STATISTICAL HIGHLIGHTS

Cynthia B. Foreso

Flavor and perfume materials are organic chemicals used to impart flavors and aromas to foods, beverages, cosmetics, and soaps. These aroma chemicals are also utilized to neutralize or mask unpleasant odors in industrial processes and products as well as in consumer products.

Total domestic production of flavor and perfume materials in 1978 amounted to 189.4 million pounds (table 1). Sales of these materials in 1978 amounted to 140.2 million pounds, valued at $211.8 million, compared with 107.6 million pounds, valued at $207.1 million, in 1977. These totals do not include benzyl alcohol, which, before 1973, was included in flavor and perfume materials but is now shown in the miscellaneous cyclic section of this series. U.S. production of flavor and perfume materials in 1978 increased 26 percent from the level in 1977; while the quantity of sales increased by 30 percent.

Production of cyclic flavor and perfume materials in 1978 amounted to 101.2 million pounds; sales amounted to 83.6 million pounds, valued at $137.2 million. Individual publishable chemicals in the cyclic group produced in the greatest volume in 1978 were α-terpineol, anethole, and benzyl acetate.

U.S. output of acyclic flavor and perfume materials in 1978 amounted to 88.3 million pounds; sales of these materials amounted to 56.7 million pounds, valued at $74.6 million. Monosodium glutamate was by far the most important of the acyclic chemicals in 1978, although the data are not publishable. Other important acyclic compounds included linalyl alcohol, citronellol, and linalyl acetate.

TABLE 1.--FLAVOR AND PERFUME MATERIALS: U.S. PRODUCTION AND SALES, 1978

[Listed below are all synthetic organic flavor and perfume materials for which any reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists separately all flavor and perfume materials for which data on production and/or sales were reported and identifies the manufacturers of each]

FLAVOR AND PERFUME MATERIALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Grand total	189,446	140,221	211,804	$1.51
CYCLIC				
Total	101,175	83,565	137,239	1.64
Benzenoid and Naphthalenoid				
Total	84,937	73,961	106,619	1.44
4-Allyl-2-methoxyphenol (Eugenol)	425	414	1,662	4.02
4-Allyl-2-methoxyphenol acetate	7	7	43	6.51
Benzophenone[2]	1,370	966	1,727	1.79
Benzyl acetate	1,889	1,800	1,797	1.00
Benzyl propionate	29	23	36	1.59
Cinnamaldehyde	...	1,098	1,530	1.39
Cinnamyl acetate	17	12	60	5.12
Isobutyl phenylacetate	27	29	68	2.33
Isopentyl salicylate	838	904	1,183	1.31
2-Methoxy-4-propenylphenol (Isoeugenol)	139	...	...	...
p-Methylanisole	29	31	58	1.86
Methyl anthranilate	...	337	523	1.55
Methyl phenylacetate	36	...	...	...
Phenethyl isobutyrate	7	5	26	4.67
2-Phenethyl phenylacetate	23	16	79	4.94
Phenethyl propionate	...	12	58	4.73
p-Propenylanisole (Anethole)	2,279	2,263	7,248	3.20
All other benzenoid and naphthalenoid materials	77,822	66,044	90,521	1.37
Terpenoid, Heterocyclic, and Alicyclic				
Total	16,238	9,604	30,620	3.19
β-Caryophyllene	52	...	...	...
Cedrol	49	52	301	5.84
Cedryl acetate	260	157	601	3.84
Dihydronordicyclopentadienyl acetate	67	...	...	...
Dihydroterpinyl acetate	131	82	147	1.79
Guaiacwood acetate	39	42	183	4.35
α-Ionone	59	37	311	8.29
Ionone (α- and β-)	46	41	236	5.74
Methylionone (α- and β-)	764	565	2,960	5.24
Nopyl acetate	96	101	157	1.55
α-Terpineol	2,951	2,416	1,211	.50
α-Terpinyl acetate	1,181	1,066	995	.93
Vetivenyl acetate	9	...	...	...
All other terpenoid, heterocyclic, and alicyclic materials	10,534	5,045	23,518	4.66
ACYCLIC				
Total	88,271	56,656	74,565	1.32
Allyl heptanoate	3	2	12	5.00
Citral dimethyl acetal	74	68	324	4.79
Citronellyl acetate	94	59	200	3.41
Citronellyl formate	27	16	97	5.97

See footnotes at end of table.

TABLE 1.--FLAVOR AND PERFUME MATERIALS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
ACYCLIC--Continued	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
Citronellyl isobutyrate	7	...	...	...
3,7-Dimethyl-cis-c,6-octadien-1-ol (Nerol)	...	462	333	$0.72
3,7-Dimethyl-trans-2,6-octadiene-1-ol (Geraniol)	...	2,307	4,997	2.17
3,7-Dimethyl-cis-2,6-octadien-1-ol acetate (Neryl acetate)	33	10	50	4.96
3,7-Dimethyl-1,6-octadien-3-ol (Linalool; Linalyl alcohol)	3,341	...	...	...
3,7-Dimethyl-1,6-octadien-3-ol acetate (Linalyl acetate) acetate)	1,535	1,328	3,285	2.47
3,7-Dimethyl-6-octen-1-ol (Citronellal)	394	...	...	...
3,7-Dimethyl-6-octen-1-ol (Citronellol)	2,264	1,443	3,939	2.73
Ethyl heptanoate	8	8	24	3.16
Ethyl hexanoate (Ethyl caproate)	11	8	26	3.21
Ethyl isovalerate	18	...	...	...
Ethyl myristate	19	...	...	...
Ethyl propionate	207	229	308	1.35
Geranyl acetate	...	123	443	3.60
Geranyl butyrate	5	...	...	...
Geranyl formate	17	20	114	5.64
2-Hexanal	3	...	...	...
7-Hydroxy-3,7-dimethyl-1-octanal (Hydroxycitronellal)	730	713	4,421	6.20
Isopentyl butyrate	141	111	162	1.45
Isopentyl formate	6	6	16	2.78
1,3-Nonanediol acetate	27	26	96	3.74
N-Octyl acetate	...	1	6	4.98
All other acyclic materials	79,307	49,716	55,712	1.12

[1]Calculated from the unrounded figures.
[2]Includes significant quantities having other end uses.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*) CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT]

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC	
BENZENOID AND NAPHTHALENOID:	
Acetaldehyde, diphenethyl acetal (Phenylethyl acetal)	GIV.
2'-Acetonaphthone (β-Methyl naphthyl ketone)	GIV.
p-Allylanisole	SCM, X.
Allyl anthranilate	RT.
4-Allyl-1,2-dimethoxybenzene (4-Allylveratrole)	CI.
*4-Allyl-2-methoxyphenol (Eugenol)	CI, FB, GIV, IFF, NEO, PEN, UNG.
*4-Allyl-2-methoxyphenol acetate (Eugenol acetate)	CI, ELN, GIV, IFF, UNG.
4-Allyl-1,2-(methylenedioxy)-benzene (Safrole)	FB.
Allyl phenoxyacetate	GIV.
α-Amyl cinnamic aldehyde	IFF.
tert-Amyl cymene	PFW.
p-Anisaldehyde	OPC, UOP.
Anisole (Methoxybenzene) (Methyl phenyl ether)	OPC.
Anisyl acetate	ELN, OPC.
Anisyl butyrate	RT.
Anisyl caproate	RT.
Benzaldehyde glyceryl acetal	GIV.
*Benzophenone	CWN, NEO, PD, UOP.
*Benzyl acetate	FB, GIV, MON, OPC, UOP.
Benzyl benzoate	CIN, MON, PFZ.
Benzyl butyrate	ELN, FB.
Benzyl cinnamate	FB, GIV.
Benzyl ether	FB, UOP, VEL.
Benzyl formate	ELN, GIV.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
BENZENOID AND NAPTHALENOID--Continued	
Benzyl isobutyrate	ELN.
Benzyl isopentyl ether	ELN, GIV.
Benzyl isovalerate	ELN, FB.
Benzyl laurate	GIV.
1-(Benzyloxy)-2-methoxy-4-propenylbenzene (Benzyl isoeugenyl ether)	ELN, GIV.
Benzyl phenylacetate	ELN, GIV.
*Benzyl propionate	ELN, FB, GIV, OPC.
Benzyl salicylate	FB, GIV, MON.
4-tert-Butyl-2',6'-dimethyl-3',5'-dinitroacetophenone (Musk ketone)	GIV.
6-tert-Butyl-3-methyl-2,4-dinitroanisole (Musk ambrette)	GIV.
p-tert-Butyl-α-methylhydrocinnamalehyde	GIV, UOP.
Butyl phenyl acetate	GIV.
1-tert-Butyl-3,4,5-trimethyl-2,6-dinitrobenzene (Musk tibetene)	GIV.
5-tert-Butyl-2,4,6-trinitro-m-xylene (Musk xylol)	GIV.
Carvacrol	GIV.
*Cinnamaldehyde	CI, FB, UOP.
Cinnamic aldehyde dimethyl acetal	CI.
*Cinnamyl acetate	ELN, FB, GIV.
Cinnamyl alcohol	FB, UOP.
Cinnamyl anthranilate	GIV, RT.
Cinnamyl butyrate	FB.
Cinnamyl cinnamate	FB, FEL.
Cinnamyl propionate	ELN, GIV.
Cinnamyl tiglate	FB.
Coumarin	RDA.
Cuminyl acetate	IFF.
Cuminyl alcohol	GIV, IFF.
Cuminyl formate	IFF.
trans-Decahydro-β-naphthol	IFF.
2-4-Dibromo-6-nitro-m-cresyl methyl ether	GIV.
1,2-Dimethoxy-4-propenylbenzene (4-Propenylveratrole)	FB, GIV.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
BENZENOID AND NAPHTHALENOID--Continued	
Dimethyl benzene ethanol acetate	IFF.
3,7-Dimethyl-2,6-octadienyl phenylacetate (Geranyl phenylacetate)	GIV.
α,α-Dimethylphenethyl acetate	IFF.
α,α-Dimethylphenethyl alcohol	IFF.
α-α-Dimethylphenethyl butyrate	IFF.
Dimethyl phenylethyl carbinol	IFF.
Dimethyl phenylethyl carbinyl acetate	IFF.
Diphenylmethane (Benzylbenzene)	UOP.
1,3-Diphenyl-2-propanone (Dibenzylketone)	GIV.
p-Ethoxybenzaldehyde	GIV.
2-Ethoxynaphthalene	GIV.
Ethyl anthranilate	FB.
Ethyl benzoate	ELN.
Ethyl cinnamate	ELN, GIV.
Ethyl-α,β-epoxy-β-methylhydrocinnamate	ELN, MON.
2-Ethyl hexyl salicylate	FEL, NEO.
Ethyl phenylacetate	ELN, GIV, OPC.
Ethyl phenylglycidate	GIV.
Ethyl salicylate	FB.
3'-Ethyl-5',6',7',8'-tetrahydro-5',5',8',8',-tetramethyl-2'-acetonaphthone	UOP.
Geranyl benzoate	GIV.
Hexyl benzoate	PFW.
α-Hexylcinnamaldehyde	CI, IFF.
Hydratropaldehyde	GIV, IFF.
Hydratropaldehyde,dimethyl acetal	GIV.
Hydrocinnamic acid	ELN.
Hydrocoumarin	ARS, GIV, UOP.
Hydroxycitronellal methyl anthranilate	FB, GIV.
4-Hydroxy-3-ethoxybenzaldehyde (Ethylvanillin)	MON.
4-Hydroxy-3-methoxybenzaldehyde [Vanillin]	MON, SDH.
4(4-Hydroxy-3-methoxyphenyl)-2-butanone (Vanillyacetone)	GIV.
Indole	GIV.
Isoamyl phenylacetate	ELN, FB.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
BENZENOID AND NAPHTHALENOID--Continued	
Isobutyl benzoate	ELN.
*p-Isobutyl-α-methylhydrocinnamaldehyde (Rhodial)	RDA.
Isobutyl phenylacetate	ELN, FB, GIV, OPC.
Isobutylquinoline	IFF.
Isobutyl salicylate	FB, GIV.
Isohexenyl tetrahydrobenzaldehyde (Myrac aldehyde)	IFF.
Isopentyl benzoate	ELN, GIV.
*Isopentyl salicylate	FB, MON, UOP.
Isopropylbenzaldehyde (Cumaldehyde)	GIV.
p-Isopropyl-α-methylhydrocinnamaldehyde (Cyclamen aldehyde)	GIV, RDA.
p-Isopropyl-α-methylhydrocinnamyl alcohol	GIV.
Linalyl anthranilate	FMT.
Linalyl benzoate	GIV.
Linalyl cinnamate	HOF.
p-Mentha-1,8-diene (Limonene)	SCM, SKG.
Menthyl anthranilate	PFW.
4'-Methoxyacetophenone	GIV, OPC, UOP.
p-Methoxybenzyl alcohol (Anisyl alcohol)	ELN, GIV, OPC, UOP.
o-Methoxy cinnamic aldehyde	CI, FB.
o-Methoxy cinnamic aldehyde crystals	CI.
2-Methoxynaphthalene	GIV.
p-Methoxyphenyl methylglycidate	OPC.
1-p-Methoxyphenyl penten-1-one-3 (α-Methyl-anisal-acetone)	GIV.
*2-Methoxy-4-propenylphenol (Isoeugenol)	CI, FB, GIV, IFF, NEO.
2-Methoxy-4-propenylphenol,acetate	CI.
4'-Methylacetophenone	OPC, UOP.
*p-Methylanisole	GIV, OPC, SW, UOP.
*Methyl anthranilate	FB, SW, UNG.
Methyl benzoate	HN, HPC.
α-Methylbenzyl acetate (Styralyl acetate)	CI, GIV, IFF.
α-Methylcinnamaldehyde	CI, FB.
Methyl cinnamate	FB.
6-Methylcoumarin	GIV.
1,2-(Methylenedioxy)-4-propenylbenzene (Isosaferole)	OPC.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
BENZENOID AND NAPHTHALENOID--Continued	
4-Methyl-7-ethoxycoumarin	GIV.
p-Methyl ethyl phenyl glycidate	PFW.
p-Methylhydratropaldehyde	GIV.
1-Methyl-isohexyl-hexahydro benzaldehyde	CI, GIV.
Methyl N-methylanthranilate	GIV, OPC, SW.
*Methyl phenylacetate	ELN, GIV, OPC.
Methyl salicylate	HN, MON.
Musk 89	IFF.
α-Pentylcinnamaldehyde	CI, FB.
Phenethyl acetate	IFF, OPC.
Phenethyl alcohol	IFF, OPC.
Phenethyl formate	ELN, IFF.
*Phenethyl isobutyrate	ELN, GIV, IFF.
Phenethyl isovalerate	ELN, FB, GIV, RT.
Phenethyl methacrylate	NEO.
*2-Phenethyl phenylacetate	CI, ELN, FB, GIV, IFF.
*Phenethyl propionate	ELN, GIV, IFF, OPC.
Phenethyl salicylate	NEO.
2-Phenoxyethyl isobutyrate	ELN, OPC.
Phenoxyethyl propionate	IFF.
Phenylacetaldehyde	GIV.
Phenylacetaldehyde,dimethyl acetal	ELN, GIV.
Phenylacetic acid	GIV.
Phenylacetic acid isopentyl ester	GIV.
α-Phenylanisole	GIV.
4-Phenyl-3-buten-2-one	FB, NEO.
Phenylethyl anthranilate	RT.
Phenylethyl benzoate	OPC.
Phenylethyl tiglate	FB.
3-Phenyl-1-propanol (Hydrocinnamic alcohol)	ELN, FB, GIV.
3-Phenylpropyl acetate	ELN, FB, GIV.
3-Phenylpropyl aldehyde	CI.
3-Phenylpropyl cinnamate	FB.
Phenyl propyl pyriaine acetate	IFF.
Piperonal (Heliotropin)	AMB, GIV.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
BENZENOID AND NAPHTHALENOID--Continued	
*p-Propenylanisole (Anethole)	ARZ, FB, HPC, NCI, SCM.
4-Prophenyl-1,2-dimehoxybenzene (Methyl isoeugenol)	CI.
p-Propylanisol (Dihydroanethole)	FB, GIV.
N-Propyl phenyl ethyl alcohol	GIV.
SWEETNERS, SYNTHETIC:	
Cyclohexanesulfamic acid	ABB.
Cyclohexanesulfamic acid, calcium salt	ABB.
Cyclohexanesulfamic acid, sodium salt	ABB.
Saccharin (1,2-Benzisothiazolin-3-one,-1,1-dioxide)	SW.
Saccharin, sodium salt	SW.
p-Tolualdehyde	ELN, FB, GIV.
p-Tolylacetaldehyde	GIV.
p-Tolyl acetate	ELN, GIV.
p-Tolyl isobutyrate	GIV.
p-Tolylphenylacetate	GIV.
α-(Trichloromethyl)benzyl acetate (Rosetone)	NEO.
Triethanolamine salicylate	NEO.
Trimethylcyclohexyl salicylate	ARS.
All other benzenoid or naphthalenoid chemicals	SCM.
TERPENOID, HETEROCYCLIC, AND ALICYCLIC:	
Acetyl-n-butyryl (2,3-Hexanedione)	FB.
Acetyl isovaleryl (5-Methyl-2,3-hexanedione)	FB.
Acetyl propionyl (2,3-Pentanedione)	FB.
Allo-ocimene	GIV, IFF, X.
Allyl Cyclohexyl Propionate	GIV.
Amyris acetate	GIV.
Beta methyl ionone coeur	IFF.
Bornyl isovalerate	FB, RT.
p-tert-Butylclohexyl acetate (Verbeniax)	CI, IFF.
p-tert-Butylcyclohexanone	IFF.
2-sec-Butylcyclohexanone	GIV.
o-tert-Butylcyclohexyl acetate	IFF.
Cadinene	FB.
Carvone oxide	NEO.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
TERPENOID, HETEROCYCLIC, AND ALICYCLIC--Continued	
*β-Caryophyllene	CI, FB, GIV, SCM.
Caryophyllene acetate	CI.
Caryophyllene oxide	GIV.
Cedrene	NEO.
α-Cedrene epoxide (Andrane)	IFF.
Cedrenol	ELN, IFF, NEO.
*Cedrol	ELN, GIV, IFF, NEO.
*Cedryl acetate	ELN, GIV, IFF, NEO, UNG.
Cedryl formate	IFF.
Cyclohexyl acetate	RT.
Cyclohexyl butyrate	RT.
2-Cyclohexylcyclohexanone	GIV.
Cyclohexyl isovalerate	RT.
Dihydro-iso-jasmone	FB.
*Dihydronordicyclopentadienyl acetate (Cyclacet)	CI, GIV, IFF, OPC.
Dihydronordicyclopentadienyl isobutyrate	IFF, OPC.
Dihydronordicyclopentadienyl methyl ether	OPC.
Dihydronordicyclopentadienyl propionate (Cyclaprop) (Verdyl propionate extra)	CI, IFF, OPC.
Dihydro terpineol	NCI, SCM.
*Dihydroterpinyl acetate	GIV, NCI, OPC, SCM.
3,5-Dimethyl-3-cyclohexen-1-carboxaldehyde	IFF.
3,5-Dimethyl cyclohexene aldehyde	IFF.
Ethylene brassylate	NEO.
Ethyl furoate	RT.
Furfural acetone	RT.
Furfural acrolein	RT.
Galaxolide (1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-hexamethyl-cyclopenta-γ-2-benzopyran)	IFF.
*Guaiacwood acetate	ELN, FB, GIV, NEO, UNG.
Guaiene	FB.
3-Hydroxy-2-ethyl-4-pryrone (Ethylmatol)	PFZ.
4-(4-Hydroxy-4-methyl pentyl)-3-cyclohexene-10-carboxaldehyde (Lyral)	IFF.
3-Hydroxy-2-methyl-4-pyrone (Maltol)	PFZ.
4-Hydroxynonanic acid, γ-lactone (γ-Nonalactone)	CI, GIV.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
TERPENOID, HETEROCYCLIC, AND ALICYCLIC--Continued	
4-Hydroxyundecanoic acid, γ-lactone (γ-Undecalactone)	FB.
4-Hydroxyvaleric acid, γ-lactone (γ-Valerolactone)	GIV.
*Ionone(α- and β-)	GIV, NCI, NEO, STP.
*α-Ionone	GIV, IFF, STP.
β-Ionone	HOF, STP.
Isoamyl furoate	RT.
Isobornyl acetate	NCI, RDA.
Isobornyl propionate	ELN, GIV, OPC.
Isocamphyl cyclohexanols	GIV.
Isohexenyl cyclohexenyl carboxaldehyde	OPC.
Isojasmone	FB.
Isomenthone	GIV.
2-Isopropylcyclohexanol	CI, GIV.
Isopulegyl acetate	GIV.
Jasmal	IFF.
Lavandin,acetylated	GIV, UNG.
p-Mentha-1,3-diene (α-Terpinene)	SCM.
p-Mentha-1,4-diene (γ-Terpinene)	SCM.
p-Mentha-6,8-dien-2-ol (Laevo carveol)	FB, NEO, PFW.
p-Mentha-6,8-dien-2-one (Dextro-carvone) (Carvol)	FB, NEO.
1-p-Mentha-6,8-dien-2-yl acetate (Laevo-carvyl acetate)	FB.
p-Menthan-3-one (Menthone)	SCM.
p-Menth-8-en-3-ol (Isopulegol)	GIV, SCM.
p-Menth-1-en-3-one (Piperitone)	GIV, SCM.
p-Menth-4-(8)-en-3-one (Pulegone)	GIV.
1-1-p-Menthen-6-yl-1-propanone	GIV.
Menthol, snthetic, U.S.P.	SCM.
Menthol,synthetic,tech.	GIV, NCI.
Menthyl acetate	FB, GIV, SCM.
3-Methyl cyclohexendione-1,2	PFZ.
Methyl furoate	RT.
α-Methyl-β-furyl acrolein	RT.
*Methylionone(α- and β-)	GIV, IFF, NEO, RDA, STP.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
TERPENOID, HETEROCYCLIC, AND ALICYCLIC--Continued	
γ-Methylionone	GIV, NEO.
6-Methyl-α-ionone	GIV.
Methylionones (α-β-γ-)	NCI.
Nopol	NCI, SCM.
*Nopyl acetate	FEL, NCI, OPC, RT, SCM.
Pentyl cyclohexyl acetate	IFF.
3-Pentyl tetrahydro-4-pyridine	IFF.
Rose oxide	FB.
α-Santalol	GIV, IFF.
α-Santalyl acetate	GIV.
Sassafrass oil,hydrogenated	GIV.
Terpineol(α- and β-)	GIV.
*α-Terpineol	HPC, NCI, SCM.
*α-Terpinyl acetate	GIV, NCI, NEO, SCM, UNG.
α-Terpinyl propionate	ELN, GIV.
[4,4',4'',4'''-Tetraaminophthalocyaninato(2-)]-copper	HPC.
3,3,5-Trimethyl cyclohexanol (m-Homomenthol)	ARS, NE
1-(2,6,6-Trimethyl-2-cyclohexen-1-yl)-1,6-heptadien-3-one (Allyl-α-ionone)	IFF.
2,6,10-Trimethyl-9-undecen-1-al	GIV.
Vetivenol	GIV.
*Vetivenyl acetate	FB, GIV, IFF.
All other terpenoid,heterocyclic,or alicyclic flavor and perfume chemicals	SCM, WCA.
ACYCLIC	
*Allyl heptanoate	ELN, FB, RT.
Allyl hexanoate	FB, GIV, PFW.
Allyl isothiocyanate (Synthetic mustard oil)	OPC.
Allyl isovalerate	RT.
Allyl mercaptan	RT.
Allyl octanoate (Allyl caprylate)	RT.
Allyl sulfide	RT.
Ammonium isovalerate	RSA.
Butter acids	RT.
Butter esters	RT.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--Continued

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
Butyl butyrate	FB.
Butyl butyrl lactate	BJL, ELN, RT.
Butyl undecylenate	CI, GIV.
*Citral dimethyl acetal	CI, GIV, IFF, BDA.
Citral A and B mixture	NCI.
*Citronellyl acetate	ELN, GIV, IFF, NCI, SCM.
Citronellyl butyrate	ELN, GIV.
Citronellyl crotonate	IFF.
Citronellyl ethyl ether	IFF.
*Citronellyl formate	ELN, GIV, IFF, NEO.
*Citronellyl isobutyrate	ELN, GIV, IFF.
Citronellyl oxyacetaldehyde	IFF, OPC.
Citronellyl propionate	ELN, GIV, IFF.
Crude acetate mixture (Linalyl,neryl,geranyy acetates, main components)	X.
Decanal (Capraldehyde)	CI, GIV.
Decyl acetate	GIV.
Diethyl acetal	FB.
Diethyl glutarate	PFW.
Diethyl sebacate	ELN, DOP.
Diethyl succinate	ELN.
Dihydrocarvone	SCM.
Dihydro myrcenol	IFF.
2,6 Dimethyl-5-hepten-1-al	GIV.
Dimethyl hexanediol	X.
Dimethyl hexynediol	X.
3,7-Dimethyl-2,3,6-nonadienenitrile	GIV.
3,7-Dimethyl-trans-2,6-octadienal (Citral A geranial)	FB, FEL, GIV, RDA, SCM.
*3,7-Dimethyl-cis-2,6-octadien-1-ol (Nerol)	ELN, FB, GIV, IFF, NCI, SCM.
*3,7-Dimethyl-trans-2,6-octadien-1-ol (Geraniol)	CI, ELN, FB, FEL, GIV, IFF, NCI, SCM.
*3,7-Dimethyl-1,6-octadien-3-ol (Linalool) (Linalyl alcohol)	ELN, FB, FEL, GIV, IFF, NCI, RDA, SCM.
*3,7-Dimethyl-cis-2,6-octadienol, acetate (Neryl acetate)	CI, ELN, GIV, IFF, SCM.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
3,7-Dimethyl-1,6-octadien-3-ol,acetate (Linalyl acetate)	ELN, FB, GIV, IFF, NCI, RDA, SCM, UNG.
3,7-Dimethyl-1,6-octadien-3-yl isobutyrate (Linalyl isobutyrate)	ELN, HOF.
3,7-Dimethyl-1,6-octadien-3-yl propionate (Linalyl propionate)	ELN, GIV, HOF.
Dimethyloctanal	SCM.
3,7-Dimethyl-1,7-octanediol	SCM.
3,7-Dimethyloctanol-1 [Tetrahydogeraniol]	GIV, NCI, SCM.
3,7-Dimethyl-3-octanol	IFF, SCM.
Dimethyloctanyl acetate	IFF.
*3,7-Dimethyl-6-octen-1-al (Citronellal)	FB, GIV, NCI, RDA, SCM.
2,6-Dimethyl,2-octene-7-yne-6-ol	RDA, X.
*3,7-Dimethyl-6-octen-1-ol (Citronellol)	CI, ELN, FB, GIV, IFF, NCI, SCM.
3,7-Dimethyl-7-octenol 70pct,6-octenol isomer 30pct	GIV.
Dimyrcetol	IFF.
2,6-Dipropyl-4-ethoxy-1,3-dioxane	SCM.
Ethyl butyrate	FB, NW.
Ethyl caprate	ELN, FB.
Ethyl crotonate	RT.
Ethylene glycol acetal of heptaldehyde	OPC.
Ethyl formate	FB.
*Ethyl heptanoate	ELN, FB, FEL, RT.
Ethyl heptenone	HOF.
*Ethyl hexanoate	ELN, FB, NW, PFW.
Ethyl isobutyrate	FB.
*Ethyl isovalerate	ELN, FB, PFW.
Ethyl laurate	ELN, FB.
Ethyl linalool (3,7-Dimethyl-1,6-nonadien-3-ol)	HOF.
Ethyl linalyl acetate (3,7-Dimethyl-1,6-nonadien-3-ol, acetate	HOF.
Ethyl-2-methyl butyrate	PFW, SCM.
Ethyl-2-methyl-2-pentenoate	PFW.
*Ethyl myristate	ELN, PFW, RT.
Ethyl nonanoate	ELN, FB.
Ethyl octanoate	ELN, FB.
Ethyl oxyhydrate	FLO, RT.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*Ethyl propionate	FB, NW, UOP.
Ethyl valerate	ELN.
Geranic acid	FB.
*Geranyl acetate	CI, ELN, FB, FEL, GIV, IFF, NCI, PFW, SCM.
*Geranyl butyrate	ELN, FB, GIV.
Geranyl crotonate	FB.
*Geranyl formate	CI, ELN, GIV.
Geranyl isobutyrate	ELN.
Geranyl isovalerate	FB.
Geranyl neryl formate (Nerger formate)	IFF.
Geranyl nitrile (Gerano nitrile) (Citralva)	CI, IFF.
Geranyl propionate	ELN, FB.
Geranyl tiglate	FB.
Glutamic acid, monosodium salt (Monosodium glutamate)	GRW, SFF.
Heptanolide	FB.
*2-Hexenal	FB, GIV, SCM.
cis-3-Hexen-1-ol	GIV, SW.
2-Hexenol	FB, SCM.
cis-3-Hexen-1-yl acetate	GIV.
cis-3-Hexenyl butyrate	OPC, SCM.
cis-3-Hexenyl tiglate	OPC.
Hexoxyacetaldehyde dimethyl acetal	FB.
Hexyl caproate	FB.
3-Hexynol	HOF, SW.
3-Hydroxy-2-butanone (Acetoin)	PMT, RSA.
*7-Hydroxy-3,7-dimethyl-1-octanal (Hydroxycitronellal)	GIV, IFF, RDA, SCM.
7-Hydroxy-3,7-dimethyl octanal, dimethyl acetal (Hydroxycitronellal, dimethyl acetal)	GIV.
Hydroxy-2-propanone (Acetol)	FB.
Isoamyl caproate	FB.
Isoamyl geranate	FB.
Isobutyl acetate	FB.
Isobutyl butyrate	FB.
Isodihydro lavandulol	FB.
Isodihydro lavandulylacetate	FB.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
Isodihydro lavandulylaldehyde	FB.
Isononyl acetate	OPC.
Isopentyl acetate (Isoamyl acetate)	FB, NW, PFW.
*Isopentyl butyrate	FB, GIV, NW, PFW, UOP.
*Isopentyl formate	ELN, FB, GIV, RT.
Isopentyl isovalerate	ELN, FB.
Lauraldehyde	FB, GIV, PFW.
Linalalool oxide	SCM.
Linalyl formate	HOF.
Methoxy citronellal	SCM.
Methyl butenol	IFF.
α-Methyl butric acid	PFW.
Methyl butynol	X.
3-Methyl butyraldehyde	FB.
Methyl crotonate	RT.
Methyl heptadienone	HOF.
3-Methyl-5-heptanone oxime	GIV.
Methyl heptenone	HOF, RDA.
Methyl isobutyrate	PFW.
Methyl isovalerate	FB.
Methyl-2-methyl butyrate	SCM.
3-Methyl-2-[and3]nonene nitrile	GIV.
Methyl-2-nonenoate	GIV.
Methylol methyl hexyl ketone	GIV.
4-Methyl pentanoic acid	PFW.
Methyl pentylnol	X.
Methyl propionate	FB.
β Methyl thiopropionaldehyde	RT.
2-Methylundecanal	GIV.
Myrcenyl acetate	IFF.
Myristaldehyde	GIV.
Nonanal	GIV, IFF.
*1,3-Nonanedicl acetate	CI, GIV, OPC.
Nonanol	GIV.
5-Nonanone	HOF.
Nonyl acetate	CI, ELN, GIV.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

FLAVOR AND PERFUME MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
Ocimenyl acetate	IFF.
Octanal	CI, GIV.
3-Octanol	GIV, SCM.
3-Octanone (Ethyl amyl ketone)	GIV.
*N-Octyl acetate	ELN, GIV, SCM.
N-Octyl alcohol	GIV.
Pentyl acetate	UOP.
Phellandrene hydrochloride	SCM.
Piperityl formate	SCM.
N-Propyl acetal	GIV.
Pseudo linalyl acetate (Neobergamate)	IFF.
Rhodinol	FB, FEL, GIV, IFF.
Rhodinyl acetate	GIV, IFF.
Tepyl acetate	ELN.
Tetrahydro allo-ocimene	IFF.
Tetrahydro pseudoionone	CI.
Undecanal	GIV, IFF.
9-Undecenal	GIV.
All other acyclic flavor and perfume materials	IFF, NEO, SCM, X, X.

TABLE 3.--FLAVOR AND PERFUME MATERIALS: DIRECTORY OF MANUFACTURERS, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of flavor and perfume materials to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of Company	Code	Name of Company
ABB	Abbott Laboratories	NCI	Union Camp Corp., Terpenes and Aromatics Div.
AMB	American Bio-Synthetics Corp.	NEO	Norda Inc.
ARS	Arsynco, Inc.	NW	Northwestern Chemical Co.
ARZ	Arizona Chemical Co.	OPC	Orbis Products Corp.
BJL	Burdick & Jackson Labs., Inc.	PD	Parke, Davis & Co., Sub. of Warner-Lambert Co.
CI	Chem-Fleur, Inc.	PEN	CPC International, Inc., Penick Div.
CIN	Cindet Chemicals, Inc.	PFW	PFW, Inc.
CWN	Upjohn Co., Fine Chemical Div.	PFZ	Pfizer, Inc.
ELN	Elan Chemical Co.	RDA	Rhone-Poulenc, Inc.
FB	Fritzsche, Dodge & Olcott, Inc.	RSA	R.S.A. Corp.
FEL	Felton International, Inc.	RT	Ritter International
FLO	Florasynth, Inc.	SCM	SCM Corp., Organic Chemicals Div.
FMT	Fairmount Chemical Co., Inc.	SDH	Sterling Drug, Inc., Hilton Davis Chemical Co. Div.
GIV	Givaudan Corp.	SFF	Stauffer Chemical Co., Food Ingredients Div.
GRW	Great Western Sugar Co.	SKG	Sunkist Growers, Inc.
HN	Tenneco Chemicals, Inc.	STP	Stepan Chemical Co.
HOF	Hoffman-LaRoche, Inc.	SW	Sherwin-Williams Co.
HPC	Hercules, Inc.	UNG	Ungerer & Co.
IFF	International Flavors & Fragrances, Inc.	UOP	UOP, Inc., Chemical Div.
MON	Monsanto Co.	VEL	Velsicol Chemical Corp.
		VIK	Viking Chemical Co.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix. The above codes identify those of the 42 reporting companies and company divisions for which permission to publish was not restricted.

STATISTICAL HIGHLIGHTS

Edward J. Taylor

Plastics and resin materials are high molecular weight polymers which, at some stage in their manufacture, exist in such physical condition that they can be shaped or otherwise processed by the application of heat and pressure. The terms "plastics," "resin," and "polymers," can be (and often are) used interchangeably by the trade. Depending on the chemical composition, manufacturing process or intended use, the commercial products may contain plasticizers, fillers, extenders, stabilizers, coloring agents, or other additives. There are about 40 to 50 basic plastics and resins which are available commercially. These basic materials are available in literally thousands of individual compounds each with its distinct properties depending on the molecular weight of the resin and the types and amounts of the additives present. Plastics materials may be molded, cast, or extruded into semi-finished or finished solid forms. Resin materials may be in the form of solutions, pastes,or emulsions for applications such as protective coatings, adhesives, or paper and textile treatment.

Statistics on U.S. production and sales of synthetic plastics and resin materials for 1978 are given in table 1. U.S. production of plastics and resin materials in 1978 totaled 38,878 million pounds, or 12.3 percent more than the 34,623 million pounds produced in 1977. Sales in 1978 totaled 33,527 million pounds, valued at $12,349 million compared with 29,799 million pounds, valued at $10,882 million in 1977.

Thermosetting materials are those which harden with a change in composition in the final treatment so that in their final state as finished articles they are substantially infusible and insoluble, that is, they cannot again be softened by heat or solvents. U.S. production of thermosetting materials totaled 7,906 million pounds in 1978 compared with 7,129 million pounds in 1977. Production of the most important products in 1978 included phenolic resins (1,926 million pounds), amino (or urea and melamine) resins (1,604 million pounds), polyester resins, (unsaturated) (1,133 million pounds) and alkyd resins (754 million pounds).

Thermoplastic materials are those which in their final states as finished articles can be repeatedly softened by heat and hardened by a decrease in temperature. U.S. production of thermoplastic materials totaled 30,972 million pounds in 1978 compared with 27,494 million pounds in 1977. Production of the most important products in 1978 included polyethylene (11,359 million pounds), vinyl resins (7,060 million pounds), and styrene type materials (5,989 million pounds).

TABLE 1.--PLASTICS AND RESIN MATERIALS: U.S. PRODUCTION AND SALES, 1978

[Quantities and values are given in terms of the total weight of the materials (dry basis). Listed below are all plastics and resin materials, urethane type elastomers, and certain precursors for which any reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all products for which data on production and/or sales were reported and identifies the manufacturers of each]

PLASTICS AND RESIN MATERIALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
	1,000 pounds dry basis[2]	*1,000 pounds dry basis*[2]	*1,000 dollars*	*Per pound*
Grand total	38,877,792	33,527,154	12,349,424	$0.37
Plastics and resin materials, benzenoid[3]	11,819,919	10,103,322	4,969,197	.49
Plastics and resin materials, nonbenzenoid	27,057,873	23,423,832	7,380,227	.32
THERMOSETTING RESINS				
Total	7,906,242	6,088,699	2,508,513	.41
Alkyd resins, total	753,835	414,687	204,657	.49
Phthalic anhydride type	599,337	370,255	178,022	.48
Polybasic acid type	71,810	23,565	14,506	.62
Styrenated-alkyds or copolymer alkyds[4]	60,768	15,356	8,929	.58
Vinyl toluene alkyds	21,920	4,927	2,832	.57
Other copolymer alkyds	...	584	368	.63
Dicyandiamide resins	2,052	1,884	1,753	.93
Epoxy resins:[5,6]				
Unmodified	351,004	256,667	242,116	.94
Advanced	(124,364)	(70,761)	(80,375)	1.14
Furfuryl type resins	16,824	16,093	9,927	.62
Melamine-formaldehyde resins (an amino resin)	228,644	174,491	98,922	.57
Phenolic and other tar acid resins	1,925,983	1,523,935	570,068	.37
Polyester resins, unsaturated[7]	1,133,323	928,390	367,416	.40
Polyether and polyester polyols for urethanes[8]	1,770,109	1,303,691	526,753	.40
Polyurethane elastomer and plastics products, total	272,689	197,731	214,718	1.09
Elastomers[9]	111,707	96,535	130,968	1.36
Plastics	160,982	101,196	83,750	.83
Silicone resins	16,448	11,016	33,790	3.07
Urea-formaldehyde resins (an amino resin)	1,375,207	1,211,464	190,046	.16
Other thermosetting resins[10]	60,124	48,650	48,347	.99
THERMOPLASTIC RESINS				
Total	30,971,550	27,438,455	9,840,911	.36
Acrylic resins, total[11]	1,085,293	...	...	...
Polymethyl methacrylate	418,141	224,809	150,755	.67
Thermosetting acrylics	69,993	9,268	8,155	.88
Other acrylics	597,159	...	...	...
Cellulose plastics[11]	468,098	...	...	...
Engineering plastics[12]	656,734	549,471	946,395	1.72
Petroleum hydrocarbon resins	318,633	308,578	81,227	.26
Polyamide resins, total	268,548	246,384	299,037	1.21
Nylon type[11,13]	235,052	213,754	262,659	1.23
Non-nylon type	33,496	32,630	36,378	1.11
Polyester resins, saturated, total[11,14]	464,754	...	...	...
Polybutylene terephthalate (PBT)	48,370	43,827	49,591	1.13
Polyethylene terephthalate (PET)	387,091	210,930	140,344	.67
Other polyesters, saturated	29,293	...	...	...

See footnotes at end of table.

TABLE 1.--PLASTICS AND RESIN MATERIALS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

PLASTICS AND RESIN MATERIALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
THERMOPLASTIC RESINS--Continued	*1,000 pounds dry basis*[2]	*1,000 pounds dry basis*[2]	*1,000 dollars*	*per pound*
Polyethylene resins, total	11,359,419	10,467,276	2,835,016	$0.27
Specific gravity 0.940 and below	6,741,057	6,130,170	1,732,152	.28
Specific gravity over 0.940	4,618,362	4,337,106	1,102,864	.25
Polypropylene resins	3,055,280	2,594,761	703,610	.27
Polyterpene resins	15,320	15,193	7,164	.47
Polytetrafluoroethylene (PTFE)	20,197	16,859	68,808	4.08
Rosin modifications, total	41,464	41,597	17,101	.41
Rosin esters, unmodified (ester gums)	14,476	19,497	7,823	.40
Rosin esters and others, modified	26,988	22,100	9,278	.42
Styrene plastics materials, total	5,988,617	5,704,909	2,003,207	.35
Acrylonitrile-butadiene-styrene terpolymer (ABS) resins	1,190,537	1,158,804	564,964	.49
Straight polystyrene	2,235,936	2,126,507	610,811	.29
Rubber modified polystyrene	1,499,902	1,482,156	407,765	.28
Styrene-butadiene latexes	578,296	521,342	186,670	.36
All other styrene latexes	60,923	55,261	18,724	.34
All other styrene plastics materials[15]	423,023	360,839	214,273	.59
Vinyl resins, total[16]	7,060,054	6,121,805	1,837,518	.30
Polyvinyl acetate[17]	763,796	684,366	271,060	.40
Polyvinyl alcohol[18]	145,550	130,939	87,944	.67
Polyvinyl chloride and copolymers	5,878,037	5,127,567	1,322,491	.26
Polyvinylidene chloride latex resins	21,746	21,671	12,592	.58
Other vinyl and vinylidene resins	250,925	157,262	143,431	.91
All other thermoplastics resins[19]	169,139	882,788	692,983	.78

[1]Calculated from unrounded figures.

[2]Dry weight basis unless otherwise specified. Dry weight basis is the total weight of the materials including resin and coloring agents, extenders, fillers, plasticizers, and other additives, but excluding water and other liquid diluents unless they are an integral part of the materials.

[3]Includes benzenoid plastics and resin materials as defined in part 1 of schedule 4 of the Tariff Schedules of the United States; also includes urethane type elastomers which are not defined in part 1 of schedule 4 of the TSUS.

[4]Includes data for other copolymers alkyds (production only).

[5]Includes reactive diluents which are an integral part of the resin. Excludes the weight of hardeners sold in association with the resin as part of a two-component system.

[6]Data shown for advanced epoxy resins are that part of the unmodified epoxy resins which is further processed; therefore, the totals in parentheses are not included in the grand total.

[7]Polyester resins are unsaturated alkyd resins, later to be copolymerized with a monomer (such as styrene or methyl methacrylate), and polyallyl resins (such as diallyl phthalate and diglycol carbonate). Data are on an "as sold" basis, including monomer if part of the resin system.

[8]In addition to the polyols, the other principal starting materials used in the production of urethane products are the isocyanic acid derivatives, mainly the 80/20 mixture of toluene-2,4- and 2,6-diisocyanate. Statistics for the isocyanic acid derivatives are reported in the "Cyclic Intermediated" section of the Synthetic Organic Chemicals report.

[9]The data on urethane elastomers are believed to be not fully representative of the total urethane market in view of the very large number of urethane elastomer producers.

[10]Includes acetone-formaldehyde resins, glyoxal-formaldehyde resins, polybutadiene resins and certain other thermosetting resins.

[11]Does not include production or sales for fiber use.

[12]Engineering plastics: Includes acetal, polycarbonate, polyimide and amide-imide polymers, polysulfone, and polyphenylene oxide, and polyphenylene sulfide. Engineering plastics are defined in Whittington's Dictionary of Plastics, as "Those [plastics] which have mechanical, chemical and thermal properties suitable for use in construction, machine components and chemical processing equipment." The above list of plastics (all of which are thermoplastic) was selected from a larger group in this source. The other plastics named in Whittington's Dictionary as engineering plastics, ABS resins and nylon resins, are not included in the above list as they are published separately.

Footnotes--Continued

[13]Statistics for nylon 6 and nylon 6/6 which are used in plastic applications (e.g., molding, etc.) are included here.

[14]Statistics are included here for polyethylene terephthalate used in plastics applications (e.g., molding, etc.). Statistics also are included here for production only when the starting materials are converted directly to a finished product (i.e., "in-situ" production), polyester film and tape are examples of such a conversion.

[15]Includes data for styrene-acrylonitrile copolymer (SAN) resins, α-methyl styrene poylmers, methyl methacrylate-butadiene-styrene (MBS) resins, and all other styrene copolymers.

[16]Data are on the basis of dry resin content, excluding the weight of plasticizers, extenders, fillers, coloring agents, stabilizers, or impact modifiers, unless otherwise noted.

[17]Data for polyvinyl acetate produced and sold in latex form includes the weight of any protective colloids which are used as emulsions stabilizers and form an integral part of the resin system. Production and sales do not include polyvinyl acetate used as a reactive intermediate for polyvinyl alcohol or other vinyl resins.

[18]Production and sales do not include polyvinyl alcohol used as a reactive intermediate for polyvinyl butyral or other vinyl resins.

[19]Includes acrylic resins (sales only), cellulose plastics (sales only), coumarone-indene resins, fluorocarbon resins except PTFE, polybutylene type resins, polyester resins, saturated (sales only), polyphenyl aromatic ester resins, and other thermoplastics materials.

Note.--Data reported to the U.S. International Trade Commission do not necessarily coincide with that reported to the Society of the Plastics Industry (SPI) because of differences in both the reporting instructions and in the coverage of certain resins.

TABLE 2.--PLASTICS AND RESIN MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*) CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT]

PLASTICS AND RESIN MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
THERMOSETTING RESINS	
Acetone-formaldehyde resins	ACY, AMR, SED.
*ALKYD RESINS:	
*Alkyd copolymers,all other	DEG, DSO, DUP, IMC, MCC, PPG, SW.
*Phthalic anhydride type alkyd resins	ACY, APT, ASH, AZS, BAL, BEN, BRU, CEL, CGL, CNE, CPV, DEG, DSO, EW, FAR, FCD, FOC, FRE, GEI, GIL, GRV, HAN, ICF, IMC, JOB, JSC, KMC, KMP, KPT, MCC, MID, MNP, NPV, OBC, PER, PLS, PPG, PRT, RCI, RED, REL, RH, RSY, SCM, SCN, SDH, SKT, SM, STT, SW, USS, X.
*Polybasic acid type alkyd resins	ACY, BEN, CEL, CGL, DEG, DSO, DUP, EW, FAR, FOC, GEI, GRV, HAN, ICF, IMC, MCC, MID, PPG, RCI, RED, REL, RH, SCM, SCN, SED, SKT, SM, STT, SW.
*Styrenated-alkyds, or copolymer alkyds	APT, ASH, CGL, CNE, CPV, DSO, EW, GEI, GRV, HAN, ICF, JOB, KPT, MCC, OBC, REL, SCM, SM, STT, SW.
*Vinyl toluene alkyds	CSD, DSO, FAR, FRE, GEI, HAN, IMC, JOB, OBC, PRT, REL, SCM, STT.
AMINO RESINS:	
*Melamine-formaldehyde resins	ACS, ACY, AMP, BOR, CBD, CEL, CGL, CNE, CPV, DAN, DGO, DUP, ENJ, GE, GRV, HAN, JSC, KPT, MID, MON, OCF, PMC, PPL, QCP, RCI, REL, RH, SCM, SED, SM, SNW, STC, USM, VAL, WRD.
*Urea-formaldehyde resins	ACS, ACY, AMP, APX, BOR, CBD, CBM, CEL, CGL, CLK, CMP, CNE, CPV, DAN, DSO, DUP, GAF, GOC, GP, GRV, HNC, HRT, IRI, JSC, KPT, MMM, MON, NTC, PC, PMC, RCI, REL, RH, RPC, SAC, SCM, SNW, SOR, SW, UNO, USM, USO, VAL, VPC, X, X.
*Dicyandiamide resins	APX, ECC, JSC, RPC, S, SNW, STC, VAL, VPC.

TABLE 2.--PLASTICS AND RESIN MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--Continued

PLASTICS AND RESIN MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
THERMOSETTING RESINS--Continued	
EPOXY RESINS:	
*Epoxy resins, advanced	ACS, ADC, ASH, AZS, BEN, CEL, CGY, CNI, DSO, EW, GE, GRV, ICF, MCC, MID, MMM, MRT, NPV, OCF, POL, PPG, RCI, SCM, SCN, SM, STT, SW, WLN.
*Epoxy resins, unmodified	CEL, CGY, DA, DOW, ICF, JOB, RCI, SHC, SM, UCC.
*Furfuryl type resins	ACR, HVG, STC, UNO, WRD.
Glyoxal-formaldehyde resins	USM, VAL.
*Phenolic and other tar acid resins	ABS, ACR, ACS, AMR, ASH, BME, BOR, CBD, CBM, CGL, CLK, DA, DOW, DSO, ENJ, EW, FAR, FOM, GE, GEI, GIL, GOC, GP, GRG, HER, HKD, HPC, HVG, ICF, IMC, INL, IRI, KPT, MCA, MID, MMM, MON, MRB, OCF, PLS, PPG, PPL, PSL, PYZ, RAB, RCI, RGC, RH, RPC, SCM, SCN, SIM, SKT, SM, SPL, STC, UCC, UNO, USR, VPC, VSV, WCA, WRD, WTH.
Polybutadiene resins	CNI, MRB, SM.
*POLYESTER RESINS, UNSATURATED, AND ALLYL RESINS:	
Allyl resins	ACS, FMP, PPG.
Diallyl isophthalate	FMP.
*Polyester resins, unsaturated	ACS, ACY, APH, APT, ASH, AZS, CEL, CGL, CNE, CPV, DOW, DSO, EW, FCD, FMP, FRE, GEI, GRG, ICF, ICI, IPC, KMC, KPT, MCC, MPG, OCF, POL, PPG, PPL, RCI, RH, SCM, SCN, SHC, SLC, SM, SW, USS.
*Polyether and polyester polyols for urethanes	ACR, APT, ARK, BAS, CGL, CHC, CPV, DOW, DSO, HPC, ICF, ICI, INP, JCC, MMM, MOB, NTL, OCF, OMC, PPG, RCI, SIL, SKT, UCC, UNO, UPJ, WTC.
*POLYURETHANE ELASTOMER AND PLASTIC PRODUCTS:	
*Polyurethane elastomers	ACY, ADC, BAS, BFG, CNI, CWN, DNS, DUP, EPI, GRD, HXL, MMM, MOB, MRT, PLN, PPG, PRC, RUB, TKL, UPJ, USR, WLN, WTC.
*Polyurethane resins	APT, ASH, BAS, CGL, CPV, DSO, DUP, EW, FAR, ICF, ICI, INP, KMC, MCC, MID, MNP, NTL, OMC, PVI, QUN, RCI, SCM, SCN, SLC, SW, TNO, UPJ, USM, USR, WTC.
*Silicone resins	ASH, CGL, DCC, JOB, MID, RCI, SCM, SM, SPD.
*Thermosetting resins, all other	ACR, APX, BAS, DEG, DSO, GEI, MCC, MID, MOB, PPG, PRT, S, SCM, SED, SHC, SM, SW, USO, VAL.

TABLE 2.--PLASTICS AND RESIN MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--Continued

PLASTICS AND RESIN MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
THERMOPLASTIC RESINS	
*ACRYLIC RESINS:	
*Acrylic resins,all other	ACY, AZS, CEL, CHP, DSO, DUP, EFH, FLH, GLC, GRD, ICF, JNS, JSC, PPG, PVI, RH, SAR, SCM, SCP, SM, SW, TX, UOC, VAL, VPC.
Ethyl acrylate butyl acrylate copolymer	QUN.
*Polymethyl methacrylate	ASH, CNE, CYR, DSO, DUP, ICF, IOC, JOB, JWC, MRT, PPG, PVI, RH, RPC, SAR, SNW, SWE.
*Thermosetting acrylics	CEL, CPV, DSO, GRV, ICF, MID, OBC, PPG, SCM, USM.
*CELLULOSE PLASTICS AND RESINS:	
Cellulose nitrate	DUP, X.
Ethyl cellulose	X.
Cellulose plastics, all other	DOW, DUP, EKT.
Chlorinated polyolefins,thermoplastic	EKX.
Coumarone-indene resins	DUP, HPC, NEV, VEL, ZGL.
*ENGINEERING PLASTICS:	
Acetal resins	CEL, DUP, MID, PPG.
Polycarbonate resins	GE, MOB.
Polyimides and amide-imide polymers	AMO, BAS, DUP, EW, MON, PDI.
Polyphenylene oxide type resins	GE.
Polyphenylene sulfide resins	PLC.
Polysulfone resins	UCC.
FLUOROCARBON RESINS:	
Chlorotrifluoroethylene resins	ACS.
*Polytetrafluoroethylene (PTFE)	ACS, DUP, ICI.
Polyvinylidene fluoride resin	PAS.
Fluorocarbon resins,all other	DUP.
*Petroleum hydrocarbon resins	EKX, ENJ, GYR, HPC, ICF, NEV, NPV, RCI, SCM, SM, VEL, ZGL.
Phenoxy (R) Resins (other Than for coating and Adhesives)	UCC.
*POLYAMIDE RESINS:	
*Non-nylon type,polyamide resins	AMP, AZS, CBY, COO, DGO, EFH, EMR, MCC, SCP, SM, SNW, USM.
*Nylon type ,polyamide resins	ALF, AZS, BCM, CEL, CTR, DGO, DUP, FRF, HST, MON, POL, RSN, SCP, USM.
Polybutylene type resins	ENJ, SHC, WTC.

TABLE 2.--PLASTICS AND RESIN MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--Continued

PLASTICS AND RESIN MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
THERMOPLASTIC RESINS--Continued	
*POLYESTER RESINS, SATURATED:	
*Polybutylene terephthalate(PBT)	DXT, EKT, GAF, GE, USM.
*Polyethylene terephthalate(PBT)	CEL, COO, DUP, EKT, GYR, ICF, ICI, MMM, MRT, SCM, SNW, USM.
*Polyester resins, saturated, all other	DGO, DSO, EKT, RUB, STT, SW.
*POLYETHYLENE AND COPOLYMERS RESINS:	
*Polyethylene resins,"high density"(specific gravity over 0.940)	ACS, AMO, CPX, DOW, DUP, GOC, HPC, KPP, MON, NWP, PLC, SHC, SLT, UCC, USI.
*Polyethylene resins,"low density"(specific gravity of 0.940 and below)	ACS, CBN, CPX, DOW, DUP, EKX, ENJ, GOC, KPP, PLC, RCC, RH, SNW, UCC, USI.
Polyphenyl aromatic ester resins	X.
*Polypropylene polymer and copolymer resins	AMO, EKX, ENJ, GOC, HPC, KPP, NVT, NWP, PLC, RCC, SHC, SLT, SWE.
*Polyterpene resins	CBY, HPC, SCN.
*ROSIN MODIFICATIONS:	
Modified rosin (Unesterified)	DPP, SCM.
*Modified rosin esters	ASH, CBY, DPP, EW, FCD, FRP, GRV, ICF, MCC, PPG, RCI, SDH, SM, SW, ZGL.
*Rosin esters, unmodified (Ester gums)	ASH, CBY, DPP, FAR, FRP, RCI, SDH.
*STYRENE TYPE PLASTICS MATERIALS:	
*Acrylonitrile-butadiene-styrene (ABS) Terpolymer resins	BFG, CSD, DOW, GOR, GRD, GYR, MCB, MON, SM, USR.
POLYSTYRENE:	
*Rubber modified polystyrene	ASY, DOW, GOC, GOR, GRD, KPP, MON, SHC, SM, SOL, SPI, USS.
*Straight polystyrene	AEP, AMO, BAS, CSD, DOW, GOC, GOR, HST, JSC, KPP, MMM, MON, RCD, SHC, SM, SOL, UCC, USS.
*OTHER STYRENE COPOLYMERS	
Methyl methacrylate-butadiene-styrene (MBS) terpolymer resins	CYR, MCB.
α-Methyl styrene polymers	AMO.
Styrene-acrylonitrile copolymer resins (SAN)	BFG, CSD, DOW, MON, SKT, SM.
Styrene copolymers, all other	BFG, DOW, DSO, DUP, GYR, HPC, IOC, JNS, MON, MRT, OBC, PLC, RCD, RH, SKT, SW, UOC.
STYRENE LATEXES:	
*Styrene-butadiene latexes	BOR, CEL, DOW, GAF, GNT, GRD, GYR, UOC, USR.
*all other styrene latexes	DOW, FIR, GNT, GRD, MON, PVI, UOC.

TABLE 2.--PLASTICS AND RESIN MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--Continued

PLASTICS AND RESIN MATERIALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
THERMOPLASTIC RESINS--Continued	
*VINYL RESINS:	
*Polyvinyl acetate resins	AIP, AZS, BAL, BEN, BLS, BOR, CEL, CNE, DAN, FAR, FLH, FLN, GLC, GRD, IMC, JSC, KMC, KMP, MCC, MON, NSC, RCI, RPC, SCO, SED, SPC, UCC, UOC, X.
*Polyvinyl alcohol resins	AIP, DUP, MON.
Polyvinyl butyral resins	BFG, DUP, MON, UCC.
*Polyvinyl chloride and copolymer resins	AIP, BFG, BOR, CO, CPR, DA, FIR, GNT, GP, GRA, GYR, HN, KYS, NSC, PNT, QCP, RCO, RUB, SFP, SHT, TNA, UCC.
Polyvinyl formal resin	MON.
Vinyl acetate-acrylate copolymers	DSO, NPV, OBC, SCM.
POLYVINYLIDINE CHLORIDE RESINS:	
*Latex type polyvinylidene chloride resins	DOW, GRD, MRT, UOC.
*Vinyl resins,all other	DOW, DUP, EW, GAF, RH.
Thermoplastic resins, all other	CEL, DGO, MON, RPC, SW, UPJ, X.

TABLE 3.--PLASTICS AND RESIN MATERIALS: DIRECTORY OF MANUFACTURERS, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of plastics and resin materials to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ABS	Abex Corp., Friction Products Group	DEG	Degan Oil & Chemical Co.
ACR	CPC International, Inc., Acme Resin Corp.	DGO	Day-Glo Color Corp.
ACS	Allied Chemical Corp., Specialty Chemical Div.	DNS	Dennis Chemical Co.
ACY	American Cyanamid Co.	DOW	Dow Chemical Co.
ADC	Anderson Development Co.	DPP	Dixie Pine Chemicals, Inc.
AEP	A & E Plastics Pak Co., Inc.	DSO	DeSoto, Inc.
AIP	Air Products & Chemicals, Inc.	DUP	E.I. duPont de Nemours & Co., Inc.
ALF	Allied Chemical Corp., Fibers Div.		
AMO	Standard Oil Co. (Indiana)	ECC	Eastern Color & Chemical Co.
AMR	Pacific Resins & Chemical Co.	EFH	E.F. Houghton & Co.
APH	Alpha Chemical Corp.		Eastman Kodak Co.:
APT	Whittaker Corp., Whittaker Coatings &	EKT	Tennessee Eastman Co. Div.
	Chemical, Mol Rez Resins	EKX	Texas Eastman Co. Div.
APX	Apex Chemical Co., Inc.	EMR	Emery Industries, Inc.
ARK	Armstrong Cork Co.	ENJ	Exxon Chemical Co. U.S.A.
ASH	Ashland Oil, Inc.	EPI	Eagle Pitcher Industries, Inc.,
ASY	American Synthetic Rubber Corp.		Ohio Rubber Co.
AZS	AZS Corp.:	EW	Westinghouse Electric Corp., Industrial
	AZ Products Co. Div.		Materials Div.
	AZS Chemical Co.		
		FAR	Syncon, Inc.
BAL	Baltimore Paint & Chemical Corp., Div. of	FCD	Synres Chemical Corp.
	Dutch Boy, Inc.	FIR	Firestone Tire & Rubber Co., Firestone
BAS	BASF Wyandotte Corp.		Plastics Co. Div.
BCM	Belding Chemical Industries	FLH	H.B. Fuller Co., Polymer Div.
BEN	Bennett's	FLN	Franklin Chemical Corp.
BFG	B.F. Goodrich Co., B.F. Goodrich Chemical	FMP	FMC Corp., Industrial Chemical Div.
	Co. Div.	FOC	Handschy Industries, Inc., Farac Oil &
BLS	Life Savers, Inc.		Chemical Co. Div.
BME	Bendix Corp.	FOM	Formica Corp.
BOR	Borden Co., Borden Chemical Co. Div.	FRE	Freeman Chemical Corp.
BRU	M.A. Bruder & Sons, Inc.	FRF	Firestone Tire & Rubber Co., Firestone
			Synthetic Fibers Co.
CBD	Chembond Corp.	FRP	FRP Company
CBM	Carborundum Co.		
CBN	Cities Service Co., Petrochemicals Div.	GAF	GAF Corp.
CBY	Crosby Chemicals, Inc.	GE	General Electric Co.:
CEL	Celanese Corp.:	GEI	Insulating Materials Products Sec.
	Celanese Plastics Materials Co.	GIL	Gilman Paint & Varnish Co.
	Celanese Polymer Specialties Co.	GLC	General Latex & Chemical Corp.
CGL	Cargill, Inc.	GNT	General Tire & Rubber Co., Chemical
CGY	Ciba-Geigy Corp., Resins Dept.		Div.
CHC	Carpenter Chemical Co.	GOC	Gulf Oil Corp., Gulf Oil Chemicals
CHP	C.H. Patrick & Co., Inc.		Co.-U.S.
CLK	Clark Oil & Refining Corp.	GOR	Carl Gordon Industries, Inc.
CMP	Commercial Products Co., Inc.	GP	Georgia-Pacific Corp.:
CNE	Conchemco, Inc.		Plaquemine Div.
CNI	Frye Copysystems, Conap Div.		Resins Operations
CNT	Certainteed Corp.	GRA	Great American Chemical Corp.
CO	Continental Oil Co.	GRD	W.R. Grace & Co., Organic Chemicals Div.,
COO	The Terrell Corp.		Polymers & Chemicals Div.
CPV	Cook Paint & Varnish Co.	GRG	P.D. George Co.
CPX	Chemplex Co.	GRV	Guardsman Chemicals, Inc.
CSD	Cosden Oil & Chemical Co.	GYR	Goodyear Tire & Rubber Co.
CTR	Custom Resins Div. of Bemis Co., Inc.		
CWN	Upjohn Co., Fine Chemical Div.	HAL	C.P. Hall Co.
CYR	CY/RO Industries, Inc.	HAN	Hanna Chemical Coating Corp.
		HER	Heresite-Saekaphen, Inc.
DA	Diamond Shamrock Corp.	HKD	Hooker Chemical Corp., Hooker Chemicals
DAN	Dan River, Inc., Chemical Products Dept.		& Plastics Corp., Durez Div.
DCC	Dow Corning Corp.	HN	Tenneco Chemicals, Inc.

TABLE 3.--PLASTICS AND RESIN MATERIALS: DIRECTORY OF MANUFACTURERS, 1978--CONTINUED

Code	Name of company	Code	Name of company
HNC	H & N Chemical Co.	PER	Perry & Derrick Co., Inc.
HPC	Hercules, Inc.	PLC	Phillips Petroleum Co.
HRT	Hart Products Corp.	PLN	Disogrin Industries Corp.
HST	American Hoechst Corp.	PLR	Polysar Resins, Inc.
HVG	Haveg Industries, Inc., Sub. of Hercules,	PLS	Plastics Engineering Co.
	Inc.	PMC	Plastics Manufacturing Co.
HXL	Hexcel Corp., Hexcel Specialty Chemicals	PNT	Pantasote, Inc., Film/Compound Div.
		POL	Polymer Corp.
ICF	Inmont Corp.	PPG	PPG Industries, Inc.
ICI	ICI Americas, Inc.:	PPL	Pioneer Plastics, Div. of LOF Plastics, Inc.
	Plastics Div.	PRC	Products Research & Chemical Corp.
	Chemical Specialties Co.	PRT	Pratt & Lambert, Inc.
IMC	International Minerals & Chemicals, Inc.:	PSL	Plaslok Corp.
	Foundry Products Div.	PST	Perstorp, Inc.
	McWorter Resins	PVI	Polyvinyl Chemical Industries
INL	Inland Steel Co., Inland Steel Container	PYZ	Polyrez Co., Inc.
	Co. Div.		
INP	Indopol, Inc.	QCP	Quaker Chemical Corp.
IOC	Ionac Chemical Co. Div. of Sybron Corp.	QUN	K.J. Quinn & Co., Inc.
IPC	Interplastic Corp.		
IRI	Ironsides Resins, Inc.	RAB	Raybestos-Manhattan, Inc., Raybestos
			Materials Co.
JCC	Jefferson Chemical Co.	RCC	Rexene Polyolefins Co.
JNS	S.C. Johnson & Sons, Inc.	RCD	Richardson Co., Polymeric Systems Div.
JOB	Jones-Blair Paint Co.	RCI	Reichhold Chemicals Inc.
JSC	Jersey State Chemical Co.	RCO	Rico Chemical Corp.
JWC	J.W. Carroll & Sons Div. of U.S. Industries,	RED	Red Spot Paint and Varnish Co., Inc.
	Inc.	REL	Reliance Universal, Inc., Louisville Resins
			Operations
KMC	Komac Paint, Inc.	RGC	Rogers Corp., Molding Materials Div.
KMP	Kelly-Moore Paint Co.	RH	Rohm & Haas Co.
KPP	Arco/Polymers, Inc.	RPC	Millmaster Dnyx Group, Refined Onyx Co.
KPT	Koppers Co., Inc.		Div.
KYS	Keysor Corp.	RSN	Rilsan Corp.
		RSY	Resyn Corp.
MCA	Masonite Corp., Alpine Div.	RUB	Hooker Chemical Corp., Hooker Chemicals &
MCB	Borg-Warner Corp., Borg-Warner Chemicals		Plastics Corp., Ruco Div.
MCC	McCloskey Varnish Co.		
MCC	McCloskey Varnish Co. of the Northwest	S	Sandoz, Inc.
MCC	McCloskey Varnish Co. of the West	SAC	Southeastern Adhesives Co., Inc.
MFG	Rockwell International Corp.	SAR	Sartomer Industries, Inc.
MID	Dexter Corp., Midland Div.	SCM	SCM Corp., Glidden Coatings & Resins Div.
MMM	Minnesota Mining & Manufacturing Co.	SCN	Schenectady Chemicals, Inc.
MNP	The Valspar Corp.	SCO	Scholler Bros., Inc.
MOB	Mobay Chemical Co.	SCP	Henkel Corp.
MON	Monsanto Corp.	SDH	Sterling Drug, Inc., Hilton Davis
MRB	Marblette Co.		Chemical Co. Div.
MRT	Morton Chemical Co. Div. of Morton Norwich	SED	Conchemco, Inc.
	Products, Inc.	SFP	Stauffer Chemical Co., Plastics Div.
		SHC	Shell Oil Co., Shell Chemical Co. Div.
NCI	Union Camp Corp., Chemical Products Div.	SHT	Shintech, Inc.
NEV	Neville Chemical Co.	SIC	Vistron Corp., Silmar Div.
NPV	Norris Paint & Varnish Co., Inc.	SIM	Simpson Timber Co., Chemicals Div.
NSC	National Starch & Chemical Corp.	SKT	Textron Inc., Spencer Kellogg Div.
NTC	National Casein Co.	SLC	Soluol Chemical Co., Inc.
NTL	NL Industries, Inc.	SLT	Soltex Polymer Corp.
NVT	Novamont Corp.	SM	Mobil Oil Corp.:
NWP	Northern Petrochemical Co.		Mobil Chemical Co.:
			Chemical Coatings Div.
OBC	O'Brien Corp.	SNW	Sun Chemical Corp., Chemicals Div.
OCF	Owens-Corning Fiberglas Corp.	SDR	M. W. Manufacturers, Southern Resin Div.
DMC	Olin Corp.	SPC	Insilco Corp., Sinclair Paint Co. Div.
		SPD	General Electric Co., Silicone Products
PAS	Pennwalt Corp.		Dept.
PC	Proctor Chemical Co., Inc.	SPI	Sterling Plastics, Inc.
PDI	Phelps Dodge Industries, Inc., Phelps Dodge	SPL	Spaulding Fibre Co., Inc.
	Magnet Wire Co. Div.	STC	American Hoechst Corp., Sou-Tex Works

TABLE 3.--Plastics and resin materials: Directory of manufacturers, 1978--Continued

Code	Name of company	Code	Name of company
STT	Standard T Chemical Co.	USO	U.S. Oil Co.
SW	Sherwin-Williams Co.	USR	Uniroyal, Inc., Uniroyal Chemical Div.
SWE	Novamont Corp.	USS	USS Chemicals Div. of U.S. Steel Corp.
TKL	Thiokol Corp.	VAL	Valchem Div. of United Merchants & Manufacturers, Inc.
TNA	Ethyl Corp.		
TNO	Trancoa Chemical Corp.	VEL	Velsicol Chemical Corp.
TX	Texaco, Inc.	VPC	Mobay Chemical Corp., Verona Dyestuff Div.
UCC	Union Carbide Corp.	VSV	Valentine Sugars, Inc., Valite Div.
UNO	United-Erie, Inc.		
UOC	Union Oil Co. of California & Union Chemicals Div., Petrochemicals Group	WCA	West Coast Adhesives Co., Inc.
		WLN	Wilmington Chemical Corp.
UPJ	Upjohn Co.	WRD	Weyerhaeuser Co.
USI	National Distillers & Chemical Corp.: U.S. Industrial Chemicals Co.: National Petro Chemical Corp.	WTC	Witco Chemical Corp.
USM	USM Corp., Bostik Div. & Bostik Div. East	ZGL	Carolina Processing Corp.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix. The above codes identify those of the 247 reporting companies and company divisions for which permission to publish was not restricted.

STATISTICAL HIGHLIGHTS

J. Lawrence Johnson

Rubber-processing chemicals are organic compounds that are added to natural and synthetic rubber to give them qualities necessary for their conversion into finished rubber goods. In this report, statistics are given for cyclic and acyclic compounds by use--such as accelerators, antioxidants, blowing agents, and peptizers. Data on production and sales of rubber-processing chemicals in 1978 are given in table 1.[1]

Production of rubber-processing chemicals as a group in 1978 amounted to 366 million pounds, or 9.0 percent less than the 402 million pounds in 1977. Sales of rubber-processing chemicals in 1978 amounted to 228 million pounds, valued at $287 million, compared with 238 million pounds, valued at $278 million, in 1977.

The production of cyclic rubber-processing chemicals in 1978 amounted to 325 million pounds, or 8.6 percent less than the 356 million pounds in 1977. Sales in 1978 were 201 million pounds, valued at $258 million, compared with 202 million pounds, valued at $249 million, in 1977. Of the total production of cyclic rubber-processing chemicals in 1978, accelerators, activators, and vulcanizing agents accounted for 36.2 percent and antioxidants, antiozonants, and stabilizers for 58.7 percent. Production of antioxidants, antiozonants, and stabilizers, which amounted to 190.9 million pounds in 1978, included 127.9 million pounds of amino compounds and 63.0 million pounds of phenolic and phosphite compounds. Sales of amino antioxidants, antiozonants, and stabilizers in 1978 amounted to 78.7 million pounds, valued at $102.1 million; sales of phenolic and phosphite antioxidant, antiozonants, and stabilizers, were 39.7 million pounds, valued at $43.3 million.

Production of acyclic rubber-processing chemicals in 1978 amounted to 40.8 million pounds, or 12.2 percent less than the 46.5 million pounds reported for 1977. Sales in 1978 totaled 27.9 million pounds, valued at $28.8 million, compared with 35.8 million pounds, valued at $29.0 million, in 1977. Dithiocarbamic acid derivatives accounted for 20.9 percent of sales (based on quantity) of acyclic rubber-processing chemicals in 1978.

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[1] See also table 2 which lists these producers and identifies the manufacturers by codes. These codes are given in table 3.

TABLE 1.--Rubber-processing chemicals: U.S. production and sales, 1978

[Listed below are all rubber-processing chemicals for which any reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists separately all rubber-processing chemicals for which data on production and/or sales were reported and identifies the manufacturers of each]

RUBBER-PROCESSING CHEMICALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Grand total	365,803	228,449	287,064	$1.26
CYCLIC				
Total	325,001	200,514	258,254	1.29
Accelerators, activators, and vulcanizing agents, total	117,607	68,496	84,908	1.24
Aldehyde-amine reaction products	925	733	1,254	1.71
Thiazole derivatives, total	108,527	59,490	66,374	1.12
N-Cyclohexyl-2-benzothiazolesulfenamide	5,061	8,169	10,678	1.31
2,2'-Dithiobis(benzothiazole)	16,611	6,260	6,139	.98
2-Mercaptobenzothiazole	...	6,106	4,161	.68
2-Mercaptobenzothiazole, zinc salt	2,691	...	...	...
All other thiazole derivatives	84,164	38,955	45,396	1.16
All other accelators, activators, and vulcanizing agents[2]	8,155	8,273	17,280	2.09
Antioxidants, antiozonants, and stabilizers, total	190,888	118,360	145,544	1.23
Amino compounds, total	127,934	78,676	102,141	1.30
Aldehyde- and acetone-amine reaction products	...	5,204	5,723	1.10
Substituted p-phenylenediamines	72,163	40,119	62,215	1.55
All other amino compounds[3]	55,771	33,353	34,203	1.03
Phenolic and phosphite compounds, total	62,954	39,684	43,403	1.09
Phenolic compounds, total	19,930	14,438	26,348	1.83
Polyphenolics (including bisphenols)	14,313	11,352	23,110	2.04
Phenol, alkylated	2,375	1,426	1,322	.93
Phenol, styrenated	...	820	476	.58
Other	3,242	840	1,440	1.71
Phosphite compounds	43,024	25,246	17,055	.68
Retarder: N-Nitrosodiphenylamine	1,614	769	853	1.11
All other cyclic rubber-processing chemicals[4]	14,892	12,889	26,949	2.08
ACYCLIC				
Total	40,802	27,935	28,811	1.03
Dithiocarbamic acid derivatives, total[5]	8,533	6,611	10,560	1.60
Dimethyldithiocarbamic acid, zinc salt	2,231	2,098	2,230	1.06
All other dithiocarbamic acid derivatives	6,302	4,513	8,330	1.85
Thiurams	7,662	6,090	6,519	1.07
Xanthates and sulfides	249	...	...	...
Shortstops	3,174	...	...	...
Other accelerators, activators, and vulcanizing agents	61	74	270	3.65
All other acyclic rubber-processing chemicals[6]	21,123	15,160	11,462	.76

[1] Calculated from unrounded figures.
[2] Includes guanidines and other uses not separately shown.
[3] Includes aldehyde- and acetone-amine reactions products.
[4] Includes blowing agents, peptizers, and other uses not separately shown.
[5] Data on dithiocarbamates included in this table are for materials used chiefly in the processing of natural and synthetic rubber. Data on dithiocarbamates which are used chiefly as fungicides are included in the report on "Pesticides and Related Products."
[6] Includes "other" xanthates and sulfides (sales only), conditioning and lubricating agents, polymerication regulators, shortstops (sales only), and other uses not separately shown.

TABLE .--RUBBER-PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*) CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT]

RUBBER PROCESSING CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC	
*ACCELERATORS, ACTIVATORS AND VULCANIZING AGENTS:	
*ALDEHYDE-AMINE REACTION PRODUCTS:	
Bis(cinnamylidene)hexamethylenediamine	DUP.
n-Butyraldehyde-aniline condensate	DUP, RCD.
Heptaldehyde-aniline condensate	USR.
Triethyltrimethylenetriamine	USR.
DITHIOCARBAMIC ACID DERIVATIVES:	
Dibenzyldithiocarbamic acid, sodium salt	USR.
Dibenzyldithiocarbamic acid, zinc salt	USR.
2,4-Dinitrophenyl dimethyldithiocarbamate	USR.
Piperidinecarbodithioic acid, piperidinium potassium salts, mixed	DUP.
GUANIDINES:	
Dicatechol borate, di-o-tolylguanidine salt	DUP.
1,3,-Diphenylguanidine	ACY.
1,3-Di-o-tolylguanidine	ACY.
*THIAZOLE DERIVATIVES:	
1,3-Bis(2-benzothiazolylmercaptomethyl) urea	LAK.
N-tert-Butyl-2-benzothiazolesulfonamide	BFG, USR, X.
*N-Cyclohexyl-2-benzothiazolesulfenamide	ACY, BFG, MON, USR.
N,N-Diisopropyl-2-benzothiazolesulfenamide	ACY.
2,5-Dimercapto-1,3,4-thiodiazole	VNC.
N-(2,6-Dimethylmorpholino)-2-benzothiazole-sulfenamide	USR.
*2,2'-Dithiobis (Benzothiazole)	ACY, BFG, GYR, MON.
*2-Mercaptobenzothiazole	ACY, BFG, GYR, MON, USR.

TABLE 2.--RUBBER-PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

RUBBER-PROCESSING CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--CONTINUED	
ACCELERATORS, ACTIVATORS, AND VULCANIZING AGENTS--CON.	
THIAZOLE DERIVATIVES--CONTINUED	
2-Mercaptobenzothiazole, copper salt	ACY.
2-Mercaptobenzothiazole, zinc chloride	DUP.
*2-Mercaptobenzothiazole, zinc salt	ACY, GYR, USR.
4-Morpholinyl 2-benzothiazyl disulfide	GYR.
N-Oxydiethylene-2-benzothiazolesulfenamide	ACY, BFG.
Thiazole derivatives, cyclic, other	USR.
ALL OTHER CYCLIC ACCELERATORS, ACTIVATORS AND VULCANIZING AGENTS:	
Bis(morpholinothiocarbamoyl) disulfide	ACY.
Dibenzylamine	DUP, HXL.
Dimethylethanolamine, toluene-2,4-diisocyanate adduct	DUP.
Di-N,N'-pentamethylenethiuram tetrasulfide	DUP, VNC.
4,4'-Dithiodimorpholine	MON.
2-Imidazolidenethione (1,3-Ethylene-2-thiourea)	RBC.
m-Phenylenebismaleimide	DUP.
Poly-p-dinitrosobenzene	DUP.
Tetramethylthiuram disulfide	DUP.
Tetramethylthiuram tetrasulfide	GYR.
*ANTIOXIDANTS, ANTIOZONANTS AND STABILIZERS:	
*AMINO ANTIOXIDANTS, ANTIOZONANTS AND STABILIZERS:	
*ALDEHYDE AND ACETONE-AMINE REACTION PRODUCTS:	
Butyraldehyde-aniline condensate	DUP.
Diphenylamine-acetone condensate	ACY, BFG, USR.
*SUBSTITUTED P-PHENYLENEDIAMINES:	
Alkylaryl-p-phenylamine-diamines	MON.
N,N'-Bis(1,4-dimethylpentyl)-p-phenylenediamine	MON, UPM, USR.
N,N'-Bis(1-ethyl-3-methylpentyl)-p-phenylene diamine	UPM.
N,N'-Bis(1-methylheptyl)-p-phenylenediamine	BFG, UPM.
N-Cyclohexyl-N'-phenyl-p-phenylenediamine	USR.
Diarylenediamines, mixed	GYR.
N-(1,3-Dimethylbutyl)-N-phenyl-p-phenylene diamine	GYR, UPM.
N,N'-Di-2-naphthyl-p-phenylenediamine	BFG.
N,N'-Diphenyl-p-phenylenediamine	BFG, USR.

TABLE 2.--RUBBER-PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

RUBBER PROCESSING CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--CONTINUED	
ANTIOXIDANTS, ANTIOZONANTS, AND STABILIZERS--CONTINUED	
AMINO ANTIOXIDANTS, ANTIOZONANTS, AND STABILIZERS-CON.	
SUBSTITUTED p-PHENYLENEDIAMINES--CONTINUED	
N-Isopropyl-N'-phenyl-p-phenylenediamine	USR.
N-(1-Methylheptyl)-N'-phenyl-p-phenylenediamine	UPM.
N-(1-Methylpentyl)-N'-phenyl-p-phenylenediamine	USR.
p-Phenylenediamines, substituted, other	UPM.
OTHER AMINES:	
p-Anilinophenol	BFG.
1,2-Dihydro-6-dodecyl-2,2,4-trimethylquinoline	X.
1,2-Dihydro-6-ethoxy-2,2,4-trimethylquinoline	X.
1,2-Dihydro-2,2,4-trimethylquinoline	BFG, X.
Diphenylamine-styrenated	GYR.
Diphenylamine, substituted	USR.
Nonyldiphenylamine mixture (Mono-, di-, and tri-)	USR.
Octyldiphenylamine	ACY, USR.
Octyldiphenylamine, alkylated	BFG.
N-Phenyl-1-naphthylamine	USR.
Toluenediamine (Mixed isomers)	DUP.
p-(p-Toluenesulfonamido)diphenylamine	USR.
*PHENOLIC AND PHOSPHITE ANTIOXIDANTS AND STABILIZERS:	
*PHOSPHITES:	
Alkylaryl phosphites mixed	MCB, X.
Nonylphenyl phosphites, mixed	MCB, NPI, USR, X.
Polymeric phosphites	MCB, NPI.
Polyphenolic phosphite, polyalkylated	BFG, MCB.
Triaryl phosphites	MCB.
*POLYPHENOLICS (INCLUDING BISPHENOLS):	
Bisphenol, hindered	GYR, USR.
4,4'-Butylidenebis(6-tert-butyl-m-cresol)	MON.
2,5-Di-sec-butyldecylhydroquinone	USR.
2,5-Di-(1,1-dimethylpropyl)hydroquinone	X.
2,2'-Methylenebis(6-tert-butyl-p-cresol)	ACY.
2,2'-Methylenebis(6-tert-butyl-4-ethylphenol)	ACY.
2,2'-Methylenebis[6-(1-methylcyclohexyl)-p-cresol]	ACY, ICI.
4,4'-Thiobis(6-tert-butyl-m-cresol)	X.
Thiobisphenol, alkylated	USR.

TABLE 2.--RUBBER-PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

RUBBER-PROCESSING CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--CONTINUED	
ANTIOXIDANTS, ANTIOZONANTS, AND STABILIZERS--CONTINUED	
PHENOLIC AND PHOSPHITE ANTIOXIDANTS AND STABILIZERS--CONTINUED	
POLYPHENOLICS (INCLUDING BISPHENOLS)--CONTINUED	
1,1,3-Tri(2-methyl-4-hydroxy-5-tert-butylphenyl) butane	ICI.
ALL OTHER PHENOLIC ANTIOXIDANTS AND STABILIZERS:	
o-Cresol, alkylated	PIT.
*Phenol, alkylated	ACY, BFG, GYR, NEV, RCI.
Phenol, hindered	DUP, USR.
*Phenol, styrenated, mixtures	GYR, NEV, USR.
N-Stearoyl-p-aminophenol	HXL.
BLOWING AGENTS:	
Dinitrosopentamethylenetetramine	NPI.
p,p'-Oxybis(benzenesulfonhydrazide)	USR.
p-Toluenesulfonylsemicarbazide	USR.
Blowing agents, cyclic, all other	USR.
PEPTIZERS:	
2',2'''-Dithiobis(benzanilide)	ACY.
Dixylyl disulfides, mixed	PIT.
Xylenethiol	DUP.
ALL OTHER CYCLIC RUBBER-PROCESSING CHEMICALS:	
p-tert-Amylphenol sulfide (Tackifier)	PAS.
4-Chloro-2,6-bis(2,4-dihydroxybenzyl)phenol	ICI.
N-(Cyclohexylthio)phthalimide	X.
Diphenl-4,4'-diphenylmethylenedicarbamate	USR.
N-(2-Methyl-2-nitropropyl)-4-nitrosoaniline	MON.
*Nitrosodiphenylamine (Retarder)	ACY, BFG, GYR, USR.
ACYCLIC	
ACCELERATORS, ACTIVATORS AND VULCANIZING AGENTS:	
*DITHIOCARBAMIC ACID DERIVATIVES:	
Dibutyldithiocarbamic acid, nickel salt	DUP, USR.
Dibutyldithiocarbamic acid, sodium salt	DUP, USR, VNC.
Dibutyldithiocarbamic acid, zinc salt	ALC, PAS, VNC.
Diethyldithiocarbamic acid, cadmium salt and bis (diethylthiocarbamoyl)disulfide, mixture	VNC.
Diethyldithiocarbamic acid, selenium salt	VNC.
Diethyldithiocarbamic acid, sodium salt	PAS.
Diethyldithiocarbamic acid, tellurium salt	VNC.
Diethyldithiocarbamic acid, zinc salt	ALC, GYR.

TABLE 2.--RUBBER-PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

RUBBER PROCESSING CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--CONTINUED	
ACCELERATORS, ACTIVATORS, AND VULCANIZING AGENTS--CON	
DITHIOCARBAMIC ACID DERIVATIVES--CONTINUED	
Dimethylammonium-dimethyldithiocarbamate	USR.
Dimethyldithiocarbamic acid, bismuth salt	VNC.
Dimethyldithiocarbamic acid, copper salt	VNC.
Dimethyldithiocarbamic acid, lead salt	VNC.
Dimethyldithiocarbamic acid, selenium salt	VNC.
Dimethyldithiocarbamic acid, sodium salt and sodium polysulfide	BFG.
*Dimethyldithiocarbamic acid, zinc salt	ALC, FMN, GYR, PAS, USR, VNC.
*THIURAMS:	
Bis(diethylthiocarbamoyl)disulfide	GYR, PAS.
Bis(dimethylthiocarbamoyl) disulfide	GYR, PAS, VNC.
Bis(dimethylthiocarbamoyl) sulfide	DUP, GYR, USR.
N,N'-Dioctadecyl-N,N'-diisopropyl thiuram disulfide	USR.
Methyl-ethyl thiurams, mixed	PAS.
*XANTHATES AND SULFIDES:	
Di-n-butylxantho disulfide	USR.
Diisopropylxantho disulfide	BFG.
Zinc diisopropyl xanthate	VNC.
ALL OTHER ACYCLIC ACCELERATORS, ACTIVATORS, AND VULCANIZING AGENTS:	
p-Aminocyclohexylmethane carbonate	DUP.
n-Butyraldehyde-butylamine condensate	DUP.
3-Ethyl-1,1-dimethyl-2-thiourea	VNC.
Ethylenediamine carbamate	DUP.
Methacrylic acid, zinc salt	USR.
1,1,3-Trimethyl-2-thiourea	RBC.
CONDITIONING AND LUBRICATING AGENTS:	
Alkyl alcohols, mixed	DUP.
Mono- and dialkyl phosphate ammonium salts, mixed	DUP.
Sodium alkyl sulfates	DUP.
POLYMERIZATION REGULATORS:	
Alkyl mercaptans, mixed	PLC.
n Dodecyl mercaptans	PAS, PLC.
tert-Hexadecyl mercaptan	PLC.
n-Octyl mercaptan	PAS, PLC.

TABLE 2.--RUBBER-PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

RUBBER-PROCESSING CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--CONTINUED	
POLYMERIZATION REGULATORS--CONTINUED	
tert-Octyl mercaptan	PAS, PLC.
Tetradecyl mercaptan	PLC.
Tridecyl mercaptan	PAS.
*SHORTSTOPS:	
Dimethyldithiocarbamic acid, potassium salt	USR.
Dimethyldithiocarbamic acid, sodium salt	ALC, DUP, GYR, PAS, USR.
ALL OTHER ACYCLIC RUBBER-PROCESSING CHEMICALS:	
3,7-Dioctylphenothiazine	USR.
Waxes and paraffinic products	DUP, RCI.
Zinc laurate (Activator, physical property improver and processing auxiliary)	USR.
Rubber-processing chemicals, acyclic, all other	VNC.

TABLE 3.--Rubber-Processing chemicals: Directory of manufacturers, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of rubber-processing chemicals to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ACY	American Cyanamid Co.	MCB	Borg-Warner Corp., Borg-Warner Chemicals
ALC	Alco Chemical Corp.	MON	Monsanto Co.
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Co. Div.	NEV	Neville Chemical Co.
		NPI	Stepan Chemical Co., Polychem Dept.
DUP	E. I. duPont de Nemours & Co., Inc.	PAS	Pennwalt Chemicals Corp.
		PIT	Pitt-Consol Chemical Co.
		PLC	Phillips Petroleum Co.
FMN	FMC Corp., Agricultural Chemical Div.		
		RBC	Fike Chemicals, Inc.
		RCD	Richardson Co.
GYR	Goodyear Tire & Rubber Co.	RCI	Reichhold Chemicals, Inc.
ICI	ICI Americas, Inc., Chemical Specialties Co.	UPM	UOP, Inc.
		USR	Uniroyal, Inc., Uniroyal Chemical Div.
LAK	Bofors Lakeway, Inc.	VNC	Vanderbilt Chemical Corp.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix. The above codes identify those of the 26 reporting companies and company divisions for which permission to publish was not restricted.

STATISTICAL HIGHLIGHTS

Eric Land and Rick Talisman

Elastomers (synthetic rubber) are high polymeric materials with properties similar to those of natural rubber. The term "elastomers" as used in this report, means a substance, whether in bale, crumb, powder, latex, and other crude form, which can be vulcanized or similarly processed into a material that can be stretched to at least twice its original length and, after having been so stretched and the stress removed, will return with force to approximately its original length. U.S. production and sales of elastomers in 1978 are shown in table 1.[1]

Total U.S. production[2] of synthetic rubber in 1978 amounted to 5,761 million pounds, a decrease of 0.9 percent from that produced in 1977. Total sales[2] of elastomers in 1978 amounted to 3,640 million pounds, a decrease of 12.9 percent from that sold in 1977.

Styrene-butadiene rubber (SBR, or S-type rubber) in 1978 continued to be the elastomer produced in the greatest quantity as it has been for more than a quarter of a century. U.S. production of S-type rubber, including 43 million pounds of its vinylpyridine sub-type, amounted to 3,037 million pounds in 1978, a decrease of 7.6 percent from that reported for 1977. Solution polymerized butadiene rubber, a stereo type elastomer, was produced domestically in 1978 in the next largest amount--802 million pounds. Other principal types of synthetic elastomers for which U.S. production data are reported separately are ethylene-propylene rubber, production of which was 385 million pounds in 1978, isobutylene-isoprene (butyl) rubber, production of which was 297 million pounds,[3] acrylonitrile butadiene (N-type) rubber, production of which was 145 million pounds, and polychloroprene (Neoprene) rubber, production of which was 310 million pounds.[3]

Sales of S-type rubber by U.S. producers in 1978 (including its vinylpyridine sub-type) amounted to 1,542 million pounds, a decrease of 21 percent over sales reported for 1977. Sales of solution polymerized butadiene rubber amounted to 317 million pounds, and those of ethylene-propylene rubber to 324 million pounds. Sales of N-type rubber in 1978 amounted to 123 million pounds. Sales of solution polymerized butadiene rubber in 1978 decreased from sales in 1977 by 42 percent, and sales of ethylene-propylene rubber increased 9 percent. Sales of N-type rubber in 1978 were 4 percent below those in 1977.

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[1] See also table 2 which lists these products and indicates the manufacturers of each by code. The codes are identified by company name in table 3.
[2] Does not include urethane type elastomers.
[3] Reported by the Rubber Manufacturers' Association.

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TABLE 1.--ELASTOMERS (SYNTHETIC RUBBER):[1] U.S. PRODUCTION AND SALES, 1978

[Listed below are all elastomers (synthetic rubber) for which reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all elastomers for which data on production and/or sales were reported and identifies the manufacturers of each]

ELASTOMERS	PRODUCTION[2]	SALES		
		QUANTITY[2]	VALUE	UNIT VALUE[3]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Grand total	5,761,141	3,640,373	1,875,106	$ 0.52
Cyclic	3,209,951	1,760,624	551,299	.31
Acyclic	2,551,190	1,879,749	1,323,807	.70
Acrylonitrile-butadiene type (N-type)	161,393	122,585	83,953	.68
Butadiene (emulsion polymerized) type	53,775	23,091	8,481	.37
Choroprene type (Neoprene)	(4)	...	...	...
Ethylene-propylene type	385,540	323,930	177,339	.55
Isobutylene-isoprene type (Butyl)	(5)	..	...	...
Silicone type	78,455	66,768	244,490	3.36
Stereo elastomer: Butadiene (solution polymerized) type	802,302	316,627	113,862	.36
Styrene-butadiene type (S-type)	2,993,954	1,528,191	428,399	.28
Styrene-butadiene-vinylpyridine type	43,464	13,827	10,965	.79
Urethane type	(6)	...	...	...
All other elastomers[7]	1,242,258	1,245,354	807,617	.65

[1] The term "elastomers" is define as substances in bale, crumb, powder, latex, and other crude forms which can be vulcanized or similarly processed into materials that can be stretched at 68° F. to at least twice their original length and, after having been stretched and the stress removed, will return with force to approximately their original length.

[2] Includes oil content of oil-extended elastomers.

[3] Calculated from unrounded figures.

[4] Included in "All other elastomers." The production of polychloroprene rubber in 1978 was reported by the Rubber Manufacturers' Association to be 161,427 metric tons (355,878,736 pounds).

[5] Included in "All other elastomers." The production of butyl rubber in 1978 was reported by the Rubber Manufact-turers' Association to be 154,365 metric tons (340,309,992 pounds)

[6] The data on production and sales of urethane elastomers are reported in the section "Plastics and Resin Materials" with urethane plastics and polyols.

[7] Includes production and sales for acrylic ester, butyl, chloroprene, epichlorohydrin, fluorinated, isobutylene, isoprenes, and polysulfide elastomers, certain solution elastomers, chlorinated rubber, chlorosulfonated polyethylene, thermoplastic rubber, miscellaneous elastomers.

TABLE 2.--Elastomers for which U.S. production and/or sales were reported, identified by manufacturer, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*); CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3]

ELASTOMERS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC	
Butadiene-styrene type:	
*Butadiene-styrene (S-Type)	ASY, BFG, BOR, CPY, FIR, FRS, GNT, GRD, GYR, PLC, PLR, TUS, USR.
*Butadiene-styrene-vinylpyridine	BFG, FIR, FRS, GNT, GYT, MIL, USR.
Polyester elastomer	DUP.
Polyisoprene, cyclized	WAY.
Thermoplastic elastomers, cyclic	PLC, SHC.
ACYCLIC	
Butadiene-acrylic acid-acrylonitrile	ASY.
*Butadiene-acrylonitrile type (N-Type)	BFG, CPY, GYR, USR.
Depolymerized butyl rubber	HDM.
Epichlorohydrin rubber	BFG.
*Ethylene-propylene rubber	BFG, CPY, DUP, ENJ, USR.
Fluoroelastomers	MMM.
Isobutylene-isoprene type (Butyl)	CBN, ENJ.
Polyacrylate ester, type elastomers	ACY, BFG, DUP.
Polyalkalene oxide	PRC.
Polyalkalene sulfide, type elastomers	TKL.
*Polybutadiene type (Emulsion)	BFG, FRS, GYR, TKL, TUS.
Polychloroprene type (Neoprene)	DKA, DUP.
Polyethylene, chlorosulfonated	DUP.
Polyisobutylene, type elastomers	ENJ.
Products of natural rubber:	
Depolymerized natural rubber	HDM.
Polymerized chlorinated rubber	HPC, ICI.
*Silicone type elastomers	DCC, SPD, SWS.
Stereoisomer type:	
Depolymerized isoprene	HDM.
*Polybutadiene (Solution polymerized)	ASY, BFG, FRS, GNT, GYR, PLC.
Polyisoprene (Solution polymerized)	BFG, GYR.
Stereoisomer type, all other	ADC.
Thermoplastic elastomers, acyclic	ASY.
All other acyclic elastomers	DUP, USR.

TABLE 3.--Elastomers (synthetic rubber): Directory of manufacturers, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of elastomers to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ACY	American Cyanamid Co.	HDM	Hardman, Inc.
ADC	Anderson Development Co.	HPC	Hercules, Inc.
ASY	American Synthetic Rubber Corp.		
		ICI	ICI Americas Inc., Chemical Specialties Co.
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Co. Div.		
		MIL	Milliken & Co., Milliken Chemical Div.
CBN	Cities Service Co., Columbian Group	MMM	Minnesota Mining and Manufacturing Co.
CPY	Copolymer Rubber & Chemical Corp.		
		PLC	Phillips Petroleum Co.
DCC	Dow Corning Corp.	PLR	Polysar, Inc., Polysar Latex Div.
DKA	Denka Chemical Corp.	PRC	Products Research & Chemical Corp.
DUP	E. I. duPont de Nemours & Co., Inc.		
		SHC	Shell Oil Co., Shell Chemical Co. Div.
ENJ	Exxon Chemical Co., U.S.A.	SPD	General Electric Co., Silicone Products Dept.
		SWS	Stauffer Chemical Co., SWS Silicones Div.
	Firestone Tire & Rubber Co.:		
FIR	Firestone Plastics Co. Div.		
FRS	Firestone Synthetic Rubber & Latex Co. Div.	TKL	Thiokol Chemical Corp.
		TUS	Texas-U.S. Chemical Co.
GNT	General Tire & Rubber Co., Chemical Div.	USR	Uniroyal, Inc., Chemical Div.
GRD	W. R. Grace & Co., Organic Chemicals Div. Polymers & Chemicals Div.	WAY	Philip A. Hunt Chemical Corp., Organic Chemical Div.
GYR	Goodyear Tire & Rubber Co.		

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

STATISTICAL HIGHLIGHTS

J. Lawrence Johnson

Plasticizers are organic chemicals that are added to synthetic plastics and resin materials to (1) improve workability during fabrication, (2) extend or modify the natural properties of these materials, or (3) develop new improved properties not present in the original material. Table 1 presents statistics on U.S. production and sales of plasticizers in as great a detail as is possible without revealing the operations of individual producers.

U.S. production of plasticizers totaled 2,086 million pounds in 1978, an increase of 16.4 percent from the 1,792 million pounds reported for 1977. Sales of plasticizers totaled 1,748 million pounds, valued at $703 million. in 1978 compared with 1,668 million pounds, valued at $632 million, in 1977.

Production of cyclic plasticizers in 1978, which consisted chiefly of the esters of phthalic anhydride, phosphoric acid, and trimellitic acid, amounted to 1,673 million pounds, an increase of 21.7 percent from the 1,375 million pounds reported for 1977. Sales of cyclic plasticizers in 1978 totaled 1,380 million pounds, valued at $487 million, compared with 1,302 million pounds, valued at $425 million, in 1977. The most important cyclic plasticizers were the dioctyl phthalates, with production of 409 million pounds, in 1978.

Production of acyclic plasticizers in 1978 totaled 413 million pounds, a decrease of 1.1 percent from the 417 million pounds reported for 1977. Sales of acyclic plasticizers totaled 367 million pounds, valued at $216 million, in 1978, compared with 366 million pounds, valued at $208 million, in 1977. Epoxidized soya oils were the most important acyclic plasticizer in 1978 with production of 90 million pounds.

TABLE 1.--Plasticizers:[1] U.S. production and sales, 1978

[Listed below are plasticizers for which any reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists separately all plasticizer chemicals for which data on production and/or sales were reported and identifies the amnufacturers of each]

PLASTICIZERS	PRODUCTION	SALES QUANTITY	SALES VALUE	SALES UNIT VALUE[2]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Grand total	2,085,784	1,747,569	702,900	$0.40
Benzenoid[3]	1,781,612	1,470,534	539,216	.37
Nonbenzenoid	304,172	277,035	163,684	.59
CYCLIC				
Total	1,673,057	1,380,173	486,810	.35
Phosphoric acid esters[4]	98,790	76,319	55,728	.73
Phthalic anhydride esters, total	1,258,568	1,205,383	385,651	.32
Dibutyl phthalate	16,893	18,908	6,966	.37
Diethyl phthalate	22,288	17,816	13,092	.73
Diisodecyl phthalate	170,774	151,319	47,346	.31
Dimethyl phthalate	9,643	9,942	4,005	.40
Dioctyl phthalates	[5]408,641	391,131	116,928	.30
n-Hexyl n-decyl phthalate	15,599	...	...	...
All other phthalic anhydride esters	614,730	616,267	197,314	.32
Trimellitic acid esters, total	32,762	30,915	16,086	.52
Tri-n-octyl n-decyl trimellitate	1,129	954	595	.62
Trioctyl trimellitate	15,778	13,305	7,311	.55
All other trimellitic acid esters	15,855	16,656	8,180	.49
All other cyclic plasticizers[6]	282,937	67,556	29,345	.43
ACYCLIC				
Total	412,727	367,396	216,090	.58
Adipic acid esters, total	67,743	63,480	30,267	.48
Di(2-ethylhexyl) adipate	44,816	43,015	18,717	.44
Diisodecyl adipate	2,054	1,743	885	.51
Di-tridecyl adipate	4,123	1,953	1,128	.58
All other adipic acid esters	16,750	16,769	9,537	.57
Complex linear polyesters and polymeric plasticizers, total	54,208	44,037	30,777	.70
Adipic acid type	12,222	5,808	3,878	.67
All other	41,986	38,229	26,899	.70
Epoxidized esters, total	113,789	109,161	56,431	.52
Epoxidized linseed oils	...	6,380	4,930	.77
Epoxidized soya oils	89,894	85,544	42,247	.49
All other epoxidized esters	23,895	17,237	9,254	.54
Isopropyl myristate	3,340	3,014	2,537	.84
Oleic acid esters, total	14,785	12,743	6,167	.48
Butyl oleate	2,651	1,892	918	.49
Methyl oleate	6,251	6,278	2,774	.44
Propyl oleates	344	137	176	1.29
All other oleic acid esters	5,539	4,436	2,299	.52
Phosphoric acid esters	17,292	12,205	9,536	.78

See footnotes at end of table.

TABLE 1.--PLASTICIZERS:[1] U.S. PRODUCTION AND SALES, 1978--CONTINUED

PLASTICIZERS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[2]
ACYCLIC--Continued	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
Ricinoleic and acetylricinoleic acid esters	...	824	760	$ 0.92
Sebacic acid esters	1,653	1,177	1,416	1.20
Stearic acid esters, total	15,087	14,407	7,545	.52
n-Butyl stearate	8,572	8,464	3,463	.41
Isobutyl stearate	1,739	1,704	818	.48
All other stearic acid esters	4,776	4,239	3,264	.77
All other acyclic plasticizers[7]	124,830	106,348	70,654	.66

[1]Includes data for compounds used principally (but not exclusively) as primary plasticizers. Does not include clearly defined extenders of secondary plasticizers.
[2]Calculated from unrounded figures.
[3]Includes benzenoid products as defined in part 1 of schedule 4 of the Tariff Schedules of the United States Annotated.
[4]Includes data for cresyl diphenyl phosphate, dibutyl phenyl phosphate, diphenyl octyl phosphate, tricresyl phosphate, triphenyl phosphate, and other cyclic phosphoric acid esters.
[5]The difference between the production reported here and that shown on the Preliminary Report on U.S. Production of Selected Organic Chemicals for 1978, results from a combination of incorrect reporting by some companies, end of year inventory adjustments, and rounding.
[6]Includes data for glycol dibenzoates, toluenesulfonamides, tetrahydrofurfuryl oleate, and other cyclic plasticizers.
[7]Includes data for azelaic, citric and acetylcitric, myristic, pelargonic, ricinoleic (production only), acetylricinoleic (production only), glyceryl, and glycol esters, and other acyclic plasticizers.

TABLE 2.--PLASTICIZERS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*) CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT]

PLASTICIZERS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC	
Diethylene glycol dibenzoate	VEL.
Dipropanediol dibenzoate (Dipropylene glycol dibenzoate)	VEL.
N-Ethyl-p-toluenesulfonamide	MON, NES.
Isopropylidenediphenoxypropanol	DCC.
*PHOSPHORIC ACID ESTERS:	
Cresyl diphenyl phosphate	FMP, SFS.
Dibutyl phenyl phosphate	FMP.
Diphenyl octyl phosphate	MON.
Tricresyl phosphate	FMP, SFS, SM.
Triphenyl phosphate	EK, MON.
Phosphoric acid esters, all other	SFS.
*PHTHALIC ANHYDRIDE ESTERS:	
Alkyl benzyl phthalates	MON.
Bis(2-ethylhexyl)terephthlate	EKT.
Butyl benzyl phthalate	MON.
Butyl cyclohexyl phthalate	CPS.
Butyl octyl phthalates	RCI, USS.
Di(2-butoxyethyl) phthalate	HAL.
*Dibutyl phthalate (Including diisobutyl phthalate)	BAS, EKT, GRH, HCC, RCI, SW, USS, WTH.
Dicyclohexyl phthalate	MON, PFZ.
Diethyl isophthalate	PFZ.
*Diethyl phthalate	EKT, KF, MON, PFZ, TCC.
*Diisodecyl phthalate	BAS, CO, ENJ, GRH, HCC, HN, MON, RCI, TEK, USS.
Diisononyl phthalate	ENJ, USS.
Di(2-methoxyethyl) phthalate	EKT.

TABLE 2.--PLASTICIZERS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTUER, 1978--CONTINUED

PLASTICIZERS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--CONTINUED	
PHTHALIC ANHYDRIDE ESTERS--CONTINUED	
Dimethyl isophthalate	PFZ.
*Dimethyl phthalate	EKT, KF, MON, PFZ, TCC.
Dinonyl phthalate	ENJ.
*DIOCTYL PHTHALATES:	
Di(2-ethylhexyl) phthalate	BAS, BFG, CO, EKT, GRH, HCC, HN, RCI, TEK, USS.
Diiso-octyl phthalate	RCI, USS.
Di-n-octyl phthalate	EK.
Dioctyl phthalates, all other	GRH, USS, WTH.
Diphenyl phthalate	MON.
Di-tridecyl phthalate	ENJ, GRH, HCC, HN, RCI, SM, TEK, USS.
Diundecyl phthalate	MON.
GLYCOL PHTHALATE ESTERS:	
Butyl phthalyl butyl glycolate	MON.
Glycol phthalate esters, all other	SCP.
*Hexyl n-decyl phthalate	BAS, CO, HN, TEK.
Hexyl iso-octyl phthalate	PFZ.
n-Octyl n-decyl phthalate	RCI, USS.
Phthalic anhydride esters, all other	HCC, HN, MON.
Polyethylene glycol dibenzoate	VEL.
Tetrahydrofurfuryl oleate	EMR.
Toluenesulfonamide o-, p-mixtures	MON.
*TRIMELLITIC ACID ESTERS:	
Tri(2-ethylhexyl) trimellitate	GRH, HCC, PFZ.
Tri-n-hexyl n-decyl trimellitate	GRH.
Triisodecyl trimellitate	PFZ.
Triisooctyl trimellitate	RCI, RUB, USS.
*Tri-n-octyl n-decyl trimellitate	PFZ, RCI, RUB.
*Trioctyl trimellitate	EKT, HN, RCI, RUB, USS, WTH.
Trimellitic acid esters, all other	ENJ, HCC, MON, PFZ, TEK, USS, WTH, X.
Cyclic plasticizers, all other	HDW, HN, MON, NEV.
ACYCLIC	
*ADIPIC ACID ESTERS:	
Di(2-(2-butoxyethoxy)ethyl) adipate	RCI, TKL.
*Di(2-ethylhexyl) adipate	GRH, HAL, HCC, HN, MON, PFZ, RCI, RH, RUB, USS, WM, WTH.
Diisobutyl adipate	GRH, HAL, HCC.

TABLE 2.--PLASTICIZERS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PLASTICIZERS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--CONTINUED	
*ADIPIC ACID ESTERS--CONTINUED	
*Diisodecyl adipate	GRH, HCC, PFZ, RCI, RH, USS.
Diiso-octyl adipate	HAL, RH.
Diisopropyl adipate	VND, WTH.
Di-n-octyl adipate	DA.
*Di-tridecyl adipate	EMR, GRH, HCC, RUB.
Iso-octyl isodecyl adipate	GRH.
n-Octyl n-decyl adipate	MON, RCI, RH, USS.
Adipic acid esters, all other	GRH, HAL, MON, SM.
AZELAIC ACID ESTERS:	
Di(2-ethylhexyl) azelate	EMR, HAL, RCI, WM.
Diiso-octyl azelate	EMR.
Azelaic acid esters, all other	EMR, HAL, PFZ.
CITRIC AND ACETYLCITRIC ACID ESTERS:	
Tributyl acetylcitrate	PFZ.
Tributyl citrate	PFZ.
Triethyl citrate	PFZ.
Citric and acetylcitric acid esters, all other	PFZ.
*COMPLEX LINEAR POLYESTERS AND POLYMERIC PLASTICIZERS:	
*Adipic acid type complex linear polyesters and polymeric plasticizers	ASH, DUP, HAL, TEK, WTH.
Complex linear polyesters and polymeric plasticizers, all other	EKT, EKX, EMR, GRH, HCC, HN, HPC, MON, RCI, RH, WTH.
Di(2-(2-butoxyethoxy)ethyl) methane	TKL.
Diiso-octyl diglycolate	CCA.
*EPOXIDIZED ESTERS:	
Butyl epoxystearates	WTC.
*Epoxidized linseed oils	ASH, SWT, VIK, WTC, X.
*Epoxidized soya oils	ASH, FMP, RH, SWT, UCC, VIK, WTC, X.
Epoxy oleates, mixed	RH.
2-Ethylhexyl epoxytallates	UCC.
Octyl epoxystearates	WTC.
Octyl epoxytallates	RH, WTC.
Epoxidized esters, all other	UCC.
Glyceryl tripropionate	EKT.

TABLE 2.--PLASTICIZERS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PLASTICIZERS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--CONTINUED	
LAURIC ACID ESTERS:	
Lauric acid esters, all other	GRO, HAL.
MYRISTIC ACID ESTERS:	
*Isopropyl myristate	ARC, RWC, TCH, WM, WTH.
Isopropyl palmitate-isopropyl myristate mixture	WTH.
Myristyl ethoxy myristate	SCP.
Myristic acid esters, all other	HUM.
*OLEIC ACID ESTERS:	
*Butyl oleate	ARC, CHL, ELC, EMR, GRO, HAL, WM, WTH.
Decyl oleate	SCP, VND.
Glyceryl trioleate (Triolein)	EMR, GLY, GRO, TCH.
Isobutyl oleate	DA.
*Methyl oleate	EMR, GRO, HUM, TCH.
*PROPYL OLEATES:	
Isopropyl oleate	SCP, WM.
n-Propyl oleate	CHL, EMR, GRO, TCH.
Oleic acid esters, all other	EMR, HAL.
PALMITIC ACID ESTERS:	
2-Ethylhexyl palmitate	WTH.
Isobutyl palmitate	ARC.
Isopropyl palmitate	CIN, RWC, TCH, WM, WTH.
Palmitic acid esters, all other	SCP.
PELARGONIC ACID ESTERS:	
Diethylene glycol dipelargonate (Diethylene glycol dinonanoate)	EMR.
Glycol pelargonate	EMR.
Isodecyl pelargonate	EMR.
*PHOSPHORIC ACID ESTERS:	
Tri(2-butoxyethyl) phosphate	FMP.
Tributyl phosphate	MON.
Triethyl phosphate	EKT.
Trioctyl phosphate	HN, UCC.
*RICINOLEIC AND ACETYLRICINOLEIC ACID ESTERS:	
n-Butyl acetylricinoleate	NTL.
Butyl ricinoleate	NTL.
Glyceryl monoricinoleate	NTL.
Glyceryl tri(acetylricinoleate)	NTL.

TABLE 2.--PLASTICIZERS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PLASTICIZERS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--CONTINUED	
*RICINOLEIC AND ACETYLRICINOLEIC ACID ESTERS--CONTINUED	
Methyl ricinoleate	NTL, TCH.
Ricinoleic and acetylricinoleic acid esters, all other	NTL, RH.
*SEBACIC ACID ESTERS:	
Dibutoxyethyl sebacate	HAL.
Dibutyl sebacate	EKT, HAL.
Di(2-ethylhexyl) sebacate	GRH, HAL, HCC, RH.
*STEARIC ACID ESTERS:	
*n-Butyl stearate	ARC, ASH, CHL, EMR, GRO, RWC, SCP, TCH, WM, WTH.
2-Ethylhexyl stearate	SCP.
Glyceryl triacetyl stearate	NTL.
Hexadecyl stearate	VND, WM.
*Isobutyl stearate	ARC, WM, WTH.
Isopropyl stearate	TCH, WTH.
Methyl stearate	CIN, GRO.
Polyglycol stearates	WTH.
Stearic acid esters, all other	GRO, SCP, TCH, VND, WM, WTH, X.
Sucrose acetate isobutyrate	ARC, EKT.
Tetraethylene glycol di(2-ethylhexanoate)	HAL, UCC.
Triethylene glycol di(caprylate-caprate)	HAL, PVO, WM.
Triethylene glycol di(2-ethylbutyrate)	UCC.
Triethylene glycol di(2-ethylhexanoate)	EKT, PVO.
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	EKX.
Acyclic plasticizers, all other	ARC, DA, EMR, HPC, PFZ, PVO, SM, TCH, VIK, WM, WTH.

TABLE 3.--PLASTICIZERS: DIRECTORY OF MANUFACTURERS, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of plasticizers to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of Company
ARC	Armak Co.	NEV	Neville Chemical Co.
ASH	Ashland Oil, Inc.	NTL	NL Industries, Inc.
BAS	BASF Wyandotte Corp.		
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Co. Div.	PFZ	Pfizer, Inc.
		PVO	PVO International, Inc.
CCA	Interstab Chemicals, Inc.		
CHL	Chemol, Inc.	RCI	Reichhold Chemicals, Inc.
CIN	Cindet Chemicals, Inc.	RH	Rohm & Haas Co.
CO	Continental Oil Co.	RUB	Hooker Chemical Corp., Hooker Chemicals & Plastics Corp., Ruco Div.
CPS	CPS Chemical Co.		
		RWC	Robinson-Wagner Co., Inc.
DA	Diamond Shamrock Corp.		
DOW	Dow Chemical Co.	SBC	Scher Brothers, Inc.
DUP	E. I. duPont de Nemours & Co., Inc.	SCP	Henkel, Inc.
		SFS	Stauffer Chemical Co., Specialty Chemical Div.
EK	Eastman Kodak Co.:		
EKT	Tennessee Eastman Co. Div.	SM	Mobil Oil Corp., Mobil Chemical Co. Div., Chemical Coatings Div.
EKX	Texas Eastman Co. Div.		
ELC	Elco Corp., Sub. of Detrex Chemical Industries, Inc.	SW	Sherwin-Williams Co.
		SWT	Unitech Chemical, Inc.
EMR	Emery Industries, Inc.		
ENJ	Exxon Chemical Co. U.S.A.	TCC	Tanatex Chemical Corp.
		TCH	Emory Industries, Inc., Trylon Div.
FMP	FMC Corp., Industrial Chemical Group	TEK	Teknor Apex Co.
		TKL	Thiokol Chemical Corp.
GLY	Glyco Chemicals, Inc.		
GRH	W. R. Grace & Co., Hatco Chemical Div.	UCC	Union Carbide Corp.
GRO	A. Gross & Co., Millmaster Onyx Group, Kewanee Industries, Inc.	USS	USS Chemicals Div. of U.S. Steel Corp.
HAL	C. P. Hall Co.	VEL	Velsicol Chemical Corp.
HCC	Hatco Chemical Corp.	VIK	Viking Chemical Co.
HN	Tenneco Chemicals, Inc.	VND	Van Dyk & Co., Inc.
HPC	Hercules, Inc.		
HUM	Kraft Inc., Humko Sheffield Chemical Operation	WM	Inolex Corp.
		WTC	Witco Chemical Corp.
KF	Kay-Fries Chemicals, Inc.	WTH	Union Camp Corp., Chemical Div.
MON	Monsanto Co.		

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix. The above codes identify those of the 57 reporting companies and company divisions for which permission to publish was not restricted.

STATISTICAL HIGHLIGHTS

Eric Land and J. Lawrence Johnson

The surface-active agents included in this report are organic chemicals that reduce the surface tension of water or other solvents and are used chiefly as detergents, dispersing agents, emulsifiers, foaming agents, or wetting agents in either aqueous or nonaqueous systems. Waxes and products used chiefly as plasticizers are excluded. Surface-active agents are produced from natural fats and oils, from silvichemicals such as lignin, rosin, and tall oil, and from chemical intermediates derived from coal tar and petroleum. A major part of the output of the bulk chemicals shown in this report is consumed in the form of packaged soaps and detergents for household and industrial use. The remainder is used in the processing of textiles and leather, in ore flotation and oil-drilling operations, and in the manufacture of agricultural sprays, cosmetics, elastomers, foods, lubricants, paint, pharmaceuticals, and many other products.

The statistics for production and sales of surface-active agents are grouped by ionic class and by chemical class and subclass. All quantities are reported in terms of 100-percent organic surface-active ingredient and thus exclude all inorganic salts, water, and other diluents. Sales statistics reflect sales of bulk surface-active agents only; sales of formulated products are excluded.

Total U.S. production of surface-active agents in 1978 amounted to 4,738 million pounds, or 0.4 percent more than the 4,718 million pounds reported for 1977. Sales of bulk surface-active agents in 1978 amounted to 2,708 million pounds, valued at $966 million, compared with sales in 1977 of 2,515 million pounds, valued at $875 million. In terms of quantity, sales in 1978 were 7.7 percent higher than in 1977; in terms of value, sales in 1978 were 10.4 percent greater than in 1977.

Production of anionic surface-active agents in 1978 amounted to 3,094 million pounds, or 65.3 percent of the total output reported for 1978. Sales of anionics in 1978 amounted to 1,511 million pounds valued at $359 million.

Production of cationic surface-active agents in 1978 amounted to 296 million pounds, 0.4 percent less than the 297 million pounds reported in 1977. Production of nonionic surface-active agents amounted to 1,324 million pounds in 1978, 10.8 percent greater than the 1,195 million pounds reported in 1977. Sales of cationic surface-active agents in 1978 decreased by 4.6 percent in terms of quantity but increased 7.6 percent in terms of value over 1977. Sales of nonionics in 1978, however, increased by 12.9 percent, in terms of quantity and by 14.9 percent in terms of value over 1977.

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The difference between production and sales reflects inventory changes and captive consumption of soaps and surface-active agents by synthetic rubber producers, and by manufacturers of cosmetics, packaged detergents, bar soaps, and other formulated consumer products. In some instances the difference may also reflect quantities of surface-active agents used as chemical intermediates, e.g., nonionic alcohol and alkylphenol ethoxylates which may be converted to anionic surface-active agents by phosphation or sulfation.

TABLE 1.--SURFACE-ACTIVE AGENTS: U.S. PRODUCTION AND SALES, 1978

[Listed below are all surface-active agents for which reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all surface-active agents for which data on production and/or sales were reported and identifies the manufacturers of each]

SURFACE-ACTIVE AGENTS	PRODUCTION[1]	SALES[2] QUANTITY[1]	SALES[2] VALUE	SALES[2] UNIT VALUE[3]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Grand total	4,737,853	2,708,035	965,660	$0.36
Benzenoid[4]	1,099,120	570,987	228,476	.40
Nonbenzenoid[5]	3,638,733	2,137,048	737,184	.34
AMPHOTERIC				
Total	22,971	22,349	20,797	.93
ANIONIC				
Total	3,094,451	1,510,946	359,112	.24
Carboxylic acids (and salts thereof), total	815,655	143,206	54,075	.38
Amine sales of fatty, rosin, and tall oil acids	2,193	876	1,018	1.16
Carboxylic acids having amide, ester, or ether linkages	4,837	4,509	4,789	1.06
Coconut oil acids, potassium salt	9,203	1,836	1,464	.80
Coconut oil acids, sodium salt	162,511	1,658	383	.23
Mixed vegetable oil acids, potassium salt	2,610	2,823	2,864	1.01
Oleic acid, potassium salt	433	204	144	.71
Oleic acid, sodium salt	579	132	107	.81
Soybean oil acid, potassium salt	1,107	313	139	.44
Stearic acid, potassium salt	517	...	...	...
Tall oil acids, potassium salt	10,367	3,963	2,166	.55
Tall oil acids, sodium salt	1,482	1,173	337	.29
Tallow acids, sodium salt	358,720	...	...	...
All other carboxylic acids (and salts thereof)	261,096	125,719	40,664	.32
Phosphoric and polyphosphoric acid esters (and salts thereof), total	38,033	23,690	17,365	.73
Alcohols and phenols, alkoxylated and phosphated, total	18,518	16,309	11,273	.69
Mixed linear alcohols, ethoxylated and phosphated	4,771	3,901	3,045	.78
Nonylphenol, ethoxylated and phosphated	6,285	5,378	3,476	.65
Phenol, ethoxylated and phosphated	2,256	2,329	1,673	.72
Tridecyl alcohol, ethoxylated and phosphated	812	...	...	...
All other	4,394	4,701	3,079	.65
All other phosphoric and polyphosphoric acid esters (and salts thereof)	19,515	7,381	6,092	.83
Sulfonic acids (and salts thereof), total	1,645,140	1,104,910	176,511	.16
Alkybenzenesulfonates, total	639,859	179,944	62,412	.35
Dodecylbenzenesulfonic acid	203,406	95,309	29,237	.31
Dodecylbenzenesulfonic acid, calcium salt	6,688	8,260	6,315	.76
Dodecylbenzenesulfonic acid, isopropylamine salt	3,346	3,382	2,037	.60
Dodecylbenzenesulfonic acid, sodium salt	310,904	52,416	13,927	.27
Dodecylbenzenesulfonic acid, triethanolamine salt	6,211	6,426	2,715	.42
Tridecylbenzenesulfonic acid	1,530	...	...	...
All other	107,774	14,151	8,181	.58
Ligninsulfonates, total	830,004	802,871	52,179	.06
Ligninsulfonic acid, calcium salt	553,681	526,403	20,734	.04

See footnotes at end of table.

TABLE 1.--SURFACE-ACTIVE AGENTS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	PRODUCTION[1]	SALES[2] QUANTITY[1]	SALES[2] VALUE	SALES[2] UNIT VALUE[3]
ANIONIC--Continued	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
Sulfonic acids (and salts thereof)--Continued				
Ligninsulfonic acid--Continued				
Ligninsulfonic acid, iron salt	2,226	2,226	368	$0.17
Ligninsulfonic acid, sodium salt	120,868	121,013	14,759	.12
All other	153,229	153,229	16,318	.11
Naphthalenesulfonates, total	17,821	...	...	...
Diisopropylnaphthalenesulfonic acid, sodium salt	2,121	...	...	...
All other	15,700	...	...	...
Sulfonic acids having amide linkages, total	5,680	4,093	4,557	1.11
Sulfosuccinamic acid derivatives	2,690	...	...	...
Taurine derivatives	2,990	...	...	...
All other	...	4,093	4,557	1.11
Sulfonic acids having ester or ether linkages, total	75,746	28,905	31,020	1.07
Sulfosuccinic acid esters, total	21,996	16,380	13,251	.81
Sulfosuccinic acid, bis(2-ethylhexyl)ester, sodium salt	17,940	12,773	11,022	.86
All other	4,056	3,607	2,229	.62
Other sulfonic acids having ester or ether linkages	53,750	12,525	17,769	1.42
Xylenesulfonic acid, ammonium salt	5,470	6,020	1,183	.20
Xylenesulfonic acid, sodium salt	31,693	23,683	6,512	.27
All other sulfonic acids (and salts thereof)	38,867	59,394	18,648	.31
Sulfuric acid esters (and salts thereof), total	551,080	223,178	105,776	.47
Acids, amides, and esters, sulfated, total	22,818	17,493	10,509	.60
Butyl oleate, sulfated, sodium salt	1,071	1,003	451	.45
Isopropyl oleate, sulfated, sodium salt	129	129	92	.71
Propyl oleate, sulfated, sodium salt	442	389	192	.49
Tall oil sulfated, sodium salt	2,794	1,579	457	.29
All other	18,382	14,393	9,317	.65
Alcohols, sulfated, total	222,869	46,848	37,653	.80
Dodecyl sulfate, ammonium salt	13,815	10,422	7,703	.74
Dodecyl sulfate, isopropanolamine salt	111	...	...	...
Dodecyl sulfate, magnesium salt	271	251	273	1.09
Dodecyl sulfate, sodium salt	...	19,442	15,743	.81
Dodecyl sulfate, triethanolamine salt	7,269	6,501	5,252	.81
Mixed linear alcohols, sulfated, ammonium salt	26,936	1,542	959	.62
Mixed linear alcohols, sulfated, sodium salt	...	2,989	2,364	.79
Mixed linear alcohols, sulfated, triethanolamine salt	...	677	466	.69
Octyl sulfate, sodium salt	178	180	158	.88
All other	174,289	4,844	4,735	.98
Ethers, sulfated, total	284,802	139,537	50,548	.36
Dodecyl alcohol, ethoxylated and sulfated, sodium salt	14,163	13,621	10,618	.78
Mixed linear alcohols, ethoxylated and sulfated, ammonium salt	114,525	...	...	...
Mixed linear alcohols, ethoxylated and sulfated, sodium salt	...	33,461	11,182	.33
All other	156,114	92,455	28,748	.31
Natural fats and oils, sulfated, total	20,591	19,300	7,066	.37
Castor oil, sulfated, sodium salt	3,902	3,663	2,127	.58
Cod oil, sulfated, sodium salt	1,717	1,695	433	.26
Neat's-foot oil, sulfated, sodium salt	1,208	798	301	.38
Tallow sulfated, sodium salt	3,751	3,596	1,061	.30
All other	10,013	9,548	3,144	.33
Other anionic surface-active agents[6]	44,543	15,962	5,385	.34

See footnotes at end of table.

TABLE 1.--SURFACE-ACTIVE AGENTS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	PRODUCTION[1]	SALES[2]		
		QUANTITY[1]	VALUE	UNIT VALUE[3]
CATIONIC	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
Total	296,261	194,891	151,533	$0.78
Amine oxides and oxygen-containing amines (except those having amide linkages), total	75,414	25,016	18,944	.76
Acyclic, total	66,890	21,609	16,817	.78
(Coconut oil alkyl)amine, ethoxylated	2,056	...	...	...
(Mixed alkyl)amine, ethoxylated	...	1,878	1,869	1.00
(Tallow alkyl)amine, ethoxylated	3,051	3,290	2,237	.68
All other	61,783	16,441	12,711	.77
Cyclic (including imidazoline and oxazoline derivatives), total	8,524	3,407	2,127	.60
1-(2-Hydroxyethyl)-2-nor(coconut oil alkyl)-2-imidazoline	107	...	...	...
1-(2-Hydroxyethyl)-2-nor(tall oil alkyl)-2-imidazoline	...	105	94	.89
All other	8,417	3,302	2,033	.59
Amines and amine oxides having amide linkages, total	28,807	22,290	16,913	.76
Tall oil acids - diethylenetriamine and polyalkylenepolyamine condensates	8,810	...	...	...
All other	19,997	22,290	16,913	.76
Amines, not containing oxygen (and salts thereof), total	78,130	59,512	44,472	.75
Diamines, polyamines, and amino salts, total	20,546	17,410	11,858	.68
Imidazoline derivatives	1,255	1,125	1,629	1.45
N-(9-Octadecenyl)trimethylenediamine	2,081	1,780	1,340	.75
All other	17,210	14,505	8,889	.61
Primary, secondary, and tertiary monoamines, total	57,584	42,102	32,614	.77
N,N-Dimethyl(mixed alkyl)amine	7,600	6,972	6,520	.94
(Hydrogenated tallow alkyl)amine	3,695	...	...	...
9-Octadecenylamine	3,626	3,203	2,191	.68
(Tallow alkyl)amine	9,168	4,369	2,893	.66
All other	33,495	27,558	21,010	.76
Quaternary ammonium salts, containing oxygen	25,570	...	...	...
Quaternary ammonium salts, not containing oxygen, total	85,686	65,276	54,638	.84
Acyclic, total	70,521	51,270	34,945	.68
Bis(coconut oil alkyl)dimethylammonium chloride	3,282	2,478	2,072	.84
Bis(hydrogenated tallow alkyl)dimethylammonium chloride	57,506	39,833	21,202	.53
All other	9,733	8,959	11,671	1.30
Benzenoid, total	15,165	14,006	19,693	1.41
Benzyl(coconut oil alkyl)dimethylammonium chloride	197	177	180	1.02
Benzyldimethyl(mixed alkyl)ammonium chloride	8,315	7,919	12,000	1.52
Benzyldimethyloctadecylannonium chloride	1,760	...	...	...
Benzyltrimethylammonium chloride	1,789	1,177	592	.50
All other	3,104	4,733	6,921	1.46
Other cationic surface-active agents	2,654	22,797	16,566	.73
NONIONIC				
Total	1,324,170	979,849	434,218	.44
Carboxylic acid amides, total	69,391	40,695	24,357	.60

See footnotes at end of table.

TABLE 1.--SURFACE-ACTIVE AGENTS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	PRODUCTION[1]	SALES[2] QUANTITY[1]	SALES[2] VALUE	SALES[2] UNIT VALUE[3]
NONIONIC--Continued				
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Carboxylic acid amides--Continued				
Diethanolamine condensates (amine/acid ratio=2/1), total	23,449	17,354	10,138	$0.58
Capric acid	124	92	82	.89
Coconut oil acids	11,267	8,478	4,897	.58
Coconut oil and tallow acids	2,133	2,070	1,078	.52
Lauric acid	186	172	132	.77
Lauric and myristic acids	3,242	1,752	1,208	.69
Oleic acid	1,137	...	...	...
Stearic acid	573	308	128	.41
Tall oil acids	190	190	119	.63
All other	4,597	4,292	2,494	.58
Diethanolamine condensates (other amine/acid ratios), total	24,692	19,135	11,452	.60
Coconut oil acids (amine/acid ratio-1/1)	14,618	13,932	7,968	.57
Lauric acid (amine/acid ratio-1/1)	4,281	1,388	970	.70
Lauric and myristic acid (amine/acid ratio=1/1)	4,000	3,009	2,077	.69
Oleic acid (amine/acid ratio=1/1)	170	...	...	...
Stearic acid (amine/acid ratio=1/1)	233	205	100	.49
Tall oil acids	1,206	...	...	...
All other	184	601	337	.56
All other carboxylic acid amides, total	21,250	4,206	2,767	.66
Coconut oil acids (ratio 1/1), ethanolamine condensate	5,417	1,019	674	.66
All other	15,833	3,187	2,093	.66
Carboxylic acid esters, total	240,550	192,802	123,243	.64
Anhydrosorbitol esters, total	28,473	18,338	13,569	.74
Anhydrosorbitol monolaurate	...	3,884	3,224	.83
Anhydrosorbitol mono-oleate	6,122	5,659	4,156	.73
All other	22,351	8,795	6,189	.70
Diethylene glycol esters, total	1,493	1,336	821	.61
Diethylene glycol distearate	396	404	285	.71
Diethylene glycol monolaurate	243	233	135	.58
Diethylene glycol mono-oleate	24	15	12	.80
Diethylene glycol monostearate	180	185	121	.65
All other	650	499	268	.54
Ethoxylated anhydrosorbitol esters, total	30,324	31,014	19,331	.62
Ethoxylated anhydrosorbitol monolaurate	8,610	8,757	5,628	.64
Ethoxylated anhydrosorbitol mono-oleate	7,660	7,513	4,805	.64
Ethoxylated anhydrosorbitol nonostearate	8,301	9,053	5,146	.57
All other	5,753	5,691	3,752	.66
Ethylene glycol distearate	1,660	1,676	698	.42
Ethylene glycol monostearate	2,480	2,417	1,682	.70
Glycerol esters, total	91,153	79,301	46,746	.59
Glycerol esters of chemically defined acids, total	25,776	21,897	12,175	.56
Glycerol mono-oleate	3,419	3,349	2,347	.70
Glycerol monostearate	21,128	17,560	8,793	.50
All other	1,229	988	1,035	1.05
Glycerol esters of mixed acids, total	55,444	48,026	28,388	.59
Glycerol monoester of hydrogenated cottonseed oil acids	2,658	...	...	...
Glycerol monoester of hydrogenated soybean oil acids	8,627	8,643	5,696	.66
All other	44,159	39,383	22,692	.58
Natural fats and oils, ethoxylated, total	15,149	13,469	7,842	.58
Castor oil, ethoxylated	9,570	8,698	4,990	.57
Hydrogenated castor oil, ethoxylated	1,750	...	...	...
Lanolin, ethoxylated	1,433	1,250	1,109	.89
All other	2,396	3,521	1,743	.50

See footnotes at end of table.

TABLE 1.--SURFACE-ACTIVE AGENTS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	PRODUCTION[1]	SALES[2]		
		QUANTITY[1]	VALUE	UNIT VALUE[3]
NONIONIC--Continued	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
Carboxylic acid esters--Continued				
Polyethylene glycol esters, total	37,329	29,547	17,340	$0.59
Polyethylene glycol esters of chemically defined acids, total	24,265	19,237	13,082	.68
Polyethylene glycol dilaurate	1,353	...	...	...
Polyethylene glycol dioleate	3,386	1,034	676	.65
Polyethylene glycol distearate	3,189	3,065	2,238	.73
Polyethylene glycol monolaurate	4,782	4,560	3,124	.69
Polyethylene glycol mono-oleate	3,614	3,106	1,963	.63
Polyethylene glycol monostearate	6,920	5,422	3,717	.69
All other	1,021	2,050	1,364	.67
Polyethylene glycol esters of mixed acids, total	13,064	10,310	4,258	.41
Polyethylene glycol diester of tall oil acids	1,858	...	...	...
All other	11,206	10,310	4,258	.41
Polyglycerol esters	1,378	1,215	1,277	1.05
1,2-Propanediol monolaurate	59	...	...	...
1,2-Propanediol monostearate	2,571	2,316	1,598	.69
All other carboxylic acid esters	28,481	12,173	12,339	1.01
Ethers, total	981,125	740,744	279,769	.38
Benzenoid ethers, total	325,859	270,138	96,525	.36
Dodecylphenol, ethoxylated	14,069	13,658	5,147	.38
Nonylphenol, ethoxylated	203,556	181,699	59,129	.33
Phenol, ethoxylated	3,414	...	...	...
All other	104,820	74,781	32,249	.43
Nonbenzenoid ethers, total	655,266	470,606	183,244	.39
Linear alcohols, alkoxylated, total	568,875	408,690	148,361	.36
Decyl alcohol, ethoxylated	3,062	2,808	1,151	.41
Mixed linear alcohols, ethoxylated	475,794	373,185	131,869	.35
Mixed linear alcohols, ethoxylated and propoxylated	23,161	21,639	8,355	.39
9-Octadecenyl alcohol, ethoxylated	1,152	970	850	.88
Oleyl alcohol, ethoxylated	339	302	402	1.33
All other	65,367	9,786	5,734	.59
Other ethers and thioethers, total	86,391	61,916	34,883	.56
Tridecyl alcohol, ethoxylated	7,834	6,571	3,279	.50
All other	78,557	55,345	31,604	.57
Other nonionic surface-active agents	33,104	5,608	6,849	1.22

[1]All quantities are given in terms of 100 percent organic surface-active ingredient.
[2]Sales include products sold as bulk surface-active agents only.
[3]Calculated from unrounded figures.
[4]The term "benzenoid" used in this report, describes any surface-active agents, except lignin derivatives, whose molecular structure includes 1 or more 6-membered carbocyclic or hetercyclic rings with conjugated double bonds (e.g., the benzene ring or the pyridine ring).
[5]Includes ligninsulfonates.
[6]Includes all other natural fats and oils, sulfated.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*) CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT]

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
AMPHOTERIC	
1,1-Bis(carboxyethyl)-2-undecyl-imidazoline, sodium salt	MOA.
1,1-Bis(carboxymethyl)-2-undecyl-2-imidazolinium chloride, disodium salt	SCP.
1,1-Bis(carboxymethyl)-2-undecyl-2-imidazolinium hydroxide, disodium salt	BRD, WTC.
(1-Carboxyheptadecyl)trimethylammonium hydroxide, inner salt	DUP.
(Carboxymethyl)[3-(coconut oil amido)propyl]dimethyl ammonium chloride, sodium salt	X.
(Carboxymethyl)[3-(coconut oil amido)propyl]dimethyl ammonium hydroxide, inner salt	HLI, WM.
1-Carboxymethyl-2-heptadecyl-1-(2-hydroxyethyl)-2-imidazolinium hydroxide, sodium derivative, sodium salt	MIR.
1-Carboxymethyl-1-(2-hydroxyethyl)-2-nonyl-2-imidazolinium hydroxide, sodium derivative, sodium salt	MIR.
1-Carboxymethyl-1-(2-hydroxyethyl)-2-undecyl-2-imidazolinium hydroxide, sodium derivative, sodium salt	GAF, MIR.
N-(Coconut oil alkyl)-β-alanine, sodium salt	DUP, SCP.
N-Dodecyl-3-iminodipropionic acid	SCP.
N-Dodecyl-3-iminodipropionic acid, disodium salt	SCP.
Heptadecylmethylbenzimidazolinesulfonic acid, sodium salt	CGY.
Mixed acyclic primary amines, ethoxylated and sulfated, sodium salt	DUP, RH.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
AMPHOTERIC--CONTINUED	
Oleic acid-ethylenediamine condensate, propoxylated and sulfated, sodium salt	S.
Polypeptide ammonium salt	X.
Polypeptide ethyl ester	X.
Polypeptide, sodium salt	X.
N-(Tallow alkyl)-3-iminodipropionic acid, disodium salt	SCP.
Amphoteric surface-active agents, all other	ARC, DUP, MIR, MOA, SBC, SCP.
ANIONIC	
*CARBOXYLIC ACIDS (AND SALTS THEREOF):	
*AMINE SALTS OF FATTY, ROSIN, AND TALL OIL ACIDS:	
Coconut oil acids, ethanolamine salt	SBP.
Mixed fatty acids, ethanolamine salt	SBP.
Oleic acid, butylamine salt	DYS.
Oleic acid, diethylamine salt	ASH, WTC.
Rosin acids, triethanolamine salt	AES, ONX.
Stearic acid,N,N,N',N'-tetrakis(2-hydroxyethyl)-ethylenediamine salt	ICI, X.
Stearic acid, triethanolamine salt	GLY.
Tallow acids, ethanolamine salt	SBP.
Tallow acids, triethanolamine salt	SBP.
Amine salts of fatty, rosin,and tall oil acids, all other	RWC, USR, VAL, WM, X, X.
*CARBOXYLIC ACIDS HAVING AMIDE, ESTER, OR ETHER LINKAGES:	
N-(Coconut oil acyl)polypeptide, potassium salt	X.
N-(Coconut oil acyl)polypeptide, triethanolamine salt	X.
N-(Coconut oil acyl)sarcosine	HMP.
N-(Coconut oil acyl)sarcosine, sodium salt	HMP.
N-Lauroylsarcosine	HMP.
N-Lauroylsarcosine, sodium salt	CP, HMP, ONX.
N-Oleoylpolypeptide, sodium salt	LMI.
N-Oleoylsarcosine	HMP.
Carboxylic acids with amide, ester or ether linkage, other	BRD, CHP, HMP, X.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ANIONIC--CONTINUED	
*CARBOXYLIC ACIDS (AND SALTS THEREOF)--CONTINUED	
POTASSIUM AND SODIUM SALTS OF FATTY, ROSIN, AND TALL OIL ACIDS:	
Animal grease, sodium salt	NMC.
Castor oil acids, potassium salt	NTL, SEA.
Castor oil acids, sodium salt	PG.
*Coconut oil acids, potassium salt	AES, CON, DA, DYS, ESS, GRC, HNT, NMC, PCH, PEK, PG, PNX, SNW.
*Coconut oil acids, sodium salt	AGP, BSW, CON, CP, GRC, JRG, LEV, NMC, NPR, PG.
Corn oil acids, potassium salt	GRC, HNT, NMC.
Corn oil acids, sodium salt	GRC.
Fish oil acids, sodium salt	DA, PG.
Lauric acid, potassium salt	GAF.
*Mixed vegetable fatty acids, potassium salt	AES, DYS, GRC, GRL, LUR, PCH, QCP, SLC, SOP.
*Oleic acid, potassium salt	AES, DA, HAL, HNT, SNW, USR, WBG, X.
*Oleic acid, sodium salt	BSW, LUR, NMC, USR, WBG, WTC.
Olive oil acids, sodium salt	HNT.
Palm oil acids, sodium salt	PG.
Rosin acids, potassium salt	PEK, X.
Rosin acids, sodium salt	HRT, SLM, X.
*Soybean oil acids, potassium salt	CON, PEK, PNX.
*Stearic acid, potassium salt	CON, DA, PG, USR, WTC.
Stearic acid, sodium salt	DA, WTC.
*Tall oil acids, potassium salt	AES, ASY, CON, DAN, DYS, ESS, GRC, HNT, PEK, PNX, X.
*Tall oil acids, sodium salt	AES, ASY, CON, GRC, NMC, UNP, X.
Tallow acids, potassium salt	AES, AGP, ASY, DYS, PG, USR.
*Tallow acids, sodium salt	ASY, BSW, CON, CP, GRC, JRG, LEV, LUR, NMC, NPR, PG, PRX.
Potassium and sodium salts of fatty, rosin, and tall oil acids, all other	NMC, PG, VAL.
OTHER CARBOXYLIC ACIDS:	
Carboxylic acids, all other	BSW, NMC, SCP, USR.
*PHOSPHORIC AND POLYPHOSPHORIC ACID ESTERS (AND SALTS THEREOF):	
*ALCOHOLS AND PHENOLS, ALKOXYLATED AND PHOSPHATED:	
Butyl alcohol, ethoxylated and phosphated	GAF.
Dinonylphenol, ethoxylated and phosphated	GAF, MOA, TCH.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ANIONIC--CONTINUED	
*PHOSPHORIC AND POLYPHOSPHORIC ACID ESTERS (AND SALTS THEREOF)--CONTINUED	
*ALCOHOLS AND PHENOLS, ALKOXYLATED AND PHOSPHATED-CON	
Dodecyl alcohol, ethoxylated and phosphated	GAF.
Dodecylphenol, ethoxylated and phosphated	ARL, GAF.
Hexylphenol, ethoxylated and phosphated	CRT.
Isopentyl alcohol, ethoxylated and phosphated	GAF.
*Mixed linear alcohols, ethoxylated and phosphated	AZS, BAS, CHP, CRT, CST, CTL, GAF, HRT, MOA, SCP, STC, TCH, WTC.
*Nonylphenol, ethoxylated and phosphated	ARL, CHP, CTL, DEX, GAF, HRT, MOA, SCP, SOP, TCC, WTC, X.
9-Octadecenyl alcohol, ethoxylated and phosphated	GAF.
Octylphenol, ethoxylated and phosphated	RH.
*Phenol, ethoxylated and phosphated	GAF, MOA, RH, TCH, WTC, X.
Polyhydric alcohol, ethoxylated and phosphated	DEX, SCP.
*Tridecyl alcohol, ethoxylated and phosphated	DAN, GAF, MIL, SNW, WTC, X.
Alcohols and phenols, alkoxylated and phosphated or polyphosphated, all other	BAS, CHP, GAF, MIL, TCH, X.
ALCOHOLS, PHOSPHATED OR POLYPHOSPHATED:	
Butyl phosphate, potassium salt	DUP.
Decyl and octyl phosphate	GAF.
Decyl polyphosphate, sodium salt	GAF.
2-Ethylhexyl phosphate	TCC.
2-Ethylhexyl phosphate, sodium salt	CHP, DSM, WTC.
2-Ethylhexyl polyphosphate	X.
2-Ethylhexyl polyphosphate, sodium salt	X.
Hexyl phosphate	ICI, SFS.
Hexyl phosphate, potassium salt	ICI.
Hexyl polyphosphate, potassium salt	DEX.
Mixed alkyl phosphate	CTL, DUP, SFS, STC, X.
Mixed alkyl phosphate, diethanolamine salt	DUP.
Octyl decyl phosphate	X.
Octyl phosphate	SCP, TCC, WTC, X.
Octyl phosphate, alkylamine salt	DUP, SCP.
Octyl phosphate, potassium salt	DEX, DUP.
Octyl polyphosphate	DEX.
Octyl polyphosphate, potassium salt	SNW, X.
Phosphated and polyphosphated alcohols, all other	DUP, HRT, MIL, VAL, X.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ANIONIC--CONTINUED	
*PHOSPHORIC AND POLYPHOSPHORIC ACID ESTERS (AND SALTS THEREOF)--CONTINUED	
OTHER PHOSPHORIC OR POLYPHOSPHORIC ACID ESTERS:	
Glycerol monoester of mixed fatty acids, phosphated	QCP, WTC.
Phosphoric and polyphosphoric acid esters, all other	BAS, X.
*SULFONIC ACIDS (AND SALTS THEREOF):	
*ALKYLBENZENESULFONATES:	
DODECYLBENZENESULFONATES:	
*Dodecylbenzenesulfonic acid	ARC, ATR, CO, CRT, CTL, EMK, HLI, LAK, LEV, MON, PIL, PLX, PRX, RCD, STP, TCI, TEN, WTC, X.
Dodecylbenzenesulfonic acid, (Mixed alkyl)amine salt	ECC, HLI, X.
Dodecylbenzenesulfonic acid, ammonium salt	AES, STC.
Dodecylbenzenesulfonic acid, branched chain	WTC.
*Dodecylbenzenesulfonic acid, calcium salt	ICI, RCD, RH, STC, STP, TMH, WTC, X.
Dodecylbenzenesulfonic acid, dimethylamine salt	PIL.
*Dodecylbenzenesulfonic acid, isopropanolamine salt	PIL.
Dodecylbenzenesulfonic acid, isopropylamine salt	CIN, CTL, ICI, RCD, STP, TCH, WTC.
Dodecylbenzenesulfonic acid, potassium salt	AES, STP.
*Dodecylbenzenesulfonic acid, sodium salt	AAC, AES, APX, ARC, ARD, ATR, BLA, CO, CP, CRT, CTL, DUP, ECC, HLI, LEV, NMC, PEK, PG, PIL, PRX, RCD, STP, TEN.
Dodecylbenzenesulfonic acid, sodium salt, branched chain	WTC.
*Dodecylbenzenesulfonic acid, triethanolamine salt	AAC, ARD, ARL, ATR, CIN, CTL, ESS, HLI, PIL, RCD, STP, WTC.
OTHER ALKYLBENZENESULFONATES:	
Decylbenzenesulfonic acid, sodium salt	ATR, PLX.
Didodecylbenzenesulfonic acid	WTC.
Pentadecylbenzenesulfonic acid, potassium salt	CP.
Tridecylbenzenesulfonic acid	PLX, RCD, STP, WTC.
*Tridecylbenzenesulfonic acid, sodium salt	BLA, NPR, PG, RCD, WTC.
Undecylbenzene sulfonic acid	SCP.
Undecylbenzene sulfonic acid, sodium salt	WTC.
Undecylbenzene sulfonic acid, triethanolamine salt	SCP, WTC.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ANIONIC--CONTINUED	
*SULFONIC ACIDS (AND SALTS THEREOF)--CONTINUED	
*ALKYLBENZENESULFONATES--CONTINUED	
OTHER ALKYLBENZENESULFONATES--CONTINUED	
Alkylbenzene sulfonates, all other	SCP.
BENZENE-, CUMENE-, TOLUENE-, AND XYLENESULFONATES:	
Cumenesulfonic acid, ammonium salt	NES, WTC.
Cumenesulfonic acid, sodium salt	NES, STP, WTC.
Toluenesulfonic acid, potassium salt	NES.
Toluenesulfonic acid, sodium salt	CO, NES, PG, WTC.
*Xylenesulfonic acid, ammonium salt	CO, NES, STP, WTC.
*Xylenesulfonic acid, sodium salt	CO, ICI, NES, PIL, SDC, STP, WTC.
Benzene-, cumene-, toluene-, and xylenesulfonates, all other	WTC.
*LIGNINSULFONATES:	
Ligninsulfonic acid, ammonium salt	CRZ, SPA.
*Ligninsulfonic acid, calcium salt	CRZ, CWP, LKY, MAR, PSP.
Ligninsulfonic acid, chromium salt	MAR, PSP, RAY.
*Ligninsulfonic acid, iron salt	CRZ, MAR, PSP.
Ligninsulfonic acid, magnesium salt	MAR.
*Ligninsulfonic acid, sodium salt	CRZ, MAR, PSP, RAY, WVA.
Ligninsulfonic acid, zinc salt	MAR, PSP.
Ligninsulfates, all other	AZS, X.
*NAPHTHALENESULFONATES:	
Butylnaphthalenesulfonic acid, sodium salt	DA, ECC.
Dibutylnaphthalenesulfonic acid	GAF.
*Diisopropylnaphthalenesulfonic acid, sodium salt	DA, DUP, UDI.
Dipentylnaphthalenesulfonic acid	X.
Dipentylnaphthalenesulfonic acid, (Mixed alkyl) amine salt	X.
Dipentylnaphthalenesulfonic acid, ammonium salt	X.
Methylenebis(2-naphthalenesulfonic acid), sodium salt	DUP.
Methylnaphthalenesulfonic acid, sodium salt	DA, UDI.
Methylnonylnaphthalenesulfonic acid, sodium salt	UDI.
Naphthalenesulfonates, all other	DUP.
*SULFONIC ACIDS HAVING AMIDE LINKAGES:	
*SULFOSUCCINAMIC ACID DERIVATIVES:	
N-(1,2-Dicarboxyethyl)-N-octadecylsulfosuccinamic acid, tetrasodium salt	ACY, MOA.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ANIONIC--CONTINUED	
*SULFONIC ACIDS(AND SALTS THEREOF)--CONTINUED	
*SULFONIC ACIDS HAVING AMIDE LINKAGE--CONTINUED	
*SULFOSUCCINAMIC ACID DERIVATIVES--CONTINUED	
N-Octadecylsulfosuccinamic acid, disodium salt	ACY.
N-(Oleoyloxyisopropyl)sulfosuccinamic acid	WTC.
Sulfosuccinamic acid derivatives, all other	ARD.
*TAURINE DERIVATIVES:	
N-(Coconut oil acyl)-N-methyltaurine, sodium salt	GAF, TNI.
N-Cyclohexyl-N-palmitoyltaurine, sodium salt	GAF.
N-Methyl-N-oleoyltaurine, sodium salt	GAF, HRT, STC.
N-Methyl-N-palmitoyltaurine, sodium salt	GAF.
N-Methyl-N-(tall oil acyl)taurine, sodium salt	CRT, GAF, USM, X.
ALL OTHER SULFONIC ACIDS HAVING AMIDE LINKAGES:	
Sulfonic acids having amide linkages, all other	DA.
*SULFONIC ACIDS HAVING ESTER OR ETHER LINKAGES:	
*SULFOSUCCINIC ACID ESTERS:	
Sulfosuccinic acid-bis(diisobutyl)ester, sodium salt	MOA.
Sulfosuccinic acid, bis(2,6-dimethyl-4-heptyl) ester, sodium salt	DAN, MOA, PC.
*Sulfosuccinic acid, bis(2-ethylhexyl)ester, sodium salt	ACY, CHP, CRT, DAN, ECC, EMK, HDG, HRT, MCP, MOA, RH, SBC, SCO, SOS, USM, WTC.
Sulfosuccinic acid, dihexyl ester, sodium salt	ACY, MOA.
Sulfosuccinic acid, diisodecyl ester, sodium salt	ACY.
Sulfosuccinic acid, dipentyl ester, sodium salt	ACY, DA.
Sulfosuccinic acid, ditridecyl ester, sodium salt	ACY, MOA.
Sulfosuccinic acid esters, all other	ARD, HDG, LAK, RH, SCP, WTC.
ALL OTHER SULFONIC ACIDS HAVING ESTER OR ETHER LINKAGES:	
Coconut oil acids, 2-sulfoethyl ester, sodium salt	GAF, LEV.
Dodecyldiphenyloxidedisulfonic acid, disodium salt	CTL, DCC, X.
Dodecyl sulfoacetate, sodium salt	STP.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ANIONIC--CONTINUED	
*SULFONIC ACIDS (AND SALTS THEREOF)--CONTINUED	
*SULFONIC ACIDS HAVING ESTER OR ETHER LINKAGES--CON'T.	
ALL OTHER SULFONIC ACIDS HAVING ESTER OR ETHER LINKAGES--CONTINUED	
Glycerol monostearate sulfoacetate, sodium salt	WTC.
Iso-octyphenol, ethoxylated and sulfonated, sodium salt	RH.
n-Octylphenol, ethoxylated and sulfonated, sodium salt	CRT.
Sulfonic acids with ether linkages, all other	PG, USR, WTC, X.
OTHER SULFONIC ACIDS:	
Mixed alkane sulfonic acid, sodium salt	CCL, DUP, QCP, X.
Sulfosuccinic acid-half ester (Coconut mono-isopropanol)amide, disodium salt	MOA.
Sulfonic acids, all other	ARD, LAK, RBC, SLM, STP, WTC.
*SULFURIC ACID ESTERS (AND SALTS THEREOF):	
*ACIDS, AMIDES, AND ESTERS, SULFATED:	
Coconut oil acids-ethanolamine salt, sulfated, potassium salt	EMK.
CARBOXYLIC ACID ESTERS (EXCEPT NATURAL FATS AND OILS), SULFATED:	
ESTERS OF SULFATED OLEIC ACID:	
2-Butoxyethyl oleate, sulfated, sodium salt	S.
*Butyl oleate, sulfated, sodium salt	AKS, CHP, CIN, CRT, ICI, MRV, PC.
Butyl and propyl oleate, sulfated, sodium salt	MCP.
Isobutyl oleate, sulfated, sodium salt	DA.
*Isopropyl oleate, sulfated, sodium salt	CRT, DEX, HRT.
Methyl oleate, sulfated, sodium salt	DUP, ICI.
*Propyl oleate, sulfated, sodium salt	ACY, AKS, CHP, GAF, MRV.
Esters of sulfated oleic acid, all other	CHP.
OTHER SULFATED ESTERS:	
Glycerol monoester of coconut oil acids, sulfated, sodium salt	CP, X.
9-Octadecenyl acetate, sulfated, sodium salt	DUP.
Sulfated esters, all other	DA.
OTHER SULFURIC ACID ESTERS:	
Mixed fatty acids, sulfated, potassium salt	SCO.
Oleic acid, sulfated, disodium salt	ACT, ACY, DA, TEN.
Sulfuric acid esters, all other	BFP, SLM, TEN.
*Tall oil, sulfated, sodium salt	ACT, APX, BAO, CHP, CRT, ICI, KAL, SEA, SOS, WHI, WHW.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ANIONIC--CONTINUED	
*SULFURIC ACID ESTERS (AND SALTS THEREOF)--CONTINUED	
*ALCOHOLS, SULFATED:	
Decyl and octyl sulfate, sodium salt	TCH.
Decyl sulfate, sodium salt	HLI, SCP.
DODECYLSULFATE SALTS:	
Dodecyl sulfate, 2-amino-2-methylpropanol salt	HLI.
*Dodecyl sulfate, ammonium salt	AAC, CTL, HLI, JRG, ONX, SCP, STP, TCH, TNI.
Dodecyl sulfate, diethanolamine salt	DUP, JRG, SCP, TCH.
Dodecyl sulfate, N,N-diethylcyclohexylamine salt	DUP.
Dodecyl sulfate, isopropanolamine salt	JRG, ONX, TCH.
*Dodecyl sulfate, magnesium salt	AAC, HLI, STP.
Dodecyl sulfate, potassium salt	PG.
*Dodecyl sulfate, sodium salt	AAC, CTL, DUP, HLI, ONX, SCP, STP, TCH.
*Dodecyl sulfate, triethanolamine salt	AAC, CTL, HLI, ONX, SCP, STP, TCH, TNI.
2-Ethylhexyl sulfate, sodium salt	AAC, SCP, TCH.
Hexadecyl sulfate, sodium salt	AAC.
Hexyl sulfate, potassium salt	DEX.
Linear alcohols, sulfated, all other	AAC, DUP, SCP, X.
*Mixed linear alcohols, sulfated, ammonium salt	CP, LAK, NTL, PG, RCD, S, SCP, X.
*Mixed linear alcohols, sulfated, sodium salt	DUP, LAK, PG, RCD, SCP, WTC.
*Mixed linear alcohols, sulfated, triethanolamine salt	LAK, PG, RCD, SCP.
1-Octadecenyl-2-naphthenyl tetrahydropyrimidine	ONX.
Octadecyl sulfate, ammonium salt	EMK.
*Octyl sulfate, sodium salt	AAC, APX, DUP.
Tridecyl sulfate, sodium salt	AAC, DA, SCP.
*ETHERS, SULFATED:	
ALKYLPHENOLS, ETHOXYLATED AND SULFATED:	
Nonylphenol, ethoxylated and sulfated, ammonium salt	GAF, HLI, STP.
Nonylphenol, ethoxylated and sulfated, sodium salt	CRT, GAF.
Octylphenol, ethoxylated and sulfated, sodium salt	RH.
Sulfated cyclic ethers, all other	TCH.
Decyl alcohol, propoxylated and sulfated, sodium salt	APX.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ANIONIC--CONTINUED	
*SULFURIC ACID ESTERS (AND SALTS THEREOF)--CONTINUED	
*ETHERS, SULFATED--CONTINUED	
Dodecyl alcohol, ethoxylated and sulfated, ammonium salt	AAC, AKS, HLI, STP.
*Dodecyl alcohol, ethoxylated and sulfated, sodium salt	AAC, HLI, ONX, SCP, STP, TCH.
Dodecyl and tetradecyl alcohols, ethoxylated and sulfated, ammonium salt	LEV.
Hexyl alcohol, propoxylated and sulfated, sodium salt	APX.
*Mixed linear alcohols, ethoxylated and sulfated, ammonium salt	CO, LAK, MOA, PG, PIL, RCD, SCP, SHC, STP, WTC, X.
*Mixed linear alcohols, ethoxylated and sulfated, sodium salt	CO, DA, DUP, GAF, LAK, LEV, PG, PIL, RCD, SCP, SHC, STP, TCI, WTC.
Tridecyl alcohol, ethoxylated and sulfated, sodium salt	AAC.
Sulfated ethers, all other	SCP.
*NATURAL FATS AND OILS, SULFATED:	
*Castor oil, sulfated, sodium salt	ACT, ACY, AKS, APX, ARL, BAO, CRT, DA, DEX, GAF, HRT, ICI, KAL, LEA, LUR, MRV, S, SCO, SCP, SEA, SLM, WHW.
Coconut oil, sulfated, sodium salt	ACY, BAO, DA.
*Cod oil, sulfated, sodium salt	BAO, SEA, WHI, WHW.
Grease, other than wool, sulfated, sodium salt	WHI.
Herring oil, sulfated, sodium salt	SEA, SLM, WHW.
Lard, sulfated, sodium salt	CRT, WAW, WHW.
Mixed fish oils, sulfated, sodium salt	MRD, SLM.
Mixed vegetable oils, sulfated, sodium salt	LUR.
Mustard seed oil, sulfated, sodium salt	DA.
*Neat'S foot oil, sulfated, sodium salt	ACT, ARC, DA, MRD, SLM.
Peanut oil, sulfated, sodium salt	ACY.
Pecan oil, sulfated, sodium salt	CRT.
Ricebean oil, sulfated, sodium salt	SEA.
Soybean oil, sulfated, sodium salt	ACT, KAL, SEA.
Sperm oil, sulfated, sodium salt	ACT, LEA, WHW.
*Tallow, sulfated, sodium salt	ACT, ACY, AZS, DA, ECC, LUR, MRD, PC, SID, SLM, SOS, WHI.
Vegetable oils, sulfated, all other	AZS.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ANIONIC--CONTINUED	
OTHER ANIONIC SURFACE-ACTIVE AGENTS:	
Mixed linear olefin sulfonate- - - - - - - - - - - - -	X.
Polyethylene-vinyl alcohol copolymer, potassium salt	X.
Tridecyl alcohol, ethoxylated and carbonated, sodium salt- -	S.
Anionic surface-active agents, all other - - - - - -	S, SLM, VAL, WVA.
CATIONIC	
*AMINE OXIDES AND OXYGEN-CONTAINING AMINES (EXCEPT THOSE HAVING AMIDE LINKAGES):	
*ACYCLIC:	
N,N-Bis(2-hydroxyethyl)octadecylamine- - - - - - -	ARC, HXL.
N,N-Bis(2-hydroxyethyl)(tallow alkyl)amine - - - -	ARC.
*(Coconut oil alkyl)amine, ethoxylated- - - - - - -	ARC, DA, ICI, TCH, WTC, X.
(Coconut oil alkyl)amine, ethoxylated, maleate	SDH.
(Coconut oil alkyl)amine, ethoxylated, oleate- - -	DUP.
N,N-Dimethyl dodecylamine oxide- - - - - - - - - -	HLI, PG.
N,N-Dimethylhexadecylamine oxide - - - - - - - - -	ARC, ONX.
Ethylenediamine, propoxylated- - - - - - - - - - -	DUP.
N-(2-Hydroxyethyl)-N,N',N'-tris(2-hydroxypropyl)-ethylenediamine- - - - - - - - - - - - - - - - - -	X.
*(Mixed alkyl)amine, ethoxylated- - - - - - - - - -	GAF, ICI, RH.
(9-Octadecenyl)amine, ethoxylated- - - - - - - - -	ARC, TCH.
Octadecylamine, ethoxylated- - - - - - - - - - - -	ARC, TCH.
(Soybean oil alkyl)amine, ethoxylated- - - - - - -	ARC.
*(Tallow alkyl)amine, ethoxylated - - - - - - - - -	ARC, DA, DUP, GAF, TCH.
N-(Tallow alkyl)trimethylenediamine, ethoxylated	ARC.
N,N,N',N'-Tetrakis(2-hydroxyethyl)ethylenediamine	ARC, X.
N,N,N',N'-Tetrakis(2-hydroxypropyl)ethylene-diamine, propoxylated and ethoxylated- - - - - -	ARC.
Triethanolamine, ethoxylated - - - - - - - - - - -	MIL.
Amine oxides and oxygen-containing amines (Except those with amide linkages), acyclic, all other	ARC, AZS, BRD, CHP, GAF, PG, TCH, X.
*CYCLIC:	
2-(8-Heptadecenyl)-4-hydroxymethyl-4-methyl-2-oxazoline- - - - - - - - - - - - - - - - - - - -	BRD.
1-(2-Hydroxyethyl)-2-heptadecyl-3-carboxyethyl-imidazoline- - - - - - - - - - - - - - - - - - - -	MOA.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CATIONIC--CONTINUED	
*AMINE OXIDES AND OXYGEN-CONTAINING AMINES (EXCEPT THOSE HAVING AMIDE LINKAGES)--CONTINUED	
*CYCLIC--CONTINUED	
1-(2-Hydroxyethyl)-2-nonyl-2-imidazoline	BRD, MOA, SBC, SCP.
*1-(2-Hydroxyethyl)-2-nor(coconut oil alkyl)-2-imidazoline	CGY, MOA, SCP, TCH.
*1-(2-Hydroxyethyl)-2-nor(tall oil alkyl)-2-imidazoline	BRD, HDG, MOA, X.
1-(2-Hydroxyethyl)-2-tridecyl-2-imidazoline hydrochloride	CGY.
1-(2-Hydroxyethyl)-2-undecyl-3-carboxyethyl imidazoline	MOA.
Lignin amines	WVA.
Rosin amine, ethoxylated	HPC.
Amine oxides and oxygen-containing amines (Except those having amine linkages), cyclic, all other	ARC, CGY, TCH, X.
*AMINES AND AMINE OXIDES HAVING AMIDE LINKAGES:	
CARBOXYLIC ACID - DIAMINE AND POLYAMINE CONDENSATES:	
Carboxylic acid-diamine and polyamine condensates, all other	ICI, SBC, STC, X.
Coconut oil acids-N,N-dimethyltrimethylenediamine condensate	SCP.
Mixed fatty acids-polyalkylenepolyamine condensate	QCP, TCH, X.
Oleic acid-diethylenetriamine condensate	ICI.
Oleic acid-N,N-dimethyltrimethylenediamine condensate	CCW.
Oleic acid-ethylenediamine condensate, monoethoxylated	CLD, DEX, SOC.
Pelargonic acid-tetraethylenepentamine condensate	ICI.
Stearic acid-diethylenetriamine condensate	CHP, S, STC.
Stearic acid-diethylenetriamine condensate, polyethoxylated	APX.
Stearic acid-N,N-diethylethylenediamine condensate	S.
Stearic acid-ethylenediamine condensate, monoethoxylated	CST, DA, DEX, ICI, MRV, S, SLC.
Stearic acid-ethylenediamine condensate, polyethoxylated	ICI.
Stearic acid-tetraethylenepentamine condensate	ONX, X.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CATIONIC--CONTINUED	
*AMINES AND AMINE OXIDES HAVING AMIDE LINKAGES--CON'T.	
CARBOXYLIC ACID - DIAMINE AND POLYAMINE CONDENSATES--CONTINUED	
*Tall oil acids-diethylenetriamine condensate	AZS, SCP, STC, X.
*Tall oil acids-polyalkylenepolyamine condensate	AZS, NCW, QCP, SCP, X.
Carboxylic acid-diamine and polyamine condensates, alkoxylated, all other	MIR.
OTHER AMINES AND AMINE OXIDES HAVING AMIDE LINKAGES:	
3-Lauramido-N,N-dimethylpropylamine oxide	HLI, SNW.
Stearic acid,diethanolamine condensate, methyl sulfate	DUP.
Amines and amine oxides having amide linkages, all other	SCP.
*AMINES, NOT CONTAINING OXYGEN (AND SALTS THEREOF):	
*AMINE SALTS:	
(Coconut oil alkyl)amine acetate	ARC.
(Hydrogenated tallow alkyl)amine acetate	ARC.
(9-Octadecenyl)amine acetate	SCP.
Octadecylamine acetate	ARC.
(Tallow alkyl)amine acetate	ARC.
N-(Tallow alkyl)trimethylenediamine oleate	ARC, ASH.
Amine salts (Not containing oxygen), all other	SM, X.
*DIAMINES AND POLYAMINES:	
*IMIDAZOLINE DERIVATIVES:	
1-(2-Aminoethyl)-2-nor(tall oil alkyl)-2-imidazoline	SCP.
N-(Docosyl and eicosyl)trimethylenediamine	ENO.
2-Heptadecyl-2-imidazoline	CGY, SCO.
N-(Coconut oil alkyl)trimethylenediamine	ARC, SCP.
N-Dodecyldiethylenetriamine	ARC.
N-(Mixed alkyl)polyethylenepolyamine	ARC, CCW, SNW.
N-(9-Octadecenyl)trimethylenediamine	ARC, ASH, ENO, SCP.
N-(Soybean oil alkyl)trimethylenediamine	ENO.
N-(Tallow - alkyl)dipropylenetriamine	NCW, SCP.
N-(Tallow alkyl)trimethylenediamine	ARC, ASH, ENO, SCP.
Diamines and polyamines, all other	ARC, ENO, ICI, NCW, STC, X.
*PRIMARY MONOAMINES:	
(Coconut oil alkyl)amine	ARC, ASH, ENO, SCP.
(Docosyl and eicosyl)amine	ENO.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CATIONIC--CONTINUED	
*AMINES NOT CONTAINING OXYGEN (AND SALTS THEREOF)--CONTINUED	
*PRIMARY MONOAMINES--CONTINUED	
Dodecylamine	ARC, ASH, SCP.
Hexadecylamine	ENO.
*(Hydrogenated tallow alkyl)amine	ARC, ASH, ENO, SCP.
(Mixed alkyl)amine	ARC.
*9-Octadecenylamine	ARC, ASH, ENO, SCP.
Octadecylamine	ARC, ASH, ENO.
Octylamine	ARC.
(Soybean oil alkyl)amine	ARC.
(Tall oil alkyl)amine	SCP.
*(Tallow alkyl)amine	ARC, ASH, ENO, NCW, SCP.
Primary monoamines, all other	ENO.
*SECONDARY AND TERTIARY MONOAMINES:	
Bis(coconut oil alkyl)amine	ARC.
Bis(hydrogenated tallow alkyl)amine	ARC, ASH.
N,N-Dimethyl(coconut oil alkyl)amine	AAC, ARC, BRD.
N,N-Dimethyldodecylamine	ARC, BRD, ENO.
N,N-Dimethylhexadecylamine	ARC, BRD.
N,N-Dimethyl(hydrogenated tallow alkyl)amine	ARC, ASH, ENO.
*N,N-Dimethyl(mixed alkyl)amine	ARC, BRD, ENO, ONX, TNA.
N,N-Dimethyl-9-octadecenylamine	ENO.
N,N-Dimethyloctadecylamine	ARC, ENO, ONX.
N,N-Dimethyloctylamine	BRD.
N,N-Dimethyl(soybean oil alkyl)amine	ARC, ENO.
N,N-Dimethyltetradecylamine	ARC, BRD, ONX.
N-Methylbis(coconut oil alkyl)amine	ARC, ENO.
N-Methylbis(hydrogenated tallow alkyl)amine	ASH, ENO.
Triisodecylamine	SCP.
Trilaurylamine	SCP.
Trioctylamine	SCP.
Secondary and tertiary monoamines, all other	ARC, AZS, ENO.
*OXYGEN-CONTAINING QUATERNARY AMMONIUM SALTS:	
Benzyl(coconut oil alkyl)bis(2-hydroxyethyl)ammonium chloride	SCP, X.
Benzyl(coconut oil alkyl,ethoxylated)dimethylammonium chloride	ARC, DUP, GAF, SCP.
1-Benzyl-1-(2-hydroxyethyl)-2-nor(tall oil alkyl)-2-imidazoline	X.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CATIONIC--CONTINUED	
*OXYGEN-CONTAINING QUARTERNARY AMMONIUM SALTS--CON'T.	
Benzyl(tallow alkyl)bis(2-hydroxyethyl)ammonium chloride	DUP.
Bis(2-hydroxyethyl, ethoxylated)methyl(9-octadecenyl)-ammonium chloride	ARC.
Bis(2-hydroxyethyl, ethoxylated)methyloctadecyl ammonium chloride	ARC.
(Coconut oil alkyl)bis(2-hydroxyethyl, ethoxylated)-methylammonium chloride	ARC.
(Ethoxybenzyl)dimethyl(octylphenoxy)ammonium chloride	RH.
(Ethoxybenzyl)dimethyl(octyltolyloxy)ammonium chloride	RH.
1-Ethyl-2-(8-heptadecenyl)-1-(2-hydroxyethyl)-2-imidazolinium ethyl sulfate	ICI.
N-Ethyl-N-hexadecylmorpholinium ethyl sulfate	BRD, DA, ICI.
N-Ethyl-N-(soybean oil alkyl)morpholinium ethyl sulfate	ICI.
(2-Hydroxyethyl)dimethyl(3-stearamidopropyl)ammonium dihydrogen phosphate	ACY.
(2-Hydroxyethyl)dimethyl(3-stearamidopropyl)ammonium nitrate	ACY.
(3-Lauramidopropyl)trimethylammonium methyl sulfate	ACY.
2-(2-Lauroyloxyethyl)carbamoyl-1-methylpyridinium chloride	WTC.
1-Methyl-2-(2-stearoyloxyethyl)carbamoylpyridinium chloride	WTC.
Cxygen-containing quaternary ammonium salts (Except those having amide linkages), all other	ICI, MIR, SBC, TCH.
Quaternary ammonium salts having amide linkages, all other	ASH, DA, MRV, SBC, SNW, TCH, VND.
*QUATERNARY AMMONIUM SALTS, NOT CONTAINING OXYGEN:	
*ACYCLIC:	
*Bis(coconut oil alkyl)dimethylammonium chloride	ARC, ASH, ENO, SCP.
*Bis(hydrogenated tallow alkyl)dimethylammonium chloride	ARC, ASH, ENO, SCP.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CATIONIC--CONTINUED	
*QUARTERNARY AMMONIUM SALTS, NOT CONTAINING OXYGEN--CONT	
*ACYCLIC--CONTINUED	
(Coconut oil alkyl)trimethylammonium chloride	ARC.
Didecyldimethylammonium chloride	BRD.
Dimethylbis(soybean oil alkyl)ammonium chloride	ARC.
Dimethyldioctadecylammonium choride	ASH.
Dodecyltrimethylammonium chloride	ARC, SCP.
Ethyldimethyl(mixed alkyl)ammonium ethyl sulfate	DEX, JOR, TCC.
Ethyldimethyl(9-octadecenyl)ammonium bromide	ONX.
Ethylhexadecyldimethylammonium bromide	HXL.
Hexadecyltrimethylammonium bromide	HXL.
Hexadecyltrimethylammonium chloride	ARC, BRD, TCH.
Hexadecyltrimethylammonium p-toluenesulfonate	HXL.
Methyltrioctylammonium chloride	SCP.
(Mixed linear alkyl)trimethyl ammonium bromide	DUP.
N,N,N',N',N'-Pentamethyl-N-(tallow alkyl) trimethylene-bis[ammonium chloride]	ARC.
Trimethyl(mixed alkyl)ammonium chloride	X.
Trimethyloctadecylammonium chloride	ARC.
Trimethyl(soybean oil alkyl)ammonium chloride	ARC.
Trimethyl(tallow alkyl)ammonium chloride	ARC, ASH, SCP.
Trimethyltetradecylammonium bromide	HXL.
Quaternary ammonium salts, not containing oxygen, acyclic, all other	BRD.
*BENZENOID:	
*Benzyl(coconut oil alkyl)dimethylammonium chloride	ARC, CRT, ENO, LUR, SCP, TCC.
*Benzyldimethyl(mixed alkyl)ammonium chloride	BRD. HXL, ONX, RH, SDH.
*Benzyldimethyloctadecylammonium chloride	AAC, HLI, HXL, ONX, RH, TNI.
Benzyldimethyl(tallow alkyl)ammonium chloride	ENO.
Benzyldimethyltetradecylammonium chloride	HXL, X.
Benzyldodecyldimethylammonium chloride	HXL, ONX.
Benzylhexadecyldimethylammonium chloride	ONX.
Benzyl(hydrogenated tallow alkyl)dimethylammonium chloride	ENO.
1-Benzyl-2-picolinium bromide	HXL.
*Benzyltrimethylammonium chloride	CHP, CIN, CRT, HXL, SNW, TCC.
(3,4-Dichlorobenzyl)dodecyldimethylammonium chloride	ONX.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CATIONIC--CONTINUED	
*QUARTERNARY AMMONIUM SALTS, NOT CONTAINING OXYGEN--CON.	
*BENZENOID--CONTINUED	
2-Dodecylisoquinolinium bromide	ONX.
(Dodecylmethylbenzyl)trimethylammonium chloride	RH.
1-Dodecylpyridinium chloride	CCL, DAN.
(Ethylbenzyl)dimethyl(mixed alkyl)ammonium chloride	BRD.
1-Phenethyl-2-picolinium bromide	HXL.
Quaternary ammonium salts not containing oxygen, cyclic, all other	CCL, DEX, ENO, ICI, MIL, TCC, X.
OTHER CATIONIC SURFACE-ACTIVE AGENTS:	
Tallow amine, ethoxylated and propoxylated, methyl sulfate	DUP.
Tallow amine, ethoxylated, quarternary ammonium salt	DUP.
Cationic surface-active agents, all other	APX, DUP, HXL, SCP, WTC.
NONIONIC	
*CARBOXYLIC ACID AMIDES:	
*(AMINE/ACID RATIO = 2/1):	
*Capric acid (Ratio =2/1)	CGY, SCP, TCH.
Castor oil acids (Ratio = 2/1)	CLI, MOA, NTL, PC.
*Coconut oil acids (Ratio = 2/1)	AKS, ARD, ARL, AZS, BRD, BSW, CCL, CIN, CLI, CTL, DA, ECC, HLI, HRT, LUR, MOA, MRV, ONX, PEK, PG, PNX, PVO, RCD, SBC, SCP, SOP, STP, TCH, VAL, WTC, X.
*Coconut oil and tallow acids (Ratio = 2/1)	CLI, CRT, CTL, ESS, MOA, SBC, SCP, UNN.
*Lauric acid (Ratio = 2/1)	CLI, CTL, HRT, MOA, TCH.
*Lauric and myristic acids (Ratio = 2/1)	HRT, MOA, PG, RCD, SBC, STP.
Linoleic acid (Ratio = 2/1)	HRT, KNP, VND.
*Oleic acid (Ratio = 2/1)	CCW, CLI, EMR, SBC, SCP, STP.
Pelargonic acid (Ratio = 2/1)	TCH.
Soybean oil acids (Ratio=2/1)	MOA.
*Stearic acid (Ratio = 2/1)	CLI, CTL, ONX, SCO, SOS, VAL.
*Tall oil acids (Ratio = 2/1)	ECC, MOA, WTC.
Diethanolamine condensates (Amine/acid = 2/1), all other	GAF, SCP, SOS.
*OTHER AMINE/ACID RATIOS:	
*Coconut oil acids (Ratio = 1/1)	ARD, AZS, CGY, CLI, CTL, DA, GAF, HLI, JRG, ONX, PIL, SBC, SCP, STP, TCC, WTC.
*Lauric acid (Ratio = 1/1)	CLI, CON, DA, EFH, LEV, ONX, SBC, SCP, TNI.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC--CONTINUED	
*CARBOXYLIC ACID AMINES--CONTINUED	
*OTHER AMINE/ACID RATIOS--CONTINUED	
*Lauric and myristic acid (Ratio = 1/1)	ARD, CLI, HLI, SBC, SCP.
Linoleic acid (Ratio = 1/1)	SBC, VND.
*Oleic acid (Ratio = 1/1)	EFH, EMK, HLI, SBC.
*Stearic acid (Ratio = 1/1)	CHP, ECC, EFH, MRV, VPC.
*Tall oil acids	CHP, EFH, GAF.
Tallow acids	TCH.
Diethanolamine condensates, amine/acid ratio=1/1, all other	SBC.
*ALL OTHER CARBOXYLIC ACID AMIDES:	
Alkanolamine condensates, all other	EFH, PG, SBC, TCH.
Carboxylic acid-alkanocamine condensate, alkoxylated, all other	ROB.
Coconut oil acids (Specify amine/acid ratio)	STP.
*Coconut oil acids (Ratio = 1/1)	HLI, HUM, MOA, PG, SCP, VND, WTC.
Coconut oil acids (Ratio = 2/1)	STP.
Coconut oil acids, other code	SCP.
Coconut oil acids-N,N-dimethyltrimethylene-diamine condensate(amine/acid ratio=1/2)	JRG.
Coconut oil acids-ethanolamine condensate, ethoxylated	STP.
Ethanolamine condensates, all other	EFH.
Ethanolamine condensates, amine/acid ratio = 1/1, all other	GAF.
Hydrogenated castor oil acids, (Ratio = 2/1)	TCH.
Isopropanolamine condensates, all other	SBC, WTC, X.
Lauric acid (Specify amine/acid ratio)	CLI, MOA, SNW.
Lauric and myristic acids (Specify amine/acid ratio)	LEV.
Lauric and myristic acids (Ratio = 1/1)	MOA, PG, STP, WTC.
Oleic acid-ethanolamine condensate, ethoxylated	GAF.
Stearic acid (Ratio = 1/1)	MOA, SBC, SNW, VND, WTC.
Stearic acid (Ratio = 1/2)	HAL, TCH, WTC.
Stearic acid (Ratio = 2/1)	CLI, ECC.
Stearic acid-ethylenediamine condensate amine/acid ratio=1/2	ARC, DA.
Carboxylic acid amides, all other	VPC.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC--CONTINUED	
*CARBOXYLIC ACID ESTERS:	
*ANHYDROSORBITOL ESTERS:	
Anhydrosorbitol dioleate	ICI.
Anhydrosorbitol monoester of tall oil acids	HDG.
*Anhydrosorbitol monolaurate	GLY, HDG, ICI, TCH.
*Anhydrosorbitol mono-oleate	ARC, GLY, HDG, ICI, TCH.
Anhydrosorbitol monopalmitate	GLY, HDG, ICI, TCH.
Anhydrosorbitol monostearate	GLY, HDG, ICI, PVO, TCH.
Anhydrosorbitol sesquioleate	GLY, HDG, TCH.
Anhydrosorbitol triester of tall oil acids	GLY.
Anhydrosorbitol trioleate	GLY, ICI, TCH.
Anhydrosorbitol tristearate	GLY, ICI, TCH.
Anhydrosorbitol esters, all other	CHP, ICI, TCH.
*DIETHYLENE GLYCOL ESTERS:	
*Diethylene glycol distearate	ARC, GLY, VAL.
Diethylene glycol monoester of coconut oil acids	DA.
*Diethylene glycol monolaurate	ECC, GLY, HAL, HDG, WM.
*Diethylene glycol mono-oleate	ARC, HAL, VND.
*Diethylene glycol monoricinoleate	DA.
Diethylene glycol monostearate	ARC, CHP, CLI, HAL, HDG, VND.
Diethylene glycol sesquiester of tall oil acids	ECC.
Diethylene glycol sesquilaurate	ARC, GLY.
Diethylene glycol sesquistearate	WTC.
Diethylene glycol esters, all other	BAS.
*ETHOXYLATED ANHYDROSORBITOL ESTERS:	
*Ethoxylated anhydrosorbitol monolaurate	AAC, GLY, HDG, ICI, PVO, TCH.
*Ethoxylated anhydrosorbitol mono-oleate	GLY, HDG, ICI, PVO, TCH.
Ethoxylated anhydrosorbitol monopalmitate	ICI, TCH.
*Ethoxylated anhydrosorbitol monostearate	AAC, GLY, HDG, ICI, PVO, TCH.
Ethoxylated anhydrosorbitol monotallate	TCH.
Ethoxylated anhydrosorbitol triester of tall oil acids	ICI.
Ethoxylated anhydrosorbitol trioleate	GLY, ICI, TCH.
Ethoxylated anhydrosorbitol tristearate	GLY, HDG, ICI, PVO, TCH.
Ethoxylated anhydrosorbitol esters, all other	TCH.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC--CONTINUED	
*CARBOXYLIC ACID ESTERS--CONTINUED	
ETHOXYLATED SORBITOL ESTERS:	
Ethoxylated sorbitol beeswax ester	ICI.
Ethoxylated sorbitol esters, all other	ICI, MIL.
Ethoxylated sorbitol hexaester of tall oil acids	TCH.
Ethoxylated sorbitol hexaoleate	ICI, TCH.
Ethoxylated sorbitol lanolin ester	ICI.
Ethoxylated sorbitol mono-oleate	ICI, TCH.
Ethoxylated sorbitol tetraester of lauric and oleic acids	ICI.
Ethoxylated sorbitol tetraoleate	ICI.
ETHYLENE GLYCOL ESTERS:	
*Ethylene glycol distearate	ARC, EMR, HAL, HUM, TCH, WM.
Ethylene glycol mono-oleate	CGY.
*Ethylene glycol monostearate	ARC, CLI, GLY, GRO, HAL, HDG, KNP, TCH, VND, WM.
*GLYCEROL ESTERS:	
COMPLEX GLYCEROL ESTERS:	
Glycerol lactate stearate	TCH.
Glycerol monoester of mixed fatty acids, acetylated	EK.
Glycerol monoester of mixed fatty acids, succinylated	EK.
Complex glycerol esters, all other	GLY, SCP.
*GLYCEROL ESTERS OF CHEMICALLY DEFINED ACIDS:	
Glycerol dilaurate	VND.
Glycerol dioleate	ARC, HAL.
Glycerol monocaprylate	ARC, PVO.
Glycerol monolaurate	GLY.
*Glycerol mono-oleate	ARC, CCW, EFH, EMR, GLY, GRO, HAL, HDG, PVO, TCH, WM, WTC.
Glycerol monoricinoleate	GLY, HDG.
*Glycerol monostearate	ARC, BLS, CHL, CIN, EMR, GLY, GRO, HAL, HDG, HRT, PVO, SNW, SOS, TCH, VND, WM, WTC.
Glycerol esters of chemically defined acids, all other	ARC, HAL, TCH.
*GLYCEROL ESTERS OF MIXED ACIDS:	
Glycerol monoester of coconut oil acids	GLY, PVO.
Glycerol monoester of cottonseed oil acids	EK.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC--CONTINUED	
*CARBOXYLIC ACID ESTERS--CONTINUED	
*GLYCEROL ESTERS--CONTINUED	
*GLYCEROL ESTERS OF MIXED ACIDS--CONTINUED	
*Glycerol monoester of hydrogenated cottonseed oil acids	EK, LEV, WM.
*Glycerol monoester of hydrogenated soybean oil acids	ASH, BFP, PVO, WTC, X.
Glycerol monoester of lard acids	GLY, X.
Glycerol monoester of mixed vegetable oil acid	LEV, X.
Glycerol monoester of palm oil acids	X.
Glycerol monoester of safflower oil acids	X.
Glycerol monoester of tall oil acids	FER, WTC, X.
Glycerol sesquiester of hydrogenated tallow acids	JRG.
Glycerol esters of mixed acids, all other	BFP, ICI, SLM, TCH, WTC.
*NATURAL FATS AND OILS, ETHOXYLATED:	
*Castor oil, ethoxylated	DA, GAF, ICI, MIL, NTL, PVO, TCH, TMH, X.
*Hydrogenated castor oil, ethoxylated	DA, ICI, MIL, TCH.
*Lanolin, ethoxylated	AAC, CRD, CRN, ICI, MIL, TCH.
*Natural fats and oils, ethoxylated, all other	DA, JCC, MIL, TCH, TMH.
*POLYETHYLENE GLYCOL ESTERS:	
*POLYETHYLENE GLYCOL ESTERS OF CHEMICALLY DEFINED ACIDS:	
*Polyethylene glycol dilaurate	ARC, DA, GLY, HAL, HDG, PVO, TCH, WM.
*Polyethylene glycol dioleate	ARC, CGY, CLD, DA, EFH, GLY, HAL, HDG, MIL, SLC, TCH, WM.
*Polyethylene glycol distearate	ARC, CHP, CRT, GLY, HAL, HDG, SBC, TCH.
*Polyethylene glycol monolaurate	ARC, CCA, CGY, DA, ECC, GLY, HAL, HDG, ICI, TCH, VND, WM.
*Polyethylene glycol mono-oleate	ARC, BRD, CCA, CLD, CRT, DEX, EFH, GAF, GLY, HAL, HDG, KNP, MRT, MRV, ONX, SCP, TCH, WM.
Polyethylene glycol monopelargonate	ICI.
Polyethylene glycol monoricinoleate	GLY, HAL.
*Polyethylene glycol monostearate	AKS, ARC, ARL, BAS, CGY, CHP, CRT, DA, EFH, GAF, GLY, HAL, HDG, HRT, ICI, PVO, SLC, SOS, STC, TCH, VND, WTC.
Polyethylene glycol sesquinoleate	TCH, WTC.
Polyethylene glycol esters of chemically defined acids, all other	EFH, ICI.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED, BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC--CONTINUED	
*CARBOXYLIC ACID ESTERS--CONTINUED	
*POLYETHYLENE GLYCOL ESTERS--CONTINUED	
*POLYETHYLENE GLYCOL ESTERS OF MIXED ACIDS:	
Polyethylene glycol diester of tall oil acids	ARC, EFH, MIL, X.
Polyethylene glycol monoester of capric and caprylic acids	ECC.
Polyethylene glycol monoester of soybean oil acids	GLY.
Polyethylene glycol monoester of tall oil acids	TCH.
Polyethylene glycol monoester of tall oil acids, ethoxylated	X.
Polyethylene glycol sesquiester of coconut oil acids	ARC, MRT.
*Polyethylene glycol sesquiester of tall oil acids	ICI, SLM, SNW.
Polyethylene glycol sesquiester of tallow acids	ARC, AZS.
Polyethylene glycol esters of mixed acids, all other	ARC, EFH, ICI, SOS, TCH.
*POLYGLYCEROL ESTERS:	
Polyglycerol distearate	PVO.
Polyglycerol monoester of tall oil acids	FER, HDG.
Polyglycerol mono-oleate	PVO, VND, WTC.
Polyglycerol monostearate	PVO, TCH.
Polyglycerol esters, all other	PG, PVO, TCH.
PROPANEDIOL ESTERS:	
*1,2-Propanediol monolaurate	ARC, PVO, SBC.
1,2-Propanediol mono-oleate	EFH.
*1,2-Propanediol monostearate	ARC, EK, GLY, HAL, TCH, WM.
1,2-Propanediol sesquiester of hydrogenated tallow acids	JRG.
Propanediol esters, all other	PVO, TCH, X.
OTHER CARBOXYLIC ACID ESTERS:	
Cetyl palmitate	ROB.
Di-isobutylene maleate	RH.
Ethoxylated 1,2-propanediol monostearate	ICI.
Lauric acid ester of glycerol and ethoxylated nonylphenol	TCC.
Methylglucoside laurate	HDG.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC--CONTINUED	
*CABOXYLIC ACID ESTERS--CONTINUED	
OTHER CARBOXYLIC ACID ESTERS--CONTINUED	
Pentaerythritol distearate	GLY.
Pentaerythritol stearate	VAL.
Polyalkylene glycol adipate	X.
Polyalkylene glycol diglycolate	BAS.
Carboxylic acid esters, all other	AAC, CCW, CRN, DUP, EMR, HDG, PG, PVO, STC, TCH, VND, WTC, X.
*ETHERS:	
*BENZENOID ETHERS:	
Alkylphenol-formaldehyde condensates, alkoxylated, all other	X.
Diisobutylphenol, ethoxylated	GAF.
Dinonylphenol, ethoxylated	GAF, RH, TCH.
*Dodecylphenol, ethoxylated	DA, GAF, MON, TMH.
Iso-octylphenol, ethoxylated	AAC, DA, RH.
(Mixed alkyl)phenol, ethoxylated	MIL, NTL, X.
(Mixed alkyl)phenol, ethoxylated, butyl ether	RH.
(Mixed alkyl)phenol-formaldehyde	ARC, BAS, NTL, X.
(Mixed alkyl)phenoxypoly(ethyleneoxy)ethyl chloride	GAF.
*Nonylphenol, ethoxylated	DA, GAF, HDG, ICI, JCC, MIL, MON, OMC, RH, S, STC, STP, TCH, TMH, UCC, WTC, X.
Nonylphenol, ethoxylated and propoxylated	RH.
Nonylphenol-formaldehyde, alkoxylated	X.
Nonylphenoxypoly(ethyleneoxy)ethyl iodide	GAF.
n-Octylphenol, ethoxylated	TCH, TMH.
tert-Octylphenol-formaldehyde, ethoxylated	ARC, DA.
*Phenol, ethoxylated	DA, DUP, GAF, ICI, STC, TCH.
Tetradecylphenol ethoxylated	ORO.
Phenols, ethoxylated, all other	DA, EFH, OMC, RH, X.
*NONBENZENOID ETHERS:	
*LINEAR ALCOHOLS, ALKOXYLATED:	
*Decyl alcohol,ethoxylated	BAS, GAF, ICI, MIL, TCH, WTC, X.
Decyloxypoly(ethyleneoxy)ethyl chloride	GAF.
Dodecyl alcohol, ethoxylated	AAC, DUP, HDG, ICI, MIL, X.
Hexadecyl alcohol, ethoxylated	ICI, TCH.
*9-Octadecenyl alcohol, ethoxylated	AAC, GAF, ICI, TCH.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC--CONTINUED	
*ETHERS--CONTINUED	
*NONBENZENOID ETHER, ALKOXYLATED--CONTINUED	
*LINEAR ALCOHOLS, ALKOXYLATED--CONTINUED	
Octadecyl alcohol, ethoxylated	DUP, ICI, STC.
*Oleyl alcohol, ethoxylated	CRD, CRN, GLY, HDG.
Wool wax alcohols, ethoxylated	CRD.
Chemically defined linear alcohol, alkoxylated, all other	ICI, MIL.
Coconut oil alcohol, ethoxylated	GAF, GLY, JCC, STC.
*Mixed linear alcohols, ethoxylated	BAS, CO, DA, DUP, GAF, HDG, JCC, MIL, OMC, RH, SHC, STC, STP, TCH, UCC, WTC, X.
*Mixed linear alcohols, ethoxylated and propoxylate propoxylated	BAS, DUP, JCC, MIL, OMC, STP, TCH, UCC, WTC, X.
Tallow alcohol, ethoxylated	AAC, JCC.
Mixed linear alcohols, alkoxylated, all other	BAS, GAF, GLY, TCH, TNA.
*OTHER ETHERS AND THIOETHERS:	
Corn starch, propoxylated	VAL.
tert-Dodecyl mercaptan, ethoxylated	AAC, GAF.
Isodecyl alcohol, ethoxylated	TCH.
Mixed alcohols, ethoxylated	CRN, MIL, MON, PVO, RH, X.
Poly(mixed ethylene, propylene)glycol	BAS, UCC, WTC, X.
Polyoxyalkylene glycols, alkoxylated	X.
Polypropylene glycol, ethoxylated	WTC.
Rosin alcohol, ethoxylated	GAF.
*Tridecyl alcohol, ethoxylated	DA, DUP, GAF, ICI, JCC, MIL, MON, OMC, PVO, STC, TCH, TMH, WTC, X.
Tridecyl alcohol, propoxylated and ethoxylated	JCC.
Trimethylheptanol, ethoxylated	TCH.
Trimethylnonyl alcohol, ethoxylated	HDG, TCH, UCC.
Trimethylolpropane, alkoxylated	BAS, HDG, MIL, X.
Ethers and thioethers, all other	BAS, ICI, MIL, TCH.
*OTHER NONIONIC SURFACE-ACTIVE AGENTS:	
Octyl phosphate, ethoxylated	DUP.
Tri(castor oil alkyl)phosphate	GLY.
Trimethylalpropane, ethoxylated	DUP.
Nonionic surface-active agents, all other	MIL, PG, RH, X, X.

TABLE 3.--SURFACE-ACTIVE AGENTS: DIRECTORY OF MANUFACTURERS, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of surface-active agents to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of company
AAC	Alcolac Chemical Corp.
ACT	Southland Corp., Chemical Div., Arthur C. Trask Div.
ACY	American Cyanamid Co.
AES	Penetone Corp.
AGP	Armour-Dial, Inc.
AKS	Arkansas Co., Inc.
APX	Apex Chemical Co., Inc.
ARC	Armak Co.
ARD	Ardmore Chemical Co.
ARL	Arol Chemical Products Co.
ASH	Ashland Oil, Inc.
ASY	American Synthetic Rubber Corp.
ATR	Atlantic Richfield Co., ARCO Chemical Co.
AZS	AZS Corp.: AZ Products Co. Div. AZS Chemical Co.
BAO	Bayoil Co., Inc.
BAS	BASF Wyandotte Corp.
BFP	Breddo Food Products Co., Inc.
BLA	Astor Products, Inc., Blue Arrow Div.
BLS	Life Savers, Inc.
BRD	Lonza, Inc.
BSW	Original Bradford Soap Works, Inc.
CCA	Interstab Chemicals, Inc.
CCL	Catawba-Charlab, Inc.
CCW	Cincinnati Milacron Chemicals, Inc.
CGY	Ciba-Geigy Corp.
CHL	Chemol, Inc.
CHP	C.H. Patrick & Co., Inc.
CIN	Cindet Chemicals, Inc.
CLD	Colloids, Inc.
CLI	Clintwood Chemical Co.
CO	Continental Oil Co.
CON	Concord Chemical Co., Inc.
CP	Colgate-Palmolive Co.
CRD	Croda, Inc.
CRN	CPC International, Inc., Amerchol Corp.
CRT	Crest Chemical Corp.
CRZ	Crown Zellerbach Corp., Chemical Products Div.
CST	Charles S. Tanner Co.
CTL	Continental Chemical Co.
CWP	Consolidated Papers, Inc.
DA	Diamond Shamrock Corp.
DAN	Dan River, Inc., Chemical Products Dept.
DEX	Dexter Chemical Corp.
DOW	Dow Chemical Co.
DUP	E.I. duPont de Nemours & Co., Inc.
DYS	Davies-Young Co.
ECC	Eastern Color & Chemical Co.
EFH	E.F. Houghton & Co.
EKT	Eastman Kodak Co., Tennessee Eastman Co. Di
EMK	Emkay Chemical Co.
EMR	Emery Industries, Inc.
ENO	Enenco, Inc.
ESS	Essential Chemicals Corp.
FER	Ferro Corp., Keil Chemical Div.
GAF	GAF Corp.
GLY	Glyco Chemicals, Inc.
GRC	Chemed Corp., Dubois Chemicals Div.
GRL	Chemed Corp., Vestal Laboratories, Inc.
GRO	A. Gross & Co., Millmaster Onyx Group, Kewanee Industries, Inc.
HAL	C.P. Hall Co.
HDG	Hodag Chemical Corp.
HEW	Hewitt Soap Co., Inc.
HLI	Millmaster Onyx Corp., Haag Labs/Onyx Chemical Corp.
HMP	W.R. Grace & Co., Organic Chemicals Div.
HNT	Huntington Laboratories, Inc.
HPC	Hercules, Inc.
HRT	Hart Products Corp.
HUM	Kraft, Inc., Humko Sheffield Chemical Operation
HXL	Hexcel Corp., Hexcel Specialty Chemicals
ICI	ICI Americas Inc., Chemical Specialties Co.
JCC	Jefferson Chemicals Co., Inc.
JOR	Jordan Chemical Co.
JRG	Andrew Jergens Co.
KAL	Pathan Chemical Co.
KNP	Knapp Products, Inc.
LAK	Bofors Lakeway Inc.
LEA	Leatex Chemical Co.
LEV	Lever Brothers Co.
LKY	Lake States Div. of Monarch Paper Corp.
LMI	North American Chemical Co.
LUR	Laurel Products Corp.
MAR	American Can Co.
MCP	Moretex Chemical Products, Inc.
MIL	Milliken & Co., Milliken Chemical Div.
MIR	Miranol Chemical Co., Inc.
MOA	Mona Industries, Inc.

TABLE 3.--SURFACE-ACTIVE AGENTS: DIRECTORY OF MANUFACTURERS, 1978--CONTINUED

Code	Name of company	Code	Name of company
MON	Monsanto Co.	SEA	Seaboard Chemicals, Inc.
MRD	Marden-Wild Corp.	SFS	Stauffer Chemical Co., Specialty Div.
MRT	Morton Chemical Co. Div. of Morton-Norwich Products, Inc.	SHC	Shell Oil Co., Shell Chemical Co. Div.
		SID	George F. Siddall Co., Inc.
MRV	Marlowe-Van Loan Corp.	SLC	Soluol Chemical Co., Inc.
		SLM	Salem Oil & Grease Co.
NCW	Nostrip Chemical Works, Inc.	SM	Mobil Oil Corp., Mobil Chemical Co., Chemical Coatings Div.
NES	Ruetgers-Nease Chemical Co., Inc.		
NMC	National Milling & Chemical Co., Inc.	SNW	Sun Chemical Corp., Chemicals Div.
NPR	Safeway Stores, Inc.	SOC	Standard Oil Co. of California, Chevron Chemical Co.
NTL	NL Industries, Inc.		
		SOP	Southern Chemical Products Co., Inc.
OMC	Olin Corp.	SOS	SSC Industries, Inc.
ONX	Onyx Chemical Co.	SPA	Scott Paper Co.
ORO	Chevron Chemical Co.	STC	American Hoechst Corp., Sou-Tex Works
		STP	Stepan Chemical Co.
PC	Proctor Chemical Co., Inc.		
PCH	Peerless Chemical Co.	TCC	Tanatex Chemical Corp.
PEK	Peck's Products Co.	TCH	Emery Industries, Inc., Trylon Div.
PG	Procter & Gamble Co., Procter & Gamble Mfg. Co.		
		TCI	Morton-Norwich Products, Inc., Texize Div.
PIL	Pilot Chemical Co.	TEN	Cities Service Co., Copperhill Operations
PLX	Plex Chemical Corp.	TMH	Thompson-Hayward Chemical Co.
PNX	Murphy-Phoenix Co.	TNA	Ethyl Corp.
PRX	Purex Corp.	TNI	The Gillette Co., Chemical Div.
PSP	Georgia-Pacific Corp., Bellingham Div.		
PVO	PVO International, Inc.	UCC	Union Carbide Corp.
		UDI	Petrochemicals Co., Inc.
QCP	Quaker Chemical Corp.	UNN	United Chemical Corp. of Norwood
		UNP	United Chemical Products Corp.
RAY	ITT Rayonier, Inc.	USM	USM Corp., Bostik Div.
RBC	Fike Chemicals, Inc.	USR	Uniroyal, Inc., Chemical Div.
RCD	Richardson Co.		
RH	Rohm & Haas Co.	VAL	Valchem Div. of United Merchants & Manufacturers, Inc.
ROB	Robeco Chemicals, Inc.		
RWC	Robinson-Wagner Co.	VND	Van Dyk & Co., Inc.
		VPC	Mobay Chemical Corp., Verona Dyestuff Div.
S	Sandoz, Inc.		
SBC	Scher Bros. Inc.		
SBP	Sugar Beet Products Co.	WAW	W.A. Wood Co.
SCO	Scholler Bros., Inc.	WBG	White & Bagley Co.
SCP	Henkel Corp.	WHI	White & Hodges, Inc.
SDC	Martin-Marietta Corp., Sodyeco Div.	WHW	Whittemore-Wright Co., Inc.
	Sterling Drug, Inc.:	WM	Inolex Corp.
SDH	Hilton Davis Chemical Co. Div.	WTC	Witco Chemical Corp.
SDW	Winthrop Laboratories Div.	WVA	Westvaco Corp., Polychemicals Dept.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix. The above codes identify those of the 166 reporting companies and company divisions for which permission to publish was not restricted.

IMPORTANT DEVELOPMENTS IN PESTICIDES IN 1978

Edmund Cappuccilli

During 1978, the most important developments affecting peticide producers and consumers were the result of U.S. Government actions. The Congress passed the Federal Pesticide Act of 1978 which provides for a more efficient registration process for pesticides and incentives for the development of new pesticides. The Environmental Protection Agency (EPA) which administers pesticide legislation made several important decisions in 1978 concerning pesticides, the most important of which are discussed below.

Other noteworthy developments covered in this paper are the registration of two new pesticides which were developed to biologically control specific insects and the concept of Integrated Pest Management (IPM), which was promoted by several Government agencies to decrease the use of synthetic pesticides in the United States.

Biological Pesticides

In 1978, the pesticide industry produced several new pesticides, namely insect pheromones. Insect pheromones, or sex attractants, have long been desired as insect control agents because of their low toxicity and relatively fast degradation time. Unfortunately, the identification and the synthesis of these compounds have been very slow because of the small amounts available and the high degree of specificity required for each insect specie.

Despite these problems, the EPA recently approved the use of a synthetically produced pheromone to control the pink ballworm caterpillar. This pheromone is sprayed on an infected cotton field to prevent the male insects from mating. Because of the specific nature of this pheromone, beneficial insects are not destroyed. It has also been shown that resistance to this chemical through evolution has been almost nonexistant. With the initial success of this and some other synthetic pheromones, and the favorable response from the EPA, it does not seem long before the major pesticide producers will allocate more time and money to this field of insect control.

Another type of biological pest control which scientists have been investigating for some time is the synthesis of natural viruses to destroy specific insects. The EPA has approved a synthetic insect virus to combat the gypsy moth. Scientists from the Federal Government, private industry, and several universities discovered how to produce this lethal moth virus. After 1 or 2 years of field trials, this product should be available to supplement other conventional chemical controls used to combat this insect.

Integrated Pest Management

Over the past few years, several Federal and State agencies have been promoting the concept of IPM to reduce the amount of chemical pesticides used in this country. Nonchemical pest controls, including the use of biological pesticides such as those mentioned above, are being reemphasized because of the increasing costs of chemical pesticides, buildup of insect resistance to some pesticides, and environmental hazards. It has also been suggested that IPM be used to restrict the use of certain pesticides by incorporating this procedure in the EPA's registration/reregistration process.

Several Government agencies have issued reports for farmers emphasizing IPM rather than chemical pesticides alone. Some nonchemical practices include crop monitoring for insects and disease before using pesticides, crop rotation, introduction of insect predators, and biological pesticides. Farmers at one time or another have used one or more of these techniques, but for the past few decades have been relying more on chemical pesticides. Additional research on IPM techniques is now being conducted by various agencies to increase cost effectiveness on certain crops to make this practice more desirable to farmers. Government officials now believe that farmers will incorporate some of the IPM techniques into their crop management programs but will not greatly decrease their dependance on chemical pesticides until IPM is shown to be cost effective.

Government Regulations

After several months of hearings in both the House and the Senate, the Congress passed the Federal Pesticide Act of 1978. The following are the major provisions of the 1978 Amendments to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):

(1) Increased authority is given to the states regarding enforcement responsibility and to register Federally approved pesticides for additional uses within their states, subject to certain conditions, without EPA authorization.

(2) Data compensation and exclusive use for a specified period of time to encourage the development of new products.

(3) Clarification of the uses consistent with the labeling on pesticides.

(4) Authority to grant conditional registrations for pesticides without data under certain circumstances.

(5) Simplification of the registration procedure in primary and minor use areas.

In general, the Pesticide Act of 1978 should benefit all who are involved with pesticides and should increase the efficiency of the registration process while encouraging the development of new products and making available to farmers a variety of registered products.

One of the provisions of the 1978 Amendment states that before a pesticide is placed on the "Rebuttable Presumption Against Registration" (RPAR) list, the EPA must confidentially inform the producer and give that firm an opportunity to supply exonerating data to the agency.

In 1978, 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2,4,5-trichlorophenol (2,4,5-TCP) and its salts were added to the RPAR list. The EPA took this action because of the presence of small amounts of dioxin, a powerful teratogen and carcinogen. The dioxin is produced as a byproduct when these pesticides are manufactured. One of these products, the herbicide 2,4,5-T, has caused some controversy because it is alleged to have caused miscarriages. The EPA is now investigating this allegation and also reports that this herbicide has caused cancer in some Vietnam veterans who were exposed to it while in Vietnam. Any final decision on this product, however, is expected to take some time because the EPA must carefully examine all the risks and the benefits associated with each product. So far only two pesticides, chlorobenzilate and dibromochloropropane (DBCP), have gone through the RPAR process. Both products, especially DBCP, have been greatly restricted in their uses.

Production, Sales, and Consumption

Production of synthetic organic pesticides in 1978 increased slightly from the 1977 level. Total synthetic organic pesticide production in 1978 was 1.42 billion pounds, 2 percent greater than the 1.39 billion pounds produced in 1977. Production of herbicides declined by 1.6 percent to 664 million pounds owing mainly to increased inventories and lower consumer demand. Overall demand for herbicides was lower than anticipated because of an unusually wet spring in many parts of the country. On the other hand, fungicide production showed some strength by increasing 3 percent over the 1977 level to 148 million pounds. The quantity of sales of pesticides in 1978 remained at the 1977 level of 1.3 billion pounds; however, the value of sales increased by 6.0 percent to $2.0 billion. The average unit value of sales increased from $2.22 in 1977 to $2.34 in 1978.

U.S. consumption of organic pesticides in the unmixed form in 1978 decreased by approximately 7 percent to 1.1 billion pounds, valued at $2.8 billion from the 1977 level. The decline in consumption was due primarily to heavy rains in some parts of the country which delayed planting of crops and to larger than normal pesticide inventories at the beginning of 1978.

Foreign Trade

Imports of benzenoid pesticides (TSUS item 405.15) in 1978 amounted to 71.7 million pounds valued at $161 million. These pesticide imports represented an increase in both quantity and value of 44 and 59 percent, respectively, more than the 49.7 million pounds of pesticides valued at $101 million imported in 1977. The large increase in pesticide imports registered in 1978 is due primarily to an increase in consumer demand for certain proprietary products and an unexpectedly large volume of herbicides exported from Switzerland. Future imports of pesticides are expected to increase but not at the rate experienced in 1978. As in most commodities, the import value of these products may increase at a faster rate in the next few years because of inflationary pressures and the fluctuations of world currencies.

Total imports of benzenoid pesticides in 1978 continued to be dominated by West Germany as shown in table A. The quantity of imports from West Germany amounted to 30.6 million pounds, or by 43 percent of the total benzenoid pesticide imports. These imports consisted mainly of the herbicide, bentazon, which amounted to 18 million pounds in 1978. It is expected that West Germany will continue to dominate pesticide imports for the next several years because of their strong commitment to research and development of new environmentally safe pesticides.

Imports from countries designated to benefit from the Generalized System of Preferences (GSP) in 1978 were valued at $6.4 million, or by 4 percent of the total value of pesticides imports. Although this was an increase of 54 percent in terms of value from 1977, the market penetration of GSP imports remained the same as 1977. Israel was the principal GSP country with exports to the United States valued at $4.2 million. Imports from GSP countries are expected to remain around 4 to 5 percent of total imports in the future because of the increased demand for "noncompetitive" pesticides which are, in many cases, more effective and environmentally safer than the "competitive" products usually exported from GSP countries. The total amount of imports is expected to increase at a moderate rate over the next few years because of consumer demand for certain pesticides.

Exports of pesticides and their preparations in 1978 amounted to 618 million pounds valued at $901 million. Unmixed pesticide exports amounted to 314 million pounds valued at $490 million. The major markets for U.S. pesticides are listed in table B with the values of unmixed pesticides and pesticide preparations, which were exported from the United States in 1978. Belgium and Canada, the leading importers of U.S. pesticides, imported mainly herbicide preparations. Canada imported a large variety of pesticides in addition to herbicides (e.g., fungicides, insecticides, and fumigants), while Belgium concentrated mainly on herbicides and fungicides. Canada, Belgium, and other European export markets for pesticides are not expected to grow rapidly in the next few years because most of the usable land is already under cultivation.

The areas of greatest export potential are generally regarded as the South American and Asian markets. Many of these countries are already importing increasing amounts of insecticides along with smaller amounts of herbicides, fungicides, and plant growth regulators. It is anticipated that exports to these countries could increase rapidly over the next several years if the U.S. products can remain competitive.

The pesticide industry maintained a positive balance of trade in 1978. Total imports of pesticides, 1/ valued at $205 million, were only 23 percent of the export's value of $901 million, for a positive balance of trade of $696 million. The balance of trade in the pesticide industry is expected to remain positive over the next several years because of the competitiveness of U.S. pesticide products and consumer preference for certain U.S. pesticides. However, the relative U.S. advantage is declining. Several major European and Japanese pesticide producers are continuing to develop new environmentally safe products, although at a somewhat declining rate because of increasing cost. In the field of insecticides, new synthetic pyrethroids from Japan and England will probably increase in volume in the coming years. Herbicides continue to account for the largest amount of patent applications for pesticides in Japan and Europe, especially the products concerned with broader spectrum uses and lower toxicity. Future patent applications for pesticides by firms in these countries should continue to enhance their competitive position in the world market.

1/ Includes TSUSA items 405.1510, 405.1520, 405.1530, 405.1540, 405.1550, 425.1040, 425.3600, and 428.7270.

Table A.--Pesticides:[1] U.S. imports, by principal sources, 1976-78

Source	1976	1977	1978
	Quantity (1,000 pounds)		
West Germany	15,732	14,941	30,638
Switzerland	10,885	3,761	17,103
Japan	5,613	4,870	6,593
United Kingdom	12,988	14,025	7,341
Canada	2,289	4,609	2,076
All other	14,607	7,528	7,896
Total	62,114	49,734	71,647
	Value (1,000 dollars)		
West Germany	48,643	41,033	79,159
Switzerland	26,060	7,251	30,255
Japan	10,599	13,067	18,530
United Kingdom	19,904	20,136	11,128
Canada	3,383	5,810	4,115
All other	20,244	14,000	18,176
Total	128,833	101,297	161,363
	Unit value (per pound)		
West Germany	$3.09	$2.75	$2.58
Switzerland	2.39	1.93	1.77
Japan	1.89	2.68	2.81
United Kingdom	1.53	1.44	1.52
Canada	1.48	1.26	1.98
All other	1.39	1.86	2.30
Average	2.07	2.04	2.25

[1]TSUS item 405.15.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table B.--Pesticides:[1] U.S. exports, by principal markets, 1978

(In thousands of dollars)

Market	Unmixed	Preparations	Total
Belgium	41,902	68,278	110,180
Canada	34,884	73,970	108,854
Brazil	34,126	56,734	90,860
Japan	26,485	34,334	60,819
Switzerland	41,724	2,658	44,382
Netherlands	29,337	7,539	36,876
United Kingdom	17,982	6,222	24,204
Colombia	15,754	8,111	23,865
West Germany	16,056	4,965	21,021
Mexico	11,191	9,323	20,514
Venezuela	13,825	4,073	17,898
Nicaragua	13,648	2,638	16,286
All other	192,870	133,216	326,086
Total	489,784	412,061	901,845

[1]Includes Schedule B Nos. 486.02, 486.04, 486.09, 486.12, 486.14, 486.16, 486.19, 486.21, 486.23, 486.25, 486.26, 486.28, 486.29, 486.32, 486.34, 486.39, 486.55, 486.62, 486.64, 486.66, 486.69, 486.72, 486.79, 486.82, 486.84, 486.89, and 486.95.

Source: Compiled from official statistics of the U.S. Department of Commerce.

STATISTICAL HIGHLIGHTS

Edmund Cappuccilli

Pesticides and related products include fungicides, herbicides, insecticides, rodenticides, and related products such as plant growth regulators, seed disinfectants, soil conditioners, soil fumigants, and synergists. The data are given in terms of 100 percent active materials; they exclude such materials as diluents, emulsifers, and wetting agents.

U.S. production of pesticides and related products in 1978 amounted to 1,416 million pounds--2.1 percent greater than the 1,388 million pounds reported for 1977 (table 1).[1] Sales in 1978 were 1,300 million pounds, an increase of 2.9 percent, as compared with 1,263 million pounds reported in 1977; the value of sales was $3,041 million in 1978, compared with $2,808 million in 1977--an increase of 8.3 percent.

The output of cyclic pesticides and related products amounted to 982 million pounds in 1978--1.2 percent less than the 994 million pounds produced in 1977. Sales in 1978 were 944 million pounds, valued at $2,314 millio compared with 904 million pounds, valued at $2,066 million in 1977.. Production of acyclic pesticides and related products in 1978 amounted to 434 million pounds, compared with 394 million pounds reported for 1977, an increase of 10.3 percent. Sales in 1978 were 357 million pounds, a decrease of about 0.7 percent, as compared with 359 million pounds reported in 1977; the value of sales was $728 million in 1978, compared with $742 million in 1977--a decrease of 1.9 percent.

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[1] See also table 2 which lists these products and identifies the manufacturers by codes. These codes are given in table 3.

TABLE 1.--Pesticides and related products: U.S. production and sales, 1978

[Listed below are all pesticides and related products for which any reported data on production or sales may be published. Table 2 lists all pesticides and related products for which data on production and/or sales were reported and identifies the manufacturers of each]

PESTICIDES AND RELATED PRODUCTS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Grand total	1,416,484	1,300,111	3,041,202	$2.34
Benzenoid	795,836	747,054	1,897,623	2.54
Nonbenzenoid	620,648	553,057	1,143,579	2.07
CYCLIC				
Total	982,322	943,574	2,313,583	2.45
Fungicides, total	109,242	114,852	180,723	1.57
Naphthenic acid, copper salt	1,188	1,207	1,042	.86
Pentachlorophenol (PCP)	39,985	47,181	17,643	.37
Phenylmercuric acetate (PMA)	184	184	1,841	10.01
All other cyclic fungicides[2]	67,885	66,280	160,197	2.42
Herbicides and plant growth regulators, total	534,275	524,031	1,493,334	2.85
2,4-Dichlorophenoxyacetic acid, dimethylamine salt	19,749	20,406	16,520	.81
Plant growth regulators[3]	7,478	6,825	23,006	3.37
All cyclic herbicides[4]	507,048	496,800	1,453,808	2.93
Insecticides and rodenticides, total	338,805	304,691	639,526	2.10
Organophosphorus insecticides[5]	117,621	103,478	243,558	2.35
Piperonyl butoxide	736	749	2,304	3.08
Toxaphene(chlorinated camphene)	40,430	40,391	17,151	.42
All other cyclic insecticides and rodenticides[6]	180,018	160,073	376,513	2.35
ACYCLIC				
Total	434,162	356,537	727,619	2.04
Fungicides, total	38,283	36,065	41,229	1.14
Dithiocarbamic acid salts[7]	34,343	32,855	34,211	1.04
All other acyclic fungicides[8]	3,940	3,210	7,018	2.19
Herbicides and plant growth regulators[9]	129,295	116,048	287,471	2.48
Insecticides, rodenticides, soil conditioners and fumigants, total	266,584	204,424	398,919	1.95
Organophosphorus insecticides[10]	90,257	58,525	195,570	3.34
Trichloronitromethane (Chloropicrin)	5,818	6,498	4,321	.66
All other acyclic insecticides, rodenticides, soil conditioners and fumigants[11]	170,509	139,401	199,028	1.43

[1]Calculated from unrounded figures.

[2]Includes benomyl, captafol, captan, chlorothalonil, dinocap, DMTT, folpet, pentachloronitrobenzene, sodium pentachlorophenate, 2,4,5-trichlorophenol salts, all other phenylmercury compounds, and others.

[3]Includes maleic hydrazide.

[4]Includes alachlor, atrazine, barban, benefin, bensulide, 2,4-D acid (esters and salts), 2,4-DB, dicamba, dinitrophenol compounds, diuron, isopropyl phenylcarbamates (IPC and CIPC), MCPA, molinate, NPA, picloram, propanil, silvex and its esters, 2,4,5-T acid (esters and salts), triazines, trifluralin, uracils, and others.

[5]Includes carbophenothion, diazinon, dioxanthion, EPN, methyl parathion, parathion, and other phosphorothioates and phosphorodithioates.

[6]Includes carbaryl, carbofuran, chlorinated insecticides (chlordan, chlorobenzilate, DDT, dicofol, endrin, heptachlor, methoxychlor, and others), insect attractants, DEET and other insect repellents, small amounts of rodenticides, and others.

[7]Includes ferbam, maneb, nabam, and zineb, plus the remaining dithiocarbamates which are used chiefly as fungicides.

[8]Includes dodine, and others.

Footnotes--Continued

[9]Includes butylate, dalapon, methanearsonic acid salts, sodium TCA, thiocarbamates, and organophosphorus herbicides, and others.
[10]Includes acephate, DDVP, disulfoton, ethion, malathion, naled, phorate, and other organophosphorus insecticides.
[11]Includes methyl bromide, soil conditioners and fumigants, aldicarb, small quantities of rodenticides, and others.

Note.--Does not include data for the insect fumigant, p-dichlorobenzene nor the fungicide, o-phenylphenol. These data are include in the section on "Cyclic Intermediates." It also does not include data for the fungicides, dimethyldithiocarbamic acid, sodium salt and dimethyldithiocarbamic acid, zinc salt (i.e., ziram). These data are included in the section on "Rubber-Processing Chemicals." The data for ethylene dibromide, a fumigant, are included in the "Miscellaneous End-Use Chemicals and Chemical Products" section.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*) CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCTS]

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC	
*FUNGICIDES:	
2,6-Bis(dimethylaminomethyl)cyclohexanone	MRK.
2-Bromo-4'-hydroxyacetophenone	BKM.
5-Chloro-2-benzothiazolethiol,laurylpyridinium salt	VNC.
2,4-Dichloro-6-(o-chloroanilino)-s-triazine	CHG.
1,4-Dichloro-2,5-dimethoxybenzene (Chloroneb)	DUP.
1,2-Dihydro-6-ethoxy-2,2,4-trimethylquinoline (Ethoxyquin)	MON.
5-Ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole	OMC.
Hexahydro-1,3,5-triethyl-s-triazine	VNC.
Mercaptobenzothiazole, zinc salt	VNC.
Methyl-1-(butylcarbamoyl)-2-benzimidazolecarbamate (Benomyl)	DUP.
2-(1-Methyl-n-heptyl)-4,6-dinitrophenyl crotonate (Dinocap)	RH.
3-(2-Methylpiperidino)propyl 3,4-dichlorobenzoate (Piperalin)	LIL.
*Naphthenic acid,copper salt	CCA, MCI, TRO, WTC, X.
Pentachloronitrobenzene (PCNB)	OMC.
*Pentachlorophenol (PCP)	DOW, FRO, MON, RCI.
Pentachlorophenol, potassium salt	X.
Pentachlorophenol,sodium salt	DOW.
*Phenylmercuric acetate (PMA)	CLY, MRK, TRO.
Phenylmercuric ammonium acetate	TRO.
Phenylmercuric oleate	TRO.
Phenylmercuric propionate	MRK.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
*FUNGICIDES--Continued:	
8-Quinolinol(8-hydroxyquinoline), copper salt	ASH, X.
cis-N-[(1,1,2,2-Tetrachloroethyl)thio]-1-cyclohexene-1,2-dicarboximide (Captafol)	ORO.
2,4,5,6-Tetrachloroisophthalonitrile	DA.
Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione (DMTT)	MRK, VCC.
2-(Thiocyanomethylthio)benzothiazole	BKM.
N-Trichloromethylthio-4-cyclohexene-1,2-dicarboximide (Captan)	SFA, SFC, X.
N-Trichloromethylthiophthalamide (Folpet)	SFA, SFC.
2,4,5-Trichlorophenol	DOW.
2,4,5-Trichlorophenol, potassium salt	X.
2,4,5-Trichlorophenol, sodium salt	DOW, GAF, MRK.
1,3,5-Tri(2-isopropanol)-s-triazine	EFH.
Cyclic fungicides, all other	LIL, RH, X.
*HERBICIDES AND PLANT GROWTH REGULATORS:	
3-Amino-2,5-dichlorobenzoic acid, ammonium salt (2,5-Dichloro-3-aminobenzoic acid, ammonium salt)	GAF, UCC.
4-Amino-6-(1,1-dimethylethyl)-3-(methylthio)-1,2,4-triazin-5-(4H)-one	CHG.
4-Amino-3,5,6-trichloropicolinic acid (Picloram)	DOW.
4,6-Bis(isopropylamino)-2-methoxy-s-triazine (Prometon)	CGY.
2,4-Bis(isopropylamino)-6-(methylthio)-s-triazine (Prometryn)	CGY.
5-Bromo-3-sec-butyl-6-methyluracil (Bromacil)	DUP.
2-(tert-Butylamino)-4-chloro-6-(ethylamino)-s-triazine	CGY.
2-(sec-Butylamino)-4-ethylamino-6-methoxy-s-triazine	CGY.
2-(tert-Butylamino)-4-ethylamino-6-methoxy-s-triazine	CGY.
2-(tert-Butylamino)-4-ethylamino-6-(methylthio)-s-triazine	CGY.
3-tert-Butyl-5-chloro-6-methyluracil	DUP.
N-Butyl-N-ethyl-α,α,α-trifluoro-2,6-dinitro-p-toluidine (Benefin)	LIL.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTUER, 1978--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
*HERBICIDES AND PLANT GROWTH REGULATORS--Continued:	
2-Butynyl-4-chloro-m-chlorocarbanilate (Barban)	GOC.
2-Chloro-4,6-bis(ethylamino)-s-triazine (Simazine)	CGY.
2-Chloro-4,6-bis(isopropylamino)-s-triazine (Propazine)	CGY.
2-Chloro-4-(cyclopropylamino)-6-(isopropylamino)-s-triazine (Cyprazine)	SHC.
2-Chloro-2',6'-diethyl-N-(n-butoxymethyl)acetanilide (Butachlor)	MON.
2-Chloro-2',6'-diethyl-N-(methoxymethyl)acetanilide (Alachlor)	MON.
2-Chloro-1-(3-ethoxy-4-nitrophenoxy)-4-(trifluoromethyl)benzene ()xyfluorfen)	RH.
2-Chloro-4-(ethylamino)-6-(isopropylamino)-s-triazine (Atrazine)	CGY, FRI, SHC, VTC.
2-[4-Chloro-6-(ethylamino)-s-triazin-2-ylamino]-2-methylpropionitrile (Cyanazine)	CGY.
N-(2-Chloroethyl)-α,α,α-trifluoro-2,6-dinitro-N-propyl-p-toluidine (Fluchloralin)	BAS.
2-Chloro-N-isopropylacetanilide (Propachlor)	DOW, MON.
3-Cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4-(1H,3H)-dione	DUP.
N-(Cyclopropylmethyl)-α, α, α-trifluoro-2,6-dinitro-N-propyl-p-toluidine (Profluralin)	CGY.
3,5-Dibromo-4-hydroxybenzonitrile, octanoic acid esters (Bromoxynil octanoate)	RDA.
3,6-Dichloro-2-anisic acid (Dicamba)	VEL.
4-(2,4-Dichlorophenoxy)butyric acid (2,4-DB Acid)	RDA.
4-(2,4-Dichlorophenoxy)butyric acid, iso-octyl ester	RDA.
2-(2,4-Dichlorophenoxy)propionic acid, 2-butoxyethyl ester	DOW.
3-(3,4-Dichlorophenyl)-1,1-dimethylurea (Diuron)	DUP.
3-(3,4-Dichlorophenyl)-1-methoxy-1-methylurea (Linuron)	DUP.
2,4-Dichlorophenyl p-nitrophenyl ether	RH.
3',4'-Dichloropropionanilide (Propanil)	EGR, RH.
S-(O,O-Diisopropyl phosphorodithioate) ester of N-α-mercaptoethyl)benzenesulfonamide (Bensulide)	SFA.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
*HERBICIDES AND PLANT GROWTH REGULATORS--Continued:	
N,N-Dimethyl-2,2-diphenylacetamide (Diphenamid)	CWN, LIL.
1,2-Dimethyl-3,5-diphenyl-1H-pyrazolium methyl sulfate	ACY.
N-(1,1-Dimethyl-2-propynyl)-3,5-dichlorobenzamide (Pronamide)	RH.
Dimethyl-2,3,5,6-tetrachloroterephthalate (DCPA)	DA.
1,1-Dimethyl-3-(α,α,α-trifluoro-m-tolyl)urea (Fluometuron)	CGY.
Dinitrobutylphenol (DNBP)	DOW, VTC.
Dinitrobutylphenol,ammonium salt	DOW.
Dinitrobutylphenol,triethanolamine salt	DOW, VTC.
2,6-Dinitro-N,N-dipropyl cumidine	LIL.
3,5-Dinitro-N4,N4-dipropylsulfanilamide	SDC, X.
2-(Ethylamino)-4-(isopropylamino)-6-(methylthio)-s-triazine (Ametryne)	CGY.
5-Ethyl cyclohexylethylthiocarbamate	SFA.
S-Ethyl-hexahydro-1H-azepine-1-carbothioate (Molinate)	SFA.
N-(1-Ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzen amine	ACY, X.
2-(Ethylthio)-4,6-bis(isopropylamino)-s-triazine	CGY.
3-Isopropyl-1H-2,1,3-benzothiadiazin-4(3H)-one 2,2-dioxide	BAS.
Isopropyl N-(3-chlorophenyl)carbamate (CIPC)	PPG.
Isopropyl N-phenylcarbamate (IPC)	PPG.
1-(2-Methylcyclohexyl)-3-phenylurea (Siduron)	DUP.
Methyl 5-(2',4'-dichlorophenoxy)-2-nitrobenzoate	SM.
1-Naphthylphthalamic acid (NPA)	USR.
7-Oxabicyclo-[2.2.1]-heptane-2,3-dicarboxylic acid, disodium salt (Endothall)	PAS.
PHENOXYACETIC ACID DERIVATIVES:	
4-Chloro-2-methylphenoxyacetic acid (MCPA)	TMH.
2,4-DICHLOROPHENOXYACETIC ACID, ESTERS AND SALTS:	
2,4-Dichlorophenoxyacetic acid (2,4-D)	DOW, RDA.
2,4-Dichlorophenoxyacetic acid, butoxyethanol ester	DOW.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
*HERBICIDES AND PLANT GROWTH REGULATORS--Continued:	
PHENOXYACETIC ACID DERIVATIVES--Continued:	
2,4-Dichlorophenoxyacetic acid,butoxypolypropyeneglycol ester	DOW.
2,4-Dichlorophenoxyacetic acid,n-butyl ester	PBI, RIV.
2,4-Dichlorophenoxyacetic acid,sec-butyl ester	DOW.
*2,4-Dichlorophenoxyacetic acid,dimethylamine-salt	DOW, PBI, RDA, RIV, TMH.
2,4-Dichlorophenoxyacetic acid,ethanolamine and isopropanolamine salts	DOW.
2,4-Dichlorophenoxyacetic acid, isobutyl ester	RDA.
2,4-Dichlorophenoxyacetic acid,iso-octyl ester	DOW, PBI, RDA, RIV.
2,4-Dichlorophenoxyacetic acid,lithium salt	GTH.
2,4-Dichlorophenoxyacetic acid,esters and salts, all other	VEL.
2,4,5-TRICHLOROPHENOXYACETIC ACID, ESTERS AND SALTS:	
2,4,5-Trichlorophenoxyacetic acid, butoxyethanol ester	DOW.
2,4,5-Trichlorophenoxyacetic acid,butoxypolypropyleneglycol ester	DOW.
2,4,5-Trichlorophenoxyacetic acid,iso-octyl-ester	TMH.
2,4,5-Trichlorophenoxyacetic acid,triethylamine salt	DOW.
*PLANT GROWTH REGULATORS:	
2-Chloro-6-(trichloromethyl)pyridine	DOW.
2,4-Dichlorobenzyltributylphosphonium chloride	SM.
1,2-Dihydro-3,6-pyridazinedione (Maleic hydrazide) (MH)	ACY, CHP, FMT, USR.
Gibberellic acid	ABB, MRK.
3-Indolebutyric acid	ARA, MRK.
1-Naphthaleneacetic acid (NAA)	GNW.
1-Naphthaleneacetic acid,sodium salt	GNW.
Plant growth regulators, cyclic, all other	MMM, USR.
Sodium 5-[2-chloro-4-(trifluoromethyl)-phenoxy]-2-nitrobenzoate	RH.
2-(2,4,5-Trichlorophenoxy)propionic acid (Silvex)	TMH.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
*HERBICIDES AND PLANT GROWTH REGULATORS--Continued	
2-(2,4,5-Trichlorophenoxy)propionic acid, 2-butoxy polypropylene ester	DOW.
2-(2,4,5-Trichlorophenoxy)propionic acid, dimethyl amine salt	RIV.
2-(2,4,5-Trichlorophenoxy)propionic acid, iso-octyl ester	RIV.
α, α, α-Trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine (Trifluralin)	LIL, S.
1,1,1-Trifluoro-N-(2-methyl-4-(phenylsulfonyl) phenyl)methanesulfonamide	CGY.
Cyclic herbicides, all other	MMM.
INSECT ATTRACTANTS AND REPELLENTS:	
tert-Butyl 4(or 5)-chloro-2-methylcyclohexanecarboxylate (Trimedlure)	UOP.
N,N-Diethyltoluamide (DEET)	HDW, PFZ.
INSECTICIDES:	
Bacillus thuringiensis	ABB, S.
(5-Benzyl-3-furyl)methyl-2,2-dimethyl-3-(2-methyl propenyl)methanesulfonamide	PEN.
2,3,4,5-δ²-Butenylene-tetrahydrofurfural	PLC.
2-(p-tert-Butylphenoxy)cyclohexyl-2-propynyl sulfite	USR.
CHLORINATED INSECTICIDES:	
4,4'-Dichloro-α-trichloromethylbenzhydrol (Dicofol)	RH.
Ethyl 4,4'-dichlorobenzilate (Chlorobenzilate)	CGY.
Heptachloro-tetrahydro-endo-methanoindene (Heptachlor)	VEL.
Hexachloroepoxyoctahydro-endo,endo-dimethanophthalene (Endrin)	VEL.
Octachlorohexahydro-4,7-methanoindene (Chlordan)	VEL.
Toxaphene (Chlorinated camphene)	HN, HPC, VTC.
1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane (DDT)	MTO.
1,1,1-Trichloro-2,2-bis(p-methoxyphenyl)ethane (Methoxychlor)	CHF, DUP.
Chlorinated insecticides, cyclic, all other	ADC.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
INSECTICIDES--Continued:	
2,3-Dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate	FMN.
Di-n-propylisocinchomeronate	MGK.
Distinnaxane, hexakis(2-methyl-2-phenylpropyl)	SHC.
m-(1-Ethylpropyl)phenyl methylcarbamate	ORO.
m-(Methylbutyl)phenyl methylcarbamate	ORO.
Methyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboate	FMN.
1-Naphthyl N-methylcarbamate (Carbaryl)	UCC.
*ORGANOPHOSPHORUS INSECTICIDES:	
O-(4-Bromo-2,5-dichlorophenyl) O-methylphenylphosphonothioate (Leptophos)	VEL.
4-tert-Butyl-2-chlorophenyl methyl methylphosphoramidate (Crufomate)	DCC.
S-[[(p-Chlorophenyl)thio]methyl] O,O-diethyl phosphorodithioate (Carbophenothion)	SPA.
N'-(Chloro-o-tolyl-N,N-dimethylformamidine (Chlordimeform)	CGY.
2-Chloro-1-(2,4,5-trichlorophenyl)vinyl dimethyl phosphate (Tetrachlorvinphos)	SHC.
O-(2,4-Dichlorophenyl) O-ethyl S-propyl phosphorodithioate	CHG.
2-(Diethoxyphosphinylimino)-4-methyl-1,3-dithiolane	ACY.
O,O-Diethyl S-(2-chloro-1-phthalimidoethyl)phosphorodithioate	HPC.
O,O-Diethyl O-(2-isopropyl-4-methyl-6-pyrimidinyl) phosphorothioate (Diazinon)	CGY.
O,O-Diethyl O-[4-(methylsulfinyl)phenyl]phosphorothioate	CHG.
O,O-Diethyl O-(p-nitrophenyl)phosphorothioate (Parathion)	MON.
O, O'-Diethyl-O'-pyrazinyl phosphorodithidate	ACY.
O,O-Diethyl O-3,5,6-trichloro-2-pyridyl phosphorothioate	DOW.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER,--1978--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
INSECTICIDES--Continued:	
*ORGANOPHOSPHORUS INSECTICIDES--Continued:	CHG.
O,O-Dimethyl O-[4-(methylthio)-m-tolyl]phosphorothioate (Fenthion)	CHG.
O,O-Dimethyl O-(p-nitrophenyl)phosphorothioate (Methyl parathion)	AMP, MON, VTC.
O,O-Dimethyl S-[(4-oxo-1,2,3-benzotriazin-3(4h)-yl)methyl]phosphorodithioate (Azinphos-methyl)	CHG.
O,O-Dimethyl S-(phthalimidomethyl)phosphorodithioate	SFA.
O,O-Dimethyl O-(2,4,5-trichlorophenyl)phosphorothioate (Ronnel)	DCC.
2,3-p-Dioxanedithiol S,S-bis-(O,O-diethyl phosphorodithioate (Dioxathion)	HPC.
O-Ethyl O-[4-(methylthio)phenyl] S-propyl phosphorodithioate	CHG.
O-Ethyl O-(p-nitrophenyl)phenylphosphonothioate (EPN)	SFA, VEL.
O-Ethyl-S-phenylethylphosphonodithioate	SFA.
2-Imino-1,3-dithiolane, dihydrogen sulfate	ACY.
α-Methylbenzyl 3-(dimethoxyphosphinyloxy)-cis-crotonate	SHC.
O ,O, O',O'-Tetramethyl-O,O'-thiodi-p-phenylene phosphorothioate	ACY.
Cyclic insecticides,all other	EGR, FMN, X.
NEMATOCIDES:	
O,O-Diethyl O-(2,4-dichlorophenyl)phosphorothioate (Dichlofenthion)	SM.
RODENTICIDES:	
3-(α-Acetonylbenzyl)-4-hydroxycoumarin (Warfarin)	MOT.
2-Pivaloyl-1,3-indandione (Pindone)	MOT, PIC.
Rodenticides, cyclic,all other	MOT.
CYCLIC PESTICIDES, ALL OTHER:	
4-Bromoacetoxymethyl-N-dioxoline	EFH.
*α-[2-(2-n-Butoxyethoxy)-ethoxy]-4,5-methylenedioxy-2-propyltoluene (Piperonyl butoxide)	ALP, FMN, HDW.
N-(2-Ethylhexyl)bicyclo(2.2.1)-5-heptene-2,3-di carboximide	MGK.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC	
*FUNGICIDES:	
Bis-1,4-bromoacetoxy-2-butene	VIN.
Chloromethoxypropylmercuric acetate	TRO.
Disodium cyanodithioimidocarbonate	BKM.
*DITHIOCARBAMIC ACID FUNGICIDES:	
Dimethyldithiocarbamic acid, ferric salt (Ferbam)	FMN.
Dimethyldithiocarbamic acid, potassium salt	BKM.
Dimethyldithiocarbamic acid, sodium salt	VCC.
Ethylene bis(dithiocarbamic acid), disodium salt (Nabam)	ALC, USR, VCC.
Ethylene bis(dithiocarbamic acid), manganese salt (Maneb)	DUP, RH.
Ethylene bis(dithiocarbamic acid), manganese salt with zinc ions	RH.
Ethylene bis(dithiocarbamic acid), zinc salt (Zineb)	FMN, RH.
N-Methyldithiocarbamic acid, potassium salt	BKM.
Dithiocarbamic acid fungicides, acyclic, all other	FMN, VNC, X.
n-Dodecylguanidine acetate (Dodine)	ACY.
Methylene bis(thiocyanate)	MRK, VCC.
Acyclic fungicides, all other	BKM, MRK.
*HERBICIDES AND PLANT GROWTH REGULATORS:	
N,N-Bis(phosphonomethyl)glycine	MON.
2-Chloroallyl diethyldithiocarbamate (CDEC)	MON.
2-Chloro-N,N-diallylacetamide (CDAA)	MON.
2,2-Dichloropropionic acid, sodium salt (Dalapon)	DOW.
N-[5-(1,1-Dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea (Tebuthiuron)	LIL, MRT.
Ethyl carbamoylphosphonate, ammonium salt	DUP.
S-Ethyldiisobutylthiocarbamate (Butylate)	SPA.
S-Ethyl dipropylthiocarbamate (EPTC)	SPA.
Ethyl xanthogen disulfide	RBC.
Methanearsonic acid, disodium salt (DSMA)	DA, VIN.
Methanearsonic acid, dodecyl- and octyl- ammonium salts	CLY.
N-(Phosphonomethyl)glycine, isopropylamine salt	MON.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*HERBICIDES AND PLANT GROWTH REGULATORS--Continued:	
S-Propyl butylethylthiocarbamate (Pebulate)	SFA.
S-Propyl dipropylthiocarbamate (Vernolate)	SFA.
S,S,S-Tributyl phosphorotrithioate	PLC.
Tributyl phosphorotrithioite (Merphos)	SM.
Trichloroacetic acid, sodium salt (TCA)	DOW.
PLANT GROWTH REGULATORS:	
2-(Chloroethyl)phosphonic acid	UCC.
Succinic acid, 2,2-dimethylhydrazide	USR.
Acyclic herbicides, all other	S.
INSECTICIDES:	
2-(2-Butoxyethoxy)ethyl thiocyanate	RH.
3,3-Dimethyl-1-(methylthio)-2-butanone O-(methylamino)carbomyl oxime	EGR.
Methyl N',N'-dimethyl-N-[(methylcarbamoyl)oxy]-1-thiooxamidate	DUP.
S-Methyl-N-[(methylcarbamoyl)oxy]thioacetimidate (Methomyl)	DUP, EGR, SHC.
2-Methyl-2-(methylthio)propionaldehyde O-(methylcarbamonyl)oxime (Aldicarb)	CGY, UCC.
ORGANOPHOSPHORUS INSECTICIDES:	
S-[1,2-Bis(ethoxycarbonyl)ethyl]O,O-dimethyl phosphorodithioate (Malathion)	ACY.
2-Carbomethoxy-1-propen-2yl dimethyl phosphate	SHC.
1,2-Dibromo-2,2-dichloroethyl dimethyl phosphate (Naled)	SHC.
O,O-Diethyl S-[2-(ethylthio)ethyl] phosphorodithioate (Disulfoton)	CHG.
O,O-Diethyl O-[2-(ethylthio)ethyl] phosphorothioate (Demeton O)	CHG.
O,O-Diethyl S-[(ethylthio)methyl] phosphorodithioate (Phorate)	ACY.
3-(Dimethoxyphosphinyloxy)-N,N-dimethyl-cis-crotonamide	SHC.
O,S-Dimethylacetylphosphoramidothioate (Acephate)	ORO.
O,O-Dimethyl-O-2,2-dichlorovinyl phosphate (DDVP)	SHC.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
INSECTICIDES--Continued	
*ORGANOPHOSPHORUS INSECTICIDES--Continued:	
O,S-Dimethyl phosphoramidothioate	CHG.
O,O-Dimethyl phosphorochloridothioate	CHG.
S-[2-(Ethylsulfinyl)ethyl]O,O-dimethyl phosphorothioate (Oxydemetonmethyl)	CHG.
O,O,O',O'-Tetraethyl S,S'-methylene bisphosphorodithioate (Ethion)	FMN.
O,O,O,O-Tetra-n-propyldithiopyrophosphate	SFA.
Organophosphorus insecticides, acyclic, all other	X.
Acyclic insecticides, all other	X.
RODENTICIDES:	
2-Hydroxyethyl n-octyl sulfide	PLC.
Rodenticides, acyclic, all other	PLC, RBC.
SOIL CONDITIONERS:	
Polyacrylonitrile,hydrolyzed,sodium salt	ACY.
SOIL FUMIGANTS:	
1,2-Dibromo-3-chloropropane (DBCP)	DOW.
1,3-Dichloropropene	DOW.
1,3-Dichloropropene,1,2-dichloropropane	DOW, SHC.
O-Ethyl S,S-dipropyl phosphorodithioate	SM.
Methyl bromide (Bromomethane)	DOW, GTL, VEL.
N-Methyldithiocarbamic acid,sodium salt (Metham)	SFA.
Methyl isothiocyanate	MRT.
*Trichloronitromethane (Chloropicrin)	DOW, IMC, NLO.
ACYCLIC PESTICIDES, ALL OTHER:	
Diamino acetate	X.
Diamino copper acetate propionate	X.
2-[(Hydroxymethyl)amino]-2-methylpropanol	TRO.
2-[(Hydroxymethyl)]ethanol	TRO.
3-Iodo-2-propynyl butylcarbamate	TRO.
Pesticides and related products, acyclic, all other	PCW, X.

TABLE 3.--PESTICIDES AND RELATED PRODUCTS: DIRECTORY OF MANUFACTURERS, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of pesticides and related products to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of company
ABB	Abbott Laboratories
ACY	American Cyanamid Co.
ADC	Anderson Development Co.
ALC	Alco Chemical Corp.
ALP	Alpha Laboratories, Inc.
AMP	Kerr-McGee Chemical Corp.
ARA	Arapahoe Chemical, Inc. Sub/Syntex U.S.A., Inc.
ASH	Ashland Oil, Inc.
BAS	BASF Wyandotte Corp.
BKM	Buckman Labs., Inc.
CCA	Interstab Chemicals, Inc.
CGY	Ciba-Geigy Corp., Agricultural Div.
CHF	Chemical Formulators, Inc.
CHG	Mobay Chemical Corp., Agricultural Chemicals Div.
CLY	W. A. Cleary Corp.
CWN	Upjohn Co., Fine Chemical Div.
DA	Diamond Shamrock Corp.
DOW	Dow Chemical Co.
DUP	E. I. duPont de Nemours & Co., Inc.
EFH	E. F. Houghton & Co.
EGR	Eagle River Chemical Corp.
FMN	FMC Corp., Agricultural Chemical Div.
FMT	Fairmount Chemical Co.
FRI	Farmland Industries, Inc.
FRO	Vulcan Materials Co., Chemical Div.
GAF	GAF Corp.
GNW	Greenwood Chemical Co.
GOC	Gulf Oil Corp., Gulf Oil Chemical Co. - U.S.
GTH	Guth Chemical Co.
GTL	Great Lakes Chemical Corp.
HDW	Hardwiche Chemical Co.
HN	Tenneco Chemicals, Inc.
HPC	Hercules, Inc.
IMC	International Minerals & Chemicals Corp.
LIL	Eli Lilly & Co.
MCI	Mooney Chemical Corp.
MGK	McLaughlin, Gormley & King Co.
MMM	Minnesota Mining & Manufacturing Co.
MON	Monsanto Co.
MOT	Motomoco, Inc.
MRK	Merck & Co., Inc.
MRT	Morton-Norwich Products, Inc., Morton Chemical Co. Div.
MTO	Montrose Chemical Corp. of California
NLO	Niklor Chemical Co., Inc.
OMC	Olin Corp., Agricultural Products Dept.
ORO	Chevron Chemical Co.
PAS	Pennwalt Corp.
PBI	PBI Gordon Corp.
PCW	Pfister Chemical, Inc.
PEN	CPC International, Inc., Penick Div.
PFZ	Pfizer, Inc.
PIC	Pierce Organics, Inc.
PLC	Phillips Petroleum Co.
PPG	PPG Industries, Inc.
RBC	Fike Chemicals, Inc.
RCI	Reichhold Chemicals, Inc.
RDA	Rhone-Poulenc, Inc.
RH	Rohm & Haas Co.
RIV	Riverdale Chemical Co.
S	Sandoz Inc., Crop Protection Dept.
SDC	Martin-Marietta Corp., Sodyeco Div.
	Stauffer Chemical Co.:
SFA	Agricultural Div.
SFC	Calhio Chemicals, Inc.
SHC	Shell Oil Co., Shell Chemical Co. Div.
SM	Mobil Oil Corp., Mobil Chemical Co., Phosphorus Div.
TMH	Thompson-Hayward Chemical Co.
TRO	Troy Chemical Corp.
UCC	Union Carbide Corp. & Agricultural Products Co.
UOP	UOP, Inc., Chemical Div.
USR	Uniroyal, Inc., Chemical Div.
VCC	Vinings Chemical Co.
VEL	Velsicol Chemical Corp.
VIN	Vineland Chemical Co., Inc.
VNC	Vanderbilt Chemical Corp.
VTC	Vertac, Inc., Vicksburg Plant
WTC	Witco Chemical Corp.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix. The above codes identify those of the 83 reporting companies and company divisions for which permission to publish was not restricted.

SECTION XIV -- MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS

STATISTICAL HIGHLIGHTS

David B. Beck

This section incorporates those end-use groups which are not readily classifiable within the prior sections of this report. Both cyclic and acyclic chemicals fall within this section. With the exception of gasoline additives, both production and sales of all end-use groups contained within this section increased over 1977 levels.

In 1978 the production of miscellaneous end-use chemicals exceeded 20.6 billion pounds, an increase of 6.4 percent over the more than 19.3 billion pounds of production reported for 1977. Sales in 1978 totaled 11.7 billion pounds, valued at $2.7 billion. The sales quantity represents an increase of 7.8 percent over that of 1977 with the value of sales increasing by 6.5 percent. As in 1977, polymers for fibers and urea again collectively accounted for 84 percent of the 1978 production of these miscellaneous end-use chemicals. Urea accounted for 76 percent of the 1978 sales quantity of these chemicals.

Production of gasoline additives for 1978 totaled 1.1 billion pounds, a decrease of 6 percent from the previous year. Total sales quantity for 1978 was 801 million pounds, down 7 percent from the 1977 sales quantity of 862 million pounds. This market is expected to continue its decline as a result of environmental legislation which restricts the use of lead alkyls in gasoline.

TABLE 1.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS: U.S. PRODUCTION AND SALES, 1978

[Listed below are all miscellaneous end-use chemicals and chemical products for which any reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all miscellaneous end-use chemicals and chemical products for which data on production and/or sales were reported and identifies the manufacturers of each]

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Grand total	20,589,333	11,698,266	2,713,076	$0.23
Chelating agents, nitriloacids and salts, total	183,059	133,511	71,684	.54
(Diethylenetrinitrilo)pentaacetic acid, pentasodium salt	4,267	3,679	2,645	.72
(Ethylenedinitrilo)tetraacetic acid, calcium disodium salt	530	543	1,411	2.60
(Ethylenedinitrilo)tetraacetic acid disodium salt	...	576	986	1.71
(Ethylenedinitrilo)tetraacetic acid, tetrasodium salt	69,675	36,852	24,541	.67
(N-Hydroxyethylethylenedinitrilo)triacetic acid, trisodium salt	3,855	2,943	3,013	1.02
All other	104,732	88,918	39,088	.44
Chemical indicators	16	9	433	48.11
Enzymes, total	(2)	(2)	28,435	...
Hydrolytic enzymes, total	(2)	(2)	23,937	...
Amylases	(2)	(2)	3,293	...
Proteases, total	(2)	(2)	15,080	...
Rennin	(2)	(2)	8,196	...
All other proteases	(2)	(2)	6,884	...
All other hydrolytic enzymes	(2)	(2)	5,564	...
Non-hydrolytic enzymes	(2)	(2)	4,498	...
Flotation reagents	3,677	...	...	...
Gasoline additives, total[3]	1,080,651	800,530	817,372	1.02
N,N'-Disalicylidene-1,2-propanediamine	838	779	2,861	3.67
Ethylenedibromide	229,913	...	...	...
Tetraethyl lead	328,436	274,148	294,946	1.08
Tetra(methyl-ethyl) lead, (TEL-TML, reacted)	368,885	343,955	364,938	1.06
Tetramethyl lead	94,111	...	...	...
All other gasoline additives	58,468	181,648	154,627	.85
Lubricating oil and grease additives, total	1,603,017	1,201,344	650,235	.54
Oil soluble petroleum sulfonate, calcium salt	275,082	238,868	124,262	.52
Oil soluble petroleum sulfonate, sodium salt	128,847	117,672	35,316	.30
Phenol salts, total	143,254	124,817	57,137	.46
Nonylphenol, barium salt	7,835	...	...	...
All other	135,419	124,817	57,137	.46
Sulfur compounds, total	165,794	161,479	68,159	.42
Sulfurized lard oil	6,910	...	...	...
All other sulfur compounds	158,884	161,479	68,159	.42
Zinc dialkyldithiophosphate	33,763	8,140	6,793	.83
All other lubricating oil and grease additives	856,277	550,368	358,568	.65
Paint driers, naphthenic acid salts, total[4,5]	12,979	11,557	14,386	1.24
Calcium naphthenate	664	704	486	.69
Cobalt naphthenate	3,709	3,958	9,007	2.28
Lead naphthenate	4,071	3,646	2,199	.60
Manganese naphthenate	799	755	525	.70
Zinc naphthenate	1,856	1,745	1,231	.71
All other	1,880	749	938	1.25

See footnotes at end of table.

TABLE 1.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Photographic chemicals	...	3,531	11,947	$3.38
Polymers for fibers, total	6,355,206	422,231	218,836	.52
Nylon 6 and 6/6	2,189,909	...	...	...
Polyacrylonitrile and acrylonitrile copolymers	648,701	...	...	...
Polyethylene terephthalate	2,593,092	176,771	71,506	.40
All other polymers for fiber	923,504	245,460	147,330	.60
Polymers, water soluble, total	239,723	203,604	261,498	1.28
Cellulose ethers and esters	151,303	139,423	188,640	1.35
Polyacrylamide	53,021	41,441	45,165	1.09
Sodium polyacrylate	10,055	2,794	2,829	1.01
All other water soluble polymers	25,344	19,946	24,864	1.25
Tanning materials, synthetic, total	62,970	55,614	24,371	.44
2-Naphthalenesulfonic acid, formaldehyde condensate and salt	37,642	38,197	16,340	.43
All other	25,328	17,417	8,031	.46
Textile chemicals, other than surface-active agents	6,873	3,507	2,257	.64
Urea, total	11,016,683	8,854,710	583,103	.07
In feed compounds	469,940	423,186	23,022	.05
In liquid fertilizer	3,088,773	2,594,157	204,215	.08
In solid fertilizer	6,368,031	5,396,079	324,470	.06
In plastics	946,850	373,242	24,526	.07
All other	143,089	68,046	6,870	.10
All other miscellaneous end-use chemicals and chemical products[6]	24,479	8,118	28,519	3.51

[1]Calculated from rounded figures.
[2]Not available.
[3]Statistics exclude production and sales of tricresyl phosphate. Statistics on tricresyl phosphate are given with the section on "Plasticizers."
[4]Quantities are given in the basis of solid naphthenate.
[5]Statistics exclude production and sales of copper naphthenate. Statistics for copper naphthenate are given in the section on "Pesticides and Related Products."
[6]Includes all other items listed in table 2 which are not individually publishable or publishable as groups.

TABLE 2.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*) CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U.S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1978 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS]

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
Biological stains	EK, MMC.
*CHELATING AGENTS, NITRILOACIDS AND SALTS:	
(Diethylenetrinitrilo)pentaacetic acid	HMP.
(Diethylenetrinitrilo)pentaacetic acid, monosodium hydrogen ferric salt	CGY.
*(Diethylenetrinitrilo)pentaacetic acid, pentasodium salt	CGY, DAN, DOW, HMP, RPC.
(Diethylenetrinitrilo)pentaacetic acid, sodium salt	CGY.
N,N-Dihydroxyethylglycine, sodium salt	DAN, HMP.
Ethanoldiglycine, disodium salt	HMP.
(Ethylenedinitrilo)tetraacetic acid (Ethylenediamine tetraacetic acid) (EDTA)	CGY, DOW, HMP.
*(Ethylenedinitrilo)tetraacetic acid, calcium disodium salt	CGY, DOW, HMP.
(Ethylenedinitrilo)tetraacetic acid, diammonium salt	DOW, HMP.
(Ethylenedinitrilo)tetraacetic acid, disodium copper salt, dihydrate	CGY, HMP.
*(Ethylenedinitrilo)tetraacetic acid, disodium salt	CGY, DOW, HMP.
(Ethylenedinitrilo)tetraacetic acid, disodium zinc salt, dihydrate	CGY, HMP.
(Ethylenedinitrilo)tetraacetic acid, manganese salt	DOW, HMP.
(Ethylenedinitrilo)tetraacetic acid, monosodium iron salt	HMP.
(Ethylenedinitrilo)tetraacetic acid, tetraammonium salt	DOW, HMP.
(Ethylenedinitrilo)tetraacetic acid, tetrapotassium salt	CGY, HMP.

TABLE 2.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CHELATING AGENTS, NITRILOACIDS AND SALTS--CONTINUED	
*(Ethylenedinitrilo)tetraacetic acid, tetrasodium salt	CGY, CRT, DAN, DOW, HMP, RPC.
(Ethylenedinitrilo)tetraacetic acid, trisodium salt	CGY, HMP.
(N-Hydroxyethylethylenedinitrilo) triacetic acid	HMP.
(N-Hydroxyethylethylenedinitrilo)triacetic acid, copper salt	HMP.
(N-Hydroxyethylethylenedinitrilo)triacetic acid, iron salt	HMP.
(N-Hydroxyethylethylenedinitrilo)triacetic acid, magnesium salt	HMP.
*(N-Hydroxyethylethylenedinitrilo)triacetic acid, trisodium salt	CRT, DAN, DOW, HMP, RPC.
Nitriloacetic acid, zinc salt	HMP.
Nitrilotriacetic acid	HMP, MON.
Nitrilotriacetic acid, trisodium salt	HMP.
Chelating agents, nitriloacids and salts, all other	DOW, HMP, X.
*Chemical indicators	EK, GFS, HXL, MMC.
Chemical reagents	EK, GFS, MMC, RSA, X.
*ENZYMES:	
*HYDROLYTIC ENZYMES:	
*AMYLASES:	
*Amylases, all other	BAX, CRN, MLS, PFZ, RH.
*PROTEASES:	
Bromelain	DOL.
Papain	PFZ.
Pepsin	CHH, SPR.
*Rennin	CHH, MLS, PFZ.
Proteases, all other	BAX, MLS, PIC, PMP, SPR.
*Hydrolytic enzymes including pectic enzymes and lipase, all other	JFR, MLS, PFN, PMP, RH, SPR, WBC.
*NON-HYDROLYTIC ENZYMES:	
*Nonhydrolytic enzymes	ASH, DLI, ICI, MLS, OMS, PLB.
RARE SUGARS:	
Rare sugars	PFN.
*FLOTATION REAGENTS:	
PHOSPHORODITHIOATES (DITHIOPHOSPHATES):	
Dicresylphosphorodithioic acid	ACY.

TABLE 2.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
FLOTATION REAGENTS--CONTINUED	
PHOSPHORODITHIOATES (DITHIOPHOSPHATES)--CONTINUED	
Dicresylphosphorodithioic acid, ammonium salt	ACY.
Dicresylphosphorodithioic acid, sodium salt	KCU.
OTHER FLOTATION REAGENTS:	
2,2'-Dimethylthiocarbanilide (Di-o-tolylthiourea)	RBC.
Rosin amines	HPC.
Thiocarbanilide (Diphenylthiourea)	ACY.
*GASOLINE ADDITIVES:	
N-sec-Butyl-N-phenylphenylenediamine	X.
4,4'-Di-sec-butylaminodiphenylmethane	X.
N,N'-Di-sec-butyl-p-phenylenediamine	USR, X.
N,N'-Diisopropyl-p-phenylenediamine	DUP. USR, X.
*N,N'-Disalicylidene-1,2-propanediamine	DUP, FER, SM, TX.
*Ethylene dibromide	DOW, PPG, TNA.
Methylcyclopentadienylmanganese tricarbonyl	TNA.
4,4'-Methylenebis(2,6-di-tert-butylphenol)	TNA.
*Tetraethyl lead	DUP, PPG, TNA.
*Tetra(methyl-ethyl)lead, (Tel-tml,reacted)	DUP, PPG, TNA.
*Tetramethyl lead	DUP, TNA, X.
1,3,5-Tris(3,5-di-tert-butyl-4-hydroxybenzyl)mesitylene	TNA, X.
Gasoline additives, all other	DUP. GLY, SM, TNA, X, X.
*LUBRICATING OIL AND GREASE ADDITIVES:	
CHLOROSULFURIZED AND SULFURIZED COMPOUNDS:	
Methylene-bridged polyalkl phenols	TNA.
4,4'-Thiobis(6-tert-butyl-o-cresol)	TNA.
Chlorosulfurized and sulfurized compounds: used as lubricating oil and grease additives, all other	GLY.
OIL-SOLUBLE PETROLEUM SULFONATES:	
Oil-soluble petroleum sulfonate, ammonium salt	NTL.
Oil-soluble petroleum sulfonate, barium salt	PAR, WTC, X(E).
*Oil-soluble petroleum sulfonate, calcium salt	ORO, PAR, PLC, TNA, TX, WTC, X(E).
Oil-soluble petroleum sulfonate, magnesium salt	WTC.
*Oil-soluble petroleum sulfonate, sodium salt	ENJ, MOR, PAR, SHC, WTC, X(E).
Oil-soluble petroleum sulfonate, all other	SHC.
*PHENOL SALTS:	
Alkylphenol, calcium salt	ORO.

TABLE 2.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
LUBRICATING OIL AND GREASE ADDITIVES--CONTINUED	
PHENOL SALTS--CONTINUED	
*Nonylphenol, barium salt	CCA, ENJ, X.
Phenol salts, all other	TNA, TX, WTC, X(E).
PHOSPHORODITHIOATES (DITHIOPHOSPHATES):	
Di-2-ethylhexylphosphorodithioic acid	ELC, SFA.
Di-N-propylphosphorodithioic acid	ELC, SFA.
Zinc dialkyldithiophosphate	ELC, ORO, TNA, TX.
Zinc hydrocarbon dithiophosphate	X(E).
Phosphorodithioates used as lubricating oil and grease additives, all other	ELC, TX.
*SULFUR COMPOUNDS:	
Aliphatic hydrocarbon sulfides	ELC, X(E).
Aliphatic imides, sulfur compounds	ORO.
Chlorosulfurized sperm oil	CCW.
Diisobutylene polysulfide	TX.
Di-tertiary nonylpolysulfide	PAS.
*Sulfurized lard oil	CCW, FER, QCP, WBG.
Sulfurized sperm oil	ELC.
Sulfur compounds, all other	CCW, ELC, FER, ORO, TX.
Lubricating oils and grease additives, all other	ALX, ELC, ENJ, FER, GRH, HCC, MIL, ORO, PLC, SHC, SM, TNA, TX, X(E).
*PAINT DRIERS, NAPHTHENIC ACID SALTS:	
Aluminum naphthenate	SHP.
Barium naphthenate	CCA.
Cadmium naphthenate	CCA, X.
*Calcium naphthenate	CCA, HN, MCI, TRO, WTC.
Chromium naphthenate	MCI, WTC.
*Cobalt naphthenate	CCA, HN, MCI, SHP, TRO, WTC, X.
Iron naphthenate	HN, WTC.
*Lead naphthenate	CCA, MCI, SHP, SW, TRO, WTC, X.
Lithium naphthenate	CCA, MCI.
*Manganese naphthenate	CCA, HN, MCI, SHP, SM, SW, TRO, WTC, X.
Rare earths naphthenate	CCA.
*Zinc naphthenate	CCA, HN, MCI, SW, TRO, WTC, X.
Paint dryers, naphthenic acid salts, all other	EK, MCI, SM, SW.
*PHOTOGRAPHIC CHEMICALS:	
3-Amino-1,2,4-triazole (5-Amino-1,3,4-triazole)	FMT.

TABLE 2.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
PHOTOGRAPHIC CHEMICALS--CONTINUED	
Benzotriazole	FMT.
3-Chloro-4-diethylaminobenzenediazonium chloride (p-Diazo-2-chloro-N,N-diethylaniline)-zinc chloride	ESA, FMT.
Chlorohydroquinone	EK.
4-Diazo-3,5-diethoxythiocresol salts	FMT.
2,5-Diethoxy-4-morpholinobenzenediazonium chloride	ALL, ESA.
p-Diethylaminobenzenediazonium chloride (p-Diazo-N,N-diethylaniline)-zinc chloride	ESA, FMT, WAY.
N,N-Diethyltoluene-2,5-diamine, monohydrochloride	EKT, WAY.
p-Dimethylaminobenzenediazonium chloride (p-Diazo-N,N-dimethylaniline)-zinc chloride	ESA, FMT.
p-Diphenylaminediazonium sulfate	FMT.
p-(N-Ethylbenzimido)benzenediazonium chloride (p-Diazo-N-benzyl-N-ethylaniline)-zinc chloride	ESA, FMT.
p-[Ethyl(2-hydroxyethyl)amino]benzenedizonium chloride (p-Diazo-N-ethyl-N-hydroxyethylaniline)-zinc chloride	ESA, FMT.
N-Ethyl-N-hydroxyethyl-p-phenylenediamine sulfate	WAY.
Hydroquinone (Hydroquinol)	EKT.
p-[(2-Hydroxyethyl)methylamino]benzenediazonium chloride (p-Diazo-N-hydroxyethyl-N-methylaniline)-zinc chloride	FMT.
4-Methoxy-1-naphthol	X.
p-Methylaminophenol sulfate (Metol)	EK.
5-Methylbenzotriazole	EK.
6-Nitrobenzimidazole	EK, FMT.
Phenyl-5-mercaptotetrazole	FMT.
1-Phenyl-3-pyrazolidine	CGY.
Photographic chemicals, all other	DA, DUP, FMT, HST, MIL, WAY, X, X.
*POLYMERS FOR FIBERS:	
Cellulose acetate	CEL, EKT.
*Nylon 6 and 6/6	ALF, DUP, FND, FRF, MON, SKP.
*Polyacrylonitrile and acrylonitrile copolymers	ACY, DUP, MON.
*Polyethylene terephthalate	DUP, EK, EKT, FND, GYR, MON.
Polymers for fibers, all other	DUP, EK, EKT, FRF.

TABLE 2.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*POLYMERS, WATER SOLUBLE:	
*CELLULOSE ETHERS AND ESTERS:	
Hydroxyethylcellulose	UCC, X.
Methylcellulose	DOW.
Sodium carboxymethylcellulose (100%)	X.
Cellulose ethers and esters, all other	DOW, UCC, X.
Dextran	PHR.
*Polyacrylamide	ACY, CEL, DA, DOW, HPC, MRK, X.
POLYACRYLIC ACID SALTS:	
Ammonium polyacrylate	BFG.
Sodium ammonium polyacrylate and copolymers	BUK.
*Sodium polyacrylate	ALC, BFG, CEL, DA, RH, X.
Polyacrylic acid salts, all other	ACY, BFG, X.
Polyamines	DA.
Polyethyleneimine	DOW.
Polymethacrylic acid, sodium salt	GRD.
1-Vinyl-2-pyrrolidinone, polymers	DAN, GAF.
Silicone greases	DCC, SPD, SWS.
*TANNING MATERIALS, SYNTHETIC:	
Hydroxytoluenesulfonic acid, formaldehyde condensate (Cresol-formaldehyde sulfonate), sodium salt	DA.
1-Naphthalenesulfonic acid, formaldehyde condensate and salt	DA.
*2-Naphthalenesulfonic acid, formaldehyde condensate and salt	AKS, DA, GRD, RH.
1-Phenol-2-sulfonic acid, formaldehyde condensate (phenol-formaldehyde, sulfonated)	RH.
Tanning materials, synthetic, all other	DA, MIL.
*TEXTILE CHEMICALS, OTHER THAN SURFACE-ACTIVE AGENTS:	
Dimethyloldihydroxyethyene urea	CHP, DAN.
Textile chemicals, other than surface active agents, all other	DAN, DUP, HDG, ICI.
*UREA, BY END-USE MARKETS:	
*Urea, primary solution (Report on 100% urea-content basis)	ACN, ACS, AGY, APD, ARM, BNP, BOR, CFA, CFI, CHN, CNC, FMS, FRI, GCC, GPI, HKY, HPC, JDC, MSC, OMC, PLC, SAG, SMP, SNI, SOH, TER, TRI, TVA, UOC, VLN, WLC, UVC, X.

TABLE 2.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
UREA, BY END-USE MARKETS--CONTINUED	
UREA IN COMPOUNDS OR MIXTURES (100% BASIS):	
*Urea in feed compounds (100% Basis)	ACN, ACS, AGY, APD, BIC, FMS, JDC, SNI, SOH, TER, TRI, VLN, WYC.
*Urea in liquid fertilizer (100% Basis)	ACN(E), ACS, AGY, APD, ARM, CFA, CFI, CHN, CNC, FRI, GPI, HKY, HPC, JDC, MSC, PLC, SAG, SNI, SOH, TER, TRI, TVA(E), VLN, WLC, WYC, X.
*Urea in plastics (100% Basis)	BOR, FMS, OMC, SOH, TRI.
*Urea in solid fertilizer (100% Basis)	ACN, ACS, AGY, APD, CFA, CFI, CNC, FMS, GCC, HPC, JDC, MSC, OMC, SMP, SOH, TER, TRI, TVA(E), UOC, VLN, WLC.
*Urea in compounds and mixtures (100% Basis), all other	ACS, BNP, SOH, TER, WYC.

TABLE 3.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS: DIRECTORY OF MANUFACTURERS, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of miscellaneous end-use chemicals and chemical products to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
	Allied Chemical Corp.:	FRF	Firestone Tire & Rubber Co., Firestone Synthetic Fibers Co.
ACN	Agricultural Div.		
ACS	Specialty Chemicals Div.	FRI	Farmland Industries, Inc.
ACY	American Cyanamid Co.		
AGY	Agway, Inc., Olean Nitrogen Complex	GAF	GAF Corp.
AKS	Arkansas Co., Inc.	GCC	W. R. Grace & Co.
ALC	Alco Chemical Corp.	GFS	G. Frederick Smith Chemical Co.
ALF	Allied Chemical Corp., Fibers Div.	GLY	Glyco Chemicals, Inc.
ALL	Alliance Chemical, Inc.	GPI	Goodpasture, Inc.
ALX	Alox Corp.		W. R. Grace & Co.:
AMB	American Bio-Synthetic Corp.	GRD	Organic Chemicals Div., Polymers & Chemicals Div.
APD	Atlas Powder Co. Subsidiary of Tyler Corp.	GRH	Hatco Chemical Div.
ARM	USS Agri-Chemicals Div. of U.S. Steel Corp.	GYR	Goodyear Tire & Rubber Co.
ASH	Ashland Oil, Inc.	HCC	Hatco Chemical Corp.
		HDG.	Hodag Chemical Corp.
BAX	Baxter Travenol Laboratories, Inc.	HKY	Hawkeye Chemical Co.
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Co. Div.	HMP	W. R. Grace & Co., Organic Chemicals Div.
		HN	Tenneco Chemicals, Inc.
BIC	Beker Industries, Inc.	HPC	Hercules, Inc.
BNP	Bison Nitrogen Products Co.	HST	American Hoechst Corp., Industrial Chemicals Div.
BOR	Borden Co., Borden Chemical Div.		
BUK	Buckeye Cellulose Corp.	HXL	Hexcel Corp., Hexcel Specialty Chemicals
CCA	Interstab Chemicals, Inc.	ICI	ICI Americas, Inc., Chemical Specialties Co.
CCW	Cincinnati Milacron Chemicals, Inc.		
CEL	Celanese Corp.:		
	Celanese Fibers Co.	JDC	Nipak, Inc.
CFA	Cooperative Farm Chemicals Association	JFR	George A. Jeffreys & Co., Inc.
CFI	CF Industries, Inc.		
	Celanese Polymer Specialties Co.	KCU	Kennecott Copper Corp., Utah Copper Div.
CGY	Ciba-Geigy Corp.		
CHH	CHR. Hansen's Laboratory, Inc.	MCI	Mooney Chemicals, Inc.
CHN	N-ReN Corp., Cherokee Nitrogen Div.	MIL	Milliken & Co., Milliken Chemical Div.
CHP	C. H. Patricks & Co., Inc.	MLS	Miles Laboratories, Inc., Industrial Products Group
CNC	Columbia Nitrogen Corp.		
CRN	CPC International, Inc., Amerchol Corp.	MMC	MCB Manufacturing Chemists, Inc.
CRT	Crest Chemical Corp.	MON	Monsanto Co.
		MOR	Marathon Morco, Co.
DA	Diamond Shamrock Corp.	MRK	Merck & Co., Inc.
DAN	Dan River, Inc., Chemical Products Dept.	MSC	Mississippi Chemical Corp.
DCC	Dow Corning Corp.		
DLI	Dawe's Laboratories, Inc.	NTL	NL Industries, Inc.
DOL	Castle & Cooke, Inc., Castle & Cooke Foods, Hawaii Region	OMC	Olin Corp.
DOW	Dow Chemical Co.	OMS	E. R. Squibb & Sons, Inc.
DUP	E. I. DuPont de Nemours & Co., Inc.	ORO	Chevron Chemical Co.
EK	Eastman Kodak Co.:		
EKT	Tennessee Eastman Co. Div.	PAR	Pennzoil Co., Penneco Div.
ELC	Elco Corp., Sub. of Detrex Chemical Industries, Inc.	PAS	Pennwalt Corp.
		PFN	Pfanstiehl Laboratories, Inc.
ENJ	Exxon Chemical Co. U.S.A.	PFZ	Pfizer, Inc.
ESA	East Shore Chemical Co.	PHR	Pharmachem Corp.
		PIC	Pierce Chemical, Inc.
FER	Ferro Corp., Keil Chemical Div.	PLB	P-L Biochemicals, Inc.
FMS	First Mississippi Corp.	PLC	Phillips Petroleum Co.
FMT	Fairmount Chemical Co., Inc.	PMP	Premier Malt Products, Inc.
FND	Fiber Industries, Inc.	PPG	Pittsburgh Plate Glass Co.

TABLE 3.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS: DIRECTORY OF MANUFACTURERS, 1978--CONTINUED

Code	Name of company	Code	Name of company
QCP	Quaker Chemical Corp.	TER	Terra Chemicals International, Inc.
		TER	Terra Nitrogen, Inc.
RBC	Fike Chemicals, Inc.	TNA	Ethyl Corp.
RH	Rohm & Haas Co.	TRI	Triad Chemicals
RSA	R.S.A. Corp.	TRO	Troy Chemical Corp.
		TVA	Tennessee Valley Authority
SAG	Swift Agricultural Chemicals	TX	Texaco, Inc.
SFA	Stauffer Chemical Co., Agricultural Div.		
SHC	Shell Oil Co., Shell Chemical Co. Div.	UCC	Union Carbide Corp.
SHP	Shepherd Chemical Co.	UPM	UOP, Inc.
SKP	Shakespeare Co., Monofilaments Div.	USR	Uniroyal, Inc., Chemical Div.
SM	Mobil Oil Corp., Mobil Chemical Co.:		
	Chemical Coatings Div.	VLN	Valley Nitrogen Producers, Inc.
	Phosphorus Div.		
SMP	J.R. Simplot Co., Minerals & Chemical Div.	WAY	Phillip A. Hunt Chemical Corp., Organic Chemical Div.
SNI	Kaiser Aluminum & Chemicals Corp., Kaiser Agricultural Chemicals Div.	WBC	Worthington Biochemical Corp.
		WBG	White & Bagley Co.
SOH	Vistron Corp.	WLC	Agrico Chemical Co.
SPD	General Electric Co., Silicone Products Dept.	WTC	Witco Chemical Co., Inc.
		WYC	Wycon Chemical Co.
SPR	Scientific Protein Laboratories, Inc.		
SW	Sherwin-Williams Co.		
SWS	Stauffer Chemical Co., SWS Silicones Div.		

Note.--Complete names and addresses of the above reporting companies are listed in Table 1 of the Appendix. The above codes identify those of the 133 reporting companies and company divisions for which permission to publish was not restricted.

STATISTICAL HIGHLIGHTS

David B. Beck

The term miscellaneous chemicals as it is used here comprises those synthetic organic products that are not included in the use groups covered by sections I - XIV of this report. They include products that are employed in a great variety of uses. The number of chemicals used extensively for only one purpose is not large. Among the products covered are those used for refrigerants, aerosols, solvents, and a wide range of chemical intermediates.

U.S. production of miscellaneous cyclic and acyclic chemicals in 1978 amounted to 92 billion pounds, an increase of 5.9 percent over 1977. U.S. sales for 1978 totaled 39 billion pounds valued at $8.6 billion. Compared with 1977, sales quantity increased less than 1 percent, while sales value increased by 8.4 percent. Production of miscellaneous cyclic chemicals comprised only 2.5 percent of this section's total production.

The group among miscellaneous acyclic chemicals with the greatest volume of production and sales is the halogenated hydrocarbons. U.S. production for this group in 1978 was 24.6 billion pounds, an increase of 3.1 percent over the previous year. Production decreased in all segments of this group except chlorinated hydrocarbons. The production of fluorinated hydrocarbons decreased from 921,000 pounds in 1977 to 915,000 pounds in 1978. This segment of the industry is expected to continue its decline because of Federal regulation limiting the use of certain fluorinated hydrocarbons.

TABLE 1.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: U.S. PRODUCTION AND SALES, 1978

[Listed below are all miscellaneous cyclic and acyclic chemicals for which any reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all miscellaneous cyclic and acyclic chemicals for which data on production and/or sales were reported and identifies the manufacturers of each]

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
	1,000 pounds	*1,000 pounds*	*1,000 dollars*	*Per pound*
Grand total	92,101,044	38,935,033	8,581,663	$0.22
CYCLIC				
Total	2,269,712	1,132,491	734,434	.65
Benzoic acid, sodium salt	15,468	13,820	7,322	.53
Benzoyl peroxide	6,999	6,673	16,825	2.52
Benzyl alcohol	8,572	5,642	5,400	.96
tert-Butyl peroxybenzoate	3,503	3,611	7,087	1.96
Caprolactam	918,660	...	...	...
2,6-Di-tert-butyl-p-cresol (BHT):				
Food grade	10,665	9,919	9,129	.92
Tech. grade	13,034	12,842	11,235	.87
Hexamethylenetetramine, tech. grade	92,906	44,481	13,452	.30
p-Hydroxybenzoic acid, methyl ester	...	848	2,320	2.74
Maleic anhydride	341,127	271,469	66,405	.24
α-Pinene	102,354	...	...	...
β-Pinene	39,683	...	...	...
Tall oil, chemically modified	1,451	...	...	...
Tall oil salts, total	8,086	5,479	3,283	.60
Calcium tallate	...	99	74	.75
Other tall oil salts	8,086	5,380	3,209	.60
All other miscellaneous cyclic chemicals	707,204	757,707	591,976	.78
ACYCLIC				
Total	89,831,332	37,802,542	7,847,229	.21
NITROGENOUS COMPOUNDS				
Total[2]	7,667,341	2,315,698	857,430	.37
Amides	303,210	123,660	74,160	.60
Amines, total	1,540,164	425,735	239,271	.56
Butylamines, total	55,804	51,442	26,927	.52
n-Butylamine, mono-	4,097	4,103	2,318	.57
Di-n-butylamine	4,921	4,009	2,466	.62
All other butylamines	46,786	43,330	22,143	.51
Dimethylamine sulfate	5,904	...	...	...
Ethylamines, total	65,623	48,021	24,488	.51
Diethylamine	15,169	5,712	3,458	.61
Monoethylamine	36,151	31,950	13,244	.41
Triethylamine	14,303	10,359	7,786	.75
Isopropylamine, mono-	45,844	41,886	14,824	.35
All other	1,366,989	284,386	173,032	.61
2-Dimethylaminoethanol (N,N-Dimethylethanolamine)	8,148	6,201	4,776	.77
Ethanolamines, total	362,027	320,236	109,401	.34
2,2'-Aminodiethanol (Diethanolamine)	115,881	102,336	35,719	.35
2-Aminoethanol (Monoethanolamine)	131,744	122,587	38,805	.32
2,2',2''-Nitrilotriethanol (Triethanolamine)	114,402	95,313	34,877	.37
Hexamethylene diamine adipate (Nylon salt)	911,747	...	...	...

See footnotes at end of table.

TABLE 1.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
ACYCLIC--Continued				
NITROGENOUS COMPOUNDS--Continued	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
2,2'-(Methylamino)diethanol (Methyldiethanolamine)	959	765	687	$0.90
Nitriles, total	...	865,205	172,250	.20
Acetonitrile	44,942	...	...	...
Acrylonitrile	1,752,302	586,815	134,965	.23
2-Methyllactonitrile (Acetone cyanohydrin)	922,638	...	...	...
Nitriles, all other	...	278,390	37,285	.13
All other nitrogenous compounds	1,821,204	573,896	256,885	.45
ACIDS, ACYL HALIDES, AND ANHYDRIDES				
Total	7,532,896	1,716,810	507,065	.30
Acetic acid, 100%	2,775,520	823,274	120,263	.15
Acetic anhydride, 100%	...	132,078	32,032	.24
Acrylic acid	325,318	46,503	15,058	.32
Adipic acid	1,621,219	...	...	...
Dodecenylsuccinic anhydride	1,207	1,190	1,830	1.54
Fumaric acid	27,993	24,402	9,941	.41
Oxalic acid	...	10,658	4,596	.43
Polyacrylic acid	2,298	2,055	2,274	1.11
Propionic acid	83,078	62,848	10,879	.17
All other acids, acyl halides, and anhydrides	2,696,263	613,802	310,192	.51
SALTS OF ORGANIC ACIDS				
Total	332,612	329,480	166,055	.50
Acetic acid salts, total	21,751	18,591	11,333	.61
Barium acetate	...	57	125	2.19
Cobalt acetate	274	...	...	...
Magnesium acetate	60	74	97	1.31
Sodium acetate	15,935	13,450	5,223	.39
Zinc acetate	517	361	383	1.06
All other	4,965	4,649	5,505	1.18
Citric acid, potassium salt	...	4,960	2,155	.43
Citric acid, sodium salt	...	57,875	25,070	.43
2-Ethylhexanoic acid (α-Ethylcaproic acid) salts, total	17,217	16,888	27,556	1.63
Calcium 2-ethylhexanoate	2,208	2,213	1,621	.73
Cobalt 2-ethylhexanoate	4,904	4,852	12,637	2.60
Lead 2-ethylhexanoate	2,150	2,100	1,496	.71
Manganese 2-ethylhexanoate	1,571	1,526	1,197	.78
Nickel 2-ethylhexanoate	214	234	388	1.66
Zinc 2-ethylhexanoate	974	809	671	.83
Zirconium 2-ethylhexanoate	2,768	2,699	4,154	1.54
All other	2,428	2,455	5,392	2.19
Maleic acid salts	384	402	1,604	3.99
Neodecanoic acid, calcium salt	65	49	72	1.47
Stearic acid salts, total[3]	94,375	94,337	61,299	.65
Aluminum distearate	1,694	1,703	1,582	.93
Aluminum mono- and tristearates	1,618	1,737	1,457	.84

See footnotes at end of table.

TABLE 1.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
ACYCLIC--Continued				
SALTS OF ORGANIC ACIDS--Continued	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
Stearic acid salts--Continued				
Barium stearate	696	679	550	$0.81
Calcium stearate	54,391	54,147	30,387	.56
Magnesium stearate	6,491	6,577	4,793	.73
Zinc stearate	26,724	26,743	19,755	.74
All other	2,761	2,751	2,775	1.01
All other salts of organic acids	198,820	136,378	36,966	.27
ALDEHYDES				
Total	9,202,093	2,728,220	206,134	.08
Butyraldehyde	782,653	68,168	11,962	.18
Formaldehyde (37% by weight)	6,380,959	2,241,958	105,917	.05
All other	2,038,481	418,094	88,255	.21
KETONES				
Total	3,758,668	2,535,255	442,856	.17
Acetone:				
From cumene	2,051,811	1,083,662	145,869	.13
From isopropyl alcohol	467,602	456,699	71,366	.16
2-Butanone (Methyl ethyl ketone)	660,835	669,341	127,007	.19
4-Hydroxy-4-methyl-2-pentanone (Diacetone alcohol)	...	52,428	15,360	.29
4-Methyl-2-pentanone (Methyl isobutyl ketone)	232,691	155,944	42,703	.27
4-Methyl-3-penten-2-one (Mesityl oxide)	33,143	15,797	4,991	.32
All other	312,586	101,384	35,560	.35
ALCOHOLS, MONOHYDRIC, UNSUBSTITUTED				
Total	14,151,534	7,623,280	1,001,477	.13
Alcohols, C_{11} or lower, unmixed, total	13,021,012	6,961,738	780,778	.11
Butyl alcohols:				
n-Butyl alcohol (n-Propylcarbinol)	755,855	395,494	66,985	.17
Isobutyl alcohol (Isopropylcarbinol)	145,903	136,197	18,180	.13
Ethyl alcohol, synthetic[4]	1,266,866	1,047,791	178,762	.17
2-Ethyl-1-hexanol	420,131	315,965	67,325	.21
n-Hexyl alcohol	39,506	22,081	6,645	.30
Isopropyl alcohol	1,729,666	1,052,634	126,388	.12
Methanol, synthetic	6,443,242	3,080,747	181,027	.06
Propyl alcohol (Propanol)	162,437	119,838	28,636	.24
All other	2,057,406	790,991	106,830	.14
Alcohols, C_{12} and higher, unmixed	401,684	150,848	52,264	.35
Mixtures of alcohols	728,838	510,694	168,435	.33
ESTERS OF MONOHYDRIC ALCOHOLS				
Total	4,347,982	2,541,095	770,248	.30
n-Butyl acetate, unmixed	122,106	128,161	32,790	.26
Butyl acrylate	279,586	147,451	52,702	.36
tert-Butyl peroxypivalate	2,186	2,133	6,989	3.28
Di(2-ethyl-1-hexyl) maleate	500	...	...	...
Dilauryl-3,3'-thiodipropionate	2,417	2,310	2,772	1.20
Ethyl acetate (85%)	181,944	177,973	33,744	.19
Ethyl acrylate	299,306	147,541	44,295	.30

See footnotes at end of table.

TABLE 1.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
ACYCLIC--Continued				
ESTERS OF MONOHYDRIC ALCOHOLS--Continued	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
2-Ethyl-1-hexyl acrylate	64,129	51,092	20,768	$0.41
Fatty acid esters, not included with plasticizers or surface-active agents, total	29,991	30,749	16,097	.52
Methyl esters of tallow	1,820	1,819	699	.38
All other	28,171	28,930	15,398	.53
Isobutyl acetate	...	48,433	12,409	.26
Phosphorus acid esters, not elsewhere specified	116,909	94,503	79,715	.84
Propyl acetate	52,497	49,634	13,007	.26
Vinyl acetate	1,691,969	942,659	167,107	.18
All other	1,504,442	718,456	287,853	.40
POLYHYDRIC ALCOHOLS[5]				
Total	5,275,821	4,242,314	929,321	.22
Ethylene glycol	3,903,889	3,137,188	546,690	.17
Glycerol, synthetic only	133,907	116,612	54,448	.47
Pentaerythritol	...	117,085	50,325	.43
Propylene glycol	546,794	525,527	127,404	.24
Sorbitol (70% by weight)	205,339	160,267	63,374	.40
All other	485,892	185,635	87,080	.47
POLYHYDRIC ALCOHOL ESTERS				
Total	174,447	148,841	73,399	.49
Triethylene glycol diacrylate	...	370	477	1.29
Trimethylolpropane triacrylate	1,641	...	...	...
All other	172,806	148,471	72,922	.49
POLYHYDRIC ALCOHOL ETHERS				
Total	2,008,574	1,324,862	401,861	.30
2-Butoxyethanol	188,838	177,079	53,806	.30
2-(2-Butoxyethoxy)ethanol (Diethylene glycol monobutyl ether)	36,603	30,715	9,668	.31
Diethylene glycol	372,243	208,804	35,343	.17
Dipropylene glycol	51,987	46,472	11,328	.24
2-Ethoxyethanol	398,346	104,307	27,664	.27
2-(2-Ethoxyethoxy)ethanol (Diethylene glycol monoethyl ether)	39,087	33,688	8,798	.26
2-[2-(2-Ethoxyethoxy)ethoxy]ethanol (Triethylene glycol monoethyl ether)	18,831	...	...	...
2-Methoxyethanol (Ethylene glycol monomethyl ether)	114,381	106,400	29,869	.28
2-(2-Methoxyethoxy)ethanol (Diethylene glycol monomethyl ether)	17,066	12,567	3,816	.30
2-[2-(2-Methoxyethoxy)ethoxy]ethanol (Triethylene glycol monomethyl ether)	29,406	...	...	...
Polyethylene glycol	89,849	84,603	31,074	.37
Polypropylene glycol	26,829	20,871	7,799	.37
Tetraethylene glycol	22,707	15,457	5,760	.37
Triethylene glycol	119,944	83,901	26,110	.31
All other	482,457	399,998	150,826	.38

See footnotes at end of table.

TABLE 1.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: U.S. PRODUCTION AND SALES, 1978--CONTINUED

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE[1]
ACYCLIC--Continued				
HALOGENATED HYDROCARBONS	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Per pound*
Total	24,634,818	9,969,588	1,676,045	$0.17
Brominated hydrocarbons	76,800	...	...	...
Chlorinated hydrocarbons, total	23,643,057	9,137,217	1,260,606	.14
Carbon tetrachloride	737,030	363,406	41,698	.11
Chlorinated paraffins (C_{10}-C_{30}), total	99,876	95,200	28,245	.30
35%-64% chloride	74,562	80,698	21,833	.27
Other	25,314	14,502	6,412	.44
Chloroethane (Ethyl chloride)	539,793	159,079	23,428	.15
Chloroform	349,169	302,114	53,423	.18
Chloromethane (Methyl chloride)	453,810	200,797	28,977	.14
1,2-Dichloroethane (Ethylene dichloride)	11,000,619	1,033,313	82,645	.08
Dichloromethane (Methylene chloride)	570,098	490,678	114,342	.23
1,2-Dichloropropane (Propylene dichloride)	74,112	33,382	2,120	.06
Tetrachloroethylene (Perchloroethylene)	725,457	549,111	53,589	.10
1,1,1-Trichloroethane (Methyl chloroform)	644,475	631,243	135,388	.21
Trichloroethylene	298,986	298,557	46,588	.16
Vinyl chloride, monomer (Chloroethylene)	6,941,123	4,885,688	618,407	.13
All other chlorinated hydrocarbons	1,208,509	94,649	31,756	.34
Fluorinated hydrocarbons, total	914,911	753,170	390,816	.52
Chlorodifluoromethane (F-22)	205,612	139,797	106,236	.76
Dichlorodifluoromethane (F-12)	327,097	316,864	134,743	.43
Tetrafluoroethylene, monomer	27,733	...	...	...
Trichlorofluoromethane (F-11)	193,735	166,898	57,341	.34
All other fluorinated hydrocarbons	160,734	129,611	92,496	.71
Iodinated hydrocarbons	50	...	...	...
All other halogenated hydrocarbons	...	79,201	24,623	.31
ALL OTHER MISCELLANEOUS ACYCLIC CHEMICALS				
Total	10,744,546	2,327,099	815,645	.35
2-Butanone peroxide	9,009	9,024	12,489	1.36
tert-Butyl peroxide (Di-tert-butyl peroxide)	2,689	3,172	3,247	1.02
Carbon disulfide	476,175	375,962	31,645	.08
Epoxides, ethers, and acetals, total	7,584,748	1,658,547	400,521	.24
Ethylene oxide	5,012,419	525,113	123,079	.23
Ethyl ether, absolute	12,098	...	...	...
Propylene oxide	2,046,843	...	...	...
All other epoxides, ethers, and acetals	513,388	1,133,434	277,442	.24
Phosgene (Carbonyl chloride)	1,296,941	...	...	...
Silicone fluids	200,370	78,326	139,966	1.79
Sodium formaldehyde bisulfite	698	...	...	...
Sodium methoxide (Sodium methylate)	7,864	7,487	5,754	.77
All other	1,166,052	194,581	222,023	1.14

[1]Calculated from rounded figures.
[2]Statistics exclude production and sales of fatty amines. Statistics on fatty amines are given with "Surface-Active Agents."
[3]Statistics exclude production and sales of potassium and sodium stearates. Statistics on these stearates are included with "Surface-Active Agents."
[4]Statistics on production of ethyl alcohol from natural sources by fermentation are issued by the Department of the Treasury, Bureau of Alcohol, Tobacco, and Firearms.
[5]Some polyols with are used as intermediates for urethanes have been included with "Plastics and Resin Materials."

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTUER, 1978

[CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH AN ASTERISK (*) CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT.]

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC	
6-Acetoxy-2,4-dimethyl-1,3-dioxane	GIV.
Acetylcyclohexane sulfonyl peroxide	WTL.
1-(2-Aminoethyl)piperazine	UCC.
p-Aminophenethyl alcohol	EKT.
1-(3-Aminopropyl)morpholine	JCC.
BENZOIC ACID SALTS:	
*Sodium benzoate,	HCP, HN, KLM, MAL, MON, PFZ.
Benzoic acid salts, all other	MON.
p-Benzoquinone (p-Quinone)	EKT.
Benzothiazole	RCI.
Benzotriazole, substituted	ACY, CGY.
*Benzoyl peroxide	AZT, CAD, NOC, WTC, WTL.
*Benzyl alcohol	MNR, MON, SFS, UOP, VEL.
Bis(2,4-dichlorobenzoyl) peroxide	CAD, WTL.
Bis(α,α-dimethylbenzyl)peroxide	WTL.
Boron fluoride - phenol complex	ACS.
Butyl benzoate	CIN, TCC, VEL.
2(and 3)-tert-Butyl-4-methoxyphenol (BHA)	EKT, X.
*tert-Butyl peroxybenzoate	AZT, CAD, WTC, WTL.
4-tert-Butylpyrocatechol	BKL, DOW.
Camphene	HPC, SCM.
Caprolactam (2-Oxohexamethylenimine)	ALF, CNP, DBC.
Cellulose acetate phthalate	X.
1-(3-Chloroally)-3,5,7-triaza-1-azoniaadamantane chloride	DOW.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
Cumene hydroperoxide	ACS, CLK, RCI.
Cyanuric acid	FMB, MON.
CYCLOHEXENE-1,2-DICARBOXYLIC ACID (TETRAHYDROPHTHALIC ACID), DISUBSTITUTED, POLYESTER SALTS:	
Cyclohexene-1,2-dicarboxylic acid (Tetrahydrophthalic acid),disubstituted, polyester salts, all other	X.
1,4-Cyclohexylenedimethanol	EKT.
Cyclopropane	OH.
Decabromobiphenyl or ether	DOW, GTL, HXL, WCC.
Decahydronaphthalene (Decalin)	DUP.
Dehydroacetic acid or sodium salt	EKT, GAN.
1,4-Diazobicyclo(2.2.2)octane	X.
2,5-Di(benzoyl peroxy)-2,5-dimethylhexane	WTL.
*2,6-Di-tert-butyl-p-cresol, (BHT), Food grade	ASH, KPT, SHC, USR.
*2,6-Di-tert-butyl-p-cresol, (BHT), Technical grade	ASH, KPT, SHC, USR.
2,5-Di-tert-butylhydroquinone	EKT.
1,3-Dichloro-5,5-dimethylhydantoin	GYR.
Dichloro-s-triazine-2,4,6(1H,3H,5H)trione (Dichloroisocyanuric acids and salts)	FMB.
4,4'-Dichloro-3-(trifluoromethyl)carbanilide	CGY.
2,5-Dihydrothiophene-1,1-dioxide (Sulfolene)	PLC.
2,2'-Dihydroxy-4,4'-dimethoxybenzophenone	GAF.
3,5-Dihydroxy-3,5,dimethyl-1,2-peroxycyclopentane	WTC, WTL.
2,2'-Dihydroxy-4-methoxybenzophenone	ACY.
Diiodomethyl-p-tolyl sulphone	ABB.
Diisopropylbenzene hydroperoxide	HPC, WTC.
Diketene	BRD, EKT.
p-Dimethoxybenzene (Dimethyl ether of hydroquinone)	ARS, ASL, EKT.
4,4-Dinitrocarbanilide-4,6-dimethyl-2-pyrimidinol	MRK.
Dioxane (1,4-Diethylene oxide)	CWN, DOW, FER.
1,3-Dioxolane	FER.
4-(Dodecyloxy)-2-hydroxybenzophenone	EKT.
1,2-Epoxy-3-phenoxypropane (Glycidyl phenyl ether)	X.
Ethyl cellulose phthalate	EK.
Ethyleneimine, monomer	DOW.
2-Ethylhexyl benzoate	TCC.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
Ethylidine norbornene	UCC.
FURAN DERIVATIVES:	
2-Furaldehyde (Furfural)	QKO.
Tetrahydrofurfuryl alcohol	QKO.
Furan derivatives, all other	JCC.
Gallic acid, tech.	MAL.
Glyceryl p-aminobenzoate	VND.
Hexamethylenetetramine, tech.	BOR, HKD, HMP, HN, PLS, WCL.
Homomenthyl salicylate	HUM, NEO.
Hydrindantin	HEX.
p-Hydroxybenzoic acid, butyl ester	HN.
p-Hydroxybenzoic acid, ethyl ester	HN.
p-Hydroxybenzoic acid, methyl ester	ARS, HN, LEM.
p-Hydroxybenzoic acid, propyl ester	ARS, HN, LEM.
N-(Hydroxyethyl)piperazine	JCC.
2-Hydroxy-4-methoxybenzophenone	ACY, GAF, GYR.
2-Hydroxy-4-methoxy-5-sulfobenzophenone trihydrate	ACY.
2-(2-Hydroxy-5-tert-octylphenyl)benzotriazole	ACY.
1-Hydroxy-2-pyridine thione (Omadine)	ACY.
LACTONES:	
Butyrolactone	GAF.
Glucono-δ-lactone	PFZ.
*Maleic anhydride	AMO, ASH, DKA, HN, KPT, MON, RCI, USS.
p-Menthane	HPC.
8-p-Menthyl hydroperoxide	HPC.
p-Methoxybenzylidenemalonic acid, diethyl and dimethyl esters	ACY.
p-Methoxybenzylidenemalonic acid, dimethyl ester	ACY.
4-Methoxyphenol	ASL, EKT.
2,2'-Methylenebis[4-chlorophenol] (Dichlorophene)	GIV.
2,2'-Methylenebis[3,4,6-trichlorophenol] (Hexachlorophene)	GIV.
Methyl gallate	BKL.
4-Methylmorpholine	JCC, UCC.
1-Methyl-2-pyrolidone, monomer	GAF.
Morpholine	DOW, JCC.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTUER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
Morpholine salt of p-toluene sulfonic acid	AMB, ASH.
Phenothiazine	WAG.
2-Phenoxyethanol (Ethylene glycol monophenyl ether)	DOW, TCH.
2-(2-Phenoxyethoxy)ethanol (Diethylene glycol phenyl ether)	DOW.
Phthalic acid, lead salt, (Dibasic)	NTL.
Picramic acid, sodium salt	SDC.
*α-Pinene	ARZ, CBY, NCI, SCM.
*β-Pinene	ARZ, CBY, HPC, NCI, SCM.
Pinene, sulfate	HPC.
Pinene, wood	HPC.
Piperazine, ethoxylated	GAF.
Poly-4-(2-acryloxyethoxy)-2-hydroxybenzophenone	ACY.
Propyl gallate	EKT.
Pyrogallol (Pyrogallic acid)	MAL.
Resorcinol monobenzoate	EKT.
ROSIN ACID SALTS:	
Calcium resinate	CBY.
Calcium zinc resinate	CBY.
Rosin acid salts, all other	FER.
Salicylic acid, lead salt	NTL.
Styrene oxide	UCC.
Succinic anhydride	ORO.
*Tall oil, chemically modified	FOC, ZGL, X.
*TALL OIL SALTS (LINOLEIC-ROSIN ACID SALTS):	
Calcium maganese tallate	MCI.
Calcium tallate	CCA, HN, MCI, X.
Cobalt tallate	HN, MCI, SHP.
Copper tallate	MCI.
Iron tallate	SHP.
Lead manganese tallate	MCI, SHP.
Lead tallate	HN, MCI.
Manganese tallate	HN, MCI, SHP.
Zinc tallate	MCI.
Tall oil salts, all other (Linoleic-rosin acid salts)	CBY, KCH, MCI, SHP, X.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--Continued	
Tannic acid, U.S.P.	MAL.
Terpene hydrocarbons, monocyclic (Solvenol)	NCI, SCM.
Tetrabromobisphenol A	GTL.
2,3,5,6-Tetrachloro-4-(methylsulfonyl) pyridine	DOW.
1,2,3,4-Tetrahydronaphthalene (Tetralin)	DUP.
Tetrahydrothiophene	PAS.
Tetrahydrothiophene-1,1-dioxide (Sulfolane)	PLC.
Tetraphenyltin	X.
[2,2'-Thiobis(4-octylphenolate)]-n-butylamine nickel salt	ACY.
Thiophene	PAS.
Triallyl cyanurate	ACY.
3,4,4'-Trichlorocarbanilide	MON.
1,3,5-Trichloro-s-triazine-2,4,6-(1H,3H,5H)trione (Trichloroisocyanuric acid)	MON.
3,3,5-Trimethylcyclohexanol (m-homomenthol)	ARS.
3,5,5-Trimethyl-2-cyclohexene-1-one (Isophorone)	ENJ, UCC.
2,4,6-Trinitroresorcinol and lead derivative	REM.
1-Vinyl-2-pyrrolidinone--other copolymers	GAF.
1-Vinyl-2-pyrrolidinone-methylacrylic acid, dimethyl amine ethyl ester, copolymer	GAF.
1-Vinyl-2-pyrrolidinone, monomer	GAF.
1-Vinyl-2-pyrrolidinone--vinyl acetate copolymer	GAF.
Cyclic chemicals, all other	AAC, ALB, ALD, AMB, ARA, ARS, AZT, BAS, CAD, CGY, CPS, CTN, DOW, DUP, EK, EKT, EVN, GAF, GIV, GOC, GRO, GYR, HK, HMY, HST, HXL, JCC, MOB, MON, PAS, PD, PEN, PFN, PIC, RSA, SCM, SK, SM, STC, SW, TNA, TNI, UCC, UPJ, VEL, VTC, WAY, WCC, WTC, WTL, X, X, X, X, X.
ACYCLIC	
*NITROGENOUS COMPOUNDS:	
Acetamidine hydrochloride	X.
Acetamidoethanol (N-Acetyl-ethanolamine)	ALB.
β-Alanine	HFT.
1-Allyl-3,3-bis(2-hydroxyethyl)thiourea	HPC.
1-Allyl-3-(2-hydroxyethyl)-2-thiourea	PMT.
Allyl trimethylammonium chloride	UOC.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*NITROGENOUS COMPOUNDS--Continued:	
2-Aminoethanol (Monoethanol amine) sulfite	EVN.
Aminoethoxyethanol	JCC, SNW.
2-(2-Aminoethylamino)ethanol (Aminoethylethanolamine)	DOW, HDG, UCC.
2-Aminoethyl mercaptoacetate (Monoethanolamine thioglycolate)	EVN.
2-Amino-2-ethyl-1,3-propanediol	IMC.
2-Amino-2-(hydroxymethyl)-1,3-propanediol [Tris(hydroxymethyl)aminomethane]	IMC.
2-Amino-2-methyl-1,3-propanediol	IMC.
2-Amino-2-methyl-1,3-propanediol condensate	IMC.
2-Amino-2-methyl-1-propanol	IMC.
2-Amino-2-methyl-1-propanol hydrochloride	VAL.
*AMIDES:	
Acetamide	ACS, SBC.
Acrylamide monomer	DOW, X.
1,1'-Azobisformamide	FMT, NPI, USR.
N-Bromoacetamide	ARA.
Coconut oil amide	ARC.
N,N-Diethyldodecanamide	X.
N,N-Dimethylacetamide	DUP.
N,N-Dimethylformamide	AIP, DUP.
Erucamide	HUM, HXL.
Erucamide - lauramide	HXL.
N,N'-Ethylenebis-oleamide (Oleic acid-ethylenediamine condensate (Amine/acid ratio = 1/2))	ARC.
N,N'-Ethylenebis(stearamide)	CCW, GAF, HUM.
Fish oil fatty acid amide	HUM.
Formamide	DUP.
12-Hydroxystearamide	CCW.
Methacrylamide	DUP.
N-Methylacetamide	ARS.
N,N'-Methylenebis(acrylamide)	ACY.
Oleamide (Octadecene amide)	ARC, GYR, HUM, HXL.
Oleoylpalmitamide	HUM, HXL.
Stearamide (Octadecane amide)	GYR, HUM, HXL, OMC.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*NITROGENOUS COMPOUNDS--Continued	
*AMIDES--Continued-	
Stearylerucamide	HXL, RPC.
Tallow amide, hydrogenated	ARC.
N-Trimethylsilylacetamide	PIC.
Amides, all other	ACY, ARS, EKT, HAL, PIC, TKL, VGC, VND, X.
*AMINES:	
Allylamines	SHC.
Bis-hexamethylenetriamine amine	DUP.
*BUTYLAMINES:	
*n-Butylamine, mono	AIP, PAS, VGC.
sec-Butylamine, mono	PAS.
tert-Butylamine, mono	MON.
*Di-n-butylamine	AIP, PAS, VGC.
Diisobutylamine	AIP, RPC, VGC.
Tri-n-butylamine	PAS, VGC.
n-Butylethylamine	PAS.
Diethylenetriamine	DOW, UCC.
Diisopropylamine	PAS, UCC.
Dimethylaminopropylamine	ABB, JCC.
*ETHYLAMINES:	
*Diethylamine	AIP, PAS, UCC, VGC.
*Ethylamine, mono	AIP, PAS, UCC, VGC.
*Triethylamine	AIP, PAS, UCC.
Ethylenediamine	DOW, JCC, UCC.
(2-Ethylhexyl)amine, mono	VGC.
1,6-Hexanediamine (Hexamethylenediamine)	CEL, DUP, MON.
3,3'-Iminobispropylamine	JCC.
*Isopropylamine, mono	AIP, PAS, UCC, VGC.
METHYLAMINES:	
Dimethylamine	AIP, DUP.
*Dimethylamine sulfate	ARC, GAF, RH.
Methylamine, mono	AIP, DUP, GAF, X.
Trimethyl amine	AIP, DUP, GAF.
n-Octylamine, mono	VGC.
PENTYLAMINES (AMYLAMINES):	
Dipentylamine	PAS.
Pentylamine, mono	PAS.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTUER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*NITROGENOUS COMPOUNDS--Continued:	
PENTYLAMINES (AMYLAMINES)--Continued:	
1,2-Propanediamine (Propylenediamine)	VGC.
1,3-Propanediamine (1,3-Diaminopropane)	JCC.
Tripentylamine	PAS.
PROPYLAMINES:	
Dipropylamine	AIP, PAS, VGC.
Propylamine, mono-	AIP, PAS, VGC.
Tripropylamine	PAS, VGC.
Tetraethylenepentamine	DOW, UCC.
N,N,N',N'-Tetramethyl-1,3-butanediamine	UCC.
Tetramethylethylenediamine	RH.
Triethylenetetramine	DOW, UCC.
Amines, all other	AAC, DOW, EKT, HCP, JCC, OMC, ONX, PAS, RH, UCC, USR, VGC, WAY, X, X.
1,3-Bis(hydroxymethyl)urea (Dimethylolurea)	GYR.
1-Butyl-3-ethyl-2-thiourea	PAS, UPJ.
Butyl isocyanate	X.
Chlorocholine chloride	ACY.
2-Chloro-N,N-diethylethylamine hydrochloride	VEL.
2-Chloro-N,N-dimethylethylamine (Dimethylamino ethyl chloride)hydrochloride	VEL.
2-Chloro-N,N-dimethylpropylamine hydrochloride	VEL.
3-Chloro-N,N-dimethylpropylamine hydrochloride	VEL.
Choline base	RH.
Cyanoacetic acid	KF.
1-(2-Cyanoethyl)ethyl urea	GAF.
2-Dibutylaminoethanol	PAS.
1,3-Dibutyl-3-thiourea	PAS, RBC.
1,4-Dicyanobutene	DUP.
2-Diethylaminoethanol (N,N-Diethylethanolamine)	PAS, UCC.
2-Diethylaminoethyl acrylate	CPS.
2-Diethylaminoethyl methacrylate	CPS, DUP.
Diethylhydroxylamine	PAS.
1,3-Diethyl-2-thiourea	PAS, RBC.
2-Diisopropylaminoethanol (N,N-Diisopropylethanol-amine)	PAS, UCC.
2-Diisopropylaminoethyl methacrylate	DUP.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*NITROGENOUS COMPOUNDS--Continued:	
Di-(methoxyethyl)hydroxylamine	X.
*2-Dimethylaminoethanol (N,N-Dimethylethanolamine)	JCC, PAS, UCC.
Dimethylaminoethyl acrylate	CPS.
Dimethylaminoethyl methacrylate	AAC, CPS.
Dimethylaminoethylmethacrylate, methyl chloride, quaternary salt	AAC.
Dimethylamino-2-propanol	PAS.
1,1-Dimethylhydrazine	USR.
2,5-Dithiobiurea	FMT.
Dithiooxamide	RBC.
*ETHANOLAMINES:	
*2,2'-Aminodiethanol (Diethanolamine)	DOW, JCC, OMC, UCC.
*2-Aminoethanol (Monoethanolamine)	DOW, GYR, JCC, OMC, UCC.
*2,2',2''-Nitrilotriethanol (Triethanolamine)	DOW, JCC, OMC, UCC.
2-Ethylaminoethanol (Ethylmonoethanolamine)	PAS, UCC.
Ethyl cyanoacetate	KF.
Ethylenediamine sulfate	EK.
Ethyl formylglycine	ARC.
Formamidinedisulfide dihydrochloride	WAY.
Glycine ethyl ester hydrochloride	SFS.
Glycine (Aminoacetic acid), non-medical	CHT, HMP.
*Hexamethylenediamine adipate (Nylon salt)	CEL, DUP, MON.
2-(Hydroxymethyl)-2-nitro-1,3-propanediol (Tris-(hydroxymethyl)nitromethane)	IMC.
Iminodiacetic acid	HMP.
ISOPROPANOLAMINES:	
1-Amino-2-propanol (Monoisopropanolamine)	DOW.
1,1'-Iminodi-2-propanol (Diisopropanolamine)	DOW.
1,1',1''-Nitrilotri-2-propanol (Triisopropanol amine)	DOW, UCC.
2-Isopropylaminoethanol	PAS.
Isopropyl ethylthionocarbamate	DOW, MON.
Ketimine, tetrafunctional	MIL.
3-Methoxypropylamine	JCC.
2-Methylaminoethanol (N-Methylethanolamine)	PAS, UCC.
Methyl carbamate	BKL.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*NITROGENOUS COMPOUNDS--Continued:	
Methyl cyanoacetate	KF.
Methyl α-cyanoacrylate	EKT.
*2,2'-(Methylimino)diethanol (Methyldiethanolamine)	DOW, PAS, UCC.
Methyl isocyanate	UCC.
2-Methyl-2-nitro-1-propanol	IMC.
Nitrated lard oil	SM.
*NITRILES:	
*Acetonitrile	DUP, EKX, MON, SOH.
*Acrylonitrile, monomer	ACY, DUP, MON, SOH.
Adiponitrile	DUP, MON.
n-Butyronitrile	EKX, WYT.
Crotononitrile	RBC.
3-Dimethylaminopropionitrile	ACY.
3-Ethoxypropionitrile	DIX.
Glycolonitrile	KF.
Hydracrylonitrile (Ethylene cyanohydrin)	TKL.
Isobutyronitrile	AIP, EKX.
Lactonitrile	MON.
Methacrylonitrile	DOW.
*2-Methyllactonitrile (Acetone cyanohydrin)	CYR, DUP, MON, RH.
Oleonitrile (Octodecene nitrile)	ARC.
Tall oil nitrile	ASH.
Tallow nitrile	ASH, NCW.
Tallow nitrile, hydrogenated	ASH.
3,3'-Thiodipropionitrile	EVN.
Vinylacetonitrile	RBC.
Nitriles, all other	ASH, HMP.
Nitroethane	IMC.
Nitromethane	IMC.
1-Nitropropane	IMC.
2-Nitropropane	IMC.
Octadecyl isocyanate	MOB, UPJ.
Pentaerythritol tetranitrate	DUP, HPC.
n-Propyl carbamate	BKL.
Propylisocyanate	HPC.
Sarcosine (N-Methylaminoacetic acid)	HMP.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*NITROGENOUS COMPOUNDS--Continued:	
Semicarbazide hydrochloride	FMT.
N,N,N',N'-Tetrakis(2-hydroxypropyl)ethylenediamine	BAS.
Tetramethylammonium bromide	RSA.
Tetramethylammonium chloride	RSA.
Tetramethylguanidine	ACY.
Thioacetamide	RBC.
Thiosemicarbazide	FMT.
Nitrogenous compounds, acyclic, all other	AAC, ABB, ACS, ARA, BKL, CHP, CPS, DAN, DOW, DUP, EK, FMT, GOC, HLI, HXL, JCC, LAK, MOB, PAS, PCW, PD, PFZ, PIC, RBC, REM, RH, RSA, SBC, SCM, SCP, SDH, SK, SM, STC, TCH, TKL, TNA, USR, VAL, VEL, WAY, WYC, X, X, X, X.
*ACIDS, ACID ANHYDRIDES, AND ACYL HALIDES:	
*ACETIC ACID, 100%:	
Acetic acid, recovered (100%)	CEL, DOW, DUP, EKT, MON, RDA, UCC.
Acetic acid, synthetic (100%)	BOR, CEL, EKT, FMP, MON, UCC.
*ACETIC ANHYDRIDE, 100%:	
Acetic anhydride from acetaldehyde (100%)	EKT.
Acetic anhydride from acetic acid, other than recovered, by the vapor-phase process (100%)	CEL, UCC.
Acetic anhydride from acetic acid, recovered, by vapor-phase process	CEL.
Acetic anhydride from ethylene (100%)	MON.
*Acrylic acid	CEL, DBC, UCC.
*Adipic acid	ALF, CEL, DUP, MON.
Azelaic acid	EMR.
Bromoacetic acid	WCC.
Bromobutyric acid	ARA, GTL.
tert-Butylperoxy maleic acid	WTC, WTL.
Butyric acid	CEL, EKT.
Butyric anhydride	EKT.
Butyryl chloride	WCC.
Castor oil fatty acids, dehydrated	NTL.
Chloroacetic acid, mono-	BUK, DOW, PFZ.
Chloroacetyl chloride	DOW.
Citric acid	MLS, PFZ.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*ACIDS, ACID ANHYDRIDES, AND ACYL HALIDES--Continued:	
Crotonic acid (2-Butenoic acid)	EKT.
Decanoyl chloride	WTL.
2,2-Dichloropropionic acid	DOW.
Dimer acid (C-36 Aliphatic dibasic acid)	CBY, EMR.
Di-n-propylacetic acid	ARA.
Dithiodipropionic acid	EVN.
Dodecanedioic acid	DUP.
*Dodecenylsuccinic anhydride	BCC, DIX, HMY.
Dodecylsuccinic anhydride	HN, SM.
2-Ethylbutyric acid (Diethylacetic acid)	UCC.
2-Ethylhexanoic acid (α-Ethylcaproic acid)	EKT, UCC.
2-Ethylhexanoyl chloride	AZT, CAD, CTN, WTL.
Fatty acids, hydrogenated	GYR.
Fatty acids, non-hydrogenated	GYR.
Fatty acids, partially hydrogenated	CBY, GYR.
Formic acid, 90%	CEL, UCC.
*Fumaric acid	HN, MON, PFZ, USS.
Gluconic acid, technical	PFZ.
Glycolic acid (Hydroxyacetic acid)	DUP.
n-Hexadecenylsuccinic anhydride	HMY.
Isethionic acid (2-Hydroxyethanesulfonic acid)	WTC.
Isoascorbic acid (Erythorbic acid)	PFZ.
Isobutyric acid	DA, EKX.
Isobutyric anhydride	EKT.
Isobutyryl chloride	WTL.
Iso-octadecenylsuccinic anhydride	HMY.
Itaconic acid (Methylenesuccinic acid)	PFZ.
LACTIC ACID:	
Lactic acid, edible, 100%	CLN, MON.
Lauroyl chloride	ONX, UOP, WCC, WTL.
Maleic acid	ACS, PFN, PFZ.
Malic acid	ACS.
Mercaptoacetic acid (Thioglycolic acid)	EVN.
3-Mercaptopropionic acid	EVN.
Mercaptosuccinic acid (Thiomalic acid)	EVN.
Methacrylic acid	DUP, RH.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*ACID, ACID ANHYDRIDES, AND ACYL HALIDES--Continued:	
Methanesulfonic acid	PAS.
Methanesulfonyl chloride	PAS.
Neodecanoic acid	ENJ.
Neopentanoic acid	ENJ.
Nonanoic acid (Pelargonic acid)	EMR, GIV.
Nonenylsuccinic anhydride	HMY.
Octancyl chloride	WCC.
Octenylsuccinic anhydride	HMY.
Oleic acid	ASH.
Oleoyl chloride	HRT.
*Oxalic acid	ACS, HK, PFZ.
Palmitoyl chloride	PD.
Peroxyacetic acid	FMB, UCC.
Pivalcyl chloride	AZT, WCC.
Polyacrylic acid	BFG, DA, RH, SNW, X.
Propionic acid	CEL, EKT, IMC, UCC.
Propionic anhydride	EKT.
Sebacic acid	BAS, WTH.
Sebacoyl chloride	WTL.
Sorbic acid (2,4-Hexadienoic acid)	MON.
Stearoyl chloride	UOP.
Succinic acid	ACS.
Thioacetic acid	EVN.
3,3'-Thiodipropionic acid	CCW, EVN.
Thiolactic acid	EVN.
Trichloroacetic acid	DOW.
Valeric acid	UCC.
Acids, acid anhydrides, and acyl halides, all other	ABB, ARA, BCC, BFG, DOW, EK, ENJ, EVN, HMY, MIL, PIC, SCP, SK, TX, WAY, WCC, WTL.
*SALTS OF ORGANIC ACIDS:	
*ACETIC ACID SALTS:	
*Aluminum acetate	ACY, UCC.
*Ammonium acetate	ACS, BKC, MAL.
*Barium acetate	BKC, CRN, MAL.
Butyltin acetate (Dibutyltin diacetate)	X.
Calcium acetate	ACS, HPT, MAL.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*SALTS OF ORGANIC ACIDS--Continued:	
*ACETIC ACID SALTS--Continued:	
Chromium acetate	SHP.
*Cobalt acetate	HSH, SHP, UCC.
Copper acetate	BKC.
Lead acetate	ACS, BKC, MAL.
Lead subacetate	BKC, MAL.
Lead tetraacetate	ARA.
*Magnesium acetate	BKC, HCP, SHP.
Manganese acetate	HSH, SHP.
Mercuric acetate	MAL.
Nickel acetate	BKC, HSH, SHP.
Potassium acetate	ACS, BKC, HCP, MAL, UCC.
*Sodium acetate	ACS, ATL, BKC, DAN, EKT, HCP, MAL, SCM, UCC.
Sodium diacetate	HCP, UCC.
*Zinc acetate	ACS, BKC, MAL, SHP, UCC.
Zirconium acetate	TZC.
Acetic acid salts, all other	MAL, RBC, X.
Allylsulfonic acid, sodium salt	IOC, UOP.
Chloroacetic acid, sodium salt	DOW.
CITRIC ACID SALTS:	
Ammonium citrate	MAL, PFZ.
Calcium citrate	PFZ.
Ferric ammonium citrate	PFZ.
*Potassium citrate	HXL, MLS, PFZ.
*Sodium citrate	HXL, MLS, PFZ.
Citric acid salts, all other	X.
*2-ETHYLHEXANOIC ACID (ALPHA-ETHYLCAPROIC ACID) SALTS	
Aluminum 2-ethylhexanoate	DA, NOC, WTC.
Barium 2-ethylhexanoate	CCA.
Cadmium 2-ethylhexanoate	CCA.
*Calcium 2-ethylhexanoate	ARC, CCA, HN, MCI, TRO, WTC, X.
*Cobalt 2-ethylhexanoate	CCA, HN, MCI, SHP, TRO, WTC, X.
Copper 2-ethylhexanoate	CCA.
Iron 2-ethylhexanoate	CCA, HN.
*Lead 2-ethylhexanoate	CCA, HN, NTL, SHP, TRO, WTC, X.
Lithium 2-ethylhexanoate	WTC.
*Manganese 2-ethylhexanoate	CCA, HN, MCI, SHP, TRO, WTC, X.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*SALTS OF ORGANIC ACIDS--Continued:	
*2-ETHYLHEXANOIC ACID (ALPHA-ETHYLCAPROIC ACID) SALTS--Continued:	
*Nickel 2-ethylhexanoate	MCI, SHP, WTC.
Potassium 2-ethylhexanoate	CCA, MCI.
Rare earths 2-ethylhexanoate	CCA, MCI.
Stannous 2-ethylhexanoate	WTC, X.
*Zinc 2-ethylhexanoate	CCA, HN, MCI, SHP, WTC, X.
*Zirconium 2-ethylhexanoate	CCA, HN, MCI, TRO, WTC, X.
2-Ethylhexanoic acid salts, all other	MCI, SHP.
FORMIC ACID SALTS:	
Lead formate	NTL.
Potassium formate	HCP, SHP.
Sodium formate, refined	BKC.
Sodium formate, technical	CEL, PST, SCM.
Fumaric acid, lead salt	NTL.
GLUCOHEPTANOIC ACID SALTS:	
Sodium glucoheptanoate	PFN.
GLUCONIC ACID SALTS:	
Sodium gluconate	PFZ.
9H-Hexadecafluorononanoic acid, ammonium salt	X.
Isoascorbic acid, sodium salt (Sodium erythorbate)	PFZ.
Laurolauric acid, dibutyltin salt	CCA, X.
Mercaptopropionic acid, dibutyltin salt	CCA.
Potassium glycolate	X.
Sodium ethyl oxalacetate	FMP.
TERTIARY-ALPHA-ALKYLCARBOXYLIC ACID SALTS (ISOCARBOXYLIC ACID SALTS):	
t-α-Alkylcarboxylic acid salts (Isocarboxylic acid salts), all other	WTC.
LACTIC ACID SALTS:	
Calcium lactate	HUM.
Sodium lactate (Nalac)	PFN.
Lactic acid salts, all other	TCC.
LAURIC ACID SALTS:	
Lauric acid, barium-cadmium salt	X.
Lauric acid salts, all other	X, X.
LINOLEIC ACID SALTS:	
Calcium linoleate	CCA, SHP.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*SALTS OF ORGANIC ACIDS--Continued:	
LINOLEIC ACID SALTS--Continued:	
Cobalt linoleate	SHP.
Manganese linoleate	SHP.
*MALEIC ACID SALTS:	
Maleic acid, dibutyltin maleate salt	X.
Maleic acid, dibutyltin salt	CCA, X.
Maleic acid, tribasic lead salt	NTL.
Maleic acid salts, all other	CCA, X.
MERCAPTOACETIC ACID (THIOGLYCOLIC ACID) SALTS:	
Ammonium mercaptoacetate	EVN.
Calcium mercaptoacetate	EVN.
Potassium mercaptoacetate	EVN.
Sodium mercaptoacetate	EVN.
Mercaptoacetic acid (Thioglycolic acid) salts, all other	CCA.
NEODECANOIC ACID SALTS:	
*Calcium neodecanoate	CCA, MCI, SHP.
Cobalt neodecanoate	MCI, SHP.
Lead-cobalt neodecanoate	MCI.
Lead neodecanoate	MCI.
Lithium neodecanoate	MCI.
Manganese neodecanoate	MCI, SHP.
Zinc neodecanoate	MCI.
Zirconium neodecanoate	MCI, SHP.
Neodecanoic acid salts, all other	MCI, SHP.
OCTANOIC-ACID (CAPRYLIC ACID) SALTS:	
Octanoic acid (Caprylic acid) salts, all other	WTC.
OLEIC ACID SALTS:	
Copper oleate	WTC.
Stannous oleate	X.
Oleic acid salts, all other	SHP.
OXALIC ACID SALTS:	
Ammonium oxalate	ACS, BKC.
Potassium oxalate	BKC.
Sodium oxalate	BKC.
Oxalic acid salts, all other	SHP.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*SALTS OF ORGANIC ACIDS--Continued	
PHOSPHORODITHIOIC ACID SALTS (DITHIOPHOSPHATES):	
Sodium di-sec-butyl/diethyl phosphorodithioate	ACY.
Sodium di-sec-butyl phosphorodithioate	ACY.
Sodium diethyl phosphorodithioate	ACY.
Sodium dihexyl phosphorodithioate	ACY.
Sodium diisopropyl phosphorodithioate	ACY.
Phosphorodithioc acid salts (Dithiophosphates), all other	ACY.
PROPIONIC ACID SALTS:	
Calcium propionate	HFT, PFZ.
Sodium propionate	HFT, PFZ.
Propionic acid salts, all other	DUP, SHP, UCC.
RICINOLEIC ACID SALTS:	
Calcium ricinoleate	NTL.
Sodium sorbitol borate	ICI.
*STEARIC ACID SALTS:	
ALUMINUM STEARATES:	
*Aluminum distearate	DA, KCH, NOC, SYP, WTC.
*Aluminum monostearate	DA, NOC, SYP.
*Aluminum tristearate	DA, NOC, PEN, SYP, WTC.
Ammonium stearate	DA, DAN.
*Barium stearate	DA, NOC, PEN, SYP, WTC.
Cadmium stearate	NOC, WTC.
*Calcium stearate	DA, FER, HN, MAL, NOC, PEN, SNW, SYP, WTC, X.
Cobalt stearate	SHP, X.
Ferric stearate	SHP, WTC.
Lead stearate	WTC.
Lead stearate, dibasic	X.
Lithium stearate	DA, NOC, PEN, SYP, WTC.
*Magnesium stearate	DA, MAL, NOC, PEN, SYP, WTC.
Nickel stearate	WTC.
*Zinc stearate	DA, HN, MAL, NOC, PEN, PLS, SYP, WTC, X.
Stearic acid salts, all other	NOC, WTC.
TARTARIC ACID SALTS:	
Potassium sodium tartrate	PFZ.
XANTHIC ACID SALTS:	
Potassium amylxanthate	DOW.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*SALTS OF ORGANIC ACIDS--Continued:	
XANTHIC ACID SALTS--Continued:	
Potassium ethylxanthate	DOW.
Potassium pentylxanthate	ACY.
Sodium n-butylxanthate	KCC, USR.
Sodium sec-butylxanthate	DOW.
Sodium ethylxanthate	DOW.
Sodium isobutylxanthate	DOW.
Sodium isopropylxanthate	DOW.
Salts of organic acids, all other	CCA, EK, HSH, SDH, SHP, STP, WTC, X, X.
*ALDEHYDES:	
Acetaldehyde	CEL, EKX, SHC, UCC.
Acrolein (Acrylaldehyde)	SHC, UCC.
Butyraldehyde	CEL, EKX, UCC.
Chloral (Trichloroacetaldehyde)	MTO.
Crotonaldehyde	EK, EKT, UCC.
2-Ethylbutyraldehyde	UCC.
2-Ethylhexanal (α-Ethylcaproaldehyde)	EKX, UCC.
2-Ethyl-2-hexen-1-al (2-Ethyl-3-propylacrolein)	UCC.
*Formaldehyde (37% HCHO by Weight)	ACS, AMR, BOR, CBD, CEL, DUP, GAF, GOC, GP, HKD, HN, HPC, IMC, MON, RCI, WCL.
Glutaraldehyde	UCC.
Glyoxal	ACY, UCC.
Isobutyraldehyde	CEL, DBC, EKX, UCC.
Isopentaldehyde, mixed isomers	UCC.
2-Methylvaleraldehyde (2-Methylpentaldehyde)	UCC.
Propionaldehyde	EKX, UCC.
Valeraldehyde (Pentanal)	UCC.
Aldehydes, acyclic, all other	EK, RDA, UCC, X.
*KETONES:	
*ACETONE:	
*Acetone from cumene	ACS, CLK, DOW, GP, GYR, MON, SHC, SKO, SOC, UCC. USS.
*Acetone from isopropyl alcohol	EKT, ENJ, SHC, UCC.
Acetone, all other	OCC.
*2-Butanone (Methyl ethyl ketone)	ATR, CEL, ENJ, SHC, UCC.
5-Chloro-2-pentanone	SDW.
1-Chloro-1-penten-3-one (β-Chlorovinyl ethyl ketone)	ABB.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*KETONES--Continued:	
Chloro-2-propanone (Chloroacetone)	EK, MRK.
1,3-Dihydroxy-2-propanone (Dihydroxyacetone)	PFZ.
Diisopropyl ketone (2,4-Dimethyl-3-pentanone)	EKX.
2-Heptanone (Methyl amyl ketone)	EKT.
3-Heptanone (Ethyl butyl ketone)	UCC.
2,5-Hexanedione (Acetonylacetone)	ARS.
*4-Hydroxy-4-methyl-2-pentanone (Diacetone alcohol)	CEL, SHC, UCC.
Isovalerone (Diisobutyl ketone)	EKT, UCC.
Lactide (3,6-Dimethyl-2,5-p-dioxanedione)	CLN.
4-Methoxy-4-methyl-2-pentanone	SHC.
5-Methyl-2-hexanone (Methyl isoamyl ketone)	EKT.
*4-Methyl-2-pentanone (Methyl isobutyl ketone)	EKT, ENJ, SHC, UCC.
*4-Methyl-3-penten-2-one (Mesityl oxide)	ENJ, SHC, UCC.
2-Octanone (Hexyl methyl ketone)	WTH.
2,4-Pentanedione (Acetylacetone)	UCC.
3-Pentanone (Diethyl ketone)	HEX, ORT, UCC.
Pseudoionone	SCM.
2,6,8-Trimethyl-4-nonanone (Isobutyl heptyl ketone)	UCC.
Ketones, all other	ARC, CHG, DUP, EKT, PFZ, SHC, UCC.
*ALCOHOLS, MONOHYDRIC, UNSUBSTITUTED:	
*ALCOHOLS, C11 OR LOWER, UNMIXED (95% OR MORE PURE):	
Allyl alcohol	FMP, SHC.
AMYL ALCOHOLS:	
2-Methyl-1-butanol	UCC.
1-Pentanol	UCC.
BUTYL ALCOHOLS:	
n-Butyl alcohol (n-Propylcarbinol)	CEL, CO, DBC, EKX, GAF, OXC, SHC, TNA, UCC.
sec-Butyl alcohol (Methylethylcarbinol)	ENJ, SHC.
tert-Butyl alcohol (Trimethylcarbinol)	SHC, X.
*Isobutyl alcohol (Isopropylcarbinol)	CEL, DBC, EKX, OXC, SHC, UCC.
*Ethyl alcohol, synthetic only	EKX, PUB, SHC, UCC, USI.
*2-Ethyl-1-hexanol	DBC, EKX, OXC, SHC, UCC.
n-Heptyl alcohol	EKX.
*n-Hexyl alcohol	CO, ENJ, TNA, UCC.
Isononyl alcohol	USS.
Iso-octyl alcohol	ENJ, USS.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*ALCOHOLS, MONOHYDRIC, UNSUBSTITUTED--Continued	
*ALCOHOLS, C11 OR LOWER, UNMIXED (95% OR MORE PURE)--Continued	
*Isopropyl alcohol	ATR, ENJ, SHC, UCC.
*Methanol, synthetic only	AIP, BOR, CEL, DUP, GP, HCF, HN, MON.
2-Methyl-1-pentanol	UCC.
4-Methyl-2-pentanol (1-Methylisobutylcarbinol)	UCC.
1-Octanol	CO.
2-Octanol (sec-Capryl alcohol)	WTH.
*Propyl alcohol (Propanol)	CEL, EKX, UCC.
2-Propyn-1-ol (Propargyl alcohol)	GAF.
Alcohols, unmixed C11 or lower, all other	ENJ, RDA, SHC, UCC.
*ALCOHOLS C12 OR HIGHER, UNMIXED (95% OR MORE PURE):	
1-Decanol	CO, TNA.
Dodecyl alcohol (Lauryl alcohol)	CO, TNA.
1-Hexadecanol (Cetyl alcohol)	CO, PG.
Hexadodecyl alcohol	TNA.
Isodecyl alcohol	ENJ, USS.
1-Octadecanol (Stearyl alcohol)	CO, PG.
cis-9-Octadecen-1-ol (Oleyl alcohol)	ASH.
1-Tetradecanol (Myristyl alcohol)	CO.
1-Tridecanol	ENJ.
2,6,8-Trimethyl-4-nonanol	UCC.
*MIXTURES OF ALCOHOLS:	
Alcohol mixtures, all other	CO, CPS, EKX, ENJ, NCI, PG, SHC, TNA, UCC, WTH.
*ESTERS OF MONOHYDRIC ALCOHOLS:	
Acrylic monomers, mixed	RH.
Allyl methacrylate	AAC, GYR, SAR.
AMYL ACETATES:	
Amyl acetate (n-Pentyl acetate)	UCC.
BUTYL ACETATES:	
*n-Butyl acetate	CEL, EK, EKT, UCC.
Isobutyl acetate	CEL, EKT, EKX, UCC.
*Butyl acrylate	CEL, DBC, RH, UCC.
sec-Butyl chloroformate	CTN.
Butyl maleate	TCH, USS.
Butyl mercaptopropionate	EVN.
Butyl methacrylate	DUP, RH, TX.
tert-Butyl peroxyacetate	AZT, WTL.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
*ESTERS OF MONOHYDRIC ALCOHOLS--Continued	
tert-Butyl peroxy-2-ethylhexanoate	AZT, WTC.
tert-Butyl peroxyisobutyrate	AZT, WTL.
tert-Butyl peroxyisopropylcarbonate	PPG, WTL.
tert-Butyl peroxyneodecanoate	WTC, WTL.
*tert-Butyl peroxypivalate	AZT, WTC, WTL.
Cetyl lactate	SBC, VND.
Dibutyl fumarate	PFZ, RCI.
Dibutyl maleate	HN, RCI, USS.
Diethyl carbonate (Ethyl carbonate)	CTN.
Diethyl(ethoxymethylene)malonate	KF.
*Di(2-ethyl-1-hexyl) maleate	CHP, DAN, HRT, RUB.
Diethyl maleate	ACY.
Diethyl malonate (Malonic ester)	KF.
Diethyl oxalate (Ethyl oxalate)	FMP, PFZ.
Diisobutyl maleate	RUB.
Diiso-nonyl maleate	RUB.
Diisopropyl peroxydicarbonate (Isopropyl percarbonate)	EKX, PPG.
*Dilauryl-3,3'-thiodipropionate	ACY, CCW, EVN.
Dimethyl carbonate	CTN.
Dimethyl maleate	AAC.
Dimethyl malonate	KF.
Dioctyl maleate	RCI, USS.
Di-n-propyl peroxydicarbonate	WTL.
Distearyl-3,3'-thiodipropionate	ACY, EVN.
Dithiobis(stearyl propionate)	EVN.
Ditridecyl maleate	EPH.
Di(tridecyl)-3,3'-thiodipropionate	ACY, EVN.
2-Ethoxyethyl acetate	EKX, UCC.
*Ethyl acetate (85%)	CEL, EKT, EKX, PUB, UCC.
Ethyl acetoacetate	EKT.
*Ethyl acrylate	CEL, RH, UCC.
Ethyl chloroacetate	DOW.
Ethyl chloroformate	CTN.
Ethylene carbonate	JCC.
2-Ethyl-1-hexyl acetate	EKT.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*ESTERS OF MONOHYDRIC ALCOHOLS--Continued	
*2-Ethyl-1-hexyl acrylate	CEL, DBC, UCC.
2-Ethyl-1-hexyl methacrylate	DUP.
Ethyl silicate	SPS.
Ethyl sulfate (Diethyl sulfate)	UCC.
*FATTY ACID ESTERS, NOT INCLUDED WITH PLASTICIZERS OR SURFACE ACTIVE AGENTS:	
Dimethyl brassylate	EMR.
Isopropyl linoleate	VND.
Methyl esters of coconut oil	PG.
*Methyl esters of tallow	FER, HUM, PG.
Methyl 12-hydroxystearate	NTL, WTH.
Methyl myristate	CHL.
Myristyl myristate	VND.
Tridecyl stearate	CIN.
Fatty acid esters, not included with plasticizers surface-active agents, all other	ARC, CCW, CHP, CRN, FER, HUM, VND, X.
Isobutyl acrylate	UCC.
Isobutyl chloroformate	CTN.
Isobutyl isobutyrate	EKX.
Isodecyl thioglycolate	EVN.
Iso-octyl mercaptoacetate	CCW, EVN.
Iso-octyl-3-mercaptopropionate	EVN.
Isopropyl acetate	EKT, UCC.
Isopropyl chloroformate	CTN, PPG, WTL.
Isostearyl neopentanoate	VND.
Lauryl lactate	VND.
Lauryl methacrylate	RH, TX.
Menthallylidene diacetate	RDA.
2-Methoxyethyl acrylate	CPS.
Methyl acetate	GRD.
Methyl acetoacetate	EKT.
Methyl acrylate, monomer	CEL, DBC.
Methyl borate	SPS.
Methyl chloroacetate	DOW.
Methyl chloroformate	CTN.
Methyl formate	CEL, DUP.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*ESTERS OF MONOHYDRIC ALCOHOLS--Continued	
Methyl methacrylate, monomer	CYR, DUP, RH.
Methyl sulfate (Dimethyl sulfate)	DUP.
Myristyl lactate	VND.
Octadecyl-3-mercaptopropionate	EKT, EVN.
*PHOSPHORUS ACID ESTERS:	
Bis (2-Chloroethyl)-2-chloroethylphosphonate	SM.
Bis(2-ethylhexyl) hydrogen phosphate	UCC.
Bis(2-ethylhexyl)hydrogen phosphite	SM.
Butyl acid phosphate	HK, SM.
Dibutyl butylphosphonate	SM.
Dibutyl hydrogen phosphite	SM.
Didodecyl hydrogen phosphate	DUP.
Diethyl ethylphosphonate	SM.
Diethyl hydrogen phosphite	SM.
Diethyl phosphorochloridothionate	SFA.
Dimethyl hydrogen phosphite	SM.
Dimethyl methylphosphonate	SM.
Dimethyl phosphoridothionate	SFA.
2-Ethylhexyl hydrogen phosphate	SM.
Iso-octyl hydrogen phosphate	SM.
Trialkyl phosphite	MCB.
Tributyl phosphate	FMP, SFS, SM.
Triethyl phosphite	SFA, SM.
Triiso-octyl phosphite	MCB, SM.
Triisopropyl phosphite	SM.
Trimethyl phosphite	SFA, SM.
Tris(butyl ethyl)phosphate	HN.
Tris(2-chloroethyl) phosphite	SM.
Tris(chloroisopropyl)thionophosphate	VEL.
Tris(2-ethylhexyl)phosphite	SM.
Phosphorus acid esters, all other	DUP, HK, JCC, MIL, MON, OMC, SFA, SM, USO, X.
*Propyl acetate	CEL, EKT, UCC.
Propylene carbonate	JCC.
Stearyl methacrylate	RH, TX.
Tetraethyl orthosilicate (Tetraethyl silicate)	UCC.
Tetraethyl silicate, condensed	UCC.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*ESTERS OF MONOHYDRIC ALCOHOLS--Continued	
Tetraoctyl orthosilicate	MON.
TITANIC ACID ESTERS:	
Tetrabutyl titanate	DUP, SFS.
Tetraisopropyl titanate	DUP, SFS.
Tetrakis(2-ethylhexyl)titanate	DUP.
Titanic acid esters, all other	DUP.
Triethyl orthoacetate	KF.
Triethyl orthopropionate	KF.
*Vinyl acetate, monomer	BOR, CEL, DUP, NSC, UCC, USI.
Monohydric alcohol esters, all other	AAC, ADC, CTN, DAN, EK, EMR, EVN, FER, HOF, KF, PIC, SFA, SNW, TKL, UCC, VND, WCC, WTL, X, X.
*POLYHYDRIC ALCOHOLS:	
2,2-Bis(bromomethyl)-1,3-propanediol	DOW.
1,2(and 1,3)-Butanediol	CEL, DUP.
1,4-Butanediol	BAS, GAF.
2-Butene-1,4-diol	GAF.
2-Butyne-1,4-diol	GAF.
3-Chloro-1,2-propanediol (Glycerol α-chlorohydrin)	EVN.
2,2-Dimethyl-1,3-propanediol (Neopentyl glycol)	EKX.
*Ethylene glycol	BAS, CAU, CEL, DIX, DOW, EKX, JCC, NWP, OMC, OXI, PPG, SHC, UCC.
2-Ethyl-1,3-hexanediol	UCC.
2-Ethyl-2-(hydroxymethyl)-1,3-propanediol (Trimethylolpropane)	CEL.
Glycerol, natural	GYR.
*Glycerol, synthetic only	DOW, FMP, SHC.
1,6-Hexanediol	CEL.
Mannitol	ICI.
3-Mercapto-1,2-propanediol (Thioglycerol)	EVN.
2-Methyl-2,4-pentanediol (Hexylene glycol)	SHC, UCC.
Pentaerythritol	CEL, HPC, IMC, PST.
1,5-Pentanediol	UCC.
*Propylene glycol (1,2-Propanediol)	DOW, JCC, OCC, OMC, UCC.
*Sorbitol (70% by weight)	BRD, ICI, MRK, PFZ.
2,2,4-Trimethyl-1,3-pentanediol	EKX.
Polyhydric alcohols, all other	ARA, JCC, MIL, UCC.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
ESTERS AND ETHERS OF POLYHYDRIC ALCOHOLS:	
*POLYHYDRIC ALCOHOL ESTERS:	
1,3-Butanediol dimethacrylate	SAR.
2-(2-Butoxyethoxy)ethyl acetate	EKT, UCC.
2-Butoxyethyl acetate	UCC.
Diethylene glycol chloroformate	PPG.
2-(2-Ethoxyethoxy)ethyl acetate	EKT, TKL.
Ethylene glycol diacetate	EKT, UCC.
Ethylene glycol dimercaptoacetate	EVN.
Ethylene glycol dimethacrylate	SAR.
Ethylene glycol hydroxyacetate	CCA.
Glyceryl diacetate (Diacetin)	ARC, HAL.
Glyceryl monoacetate (Monoacetin)	HAL.
Glyceryl monothioglycolate	EVN.
Glyceryl triacetate (Triacetin)	ARC, EKT, UCC.
Glyceryl trioleate	PVO.
Glycol adipate	WM.
1,6-Rexanediol diacrylate	CEL, SAR.
Hexylene glycol diacetate	UCC.
Rydroxyethyl acrylate	DOW.
Hydroxypropyl acrylate	DOW.
Hydroxypropyl methacrylate	CPV, RH.
Lanolin acetate	CRN.
Lanolin alcohol acetate	CRN.
Pentaerythritol stearate	X.
Pentaerythritol tetraacrylate	SAR, TKL.
Pentaerythritol tetrakis (3-Mercaptopropionate)	EVN.
Polyethylene glycol dimethacrylate	SAR.
Sucrose octa-acetate	HFT, PD.
2-Sulfoethyl methacrylate	DOW.
Tetraethylene glycol diacrylate	CEL, SAR, TKL.
Tetraethylene glycol limethacrylate	CEL, SAR.
*Triethylene glycol diacrylate	AAC, CEL, SAR, TKL.
Triethylene glycol dimethacrylate	SAR.
*Trimethylolpropane triacrylate	CEL, SAR, TKL.
2,2,3-Trimethyl-1,3-pentanediol monoisobutyrate	EKX.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
ESTERS AND ETHERS OF POLYHYDRIC ALCOHOLS--Continued	
*POLYHYDRIC ALCOHOL ESTERS--Continued	
Polyhydric alcohol esters, all other	CCW, CEL, CTN, DUP, EK, EKT, EVN, GOC, OMC, PG, SAR, SBC, SM, SNW, TKL, UCC, USB, WM, X.
*POLYHYDRIC ALCOHOL ETHERS:	
Bis(2-butoxyethyl)ether (Diethylene glycol di-n-butyl ether)	ASL.
Bis(2-ethoxyethyl)ether (Diethylene glycol diethyl ether)	UCC.
Bis(hydroxyethyl)ether butynediol	GAF.
Bis[2-(2-methoxyethoxy)ethyl] ether (Tetraethylene glycol dimethyl ether)	ASL.
Bis(2-methoxyethyl)ether (Diethylene glycol dimethyl ether)	ASL, FER.
*2-Butoxyethanol (Ethylene glycol monobutyl ether)	DOW, EKX, JCC, OMC, SHC, UCC.
*2-(2-Butoxyethoxy)ethanol (Diethylene glycol monobutyl ether)	DOW, EKX, JCC, OMC, SHC, UCC.
2-[2-(2-Butoxyethoxy)ethoxy]ethanol (Triethylene glycol monobutyl ether)	DOW, OMC, UCC.
1-Butoxyethoxy-2-propanol	UCC.
*Diethylene glycol	BAS, CEL, DIX, DOW, EKX, JCC, NWP, PPG, SHC, UCC.
Dimethoxyethane (Ethylene glycol dimethyl ether)	ASL, UCC.
*Dipropylene glycol	DOW, JCC, OCC, OMC, UCC.
*2-Ethoxyethanol (Ethylene glycol monoethyl ether)	DOW, EKX, JCC, OMC, PPG, SHC, UCC.
*2-(2-Ethoxyethoxy)ethanol (Diethylene glycol monoethyl ether)	DOW, EKX, JCC, OMC, SHC, UCC.
*2-[2-(2-Ethoxyethoxy)ethoxy]ethanol (Triethylene glycol monoethyl ether)	DOW, OMC, UCC.
2-[2-(Hexyloxy)ethoxy]ethanol	UCC.
2-(2-Isobutoxyethoxy)ethanol (Diethyene glycol monoisobutyl ether)	UCC.
1-Isobutoxy-2-propanol (Propylene glycol isobutyl ether)	DOW.
*2-Methoxyethanol (Ethylene glycol monomethyl ether)	DOW, JCC, OMC, PPG, SHC, UCC.
*2-(2-Methoxyethoxy)ethanol (Diethylene glycol monomethyl ether)	DOW, JCC, OMC, PPG, SHC, UCC.
*2-[2-(2-Methoxyethoxy)ethoxy]ethanol (Triethylene glycol monoethylether	DOW, OMC, UCC.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
ESTERS AND ETHERS OF POLYHYDRIC ALCOHOLS--Continued	
*POLYHYDRIC ALCOHOL ETHERS--Continued	
2-(2-Methoxyethoxy)ethyl-2-methoxyethyl ether (Triethylene glycol dimethyl ether)	ASL.
Methoxypolyethylene glycol	DUP, UCC.
1-Methoxy-2-propanol	DOW.
3-(3-Methoxypropoxy)propanol	DOW, UCC.
3-[3-(3-Methoxypropoxy)propoxy]propanol	DOW.
Paraformaldehyde	CEL, HN.
Polybutylene glycol	UCC.
*Polyethylene glycol	BAS, CAU, DA, DOW, HDG, JCC, OMC, TCH, UCC, X, X.
POLYPROPOXY ETHERS:	
Polypropoxybutyl ether	BAS, DA, UCC.
Polypropoxy ethers, all other	TNI, UCC.
Polyglycols, ethylene glycol and glycol ether, mixed	ARC, DOW, UCC.
Polyoxypropylene polyoxyethylene glycol, mixed	JCC, UCC.
*Polypropylene glycol	BAS, DOW, HDG, JCC, OMC, UCC.
Polytetramethylene glycol ether	DUP, QKO.
Propylene glycol, mixed ethers	DOW, JCC, UCC.
Sorbitol, ethoxylated	GYR, ICI, TCH.
Sorbitol, propoxylated	ICI.
*Tetraethylene glycol	DOW, EKX, OMC, UCC.
1,1,3,3-Tetramethoxypropane	KF.
2,2'-Thiodiethanol (Thiodiglycol)	UCC.
*Triethylene glycol	CEL, DIX, DOW, EKX, JCC, OMC, PPG, SHC, UCC.
Tripropylene glycol	DOW, HDG, OMC, UCC.
Polyhydric alcohol ethers, all other	CRN, EKX, JCC, OMC, TX, UCC, X.
*HALOGENATED HYDROCARBONS:	
*BROMINATED (INCLUDING BROMOCHLORINATED) HYDROCARBONS	
2-Bromobutane (sec-Butyl bromide)	VEL.
Bromochloromethane	DOW.
1-Bromo-3-chloropropane (Trimethylenechlorobromide)	VEL.
Bromoethane (Ethyl bromide)	DOW, GTL, VEL.
1-Bromohexane (n-Hexyl bromide)	WCC.
1-Bromo-octadecane	HMY.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*HALOGENATED HYDROCARBONS--CONTINUED	
*BROMINATED (INCLUDING BROMOCHLORINATED) HYDROCARBONS--CONTINUED	
1-Bromopentane (n-Amyl bromide)	HMY, WCC.
Bromotrichloromethane	VEL.
Dibromomethane (methylene bromide)	DOW.
1,1,2,2-Tetrabromoethane (Acetylene tetrabromide)	DOW.
Vinyl bromide (Bromoethylene)	TNA.
Brominated (Including bromochlorinated) hydrocarbons, all other	GTL, HMY, OMC, VEL, WCC.
*CHLORINATED (NOT OTHERWISE HALOGENATED) HYDROCARBONS	
*Carbon tetrachloride	ACS, DA, DOW, DUP, FMB, FRO, SFI.
*CHLORINATED PARAFFINS (C10-C30):	
*Chlorinated paraffins, 35-64% chlorine	CCH, DA, DVC, FER, ICI, NEV, PLX.
Chlorinated paraffins, less than 35% chlorine	HK.
Chlorinated paraffins, 65% or more chlorine	DA, DVC, NEV.
1-Chlorobutane (n-Butyl chloride)	PUB, UCC.
*Chloroethane (Ethyl chloride)	DOW, DUP, HPC, PPG, SFP, SHC, TNA.
*Chloroform	ACS, DA, DOW, FRO, SFI.
*Chloromethane (Methyl chloride)	ACS, CO, DCC, DOW, DUP, FRO, SFI, TNA, UCC.
3-Chloro-2-methyl-1-propene (Methallyl chloride)	FMP.
3-Chloropropene (Allyl chloride)	DOW, SHC.
Dichlorobutadiene	DUP.
1,4-Dichlorobutene	DUP.
*1,2-Dichloroethane (Ethylene dichloride)	ACS, BAS, BFG, CO, DA, DOW, FRO, ICI, OMC, PPG, SFP, SHC, TNA, UCC.
*Dichloromethane (Methylene chloride)	ACS, DA, DOW, DUP, FRO, SFI.
*1,2-Dichloropropane (Propylene dichloride)	BAS, DOW, JCC, OMC.
2,3-Dichloropropene	DOW.
Octadecyl chloride	HDW.
1,1,2,2-Tetrachloroethane (Acetylene tetrachloride)	HK.
*Tetrachloroethylene (Perchloroethylene)	DA, DOW, DUP, FRO, HK, PPG, SFI, TNA.
*1,1,1-Trichloroethane (Methyl chloroform)	DOW, FRO, PPG.
1,1,2-Trichloroethane (Vinyl trichloride)	DOW.
*Trichloroethylene	DOW, HK, PPG, TNA.
1,2,3-Trichloropropane	DOW, SHC.
1,2,3-Trichloropropene	DOW.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*HALOGENATED HYDROCARBONS--Continued	
*CHLORINATED (NOT OTHERWISE HALOGENATED) HYDROCARBONS--CONTINUED	
*Vinyl chloride, monomer (Chloroethylene)	ACS, BFG, BOR, CO, DA, DOW, FRO, ICI, MNO, PPG, SFP, SHC, TNA, USR.
Vinylidene chloride, monomer (1,1-Dichloroethylene)	DOW, PPG.
Chlorinated (Not otherwise halogenated) hydrocarbons, all other	DUP, HDW, RDA, RH, SCM.
*FLUORINATED (INCLUDING OTHER FLUOROHALOGENATED) HYDROCARBONS:	
2-Bromo-2-chloro-1,1,1-trifluoroethane	ICI.
Bromotrifluoromethane	X.
1-Chloro-1,1-difluoroethane	PAS.
*Chlorodifluoromethane (F-22)	ACS, DUP, KAI, PAS, RCN, UCC.
Chlorotrifluoroethylene (Trifluorovinyl chloride)	ACS, MMM.
Chlorotrifluoromethane	X.
Dibromodifluoromethane	X.
1,2-Dibromo-1,1,2,2-tetrafluoroethane	X.
*Dichlorodifluoromethane (F-12)	ACS, DUP, KAI, PAS, RCN.
Dichlorotetrafluoroethane	ACS, DUP, PAS.
1,1-Difluoroethane	X.
Difluorotetrachloroethane	X.
Hexafluoropropylene, monomer	DUP.
1-Iodoperfluorohexane	DUP.
*Tetrafluoroethylene, monomer	ACS, DUP, ICI.
Tetrafluoromethane	X.
*Trichlorofluoromethane (F-11)	ACS, DUP, KAI, PAS, RCN.
Trichlorotrifluoroethane	ACS, X.
Vinyl fluoride, monomer	PAS, X.
Vinylidene fluoride, monomer	X.
Fluorinated (Including other fluorohalogenated) hydrocarbons, all other	DUP, ICI.
*IODINATED (NOT OTHERWISE HALOGENATED) HYDROCARBONS:	
Diiodomethane (Methylene iodide)	NTB.
Iodoethane (Ethyl iodide), non-medical	FMT, RSA.
Iodoform (Triiodomethane)	NTB.
Iodomethane (Methyl iodide)	FMT, RSA.
Iodinated (Not otherwise halogenated) hydrocarbons all other	RSA.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*OTHER MISCELLANEOUS ACYCLIC CHEMICALS:	
Acetyl peroxide	WTL.
Aluminum isopropoxide (Aluminum isopropylate)	CHT, KCH.
*2-Butanone peroxide	CAD, NOC, RCI, WTC, WTL.
tert-Butyl hydroperoxide	AZT, CAD, OCC, WTC, WTL.
*tert-Butyl peroxide (Di-tert-butyl peroxide)	AZT, SHC, WTC, WTL.
Carbon disulfide	FMB, PAS, PPG, SFI.
Decanoyl peroxide	WTC, WTL.
2,3-Dibromopropanol	GTL.
2,5-Dimethyl-2,5-bis(2-ethyl-1-hexanoyl peroxy) hexane	WTC, WTL.
2,5-Dimethyl-2,5-di(tert-butylperoxy)hexane	WTL.
2,5-Dimethyl-2,5-di(tert-butylperoxy)hexyne-3	WTL.
*EPOXIDES, ETHERS, AND ACETALS:	
1-(Allyloxy)-2,3-epoxypropane (Allyl glycidyl ether)	AAC.
Bis(2-chloroethoxy)methane (Dichloroethylformal)	TKL.
Bis(2-chloroethyl)ether (Dichlorodiethyl ether)	DOW.
Bis(2-chloro-1-methylethyl)ether (Dichloroisopropyl ether)	DOW.
Butylene oxide	DOW.
Butyl ether (Di-n-butyl ether)	PUB.
Butyl vinyl ether	GAF.
2-Chloroethyl vinyl ether	AAC.
Chloromethyl methyl ether	RH.
2,2-Dichloro-1,1-difluoroethyl methyl ether	DOW.
Dimercaptodiethyl ether	EVN.
Epichlorohydrin	DOW, SHC.
*Ethylene oxide	BAS, GAU, CEL, DOW, EKX, JCC, NWP, OMC, PPG, SHC, SNO, UCC.
Ethyl ether, U.S.P.	MAL, USI.
*Ethyl ether, absolute	EKX, MAL, PUB, USI.
Ethyl ether, tech.	UCC, USI.
Ethyl vinyl ether	GAF.
Glycidol (2,3-Epoxy-1-propanol)	DIX.
Isopropyl ether	ENJ, SHC.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*OTHER MISCELLANEOUS ACYCLIC CHEMICALS--Continued	
*EPOXIDES, ETHERS, AND ACETALS--Continued	
Methylal (Dimethoxymethane)	CEL.
Methyl ether (Dimethyl ether)	DUP.
Methyl vinyl ether	GAF, UCC.
*Propylene oxide	BAS, DOW, JCC, OCC, OMC, OXI.
Epoxides, ethers, acetals, all other	ATR, DA, DUP, OMC, PG, UCC, VIK, X.
FATS AND OILS, CHEMICALLY MODIFIED:	
Hydrogenated tallow glycerides	CHL.
Stearic acid glycerides and oxidized stearic acid glycerides	SDW.
Fats and oils, chemically modified, all other	DOM.
Glutaraldehyde bis(sodium bisulfite)	EK, FMT.
n-Hexadecyl disulfide	PAS.
HYDROCARBONS:	
n-Decane	HMY, PLC.
n-Dodecane	HMY.
Hexadecane	HMY.
Myrcene	SCM, X.
n-Nonane	HMY.
n-Octadecane	HMY.
n-Octane	HMY.
Hydrocarbons, all other	CBY, HMY, SFS, SM, UCC.
Lauroyl peroxide	WTC, WTL.
2-Mercaptoethanol	PLC.
Methyl sulfide (Dimethyl sulfide)	CRZ, PAS.
Methyl sulfoxide (Dimethyl sulfoxide)	CRZ.
ORGANO-ALUMINUM COMPOUNDS:	
Diethylaluminum chloride	TNA, TSA.
Diethylaluminum iodide	TSA.
Diisobutylaluminum chloride	TNA, TSA.
Diisobutylaluminum hydride	TNA, TSA.
Ethylaluminum dichloride	TNA, TSA.
Ethylaluminum sesquichloride	TNA, TSA.
Isopropenylaluminum	TSA.
Methylaluminum sesquichloride	TNA.
Triethylaluminum	TNA, TSA.
Triisobutylaluminum	TNA, TSA.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--CONTINUED	
*OTHER MISCELLANEOUS ACYCLIC CHEMICALS--Continued	
ORGANO-ALUMINUM COMPOUNDS--CONTINUED	
Organo-aluminum compounds, all other	REH, TNA, TSA.
ORGANO-BORON COMPOUNDS:	
Boron fluoride - ethyl ether complex	ACS, PIC.
Trimethyl borate	MHI.
Organo-boron compounds, all other	ACS, TSA.
ORGANO-LITHIUM COMPOUNDS:	
sec-Butyllithium	FTE.
Organo-lithium compounds, all other	FTE, UCC.
ORGANO-MAGNESIUM COMPOUNDS:	
Methylmagnesium bromide	ARA.
Methylmagnesium chloride	ARA, X.
Organo-magnesium compounds, all other	TNA, TSA.
ORGANO-SILICON COMPOUNDS:	
α-Chloropropyltrichlorosilane	DCC.
Chloropropyltrimethoxysilane	DCC.
Chlorotrimethylsilane	DCC.
Dichlorodimethylsilane	DCC.
Dichloromethylsilane	DCC.
Dichloromethylvinylsilane	DCC, UCC.
Diethoxyphosphorylethyltriethoxysilane	UCC.
α-Glycidoxypropyltrimethoxysilane	UCC.
Mercaptopropyltrimethoxysilane	UCC.
α-Methacryloxypropyltrimethoxysilane	UCC.
Methyltrimethoxysilane and polymethyltrisiloxane	DCC, UCC.
Polyoxyalkene silicones	UCC.
*Silicone fluids	DCC, SPD, SWS, UCC.
Trichloromethylsilane	DCC.
Trichloropropylsilane	DCC.
Vinyltriethoxysilane	UCC.
Organo-silicone compounds, all other	RSA, SPD, UCC.
ORGANO-TIN COMPOUNDS:	
Bis(tributyltin)oxide	X.
Dibutyltin bis(isooctylmercaptoacetate)	CCW, X, X.
Dibutyltin dichloride	CCW, X.
Dibutyltin methoxide (Dibutylmethoxytin)	CCA.
Dibutyltin oxide	X.

TABLE 2.--MISCELLANEOUS CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE REPORTED, IDENTIFIED BY MANUFACTURER, 1978--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--Continued	
*OTHER MISCELLANEOUS ACYCLIC CHEMICALS--Continued	
ORGANO-TIN COMPOUNDS--Continued	
Tributyltin chloride	X.
Tributyltin fluoride	X.
Organo-tin compounds, all other	CCW, X.
ORGANO-ZINC COMPOUNDS:	
Diethylzinc	TSA.
Perchloromethanethiol (Perchloromethyl mercaptan)	SFA, SFC.
*Phosgene (Carbonyl chloride)	ACS, CTN, DUP, MOB, OMC, PPG, RUC, UCC, UPJ.
Pine oil, synthetic	CBY, NCI, SCM.
Sodium ethoxide	FMP.
Sodium formaldehyde bisulfite	DAN, EK, WAY.
Sodium formaldehyde sulfoxylate	DA.
*Sodium methoxide (Sodium methylate)	DA, HSH, OMC.
Succinyl peroxide	WTL.
Zinc formaldehyde sulfoxylate	USO.
Miscellaneous acylic chemicals, all other	AAC, ALD, CAD, CCL, DA, DAN, DUP, EK, EKT, FMP, HMY, ICI, JCC, KCH, NCI, OMC, PAS, PD, PFN, PVO, RBC, SFS, SHP, SM, TNA, UCC, VTC, WAY, WCC, WTL, X, X.
MIXTURES NOT SPECIFICALLY ITEMIZED (SPECIFY):	
Mixtures of miscellaneous acyclic chemicals not specificallyitemized	ALX, CCW, CEL, EKX, GAF, HPC, ICI, MON, MRK, MRT, NCI, PG, PLC, PMP, PVO, RH, S, SM, SYP, TNA, WLN.

TABLE 3.--Miscellaneous cyclic and acyclic chemicals: Directory of manufacturers, 1978

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production and/or sales of miscellaneous cyclic and acyclic chemicals to the U.S. International Trade Commission for 1978 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
AAC	Alcolac Chemical Corp.	CLN	Standard Brands, Inc., Clinton Corn
ABB	Abbott Laboratories		Processing Co. Div.
ACS	Allied Chemical Corp., Specialty Chemicals	CNP	Nipro Inc.
	Div.	CO	Continental Oil Co.
ACY	American Cyanamid Co.	CPS	CPS Chemical Co.
ADC	Anderson Development Co.	CPV	Cook Paint & Varnish Co., Inc.
AIP	Air Products & Chemicals, Inc.	CRN	CPC International, Inc., Amerchol Corp.
ALB	Ames Laboratories, Inc.	CRZ	Crown Zellerbach Corp., Chemical Products
ALD	Aldrich Chemical Co., Inc.		Div.
ALF	Allied Chemical Corp., Fibers Div.	CTN	Chemetron Corp., Chemical Products Div.
ALX	Alox Corp.	CWN	Upjohn Co., Fine Chemical Div.
AMB	American Bio-Synthetics Corp.	CYR	CY/RO Industries, Inc.
AMO	Standard Oil Co. (Indiana)		
AMR	Pacific Resins & Chemicals, Inc.	DA	Diamond Shamrock Corp.
ARA	Arapahoe Chemicals, Inc., Sub/Syntex	DAN	Dan River, Inc., Chemical Products
	U.S.A., Inc.		Dept.
ARC	Armak Co.	DBC	Badische Co.
ARS	Arsynco, Inc.	DCC	Dow Corning Corp.
ARZ	Arizona Chemical Co.	DIX	Dixie Chemical Co.
ASH	Ashland Oil, Inc.	DKA	Denka Chemical Corp.
ASL	The Ansul Co., Chemical Div.	DOM	Dominion Products, Inc.
ATL	Atlantic Chemical Corp.	DOW	Dow Chemical Co.
ATR	Atlantic Richfield Co., Arco Chemical Co.	DUP	E. I. duPont de Nemours & Co., Inc.
AZT	Dart Industries, Inc., Aztec Chemicals Div.	DVC	Dover Chemical Corp., Sub. of ICC Industries,
			Inc.
BAS	BASF Wyandotte Corp.	EFH	E. F. Houghton & Co.
BCC	Buffalo Color Corp.	EK	Eastman Kodak Co.:
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical	EKT	Tennessee Eastman Co. Div.
	Co. Div.	EKX	Texas Eastman Co. Div.
BKC	J. T. Baker Chemical Co.	ELP	El Paso Products Co.
BKL	Millmaster Onyx Group, Millmaster Chemical	EMR	Emery Industries, Inc.
	Co. Div.	ENJ	Exxon Chemical Co. U.S.A.
BOR	Borden Co., Borden Chemical Div.	EVN	Evans Chemetics, Inc.
BRD	Lonza, Inc.		
BUK	Buckeye Cellulose Corp.	FER	Ferro Corp.:
			Grant Chemical Div.
CAD	Noury Chemical Corp.		Keil Chemical Div.
CAU	Calcasieu Chemical Corp.		FMC Corp.:
CBD	Chembond Corp.	FMB	Industrial Chemical Group
CBY	Crosby Chemicals, Inc.	FMB	Specialty Chemicals Group
CCA	Interstab Chemicals, Inc.	FMP	Industrial Chemical Group
CCH	Pearsall Chemical Corp.	FMT	Fairmount Chemical Co., Inc.
CCL	Catawba-Charlab, Inc.	FOC	Handschy Industries, Inc., Farac Oil &
CCW	Cincinnati Milacron Chemicals, Inc.		Chemical Div.
CEL	Celanese Corp.:	FRO	Vulcan Materials Co., Chemicals Div.
	Celanese Chemical Co.	FTE	Foote Mineral Co.
	Celanese Fibers Co.		
CGY	Ciba-Geigy Corp.	GAF	GAF Corp.
CHG	Mobay Chemical Corp., Agricultural	GAN	Gane's Chemical Works, Inc.
	Chemicals Div.	GIV	Givaudan Corp.
CHL	Chemol, Inc.	GLY	Glyco Chemicals, Inc.
CHP	C. H. Patrick & Co., Inc.	GOC	Gulf Oil Corp., Gulf Oil Chemicals Co.-U.S.
CHT	Chattem, Inc.,	GP	Georgia-Pacific Corp.:
CIN	Cindet Chemicals, Inc.		Plaquemine Div.
CLK	Clark Oil & Refining Corp.		Resins Operations

TABLE 3.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: DIRECTORY OF MANUFACTURERS, 1978--CONTINUED

Code	Name of company	Code	Name of company
GRD	W. R. Grace & Co., Organic Chemicals Div., Polymers & Chemicals Div.	MON	Monsanto Co.
		MRK	Merck & Co., Inc.
GRO	A. Gross & Co., Millmaster Onyx Group Kewanee Industries, Inc.	MRT	Morton-Norwich Products, Inc. Morton Chemical Co. Div.
GTL	Great Lakes Chemical Corp.	MTO	Montrose Chemical Corp. of California
GYR	Goodyear Tire & Rubber Co.		
		NCI	Union Camp Corp., Terpenes & Aromatics Div.
HAL	C.P. Hall Co.		
HCF	Hercofina	NCW	Nostrip Chemical Works, Inc.
HCP	Honig Chemical & Processing Corp.	NEO	Norda, Inc.
HDG	Hodag Chemical Corp.	NEV	Neville Chemical Co.
HDW	Hardwicke Chemical Co.	NOC	Norac Co., Inc. and Mathe Div.
HEX	Hexagon Laboratories, Inc.	NPI	Stephan Chemical Co., Polychem Dept.
HFT	Syntex Agribusiness, Inc.	NSC	National Starch & Chemical Corp.
HK	Hooker Chemical Corp.:	NTB	National Biochemical Co.
HKD	Hooker Chemicals & Plastics Corp.,	NTL	NL Industries, Inc.
	Durez Div.	NWP	Northern Petrochemicals Co.
HLI	Millmaster Onyx Group, Haag Labs/Onyx Chemical Corp.		
		OCC	Oxirane Chemical Co.
HMP	W. R. Grace & Co., Organic Chemicals Div.	OH	Airco, Inc., Ohio Medical Products Div.
HMY	Humphrey Chemical Co.	OMC	Olin Corp.
HN	Tenneco Chemicals, Inc.	ONX	Onyx Chemical Co.
HPC	Hercules, Inc.	ORO	Chevron Chemical Co.
HRT	Hart Products Corp.	ORT	Roehr Chemicals, Inc.
HSH	Harshaw Chemical Co.	OXC	Oxochem Enterprise
HST	American Hoechst Corp., Industrial Chemical Div.	OXI	Oxirane Chemical Co. (Channelview)
HUM	Kraft, Inc., Humko Sheffield Chemical Operation	PAS	Pennwalt Corp.
		PCW	Pfister Chemical, Inc.
HXL	Hexcel Corp., Hexcel Specialty Chemicals	PD	Parke, Davis & Co., Sub. of Warner-Lambert Co.
ICI	ICI Americas, Inc.:	PEN	CPC International, Inc., Penick Corp.
	Chemical Specialties Group	PFN	Pfanstiehl Laboratories, Inc.
	Plastics Div.	PFX	Plastifax, Inc.
IMC	International Minerals & Chemicals Corp, Nitroparaffin Div.	PFZ	Pfizer, Inc. & Pfizer Pharmaceuticals, Inc.
		PG	Procter & Gamble Co., Procter & Gamble Manufacturing Co.
IOC	Ionac Chemical Co. Div. of Sybron Corp.		
		PIC	Pierce Chemical, Inc.
JCC	Jefferson Chemical Co., Inc.	PLC	Phillips Petroleum Co.
		PLS	Plastics Engineering Co.
KAI	Kaiser Aluminum & Chemical Corp., Kaiser Chemicals	PMP	Premier Malt Products, Inc.
		PPG	PPG Industries, Inc.
KCC	Kennecott Copper Corp., Chino Mines Div.	PST	Perstorp, Inc.
KCH	Joseph Ayers, Inc.	PUB	Publicker Industries, Inc.
KF	Kay-Fries Chemicals, Inc.	PVO	PVO International, Inc.
KLM	Kalama Chemical, Inc.		
KPT	Koppers Co., Inc.	QKO	Quaker Oats Co.
LAK	Bofors Lakeway, Inc.	RBC	Fike Chemicals, Inc.
LEM	Napp Chemicals, Inc.	RCI	Reichhold Chemicals, Inc.
		RCN	Racon, Inc.
MAL	Mallinckrodt Chemical Works	RDA	Rhone-Poulenc, Inc.
MCB	Borg-Warner Corp., Borg-Warner Chemicals	REH	Reheis Chemical Co. Div. of Armour Pharmaceutical Co.
MCI	Mooney Chemicals, Inc.		
MHI	Thiokol Corp., Ventron Div.	REM	Remington Arms Co., Inc.
MIL	Milliken & Co., Milliken Chemical Div.	RH	Rohm & Haas Co.
MLS	Miles Laboratories, Inc., Industrial Products Group	RPC	Millmaster Onyx Group, Refined Onyx Co. Div.
MMM	Minnesota Mining & Manufacturing Co.	RSA	R.S.A. Corp.
MNO	Monochem, Inc.	RUB	Hooker Chemical Corp., Hooker Chemicals & Plastics Corp., Ruco Div.
MNR	Monroe Chemical		
MOB	Mobay Chemical Co.	RUC	Rubicon Chemicals, Inc.

TABLE 3.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: DIRECTORY OF MANUFACTURERS, 1978--CONTINUED

Code	Name of company	Code	Name of company
S	Sandoz, Inc.	TNI	The Gillette Co., Chemical Div.
SAL	Salsbury Laboratories	TRO	Troy Chemical Corp.
SAR	Sartomer Industries, Inc.	TSA	Texas Alkyls, Inc.
SBC	Scher Bros., Inc.	TX	Texaco, Inc.
SCM	SCM Corp., Organic Chemicals Div.	TZC	Magnesium Elektron, Inc.
SCP	Henkel Corp.		
SDC	Martin-Marietta Corp., Sodeyco Div.	UCC	Union Carbide Corp.
	Sterling Drug, Inc.:	UOC	Union Oil Co. of California, Union
SDH	Hilton Davis Chemical Co. Div.		Chemicals Div., Petrochemicals Group
SDW	Winthrop Laboratories Div.	UOP	UOP, Inc., Chemical Div.
	Stauffer Chemical Co.:	UPJ	Upjohn Co.
SFA	Agricultural Div.	UPM	UOP, Inc.
SFC	Calhio Chemicals, Inc.	USB	U.S. Borax & Chemical Corp.
SFI	Industrial Div.	USI	U.S. Industrial Chemicals Co., National
SFP	Plastics Div.		Distillers & Chemicals Corp.
SFS	Specialty Chemical Div.	USO	U.S. Oil Company
SHC	Shell Oil Co., Shell Chemical Co. Div.	USR	Uniroyal, Inc., Uniroyal Chemical Div.
SHP	Shepherd Chemical Co.	USS	USS Chemicals Div. of U.S. Steel Corp.
SK	SmithKline Corp., SmithKline Chemicals		
	Div.	VAL	Valchem Div. of United Merchants &
SKO	Getty Refining & Marketing Co.		Manufacturing, Inc.
SM	Mobil Oil Corp., Mobil Chemical Co.:	VEL	Velsicol Chemical Corp.
	Chemical Coatings Div.	VGC	Virginia Chemicals, Inc.
	Phosphorus Div.	VIK	Viking Chemical Co.
SNO	SunOlin Chemical Co.	VND	Van Dyk & Co., Inc.
SNW	Sun Chemical Corp., Chemical Div.	VTC	Vertac, Inc., Vicksburg Plant
SOC	Standard Oil Co. of California, Chevron		
	Chemical Co.	WAG	West Agro-Chemical, Inc.
SOH	Vistron Corp.	WAY	Phillip A. Hunt Chemical Corp., Organic
SPD	General Electric Co., Silicone Products		Chemical Div.
	Dept.	WCC	White Chemical Corp.
STC	American Hoechst Corp., Sou-Tex Works	WCL	Wright Chemical Corp.
STP	Stepan Chemical Co.	WLN	Wilmington Chemical Corp.
SW	Sherwin-Williams Co.	WM	Inolex Corp.
SWS	Stauffer Chemical Co., SWS Silicones	WTC	Witco Chemical Corp.
	Div.	WTH	Union Camp Corp., Chemical Div.
SYP	Dart Industries, Inc., Synthetic Products	WTL	Pennwalt Corp., Lucidol Div.
	Co. Div.	WYC	Wycon Chemical Co.
		WYT	Wyeth Laboratories, Inc., Wyeth
TCC	Tanatex Chemical Co.		Laboratories Div. of American Home
TCH	Emery Industries Inc., Trylon Div.		Products Corp.
TKL	Thiokol Chemical Corp.		
TNA	Ethyl Corp.	ZGL	Carolina Processing Corp.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix. The above codes identify those of the 270 reporting companies and company divisions for which permission to publish was not restricted.

APPENDIX

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS, BY COMPANY, 1978

[Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1978 are listed below alphabetically, together with their identification codes as used in table 2 of the 15 individual sections of this report]

Identification code	Name of company	Office address
AEP	A & E Plastik Pak Co., Inc	14505 Proctor Ave., Industry, CA 91749.
AZS	AZS Corp.:	
	AZ Products Co. Div	2525 So. Combee Rd., Lakeland, FL 33801.
	AZS Chemical Co	762 Marietta Blvd., N.W., Atlanta, GA 30318.
ABB	Abbott Laboratories	14th St. and Sheridan Rd., N. Chicago, IL 60064.
ABS	Abex Corp., Friction Products Group	P. O. Box 3250, Winchester, VA 22601.
WLC	Agrico Chemical Co	P. O. Box 3166, Tulsa, OK 74101.
AGY	Agway, Inc., Olean Nitrogen Complex	1446 Buffalo St., Olean, NY 14760.
OH	Airco, Inc., Ohio Medical Products Div	3030 Airco Dr., P. O. Box 7550, Madison, WI 53701.
AIP	Air Products & Chemicals, Inc	P. O. Box 538, Allentown, PA 18105.
ALC	Alco Chemical Corp	Trenton Ave. and William St., Philadelphia, PA 19134.
AAC	Alcolac, Inc	3440 Fairfield Rd., Baltimore, MD 21226.
ALD	Aldrich Chemical Co., Inc	940 W. St. Paul Ave., Milwaukee, WI 53233.
ALL	Alliance Chemical Corp	33 Avenue P, Newark, NJ 07105.
	Allied Chemical Corp.:	
ACN	Agricultural Div	P. O. Box 2120, Houston, TX 77001.
ALF	Fibers Div	1411 Broadway - 38th Fl., New York, NY 10018.
ASC	Semet-Solvay Div	Columbia Rd., Morristown, NJ 07960.
ACS	Specialty Chemicals Div	P. O. Box 1219-R, Morristown, NJ 07960.
ACU	Union Texas Petroleum Div	P. O. Box 2120, Houston, TX 77001.
ALX	Alox Corp	3943 Buffalo Ave., Niagara Falls, NY 14303.
APH	Alpha Chemical Corp	P. O. Drawer A, Collierville, TN 38017.
ALP	Alpha Laboratories, Inc	1685 S. Fairfax St., Denver, CO 80222.
HES	Amerada Hess Corp. (Hess Oil Virgin Islands Corp.)	1 Hess Plaza, Woodridge, NJ 07095.
AMB	American Bio-Synthetics Corp	710 W. National Ave., P. O. Box 4275, Milwaukee, WI 53204.
MAR	American Can Co	American Lane, Greenwich, CT 06830.
AC	American Color & Chemical Corp	P. O. Box 51, Reading, PA 19603.
ACY	American Cyanamid Co	Wayne, NJ 07470.
HST	American Hoechst Corp	Route 202-206 North, Somerville, NJ 08876.
	Hoechst Fibers Industries Div	P. O. Box 5887, Spartanburg, SC 29304.
	Industrial Chemicals Div	129 Quidnick St., Coventry, RI 02816.
STC	Sou-Tex Works	P. O. Box 866, Mount Holly, NC 28052.
ASY	American Synthetic Rubber Corp	4500 Camp Ground Rd., Louisville, KY 40216.
ALB	Ames Laboratories, Inc	200 Rock Lane, Milford, CT 06460.
ADC	Anderson Development Co	1415 E. Michigan St., Adrian, MI 49221.
ASL	Ansul Co., Chemical Div	1 Stanton St., Marinette, WI 54143.
APX	Apex Chemical Co., Inc	200 S. 1st St., Elizabethport, NJ 07206.
APO	Apollo Colors, Inc	899 Skokie Blvd., Northbrook, IL 60062.
ARA	Arapahoe Chemicals, Inc., Sub/Syntex U.S.A., Inc.	2075 N. 55th St., Boulder, CO 80302.
KPP	ARCO/Polymers, Inc	1500 Market St., Philadelphia, PA 19101.
ARD	Ardmore Chemical Co., Inc	840 Valley Brook Ave., Lyndhurst, NJ 07071.
ARN	Arenol Chemical Corp	40-33 23d St., Long Island City, NY 11101.
ARZ	Arizona Chemical Co	Berdan Ave., Wayne, NJ 07470.
AKS	Arkansas Co., Inc	185 Foundry St., Newark, NJ 07105.
ARC	Armak Co	300 S. Wacker Dr., Chicago, IL 60606.
AGP	Armour-Dial, Inc	2000 Aucutt Rd., Montgomery, IL 60538.
ARP	Armour Pharmaceutical Co	P. O. Box 511, Kankakee, IL 60901.
ARK	Armstrong Cork Co	Charlotte & Liberty Sts., Lancaster, PA 17604.
ARL	Arol Chemical Products Co	649 Ferry St., Newark, NJ 07105.
ARS	Arsynco, Inc	P. O. Box 8, Carlstadt, NJ 07072.
ASH	Ashland Oil, Inc	1401 Winchester Ave., Ashland, KY 41101, and P. O. Box 2458, Columbus, OH 43216.
BLA	Astor Products, Inc	5244 Edgewood Ct., Jacksonville, FL 32205.
AST	Astra Pharmaceutical Products, Inc	Neponset St., Worcester, MA 01606.
ATL	Atlantic Chemical Corp	10 Kingsland Rd., Nutley, NJ 07110.
ATR	Atlantic Richfield Co., Arco Chemical Co	515 S Flower St., Los Angeles, CA 90064.
APD	Atlas Powder Co., Sub. of Tyler Corp	P. O. Box 87, Joplin, MO 64801.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS, BY COMPANY, 1978--CONTINUED

Identification code	Name of company	Office address
APR	Atlas Processing Co	P. O. Box 3099, 3333 Midway St., Shreveport, LA 71103.
KCH	Joseph Ayers, Inc	Route #2, Bethlehem, PA 18017.
BAS	BASF Wyandotte Corp	100 Cherry Hill Rd., Parsippany, NJ 07054.
DBC	Badische Corp	602 Copper Rd., Freeport, TX 77541.
BKC	J. T. Baker Chemical Co	222 Red School Lane, Phillipsburg, NJ 08865.
BAL	Baltimore Paint & Chemical Co. Div of Dutch Boy, Inc.	2325 Hollins Ferry Rd., Baltimore, MD 21230.
BAX	Baxter Travenol Laboratories, Inc	6301 N. Lincoln Ave., Morton Grove, IL 60053.
BAO	Bayoil Co., Inc	2 Union St., Peabody, MA 01960.
BEE	Beecham, Inc., Beecham Laboratories Div	101 Possumtown Rd., Piscataway, NJ 08854.
BIC	Beker Industries Corp	120 W. Putnam Ave., Greenwich, CT 06830.
BCM	Belding Chemical Industries	1430 Broadway, New York, NY 10018.
BME	Bendix Corp	P. O. Box 238, Troy, NY 12180.
BEN	Bennett's	P. O. Box 1320, Salt Lake City, UT 84110.
BDO	Benzenoid Organics, Inc	P. O. Box 157, Route 140, Bellingham, MA 02019.
PDC	Berncolors-Poughkeepsie, Inc	75 N. Water St., Poughkeepsie, NY 12601.
BNS	Binney and Smith, Inc	P. O. Box 431, 1100 Church Lane, Easton, PA 18042.
BOC	Biocraft Laboratories, Inc	12 Industrial Way, Waldwick, NJ 07463.
BNP	Bison Nitrogen Products Co	P. O. Box 1828, Sioux City, IA 51102.
LAK	Bofors Lakeway, Inc	5025 Evanston Ave., Muskegon, MI 49443.
BOR	Borden, Inc.:	
	Borden Chemical Div	180 E. Broad St., Columbus, OH 43215.
	Printing Ink Div., Pigments Div	630 Glendale-Milford Rd., Cincinnati, OH 45215.
MCB	Borg-Warner Corp., Borg-Warner Chemicals	International Center, Parkersburg, WV 26101.
BFP	Breddo Food Products Corp., Inc	18th and Kansas Avenue, Kansas City, KS 66105.
BRS	Bristol-Meyers Co	345 Park Ave., New York, NY 10022.
BRU	M. A. Bruder & Sons, Inc	52d St. and Grays Ave., Philadelphia, PA 19143.
BUK	Buckeye Cellulose Corp	2899 Jackson Ave., P. O. Box 8407, Memphis, TN 38108.
BKM	Buckman Laboratories, Inc	1256 N. McLean Blvd., Memphis, TN 38108.
BCC	Buffalo Color Corp	340 Elk St., P. O. Box 7027, Buffalo, NY 14210.
BJL	Burdick & Jackson Laboratories, Inc	1953 S. Harvey St., Muskegon, MI 49442.
BUR	Burroughs Wellcome Co	3030 Cornwallis Rd., Research Triangle Park, NC 27709.
CFI	CF Industries, Inc	Salem Lake Dr., Long Grove, IL 60047.
	CPC International, Inc.:	
ACR	Acme Resin Corp	1401 S. Circle Avenue, Forest Park, IL 60130.
CRN	Amerchol Corp	Talmadge Rd., Edison, NJ 08817.
PEN	Penick Corp	1050 Wall St. W., Lyndhurst, NJ 07071.
CPS	CPS Chemical Co	P. O. Box 162, Old Bridge, NJ 08857.
CYR	CY/RO Industries, Inc	Berden Ave., Wayne NJ 07470, and 697 Route 46, Clifton, NJ 07015.
CAU	Calcasieu Chemical Corp	P. O. Box 1522, Lake Charles, LA 70602.
CBM	Carborundum Co	P. O. Box 477, Niagara Falls, NY 14302.
CGL	Cargill, Inc	P. O. Box 9300 CPD/30, Minneapolis, MN 55440.
GOR	Carl Gordon Industries, Inc	1001 Southbridge St., Worcester, MA 01610.
ZGL	Carolina Processing Corp	P. O. Box 151, Severn, NC 27877.
CHC	Carpenter Chemical Co	P. O. Box 27205, Richmond, VA 23261.
JWC	J.W. Carroll & Sons Div. of U.S. Industries, Inc.	22600 Bonita St., Carson, CA 90745.
DOL	Castle & Cooke, Inc., Castle & Cooke Foods, Hawaii Pineapple Div.	650 Iwilei Rd., P. O. Box 3380, Honolulu, HI 96801.
CCL	Catawba-Charlab, Inc	5046 Old Pineville Rd., Charlotte, NC 28231.
CEL	Celanese Corp.:	
	Celanese Chemical Co	1250 W. Mockingbird Lane, Dallas, TX 75247.
	Celanese Fibers Co	P. O. Box 1414, Charlotte, NC 28201.
	Celanese Plastics Materials Co	26 Main St., Chatham, NJ 07928.
	Celanese Polymer Specialties Co	One Riverfront Plaza, Louisville, KY 40202.
CNT	Certainteed Corp	P. O. Box 860, Valley Forge, PA 19482.
CPR	Certified Processing Corp	U.S. Highway 22, Hillside, NJ 07205.
GRS	Champlin Petroleum Co	P. O. Box 9176, Corpus Christi, TX 78408.
SOG	Charter International Oil Co	P. O. Box 5008, Houston, TX 77012.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS, BY COMPANY, 1978--CONTINUED

Identi-fication code	Name of company	Office address
CHT	Chattem, Inc	1715 W. 38th St., Chattanooga, TN 37409.
CBD	Chembond Corp	P. O. Box 270, Springfield, OR 97477.
	Chemed Corp.:	
GRC	Dubois Chemicals Div	Dubois Tower, Cincinnati, OH 45211.
GRL	Vestal Laboratories Div	5035 Manchester Ave., St. Louis, MO 63110.
	Chemetron Corp.:	
CTN	Chemical Products Div	P. O. Box 66251-AMF O'Hare, Chicago, IL 60666.
HSC	Pigments Div., Sub. of Allegheny Ludlum Industries, Inc.	491 Columbia Ave., Holland, MI 49423.
CI	Chem-Fleur, Inc	200 Pulaski St., Newark, NJ 07105.
CHF	Chemical Formulators, Inc	P. O. Box 26, Nitro, WV 25143.
CHL	Chemol, Inc	P. O. Box 20687, Greensboro, NC 27420.
CPX	Chemplex Co	3100 Golf Rd., Rolling Meadows, IL 60008.
ORO	Chevron Chemical Co	575 Market St., Rm. 3280, San Francisco, CA 94105.
CGY	Ciba-Geigy Corp	444 Saw Mill River Rd., Ardsley, NY 10502.
	Agricultural Div	P. O. Box 11422, Greensboro, NC 27409.
	Pharmaceutical Div	556 Morris Ave., Summit, NJ 07901.
	Resins Dept	444 Saw Mill River Rd., Ardsley, NY 10502.
CCW	Cincinnati Milacron Chemicals, Inc	West St., Reading, OH 45215.
CIN	Cindet Chemicals, Inc	2408 Doyle St., P. O. Box 20926, Greensboro, NC 27420.
	Cities Service Co.:	
CBN	Columbian Div	P. O. Box 300, Tulsa, OK 74102.
TEN	Copperhill Operations	Copperhill, TN 37317.
CBN	Petrochemicals Div	P. O. Box 1522, Lake Charles, LA 70602, and 6th & Boston Sts., Tulsa, OK 74017.
CSO	Petroleum Products Group	P. O. Box 1562, Lake Charles, LA 70602.
CLK	Clark Oil & Refining Corp	131st St. & Kedzie Ave., Blue Island, IL 60406.
CLY	W. A. Cleary Corp	P. O. Box 10, Somerset, NJ 08873.
CLI	Clintwood Chemical Co	4342 S. Wolcott Ave., Chicago, IL 60609.
CSP	Coastal States Petroleum Co	P. O. Drawer 521, Corpus Christi, TX 78403.
CP	Colgate-Palmolive Co	300 Park Ave., New York, NY 10022.
CLD	Colloids, Inc	394 Frelinghuysen Ave., Newark, NJ 07114.
CNC	Columbia Nitrogen Corp	P. O. Box 1483, Augusta, GA 30903.
CMP	Commercial Products Co., Inc	117 Ethel Ave., Hawthorne, NJ 07506.
COR	Commonwealth Oil Refining Co., Inc	Petrochemical Complex, Ponce, PR 00731.
CPI	Commonwealth Petrochemicals, Inc	Petrochemical Complex, Ponce, PR 00731.
CNE & SED	Conchemco, Inc	10000 Marshall Dr., Lenexa, KS 66215, and 18th & Garfield Sts., Kansas City, MO 64127.
CON	Concord Chemical Co., Inc	17th & Federal Sts., Camden, NJ 08105.
CWP	Consolidated Papers, Inc	231 1st Ave. N., Wisconsin Rapids, WI 54494.
CTL	Continental Chemical Co	270 Clifton Blvd., Clifton, NJ 07015.
CO	Continental Oil Co	P. O. Box 1267, 1000 South Pine, Ponce City, OK 74601
CPV	Cook Paint & Varnish Co	919 E. 14th Ave., N. Kansas City, MO 64116.
CFA	Cooperative Farm Chemicals Association	P. O. Box 308, Lawrence, KS 66044.
COP	Coopers Creek Chemical Corp	River Rd., W. Conshohocken, PA 19428.
CPY	Copolymer Rubber & Chemical Corp	P. O. Box 2591, Baton Rouge, LA 70821.
SWC	Corco Cyclohexane, Inc	Petrochemical Complex, Ponce, PR 00731.
CSD	Cosden Oil & Chemical Co	P. O. Box 1311, Big Spring, TX 79720.
CRT	Crest Chemical Corp	225 Emmett St., Newark, NJ 07114.
CRD	Croda, Inc	51 Madison Ave., New York, NY 10010.
ALT	Crompton & Knowles Corp., Dyes & Chemicals Div.	500 Pear St., Reading, PA 19603.
CBY	Crosby Chemicals, Inc	P. O. Box 460, Picayune, MS 39466.
CCP	Crown Central Petroleum Corp	1 N. Charles St., Baltimore, MD 21203.
CRZ	Crown Zellerbach Corp., Chemical Products Div.	P. O. Box 4266, Camas, WA 98662.
CTR	Custom Resins Div. of Bemis Co., Inc	P. O. Box 933, Henderson, KY 42420.
DAN	Dan River, Inc., Chemical Products Dept	P. O. Box 261, Danville, VA 24541.
	Dart Industries, Inc.:	
AZT	Aztec Chemicals Div	P. O. Box 250, Elyria, OH 44035.
SYP	Synthetic Products Co. Div	1636 Wayside Rd., Cleveland, OH 44112.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS, BY COMPANY, 1978--CONTINUED

Identification code	Name of company	Office address
DYS	Davies-Young Co	2700 Wagner Place, Maryland Heights, MO 63043.
DLI	Dawe's Laboratories, Inc	450 State St., Chicago Heights, IL 60411.
DGO	Day-Glo Color Corp	4732 St. Clair Ave., Cleveland, OH 44103.
DEG	Degen Oil & Chemical Co	200 Kellogg St., Jersey City, NJ 07305.
DGC	Degussa Corp	Theodore Industrial Park, P. O. Box 606, Theodore, AL 36582.
DKA	Denka Chemical Corp	8701 Park Place Blvd., Houston, TX 77017.
DNS	Dennis Chemical Co	2701 Papin St., St. Louis, MO 63103.
DSO	DeSoto, Inc	1700 S. Mt. Prospect Ave., Des Plaines, IL 60018.
DEX	Dexter Chemical Corp	845 Edgewater Rd., Bronx, NY 10474.
MID	Midland Div	1-7 E. Water St., Waukegan, IL 60085.
DA	Diamond Shamrock Corp	1100 Superior Ave., Cleveland, OH 44114.
PLN	Disogrin Industries Corp	Grenier Field, Manchester, NH 03130.
DIX	Dixie Chemical Co	3635 W. Dallas Ave., Houston, TX 77019.
DPP	Dixie Pine Chemicals, Inc	P. O. Box 470, Hattiesburg, MS 39401.
DOM	Dominion Products, Inc	882 3d Ave., Brooklyn, NY 11232.
DVC	Dover Chemical Corp., Sub. of ICC Industries, Inc.	15th & Davis Sts., P. O. Box 40, Dover, OH 44622.
DOW	Dow Chemical Co	2020 Dow Center, Midland, MI 48640.
DCC	Dow Corning Corp	P. O. Box 1767, Mail Code #C02216, Midland, MI 48640.
DUP	E. I. duPont de Nemours & Co., Inc	DuPont Bldg., Wilmington, DE 19898.
DSC	Dye Specialties, Inc	100 Plaza Center, Box 1532, Secaucus, NJ 07094.
EPI	Eagle Pitcher Industries, Ohio Rubber Co. Div.	P. O. 1398, Denton, TX 76201.
EGR	Eagle River Chemical Corp	P. O. Box 2648, W. Helena, AR 72390.
ECC	Eastern Color & Chemical Co	35 Livingston St., Providence, RI 02904.
EK	Eastman Kodak Co	343 State St., Rochester, NY 14650.
EKT	Tennessee Eastman Co. Div	P. O. Box 511, Kingsport, TN 37662.
EKX	Texas Eastman Co. Div	P. O. Box 511, Kingsport, TN 37662.
ESA	East Shore Chemical Co	1221 E. Barney Ave., Muskegon, MI 49443.
ELN	Elan Chemical Co	268 Doremus Ave., Newark, NJ 07105.
ELC	Elco Corp., Sub. of Detrex Industries, Inc.	P. O. Box 09168, Cleveland, OH 44109.
ELP	El Paso Products Co	P. O. Box 3986, Odessa, TX 79760.
EMR	Emery Industries, Inc	1300 Carew Tower, Cincinnati, OH 45202.
TCH	Trylon Div	P. O. Box 628, Mauldin, SC 29607.
EMK	Emkay Chemical Co	319 2d St., Elizabeth, NJ 07206.
EN	Endo Laboratories, Inc	1000 Stewart Ave., Garden City, NY 11530.
ENO	Enenco, Inc	P. O. Box 398, Memphis, TN 38101.
ESS	Essential Chemicals Group	28391 Essential Rd., Merton, WI 53056.
TNA	Ethyl Corp	330 S. 4th St., Richmond, VA 23231.
	Polymer Div	Ethyl Tower, 451 Florida, Baton Rouge, LA 70801.
EVN	Evans Chemetics, Inc	90 Tokeneke Rd., Darien, CT 06820.
ENJ	Exxon Chemical Co. U.S.A	P. O. Box 3272, Houston, TX 77001.
	FMC Corp.:	
FMN	Agricultural Chemical Group	2000 Market St., Philadelphia, PA 19103.
FMB	Industrial Chemical Group	2000 Market St., Philadelphia, PA 19103.
FMP	Industrial Chemical Group	2000 Market St., Philadelphia, PA 19103.
FMB	Specialty Chemicals Div	Sawyer Ave. & River Rd., Town of Tonawanda, NY 14150.
FRP	FRP Co	P. O. Box 349, Baxley, GA 31513.
FAB	Fabricolor Manufacturing Corp	24-1/2 Van Houten St., Paterson, NJ 07509.
FMT	Fairmount Chemical Co., Inc	117 Blanchard St., Newark, NJ 07105.
FRI	Farmland Industries, Inc	P. O. Box 7305, Kansas City, MO 64116.
FEL	Felton International, Inc	599 Johnson Ave., Brooklyn, NY 11237.
FER	Ferro Corp.:	
	Chemical Div	7050 Krick Rd., Bedford, OH 44146.
	Grant Chemical Div	P. O. Box 263, Baton Rouge, LA 70821.
	Keil Chemical Div	3000 Sheffield Ave., Hammond, IN 46320.
	Ottawa Chemical Div	700 N. Wheeling St., Toledo, OH 43605.
	Productol Chemical Div	10051 Romandel Ave., Santa Fe Springs, CA 90670.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS, BY COMPANY, 1978--CONTINUED

Identification code	Name of company	Office address
FND	Fiber Industries, Inc	P. O. Box 10038, Charlotte, NC 28201.
RBC	Fike Chemicals, Inc	P. O. Box 546, Nitro, WV 25143.
	Firestone Tire & Rubber Co.:	
FIR	Firestone Plastics Co. Div	P. O. Box 699, Pottstown, PA 19464.
FRF	Firestone Synthetic Fibers Co	P. O. Box 450, Hopewell, VA 23869.
FRS	Firestone Synthetic Rubber & Latex Co. Div.	381 W. Wilbeth Rd., Akron, OH 44301.
FST	First Chemical Corp	P. O. Box 1427, Pascagoula, MS 39567.
FMS	First Mississippi Corp	P. O. Box 1249, Jackson, MS 39205.
FLM	Fleming Laboratories, Inc	P. O. Box 34384, 2205 Thrift Rd., Charlotte, NC 28231.
CIK	Flint Ink Corp., Cal/Ink Div	1404 4th St., Berkeley, CA 94710.
FLO	Florasynth, Inc	410 E. 62d St., New York, NY 10021.
FTE	Foote Mineral Co	Route 100, Exton, PA 19341.
FOM	Formica Corp	10155 Reading Rd., Cincinnati, OH 45241.
FLN	Franklin Chemical Corp	2020 Bruck St., Columbus, OH 43207.
FRE	Freeman Chemical Corp	P. O. Box 247, Port Washington, WI 53074.
FB	Fritzsche Dodge & Olcott, Inc	76 9th Ave., New York, NY 10011.
CNI	Frye Copysystems, Conap Div	1405 Buffalo St., Olean, NY 14760.
FLH	H. B. Fuller Co., Polymer Div	4450 Malsbary Rd., Blue Ash, OH 45242.
GAF	GAF Corp	P. O. Box 6037, Chattanooga, TN 37401, and P. O. Box 12, Linden, NJ 07036.
GLX	Galaxie Chemical Corp	26 Piercy St., Paterson, NJ 07524.
GAN	Gane's Chemicals, Inc	1144 Avenue of the Americas, New York, NY 10036.
GE	General Electric Co	1 Plastics Ave., Pittsfield, MA 01201, and 1350 S. Second St., Coshocton, OH 43812.
GEI	Insulating Materials Products Section	1 Campbell Rd., Schenectady, NY 12306.
SPD	Silicone Products Dept	Bldg. 11-24, Waterford, NY 12188.
GNF	General Foods Corp., Maxwell House Coffee Div.	1125 Hudson St., Hoboken, NJ 07030.
GLC	General Latex & Chemical Corp	666 Main St., Cambridge, MA 02139.
GNT	General Tire & Rubber Co., Chemical Div	1 General St., Akron, OH 44329.
GRG	P. D. George Co	5200 N. 2d St., St. Louis, MO 63147.
	Georgia-Pacific Corp.:	
PSP	Bellingham Div	P. O. Box 1236, Bellingham, WA 98225.
GP	Plaquemine Div	P. O. Box 629, Plaquemine, LA 70764.
GP	Resins Operations	900 S.W. 5th Ave., Portland, OR 97240.
SKO	Getty Refining & Marketing Co	P. O. Box 1650, Oil Center Bldg., Tulsa, OK 74102.
TID	Delaware Refinery	Delaware City, DE 19706.
TNI	The Gillette Co., Chemical Div	3500 W. 16th St., N. Chicago, IL 60064.
GIL	Gilman Paint & Varnish Co	216 W. 8th St., Chattanooga, TN 37401.
GIV	Givaudan Corp	100 Delawanna Ave., Clifton, NJ 07014.
GLY	Glyco Chemicals, Inc	51 Weaver St., Greenwich, CT 06830.
GPI	Goodpasture, Inc	P. O. Drawer 921, Brownfield, TX 79316.
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Group	6100 Oak Tree Blvd., Cleveland, OH 44131.
GYR	Goodyear Tire & Rubber Co	1144 E. Market St., Akron, OH 44316.
GCC	W. R. Grace & Co	P. O. Box 277, Memphis, TN 38101.
GRH	Hatco Chemical Div	King George Post Rd., Fords, NJ 08863.
HMP	Organic Chemicals Div	Poisson Ave., Nashua, NH 03060.
GRD	Polymers & Chemicals Div	55 Hayden Ave., Lexington, MA 02173.
GRA	Great American Chemical Corp	650 Water St., Fitchburg, MA 01420.
GTL	Great Lakes Chemical Corp	P. O. Box 2200, West Lafayette, IN 47906.
GRW	Great Western Sugar Co	P. O. Box 5308, T. A., Denver, CO 80217.
GNM	Greenwood Chemical Co	P. O. Box 26 - State Highway #690, Greenwood, VA 22943.
GRO	A. Gross & Co., Millmaster Onyx Group, Kewanee Industries, Inc.	625 Doremus Ave., Newark, NJ 07105.
GRV	Guardsman Chemical, Inc	1350 S. 15th St., Louisville, KY 40210.
GOC	Gulf Oil Corp., Gulf Oil Chemicals Co. U.S.	P. O. Box 3766, Houston, TX 77001.
GTH	Guth Corp	322 S. Center St., Hillside, IL 60162.
HNC	H & N Chemicals Co	90 Maltese Dr., Totowa, NJ 07512.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS, BY COMPANY, 1978--CONTINUED

Identification code	Name of company	Office address
HAL	C. P. Hall Co	7300 S. Central Ave., Chicago, IL 60638.
FOC	Handschy Industries, Inc., Farac Oil and Chemical Div.	13601 S. Ashland Ave., Riverdale, IL 60627.
HAN	Hanna Chemical Coatings Corp	1313 Windsor Ave., P. O. Box 147, Columbus, OH 43216.
CHH	CHR. Hansen's Laboratory, Inc	9015 W. Maple St., West Alleis, WI 53214.
HDM	Hardman, Inc	600 Cortlandt St., Belleville, NJ 07109.
HDW	Hardwicke Chemical Co	Route 2, Box 50A, Elgin, SC 29045.
HRC	Harmon Colors Corp	550 Belmont Ave., Haledon, NJ 07508.
HSH	Harshaw Chemical Co	1945 E. 97th St., Cleveland, OH 44106.
HRT	Hart Products Corp	173 Sussex St., Jersey City, NJ 07302.
HCC	Hatco Chemical Corp	King George Post Rd., Fords, NJ 08863.
HVG	Haveg Industries, Inc., Sub. of Hercules, Inc.	900 Greenback Rd., Wilmington, DE 19808.
HKY	Hawkeye Chemical Co	P. O. Box 899, Clinton, IA 52733.
SCP	Henkel, Corp	4620 W. 77th St., Minneapolis, MN 55435.
HCF	Hercofina	310 N. Front St., P. O. Box 1694, Wilmington, NC 28402.
HCR	Hercor Chemical Corp	Petrochemical Complex, Ponce, PR 00731.
HPC	Hercules, Inc	910 Hercules Tower, Wilmington, DE 19899.
HER	Heresite-Saekaphen, Inc	822 S. 14th St., Manitowoc, WI 54220.
HET	Heterochemical Corp	111 E. Hawthorne Ave., Valley Stream, NY 11580.
HEW	Hewitt Soap Co., Inc	333 Linden Ave., Dayton, OH 45403.
HEX	Hexagon Laboratories, Inc	4166 Boston Rd., Bronx, NY 10475.
HXL	Hexcel Corp., Hexcel Specialty Chemicals	205 Main St., Lodi, NJ 07644.
HDG	Hodag Chemical Corp	7247 N. Central Park Ave., Skokie, IL 60076.
HOF	Hoffmann-LaRoche, Inc	324-424 Kingsland St., Nutley, NJ 07110.
HCP	Honig Chemical & Processing Corp	414 Wilson Ave., Newark, NJ 07105.
HK	Hooker Chemical Corp	MPO Box 8, Niagara Falls, NY 14302.
	Hooker Chemicals & Plastics Corp.:	
HKD	Durez Div	Walck Rd., N. Tonawanda, NY 14121.
RUB	Ruco Div	P. O. Box 456, Revin Rd., Burlington, NJ 08016.
EFH	E. F. Houghton & Co	303 W. Lehigh Ave., Philadelphia, PA 19133.
HMY	Humphrey Chemical Co	Devine St., North Haven, CT 06473.
WAY	Philip A. Hunt Chemical Corp., Organic Chemical Div.	P. O. Box 4249, E. Providence, RI 02914.
HNT	Huntington Laboratories, Inc	970 E. Tipton St., Huntington, IN 46750.
HYN	Hynson, Westcott & Dunning, Inc	Charles and Chase Sts., Baltimore, MD 21201.
ICI	ICI Americas, Inc.:	
	Chemical Specialties Co	Wilmington, DE 19897.
	Plastics Div	Wilmington, DE 19897.
RAY	ITT Rayonier, Inc	605 3d Ave., New York, NY 10016.
IND	Indol Chemical Co	F. of Leffert St., Carteret, NJ 07008.
INP	Indpol, Inc	8434 Rochester Ave., Rancho Cucamonga, CA 91730.
IDC	Industrial Color, Inc	P. O. Box 944, Joilet, IL 60434.
INL	Inland Steel Co., Inland Steel Container Co.	4300 W. 130th St., Chicago, IL 60658.
ICC & ICF	Inmont Corp	1255 Broad St., Clifton, NJ 07015, and 150 Wagaraw Rd., Hawthorne, NJ 07506.
WM	Inolex Corp	Jackson & Swanson Sts., Philadelphia, PA 19148.
WIL	Inolex Pharmaceutical Div	2600 Bond St., Park Forest South, IL 60466.
SPC	Insilco Corp., Sinclair Paint Co. Div	3960 E. Washington Blvd., Los Angeles, CA 90023.
IFF	International Flavor and Fragrances, Inc	521 W. 57th St., New York, NY 10019.
IMC	International Minerals & Chemical Corp	P. O. Box 207, Terra Haute, IN 47808, and P. O. Box 149, Orrington, ME 04474.
	Foundry Products Div	17350 Ryan Rd., Detroit, MI 48200.
	McWorter Resins	P. O. Box 308, Cottage Place, Carpentersville, IL 60110.
	Nitroparaffins Div	666 Garland Pl., Des Plaines, IL 60016.
IPC	Interplastic Corp	2015 N.E. Broadway St., Minneapolis, MN 55413.
CCA	Interstab Chemicals, Inc	500 Jersey Ave., New Brunswick, NJ 08903.
IOC	Ionac Chemical Co. Div. of Sybron Corp	Birmingham Rd., Birmingham, NJ 08011.
IRI	Ironsides Co	270 W. Mound St., Columbus, OH 43215.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECOTY OF MANUFACTURERS, BY COMPANY, 1973--CONTINUED

Identification code	Name of company	Office address
JCC	Jefferson Chemical Co., Inc	1111 Rush, Houston, TX 77052.
JFR	George A. Jeffreys & Co., Inc	P. O. Box 709, Salem, VA 24153.
JEN	Jennison-Wright Corp	P. O. Box 691, Toledo, OH 43694.
JRG	Andrew Jergens Co	2535 Spring Grove Ave., Cincinnati, OH 45214.
JSC	Jersey State Chemical Co	59 Lee Ave., Haldron, NJ 07508.
UPF	Jim Walter Resources, Inc	3300 1st Ave. N., Birmingham, AL 35222.
JNS	S. C. Johnson & Son, Inc	1525 Howe St., Racine, WI 53403.
JOB	Jones-Blair Co	2728 Empire Central, Dallas, TX 75235.
JOR	Jordan Chemical Co	1830 Columbia Ave., Folcraft, PA 19032.
	Kaiser Aluminum & Chemical Corp.:	
SNI	Kaiser Agricultural Chemicals Div	P. O. Box 246, Savannah, GA 31402.
KAI	Kaiser Chemicals Div	P. O. Box 337, Gramercy, LA 70052.
KLM	Kalama Chemical, Inc	1110 The Bank of California Center, Seattle, WA 98164.
KF	Kay-Fries Inc., Member Dynamit Nobel Group.	200 Summit Ave., Montvale, NJ 07645.
KMP	Kelly-Moore Paint Co	987 Commercial St., San Carlos, CA 94070.
	Kennecott Copper Corp.:	
KCC	Chino Mines Div	Hurley, NM 88043.
KCU	Utah Copper Div	P. O. Box 11299, Salt Lake City, UT 84147.
AMP	Kerr-McGee Chemical Corp	1401 McGee Tower, Oklahoma City, OK 73102.
KYS	Keysor Corp	P. O. Box 308, Saugus, CA 91350.
KCW	Keystone Color Works, Inc	151 W. Gay Ave., York, PA 17403.
KNP	Knapp Products, Inc	187 Garibaldi Ave., Lodi, NJ 07644.
KON	H. Kohnstamm & Co., Inc	161 Avenue of the Americas, New York, NY 10013.
KMC	Komac Paint, Inc	P. O. Box 546, Denver, CO 80201.
KPT	Koppers Co., Inc	Koppers Bldg., Pittsburgh, PA 15219.
	Roads Materials Group	Koppers Bldg., Pittsburgh, PA 15219.
HUM	Kraft, Inc., Humko Sheffield Chemical Operation.	5050 Poplar Ave., P. O. Box 398, Memphis, TN 38101.
LKY	Lake States Div. of Monarch Paper Corp	515 W. Davenport St., Rhinelander, WI 54501.
LUR	Laurel Products Corp	2600 E. Tioga St., Philadelphia, PA 19134.
LEA	Leatex Chemical Co	2722 N. Hancock St., Philadelphia, PA 19133.
LEV	Lever Brothers Co	390 Park Ave., New York, NY 10022.
LVR	C. Lever Co., Inc	736 Dunks Ferry Rd., Cornwells Hgts, PA 19020.
BLS	Life Savers, Inc	Church St., Canajoharie, NY 13317.
LIL	Eli Lilly & Co	P. O. Box 618, Indianapolis, IN 46206, and G.P.O. Box 4388, San Juan, PR 00936.
BRD	Lonza, Inc	22-10 Route 208, Fair Lawn, NJ 07410.
MMC	MCB Manufacturing Chemists, Inc	2909 Highland Ave., Norwood, OH 45212.
SOR	M.W. Manufacturers, Southern Resin Div	P. O. Box 68, Thomasville, NC 27360.
TZC	Magnesium Elektron, Inc	Star Route A, Box 202-1, Flemington, NJ 08822.
MGR	Magruder Color Co., Inc	1029 Newark Ave., Elizabeth, NJ 07201.
MAL	Mallinckrodt, Inc	675 Brown Rd., St. Louis, MO 63134.
TRD	Manufacturing Enterprises, Inc., Squibb Manufacturing, Inc., Trade Enterprises, Inc., Ersana, Inc.	P. O. Box 609, Humacao, PR 00661.
MOR	Marathon Morco Co	P. O. Drawer C, 4401 Park Ave., Dickinson, TX 77539.
MOC	Marathon Oil Co., Texas Refining Div	P. O. Box 1191, Texas City, TX 77590.
MRB	Marblette Co	37-31 30th St., Long Island City, NY 11101.
MRD	Marden-Wild Corp	500 Columbia St., Somerville, MA 02143.
MRV	Marlowe-Van Loan Corp	P. O. Box 1851, High Point, NC 27261.
SDC	Martin-Marietta Corp., Sodyeco Div	P. O. Box 33429, Charlotte, NC 28233.
MRX	Max Marx Color & Chemical Co	192 Coit St., Irvington, NJ 07111.
MCA	Masonite Corp., Alpine Chemical Div	P. O. Box 2392, Gulfport, MS 39503.
MAY	Otto B. May Co. Div. of Cone Mills Corp	52 Amsterdam St., Newark, NJ 07105.
MCC	McCloskey Varnish Co	7600 State Rd., Philadelphia, PA 19136.
MCC	MCCloskey Varnish Co. of the Northwest	4155 N.W. Yeon Ave., Portland, OR 97210.
MCC	MCCloskey Varnish Co. of the West	5501 E. Slauson, Los Angeles, CA 90040.
MGK	McLaughlin Gormley King Co	8810 10th Ave., N., Minneapolis, MN 55427.
MDJ	Mead Johnson & Co	2404 Penna. St., Evansville, IN 47721.
MLC	Melamine Chemicals, Inc	P. O. Box 748, Donaldsonville, LA 70346.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS, BY COMPANY, 1978--CONTINUED

Identi-fication code	Name of company	Office address
MRK	Merck & Co., Inc	126 E. Lincoln Ave., P. O. Box 2000, Rahway, NJ 07065.
MER	Merichem Co	1914 Haden Rd., Houston, TX 77015.
MLS	Miles Laboratories, Inc., Industrial Products Group.	1127 Myrtle St., P. O. Box 932, Elkhart, IN 46515.
MIL	Milliken & Co., Milliken Chemical Div	P. O. Box 817, Inman, SC 29349.
	Millmaster Onyx Corp.:	
HLI	Haag Labs./Onyx Chemical Corp	14000 S. Seeley Ave., Blue Island, IL 60406.
BKL	Millmaster Chemical Co. Div	99 Park Ave., New York, NY 10016.
RPC	Refined Onyx Co. Div	624 Schuylin Ave., Lyndhurst, NJ 07071.
MMM	Minnesota Mining & Manufacturing Co	3M Center, St. Paul, MN 55101.
MIR	Miranol Chemical Co., Inc	277 Cuit St., Irvington, NJ 07111.
MSC	Mississippi Chemical Corp	P. O. Box 388, Yazoo City, MS 39194.
MOB	Mobay Chemical Corp	Penn Lincoln Parkway, W. Pittsburgh, PA 15205.
CHG	Agricultural Chemicals Div	P. O. Box 4913, Hawthorne Rd., Kansas City, MO 64120.
VPC	Verona Dyestuff Div	Iorio Ct., Union, NJ 07083.
SM	Mobil Oil Corp.:	
	Gas Liquids Dept	P. O. Box 900, Dallas, TX 75221.
	Mobil Chemical Co	P. O. Box 3868, Beaumont, TX 77704, and P. O. Box 726, Paramus, NJ 07652.
	Chemical Coatings Div	1024 South Ave., Plainfield, NJ 07062.
	Phorphorus Div	P. O. Box 26683, Richmond, VA 23261.
MOA	Mona Industries, Inc	65 E. 23d St., Paterson, NJ 07524.
MNO	Monochem, Inc	P. O. Box 488, Geismar, LA 70734.
MNR	Monroe Chemical Co	1296 N.W. 3d, Kalama, WA 98625.
MON	Monsanto Co	800 N. Lindbergh Blvd., St. Louis, MO 63166.
MTO	Montrose Chemical Corp. of California	2401 Morris Ave., P. O. Box E, Union, NJ 07083.
MCI	Mooney Chemicals, Inc	2301 Scranton Rd., Cleveland, OH 44113.
MCP	Moretex Chemical Products, Inc	314 W. Henry St., P. O. Box 1799, Spartanbury, SC 29304.
	Morton Norwich Products, Inc.:	
MRT	Morton Chemical Co. Div	110 N. Wacker Dr., Chicago, IL 60606.
NOR	Norwich Eaton Pharmaceutical Div	17 Eaton Ave., Norwich, NY 13815.
TCI	Texize Div	P. O. Box 368, Greenville, SC 29602.
MOT	Motomco, Inc	267 Vreeland Ave., P. O. Box 300, Paterson, NJ 07513.
PNX	Murphy-Phoenix Co	9505 Cassius Ave., Cleveland, OH 44105.
NTL	NL Industries, Inc	1230 Aveune of the Americas, New York, NY 10020.
CHN	N-Ren Corp., Cherokee Nitrogen Div	P. O. Box 429, Pryor, OK 74361.
LEM	Napp Chemicals, Inc	199 Main St., Lodi, NJ 07644.
NTB	National Biochemical Co	3127 W. Lake St., Chicago, IL 60612.
NTC	National Casein Co	601 W. 80th St., Chicago, IL 60620.
USI	National Distillers & Chemicals Corp.:	
	U.S. Industrial Chemicals Co	99 Park Ave., New York, NY 10016.
	National Petro Chemical Corp	99 Park Ave., New York, NY 10016.
NMC	National Milling & Chemical Co	4601 Flat Rock Rd., Philadelphia, PA 19127.
NSC	National Starch & Chemical Corp	10 Finderne Ave., Bridgewater, NJ 08876.
NEP	Nepera Chemical Co., Inc	Route 17, Harriman, NY 10926.
NEV	Neville Chemical Co	Neville Island P. O., Pittsburgh, PA 15225.
NLO	Niklor Chemical Co., Inc	2060 E. 220th St., Long Beach, CA 90810.
NIL	Nilok Chemicals, Inc	2235 Langdon Farm Rd., Cincinnati, OH 45230.
JDC	Nipak, Inc	P. O. Box 2820, Dallas, TX 75221.
CNP	Nipro, Inc	P. O. Box 1483, Augusta, GA 30903.
NOC	Norac Co., Inc	405 S. Motor Ave., Azusa, CA 91703.
	Mathe Div	169 Kennedy Dr., Lodi, NJ 07644.
NEO	Norda, Inc	140 Route 10, E. Hanover, NJ 07936.
NPV	Norris Paint & Varnish Co., Inc	P. O. Box 2023, Salem, OR 97308.
LMI	North American Chemical Co	19 S. Canal St., Lawrence, MA 01843.
NWP	Northern Petrochemical Co	2350 E. Devon Ave., Des Plaines, IL 60018.
NW	Northwestern Chemical Co	120 N. Aurora St., W. Chicago, IL 60185.
NPC	Northwest Petrochemical Corp	P. O. Box 99, Anacortes, WA 98221.
NCW	Nostrip Chemical Works, Inc	P. O. Box 160, Pedricktown, NJ 08067.
CAD	Noury Chemical Corp	2153 Lockport-Olcott Rd., Burt, NY 14028.
NVT & SWE	Novamont Corp	P. O. Box 189, Kenova, WV 25530, and 7350 Empire Dr., Florence, KY 41042.

TABLE 2.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS, BY COMPANY, 1978--CONTINUED

Identification code	Name of company	Office address
OBC	O'Brien Corp	450 E. Grand Ave., S. San Francisco, CA 94080.
OMC	Olin Corp	120 Long Ridge Rd., Stamford, CT 06904.
	Agricultural Products Dept	P. O. Box 991, Little Rock, AR 72203.
ONX	Onyx Chemical Co	190 Warren St., Jersey City, NJ 07302.
OPC	Orbis Products Corp	140 Route 10, E. Hanover, NJ 07936.
ORG	Organics, Inc	7125 N. Clark St., Chicago, IL 60628.
BSW	Original Bradford Soap Works, Inc	200 Providence St., W. Warwick, RI 02893.
OCF	Owens-Corning Fiberglas Corp	Fiberglas Tower, Toledo, OH 43659.
OCC	Oxirane Chemical Co	10801 Choate Rd., Pasadina, TX 77507.
OXI	Oxirane Chemical Co. (Channelview)	P. O. Box 580, Channelview, TX 77530.
OXC	Oxochem Enterprise	900 Route 9, Woodbridge, NJ 07095.
PBI	PBI-Gordon Corp	300 S. Third St., Kansas City, KS 66118.
PFW	PFW, Inc	33 Spraque Ave., Middletown, NY 10940.
PLB	P-L Biochemical, Inc	1037 W. McKinley Ave., Milwaukee, WI 53201.
PPG	PPG Industries, Inc	1 Gateway Center, Pittsburgh, PA 15222.
PVO	PVO International, Inc., Chemical Specialties Div.	416 Division St., Boonton, NJ 07005.
AMR	Pacific Resins & Chemicals, Inc	1754 Thorne Rd., Tacoma, WA 93421.
PNT	Pantasote, Inc., Film/Compound Div	26 Jefferson St., Passaic, NJ 07056.
PD	Parke, Davis & Co., Sub of Warner-Lambert Co.	P. O. Box 118, Detroit, MI 48232.
PSC	Passaic Color & Chemical Co	28-36 Paterson St., Paterson, NJ 07501.
KAL	Pathan Chemical Co	427 E. Moyer St., Philadelphia, PA 19125.
CHP	C. H. Patrick & Co., Inc	P. O. Box 2526, Greenville, SC 29602.
CCH	Pearsall Chemical Corp	P. O. Box 437, Houston, TX 77001.
PEK	Peck's Products Co	610 E. Clarence Ave., St. Louis, MO 63147.
PCH	Peerless Chemical Co	12416 Cloverdale St., Detroit, MI 48204.
AES	Penetone Corp	74 Hudson Ave., Tenafly, NJ 07670.
PAS	Pennwalt Corp	3 Parkway, Philadelphia, PA 19102.
WTL	Lucidol Div	1740 Military Rd., Buffalo, NY 14240.
PAR	Pennzoil Co., Penreco Div	Union Bank Bldg., Butler, PA 16001.
PER	Perry & Derrick Co., Inc	2510 Highland Ave., Norwood, OH 45212.
PST	Perstorp, Inc	238 Nonotuck St., Florence, MA 01060.
UDI	Petrochemicals Co., Inc	500 E. Central, P. O. Box 2199, Fort Worth, TX 76113.
PTT	Petro-Tex Chemical Corp	8600 Park Place Blvd., Houston, TX 77017.
PFN	Pfanstiehl Laboratories, Inc	1219 Glen Rock Ave., Waukegan, IL 60085.
PCW	Pfister Chemical, Inc	Route 46 & Linden Ave., Ridgefield, NJ 07657.
PFZ	Pfizer, Inc	235 E. 42d St., New York, NY 10017.
	Pfizer Pharmacuticals, Inc	P. O. Box 628, Barceloneta, PR 00617.
PHR	Pharmachem Corp	719 Stefko Blvd., P. O. Box 1035, Bethlehem, PA 18018.
PDI	Phelps Dodge Industries, Inc., Phelps Dodge Magnet Wire Co. Div.	132 E. Creighton Ave., Fort Wayne, IN 46861.
PPX	Phillips Paraxylene, Inc	G.P.O. Box 4129, San Juan, PR 00936.
PLC	Phillips Petroleum Co	15 CI Phillips Bldg., Bartlesville, OK 74004.
PPR	Phillips Puerto Rico Core, Inc	G.P.O. Box 4129, San Juan, PR 00936.
PIC	Pierce Chemical Co	3747 N. Meridian Rd., P. O. Box 117, Rockford, IL 61103.
PIL	Pilot Chemical Co	11756 Burke St., Santa Fe Springs, CA 90670.
PPL	Pioneer Plastics Div. of LOF Plastics, Inc.	Pionite Rd., Auburn, ME 04210.
PIT	Pitt-Consol Chemical Co	P. O. Box 1267, 1000 S. Pine, Ponca City, OK 74601.
PSL	Plaslok Corp	3155 Broadway, Buffalo, NY 14227.
PLS	Plastics Engineering Co	3518 Lakeshore Rd., Sheboygan, WI 53081.
PMC	Plastics Manufacturing Co	2700 S. Westmoreland, Dallas, TX 75224.
PFX	Plastifax, Inc	P. O. Box 1255, Brevard, NC 28712.
PLX	Plex Chemical Corp	1205 Atlantic St., Union City, CA 94487.
POL	Polymer Corp	2120 Fairmont Ave., Reading, PA 19603.
PYZ	Polyrez Co., Inc	P. O. Box 320, Woodbury, NJ 08096.
PLR	Polysar Resins, Inc	29 Fuller St., Leominster, MA 01453.
	Polysar Latex Div	3305 Amnicola Hwy., Chattanooga, TN 37406.
PVI	Polyvinyl Chemical Industries	730 Main St., Wilmington, MA 01887.
POP	Pope Chemical Corp	33 6th Ave., Paterson, NJ 07524.
PRT	Pratt & Lambert, Inc	P. O. Box 22, Buffalo, NY 14240.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS, BY COMPANY, 1978--CONTINUED

Identification code	Name of company	Office address
PMP	Premier Malt Products, Inc	917 W. Juneau Ave., Milwaukee, WI 53201.
PG	Procter & Gamble Co., Procter & Gamble Mfg. Co.	P. O. Box 599, Cincinnati, OH 45201.
PC	Proctor Chemical Co	P. O. Box 399, Salisbury, NC 28144.
PRC	Products Research & Chemical Corp	P. O. Box 1800, Glendale, CA 91209.
PUB	Publicker Industries, Inc	777 W. Putnam Ave., Greenwich, CT 06830.
PTO	Puerto Rico Chemical Co., Inc	P. O. Box 496, Arecibo, PR 00612.
PUE	Puerto Rico Olefins Co	Firm Delivery, Ponce, PR 00731.
PRX	Purex Corp	5101 Clark Ave., Lakewood, CA 90712.
QCP	Quaker Chemical Corp	Lime & Elm Sts., Conshohocken, PA 19428.
QKO	Quaker Oats Co	Merchandise Mart Plaza, Chicago, IL 60654.
QUN	K. J. Quinn & Co., Inc	195 Canal St., Malden, MA 02148.
QH	Quintana-Howell Joint Venture	P. O. Box 4656, Corpus Christi, TX 79408.
RSA	R.S.A. Corp	690 Saw Mill River Rd., Ardsley, NY 10502.
RLS	Rachelle Laboratories, Inc	700 Henry Ford Ave., Long Beach, CA 90801.
RCN	Racon, Inc	P. O. Box 198, Witchita, KS 67201.
RAB	Raybestos-Manhattan, Inc., Raybestos Friction Materials Co.	75 E. Main St., Stratford, CT 06497.
RED	Red Spot Paint & Varnish Co., Inc	110 Main St., Evansville, IN 47703.
REH	Reheis Chemical Co. Div. of Armour Pharmaceutical Co.	235 Snyder Ave., Berkeley Hgts., NJ 07922.
RCI	Reichhold Chemicals, Inc	525 N. Broadway, White Plains, NY 10603.
RIL	Reilly Tar & Chemical Corp	1510 Market Square Center, 151 N. Delaware St., Indianapolis, IN 46204.
REL	Reliance Universal, Inc., Louisville Resins Operation	P. O. Box 21423, Louisville, KY 40221.
REM	Remington Arms Co., Inc	939 Barnum Ave., Bridgeport, CT 06602.
RSY	Resyn Corp	1540 W. Blancke St., Linden, NJ 07036.
RCC	Rexene Polyolefins Co	W. 115 Century Rd., Paramus, NJ 07652.
RDA	Rhone-Poulenc, Inc	120 Jersey Ave., New Brunswick, NJ 08903.
RCD	Richardson Co	2400 E. Devon Ave., Des Plaines, IL 60018.
	Polymeric Systems Div	15 Meigs Ave., Madison, CT 06443.
LKL	Richardson-Merrell, Inc., Merrell-National Laboratories Div.	2110 E. Galbraith Rd., Cincinnati, OH 45215.
RCO	Rico Chemical Corp	P. O. Box 387, Magas Ward, Guayanilla, PR 00656.
AMS	Ridgway Color & Chemical	75 Front St., Ridgway, PA 15853.
RIK	Riker Laboratories, Inc., Sub. of 3M Co	19901 Nordhoff St., Northridge, CA 91324.
RSN	Rilsan Corp	139 Harristown Rd., Glen Roc, NJ 07452.
RT	Ritter International	4001 Goodwin Ave., Los Angeles, CA 90039.
RIV	Riverdale Chemical Co	220 E. 17th St., Chicago Heights, IL 60411.
ROB	Robeco Chemicals, Inc	99 Park Ave., New York, NY 10016.
RWC	Robinson-Wagner Co., Inc	628 Waverly Ave., Mamaroneck, NY 10543.
MFG	Rockwell International Corp	4501 Benefit Ave., Ashtabula, OH 44004.
ORT	Roehr Chemicals Div. of Aceto Industrial Chemical Corp.	52-20 37th St., Long Island City, NY 11101.
RGC	Rogers Corp., Molding Materials Div	P. O. Box 550, Rogers, CT 06263.
RH	Rohm & Haas Co	Independence Mall West, Philadelphia, PA 19105.
RUC	Rubicon Chemicals, Inc	P. O. Box 517, Geismar, LA 70734.
NES	Ruetgers-Nease Chemical Co., Inc	P. O. Box 221, State College, PA 16801.
SCM	SCM Corp.:	
	Glidden Coatings & Resins Div	299 Park Ave., New York, NY 10017.
	Organic Chemicals Div	299 Park Ave., New York, NY 10017.
SOS	SSC Industries, Inc	1550 E. Taylor Ave., East Point, GA 30344.
NPR	Safeway Stores, Inc	2800 Ygnacio Valley Rd., Walnut, CA 94604.
STX	St. Croix Petrochemical Corp	Estate Hope, St. Croix, U.S., VI 00820.
SLM	Salem Oil & Grease Co	60 Grove St., Salem, MA 01970.
SAL	Salsbury Laboratories	2000 Rockford Rd., Charles City, IA 50616.
S	Sandoz, Inc	P. O. Box 357, Fair Lawn, NJ 07410.
	Colors & Chemicals Div	Route #10, E. Hanover, NJ 07936.
	Crop Protection	480 Camino Del Rio South, San Diego, CA 92108.
SAR	Sartomer Industries, Inc	Gov. Printz Blvd. & Wanamaker Ave., Essington, PA 19029.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS, BY COMPANY, 1978--CONTINUED

Identification code	Name of company	Office address
SCN	Schenectady Chemicals, Inc	P. O. Box 1046, Schenectady, NY 12301.
SBC	Scher Bros., Inc	P. O. Box 1236, Allwood Station, Clifton, NJ 07012.
SCH	Schering Corp	1011 Morris Ave., Union, NJ 07083.
SCO	Scholler Bros., Inc	Collins and Westmoreland Sts., Philadelphia, PA 19134.
SPR	Scientific Protein Laboratories, Inc	P. O. Box 158, Waunakee, WI 53597.
SPA	Scott Paper Co	2600 Federal Ave., Everett, WA 98201.
SEA	Seaboard Chemicals, Inc	30 Foster St., Salem, MA 01970.
SRL	G. D. Searle & Co., Searle Pharmaceuticals, Inc.	P. O. Box 5110, Chicago, IL 60680.
SKP	Shakespeare Co., Monofilament Div	P. O. Box 246, Columbia, SC 29204.
SHO	Shell Oil Co	P. O. Box 20329, Houston, TX 77025.
SHC	Shell Chemical Co. Div	P. O. Box 2463, Houston, TX 77001.
SHP	Shepherd Chemical Co	4900 Beech St., Cincinnati, OH 45212.
SW	Sherwin-Williams Co	1370 Ontario St. P. O. Box 6520, Cleveland, OH 44101.
SHT	Shintech, Inc	3800 Buffalo Speedway-Suite 210, Houston, TX 77098.
SID	George F. Siddall Co., Inc	P. O. Box 925, Spartanburg, SC 29304.
SMP	J. R. Simplot Co., Minerals Chemical Div	P. O. Box 912, Pocatello, ID 83210.
SIM	Simpson Timber Co., Chemicals Div	2301 N. Columbia Blvd., Portland, OR 97217.
GFS	G. Frederick Smith Chemical Co	867 McKinley Ave., P. O. Box 23214, Columbus, OH 43223.
SK	SmithKline Corp., SmithKline Chemicals Div.	1500 Spring Garden St., P. O. Box 7929, Philadelphia, PA 19101.
SLT	Soltex Polymer Corp	P. O. Box 1000, Deer Park, TX 77536.
SLC	Soluol Chemical Co., Inc	Green Hill and Market Sts., W. Warwick, RI 02893.
SAC	Southeastern Adhesives Co	P. O. Box 791, Lenoir, NC 28645.
SOP	Southern Chemical Products Co., Inc	430 Lower Boundary St., P. O. Box 205, Macon, GA 31202.
ACT	Southland Corp., Chemical Div., Arthur C. Trask Div.	7666 W. 63d St., Summit, IL 60501.
SWR	Southwestern Refining Co	P. O. Box 9217, Corpus Christi, TX 78408.
SPL	Spaulding Fibre Co., Inc	310 Wheeler St., Tonawanda, NY 14150.
OMS	E. R. Squibb & Sons, Inc	40 W. 57th St., New York, NY 10019.
STA	A. E. Staley Mfg. Co	2200 E. Eldorado St., Decatur, IL 62525.
CLN	Standard Brands, Inc., Clinton Corn Processing Co. Div.	1251 Beaver Channel Parkway, Clinton, IA 52733.
SCC	Standard Chlorine of Delaware, Inc	1035 Belleville Turnpike, Kearny, NJ 07032.
SIO	Standard Oil Co	397 Midland Bldg., Cleveland, OH 44115.
AMO	Standard Oil Company (Indiana)	P. O. Box 5910-A, Mail Code 3503, Chicago, IL 60680.
SOC	Standard Oil Co. of California, Chevron Chemical Co.	575 Market St., San Francisco, CA 94105.
STT	Standard T Chemical, Inc	P. O. Box A-3351, Chicago, IL 60690.
STG	Stange Co	342 N. Western Ave., Chicago, IL 60612.
	Stauffer Chemical Co.:	
SFA	Agricultural Div	636 California St., San Francisco, CA 94108.
SFC	Calhio Chemicals, Inc	636 California St., San Francisco, CA 94108.
SFF	Food Ingredients Div	636 California St., San Francisco, CA 94108.
SFI	Industrial Div	636 California St., San Francisco, CA 94108.
SFP	Plastics Div	636 California St., San Francisco, CA 94108.
SFS	Specialty Div	636 California St., San Francisoc, CA 94108.
SWS	SWS Silicones Div	636 California St., San Francisco, CA 94108.
STP	Stepan Chemical Co	RR #1, Elwood, IL 60421, and 100 West Hunter Ave., Maywood, NJ 07607.
NPI	Polychem Dept	51 Eames St., Wilmington, MA 01887.
	Sterling Drug, Inc.:	
SDG	Glenbrook Laboratories Div	90 Park Ave., New York, NY 10016.
SDH	Hilton Davis Chemical Co. Div	2235 Langdon Farm Rd., Cincinnati, OH 45237.
TMS	Thomasset Colors Div	120 Lister Ave., Newark, NJ 07105.
SDW	Winthrop Laboratories Div	90 Park Ave., New York, NY 10016.
SPI	Sterling Plastics, Inc	P. O. Box 1311, Big Spring, TX 79720.
STY	Styrochem Corp	Petrochemical Complex, Ponce, PR 00731.
SBP	Sugar Beet Products Co	302 Waller St., P. O. Box 1387, Saginaw, MI 48605.
	Sun Chemical Corp.:	
SNW	Chemicals Div	P. O. Box 70, Chester, SC 29706.
SNA	Pigments Div	441 Tompkins Ave., Staten Island, NY 10305.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS, BY COMPANY, 1978--CONTINUED

Identification code	Name of company	Office address
SUN	Sun Company, Inc	100 Matsonford Rd., Radnor, PA 19087.
SKG	Sunkist Growers, Inc	P. O. Box 7888, Van Nuys, CA 91409.
SNO	SunOlin Chemical Co	P. O. Box F, Claymont, DE 19703.
SAG	Swift Agricultural Chemicals Corp	P. O. Box 2175, Beaumont, TX 77704.
BUC	Synalloy Corp., Blackman Uhler Chemical Div.	P. O. Box 5627, Spartanburg, SC 29304.
FAR	Syncon Resins, Inc	77 Jacobus Ave., S. Kearny, NJ 07032.
FCD	Synres Chemical Corp	1036 Commerce Ave., Union, NJ 07038.
HFT	Syntex Agribusiness, Inc	P. O. Box 1246 S.S.S., Springfield, MO 65805.
TCC	Tanatex Chemical Corp	P. O. Box 388, Lyndhurst, NJ 07071.
CST	Charles S. Tanner Co	1310 Barcelona Dr., Greenville, SC 29605.
TEK	Teknor Apex Co	505 Central Ave., Pawtucket, RI 02662.
HN	Tenneco Chemicals, Inc	Park Eighty Plaza West-One, Saddle Brook, NJ 07662.
TOC	Tenneco Oil Co	P. O. Box 2511, Houston, TX 77001.
TVA	Tennessee Valley Authority	Chemical Operations, A204 NFDC, Muscle Shoals, AL 35660.
TER	Terra Chemicals International, Inc	P. O. Box 1828, Sioux City, IA 51102.
TER	Terra Nitrogen, Inc	P. O. Box 1828, Sioux City, IA 51102.
COO	Terrell Corp	820 Woburn St., Wilmington, MA 01887.
TX	Texaco, Inc	P. O. Box 430, 4800 Fournace Pl., Bellaire, TX 77401.
TSA	Texas Alkyls, Inc	P. O. Box 600, Deer Park, TX 77536.
TUS	Texas-U.S. Chemical Co	P. O. Box 667, Port Neches, TX 77651.
SKT	Textron, Inc., Spencer Kellogg Div	120 Delaware Ave., Buffalo, NY 14240.
TKL	Thiokol Corp	P. O. Box 1000, Newtown, PA 18940.
MHI	Ventron Div	152 Andovin St., Danvers, MA 01923.
TMH	Thompson-Hayward Chemical Co	2 E. Madison St., Waukegan, IL 60085, and 5200 Speaker Rd., Kansas City, MO 66110.
TRC	Toms River Chemical Corp	P. O. Box 71, Toms River, NJ 08753.
TNO	Trancoa Chemical Corp	312 Ash St., Reading, MA 01867.
TRI	Triad Chemical	P. O. Box 310, Donaldsonville, LA 70346.
TRO	Troy Chemical Co	One Avenue L, Newark, NJ 07105.
UPM	UOP, Inc	10 UOP Plaza, Des Plaines, IL 60016.
UOP	Chemical Div	State Highway 17, E. Rutherway, NJ 07073.
USM	USM Corp.:	
	Bostik Div	P. O. Box 5695, Greenville, SC 29606.
	Bostik Div. East	Boston St., Middleton, VA 01949.
ARM	USS Agri-Chemicals Div. of U.S. Steel Corp	P. O. Box 1685, Atlanta, GA 30301.
USS	USS Chemicals Div. of U.S. Steel Corp	600 Grant St., Rm. 2880, Pittsburgh, PA 15230.
UHL	Paul Uhlich & Co., Inc	1 Railroad Ave., Hastings-on-Hudson, NY 10706.
UNG	Ungerer & Co	161 Avenue of the Americas, New York, NY 10013.
	Union Camp Corp.:	
WTH	Chemical Div	P. O. Box 220, Dover, OH 44622.
NCI	Chemical Products Div	1600 Valley Rd., Wayne, NJ 07470.
NCI	Terpene & Aromatics Div	P. O. Box 6170, Jacksonville, FL 32205.
UCC	Union Carbide Corp	P. O. Box 8004, S. Charleston, WV 25303.
UCC	Union Carbide Agricultural Products Co	7825 Baymeadows Way, Jacksonville, FL 32216.
UOC	Union Oil Co. of California:	1650 E. Golf Rd., Schaumburg, IL 60196.
	Union Chemicals Div	P. O. Box 60455, Los Angeles, CA 90060.
	Petrochemicals Group	1345 N. Meacham Rd., Schaumburg, IL 60196.
USR	Uniroyal, Inc., Uniroyal Chemical Div	Emic Bldg., Spencer St., Naugatuck, CT 06770.
SWT	Unitech Chemical, Inc	30 N. La Salle, Chicago, IL 60604.
UNN	United Chemical Corp. of Norwood	Endicott St., Norwood, MA 02062.
UNP	United Chemical Products Corp	472 York St., Jersey City, NJ 07302.
UNO	United-Erie, Inc	438 Huron St., Erie, PA 16512.
ROM	United Merchants & Manufacturers, Inc., Roma Chemical Div.	749 Quequechan St., Fall River, MA 02721.
USB	U.S. Borax & Chemical Corp	3075 Wilshire Blvd., Los Angeles, CA 90005.
USO	U.S. Oil Co	P. O. Box 4228, Dexter Rd., E. Providence, RI 02914.
UPJ	Upjohn Co	7000 Portage Rd., Kalamazoo, MI 49002.
CWN	Fine Chemical Div	410 Sackett Point Rd., North Haven, CT 06473.
VAL	Valchem Div. of United Merchants & Manufacturers, Inc.	1407 Broadway, New York, NY 10018.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS, BY COMPANY, 1978--CONTINUED

Identification code	Name of company	Office address
VSV	Valentine Sugars, Inc., Valite Div	726 Whitney Bldg., New Orleans, LA 70130.
VLN	Valley Nitrogen Producers, Inc	1111 Van Ness Ave., Fresno, CA 93717.
MNP	The Valspar Corp	1101 S. 3d St., Minneapolis, MN 55440.
VNC	Vanderbilt Chemical Corp	31 Taylor Ave., Bethel, CT 06801, and Rt. 5 - Box 54, Murray, KY 42071.
VND	Van Dyk & Co., Inc	Main & Williams Sts., Belleville, NJ 07109.
VEL	Velsicol Chemical Corp	341 E. Ohio St., Chicago, IL 60611.
VTC	Vertac, Inc., Vicksburg Plant	P. O. Box 3, Vicksburg, MS 39180.
VIK	Viking Chemical Co	838 Baker Bldg., Minneapolis, MN 55402.
VIN	Vineland Chemical Co., Inc	W. Wheat Rd., Vineland, NJ 08360.
VCC	Vinings Chemical Co	2555 Cumberland Pkwy., Suite 200, Atlanta, GA 30339.
VGC	Virginia Chemicals, Inc	3340 W. Norfolk Rd., Portsmouth, VA 23703.
SOH	Vistron Corp	393 Midland Bldg., Cleveland, OH 44115.
SIC	Silmar Div	12333 S. Van Ness Ave., Hawthorne, CA 90250.
VTM	Vitamins, Inc	200 E. Randolph Dr., Chicago, IL 60601.
FRO	Vulcan Materials Co., Chemicals Div	P. O. Box 7689, Birmingham, AL 35223.
WJ	Warner-Jenkinson Co	2526 Baldwin St., St. Louis, MO 63106.
WAG	West Agro-Chemical, Inc	501 Santa Fe, Kansas City, MO 64105.
WCA	West Coast Adhesives Co., Inc	11104 N.W. Front Ave., Portland, OR 97231.
EW	Westinghouse Electric Corp., Industrial Materials Div.	Manor, PA 15665.
WVA	Westvaco Corp., Polychemicals Dept	P. O. Box 5207, N. Charleston, SC 29406.
WRD	Weyerhaeuser Co	118 S. Palmetto Ave., Marshfield, WI 54449.
WBG	White & Bagley Co	P. O. Box 706, Worcester, MA 01613.
WHI	White & Hodges, Inc	576 Lawrence St., P. O. Box 1204, Lowell, MA 01853.
WCC	White Chemical Corp	P. O. Box 278, Bayonne, NJ 07002.
WHL	Whitmoyer Laboratories, Inc	19 N. Railroad St., Myerstown, PA 17067.
APT	Whittaker Corp., Whittaker Coatings & Chemicals, Mol Rez Resins.	3134 California St., N.E., Minneapolis, MN 55418.
WHW	Whittemore-Wright Co., Inc	62 Alford St., Boston, MA 02129.
WLN	Wilmington Chemical Corp	P. O. Box 66, Wilmington, DE 19899.
WTC	Witco Chemical Corp	P. O. Box 305, Paramus, NJ 07652.
WAW	W. A. Wood Co	108 Spring St., Everett, MA 02149.
WBC	Worthington Diagnostics Div. of Millipore Corp.	Halls Mill Rd., Freehold, NJ 07728.
WCL	Wright Chemical Corp	Acme Station, Riegelwood, NC 28456.
WYC	Wycon Chemical Co	9 Greenway Plaza, Houston, TX 77046.
WYT	Wyeth Laboratories, Inc., Wyeth Laboratories Div. of American Home Products Corp.	P. O. Box 831, Paoli, PA 19301.
ZOC	Zoecon Corp	975 California Ave., Palo Alto, CA 94304.

U.S. IMPORTS OF BENZENOID CHEMICALS AND PRODUCTS

U.S. general imports of benzenoid chemicals and products entered under the Tariff Schedules of the United States (TSUS), schedule 4, part 1, subparts B and C are analyzed by the U.S. International Trade Commission annually and published in detail in a separate report.[1] General imports of benzenoid items entered in parts 1B and 1C totaled 487.6 million pounds with a foreign invoice value of $663.0 million in 1978 compared with 412.5 million pounds with a foreign invoice value of $570.5 million in 1977.

Benzenoid products that are "competitive" with similar domestic products, because they accomplish results substantially equal to those accomplished by the similar domestic product when used in substantially the same manner, are subject to a special basis of valuation for customs purposes known as the "American selling price." If "noncompetitive," the benzenoid products are valued for customs purposes on the basis of the "United States value." The essential difference between these two values is that "American selling price" is based on the wholesale price in the United States of the "competitive" domestic product, whereas "United States value" is based on the wholesale price in the United States of the imported product less most of the expenses incurred in bringing the product to the United States and selling it. When neither of these two valuation bases applies, then the "export value," "foreign value," or "constructed value" is used as the valuation basis under section 402 and 402a Tariff Act of 1930, as amended. The competitive status of benzenoid imports in 1977 is shown in table 2.

Industrial organic chemicals that are entered under part 1B consist chiefly of benzenoid intermediates and small quantities of acyclic compounds which are derived in whole or in part from benzenoid compounds. Also included are mixtures and small quantities of finished products not specially provided for in part 1C (e.g., rubber-processing chemicals). In terms of value, 33.1 percent of all the benzenoid imports under part 1B in 1978 came from West Germany; 19.4 percent, from Japan; 10.6 percent, from the United Kingdom; 7.5 percent, from France.

Finished organic chemical products entered under part 1C include dyes, pigments, medicinals, flavor and perfume materials, pesticides, plastics materials, and certain other specified products. In terms of value 33.2 percent of all finished benzenoid imports under part 1C in 1978 came from West Germany; 15.3 percent, from the United Kingdom; and 12.9 percent, from Japan.

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[1] *Imports of Benzenoid Chemicals and Products, 1978*, TC Publication 990, 1979.

TABLE 2.--BENZENOID CHEMICALS AND PRODUCTS: SUMMARY OF U.S. GENERAL IMPORTS ENTERED UNDER SCHEDULE 4, PARTS 1B AND 1C OF THE TSUS, AND ANALYSIS BY COMPETITIVE STATUS, 1978

PART AND COMPETITIVE STATUS	NUMBER OF ITEMS	QUANTITY	PERCENT OF TOTAL QUANTITY	FOREIGN INVOICE VALUE	PERCENT OF FOREIGN VALUE	UNIT FOREIGN VALUE
		1,000 pounds		*1,000 dollars*		*Per pound*
SCHEDULE 4, PART 1B						
Total	824	296,029	100.0	241,387	100.0	$0.81
Competitive:						
Duty based on ASP[1]	272	165,655	56.0	96,410	39.9	.58
Other[2]	107	85,345	28.8	65,442	27.1	.77
Noncompetitive:						
Duty based on U.S. value	217	10,342	3.5	20,429	8.5	1.98
Duty based on export value	153	5,982	2.0	21,530	8.9	3.60
Other[3]	60	14,695	5.0	22,513	9.3	1.53
Competitive status not available	15	14,010	4.7	15,064	6.2	1.08
SCHEDULE 4, PART 1C						
Total	1,692	191,598	100.0	421,649	100.0	2.20
Competitive:						
Duty based on ASP[1]	366	28,421	14.8	70,677	16.8	2.49
Other[2]	215	107,228	56.0	136,131	32.3	1.27
Noncompetitive:						
Duty based on U.S. value	737	8,879	4.6	42,767	10.1	4.82
Duty based on export value	215	23,465	12.2	94,243	22.4	4.02
Other[3]	116	7,751	4.0	32,423	7.7	4.18
Competitive status not available	43	15,852	8.3	45,408	10.8	2.86
SUMMARY (SCHEDULE 4, PART 1B AND 1C)						
Total	2,516	487,627	100.0	663,036	100.0	1.36
Competitive:						
Duty based on ASP[1]	638	194,076	39.8	167,087	25.2	.86
Other[2]	322	192,573	39.5	201,573	30.4	1.05
Noncompetitive:						
Duty based on U.S. value	954	19,221	3.9	63,196	9.5	3.29
Duty based on export value	368	29,447	6.0	115,773	17.5	3.93
Other[3]	176	22,446	4.6	54,936	8.3	2.45
Competitive status not available	58	29,862	6.1	60,472	9.1	2.06

[1]All import entries in this group were "competitive" as defined in secs. 402 and 402a of the Tariff Act of 1930, as amended.

[2]Imports in this group are also "competitive." However, for each of the items in this group, there are some import entries which were appraised by the U.S. Customs Services as "noncompetitive" with like or similar U.S. products because at the time of exportation from the foreign country, the U.S. products were not freely offered for sale in the principal U.S. markets.

[3]Assessment of duties on import entries of items in this group were based on two or more import values during the year. Under the provisions of secs. 402 and 402a of the Tariff Act of 1930, as amended, each import shipment was valued either at the U.S. value, the export value, or the foreign value.

Source: Compiled by the U.S. International Trade Commission from records of the U.S. Bureau of Customs.

Note 1.--The totals shown in this table differ from those given in the official statistics of the U.S. Department of Commerce chiefly because of differences in coverage and in the methods used in compiling the data. In general, the statistics coverage in 1978 varies from a low of 53 percent for dyes, to about 88 percent coverage of flavor and perfume materials, 76 percent for intermediates, 70 percent of medicinals and pharmaceuticals, and 62 percent for organic pigments.

Note 2.--Because of rounding, figures may not add to the totals shown.

TABLE 3.--CYCLIC INTERMEDIATES: GLOSSARY OF SYNONYMOUS NAMES

Common name	Standard (Chemical Abstracts) name
A Acid	3,5-Dihydroxy-2,7-naphthalenedisulfonic acid.
1,2,4-Acid	4-Amino-3-hydroxy-1-naphthalensulfonic acid (1-Amino-2-naphthol-4-sulfonic acid).
Acid yellow 9	6-Amino-3,4'-azodibenzenesulfonic acid.
p-Aminobenzenesulfonic acid	Sulfanilic acid and salt.
m-Aminobenzoyl J acid	4-Hydroxy-7-(m-aminobenzamido)-2-naphthalenesulfonic acid.
Aminoepislon acid	8-Amino-1,6-naphthalenedisulfonic acid.
Amino G acid	7-Amino-1,3-naphthalenedisulfonic acid.
Amino J acid	6-Amino-1,3-naphthalenedisulfonic acid.
Amino R salt	3-Amino-2,7-naphthalenedisulfonic acid.
Aniline oil	Aniline.
Anthraflavic acid	2,6-Dihydroxyanthraquinone.
Anthrarufin	1,5-Dihydroxyanthraquinone.
Armstrong & Wynne's acid	4-Hydroxy-2-naphthalenesulfonic acid.
B Acid	5-Amino-4-hydroxy-1,7-naphthalenedisulfonic acid.
2B Acid	6-Amino-4-chloro-m-toluenesulfonic acid.
4B Acid	6-Amino-m-toluenesulfonic acid.
Benzal chloride	α,α-Dichlorotoluene.
Benzanthrone	7H-Benz[de]anthracen-7-one.
Benzotrichloride	α,α,α,-Trichlorotoluene.
Bisphenol A	4,4'-Isopropylidenediphenol.
B.O.N	3-Hydroxy-2-naphthoic acid.
Broenner's acid	6-Amino-2-naphthalenesulfonic acid.
Bromamine acid	1-Amino-4-bromo-2-anthraquinonesulfonic acid.
Bromobenzanthrone	3-Bromo-7H-benz[de]anthracene-7-one.
C Acid (Cassella acid)	3-Amino-1,5-naphthalenedisulfonic acid.
C.A. Acid	3-Amino-6-chloro-4-sulfobenzoic acid.
C-Amine (Lake Red C acid)	2-Amino-5-chloro-p-toluenesulfonic acid.
Chicago Acid (SS acid)	4-Amino-5-hydroxy-1,3-naphthalenedisulfonic acid.
Chlorobenzanthrone	Chloro-7H-benz[de]anthracen-7-one.
Chromotropic acid	4,5-Dihydroxy-2,7-naphthalenedisulfonic acid.
Chrysazin	1,8-Dihydroxyanthraquinone.
1,6-Cleve's acid	5-Amino-2-naphthalenesulfonic acid.
1,7-Cleve's acid	8-Amino-2-naphthalenesulfonic acid.
Crocein acid	7-Hydroxy-1-naphthalenesulfonic acid.
2-Cyanopyridine	Picolinonitrile.
3-Cyanopyridine	Nicotinonitrile.
Cyanuric chloride	2,4,6-Trichloro-s-triazine.
D Acid	6-Amino-1-naphthalenesulfonic acid.
DADI	Dianisidine diisocyanate.
DBB	p-Dibutoxybenzene.
Decacyclene	Diacenaphtho[1,2-j:1',2'-ℓ]fluoranthene.
Dehydrothio-p-toluidine	2-(p-Aminophenyl)-6-methylbenzothiazole.
Developer Z	3-Methyl-1-phenyl-2-pyrazolin-5-one.
o-Dianisidine	3,3'-Dimethoxybenzidine.
1,1'-Dianthrimide	1,1'-Iminodianthraquinone.
Dibenzanthrone	Violanthrone.
4,4'-Dihydroxydiphenylsulfone	4,4'-Sulfonyldiphenol.
Dimethyl POPOP	1,4-Bis[2-(4-methyl-5-phenyloxazolyl)]benzene.
4,5-Dinitrochrysazin	1,8-Dihydroxy-4,5-dinitroanthraquinone.
Dioxy S acid	4,5-Dihydroxy-1-napththalenesulfonic acid.
Diphenyl Epsilon Acid	6,8-Dianilino-1-naphthalenesulfonic acid.
Durene	1,2,4,5-Tetramethylbenzene.
Epsilon Acid (Andresen's acid)	8-Hydroxy-1,6-naphthalenedisulfonic acid.
F Acid	7-Hydroxy-2-naphthalenesulfonic acid.
Fast Red G base	2-Nitro-p-toluidine [NH_2=1].
Fast Scarlet R base	5-Nitro-o-anisidine [NH_2=1].
Fischer's aldehyde	1,3,3-Trimethyl-$\Delta^{2,\alpha}$-indolineacetaldehyde.
Fischer's base	1,3,3-Trimethyl-2-methyleneindoline.
Freund's acid	4-Amino-2,7-naphthalenedisulfonic acid.

TABLE 3.--CYCLIC INTERMEDIATES: GLOSSARY OF SYNONYMOUS NAMES--CONTINUED

Common name	Standard (Chemical Abstracts) name
G salt	7-Hydroxy-1,3-naphthalenedisulfonic acid.
Gamma acid	6-Amino-4-hydroxy-2-naphthalenesulfonic acid, sodium salt.
Gold salt	9,10-Dihydro-9,10-dioxo-1-anthracenesulfonic acid and salt.
H Acid	4-Amino-5-hydroxy-2,7-naphthalenedisulfonic acid. (8-Amino-1-naphthol-3,6-disulfonic acid).
Hellimellitene	1,2,3-Trimethylbenzene.
Indoxyl	3(2H)-Indolone.
J Acid	7-Amino-4-hydroxy-2-naphthalenesulfonic acid, sodium salt.
J Acid Urea	7,7'-Ureylenebis[4-hydroxy-2-naphthalenesulfonic acid].
K Acid	4-Amino-5-hydroxy-1,7-naphthalenedisulfonic acid.
Koch's Acid	8-Amino-1,3,6-napthalenetrisulfonic acid.
L Acid	5-Hydroxy-1-naphthalenesulfonic acid.
Lake Red C amine	2-Amino-5-chloro-p-toluenesulfonic acid.
Laurent's acid	5-Amino-1-naphthalenesulfonic acid.
M Acid	8-Amino-4-hydroxy-2-naphthalenesulfonic acid.
MEP	5-Ethyl-2-picoline (2-Methyl-5-ethylpyridine).
Mesitylene	1,3,5-Trimethylbenzene.
Methane base	4,4'-Methylenebis[N,N-dimethylaniline].
Michler's hydrol	4,4'-Bis[dimethylamino]benzhydrol.
Michler's ketone	4,4'-Bis[dimethylamino]benzophenone.
Naphthionic acid	4-Amino-1-naphthalenesulfonic acid.
o-Naphthionic acid	1-Amino-2-naphthalenesulfonic acid.
β-Naphthol	2-Naphthol, tech.
Naphthol AS	3-Hydroxy-2-naphthanilide.
α-Naphthylamine	1-Naphthylamine.
Neville & Winther's acid	4-Hydroxy-1-naphthalenesulfonic acid.
m-Nitrobenzoyl J acid	4-Hydroxy-7-(m-nitrobenzamido)-2-naphthalenesulfonic acid.
Oxy Koch's acid	1-Naphthol-3,6,8-trisulfonic acid.
Pentaanthrimide	1,4,5,8-Tetrakis(1-anthraquinonylamino)anthraquinone.
Peri Acid	8-Amino-1-naphthalenesulfonic acid.
Phenylbiphenyl	Terphenyl.
N-Phenyldiethanolamine	2,2'-[(Phenyl)imino]diethanol.
Phenyl Gamma acid	6-Anilino-4-hydroxy-2-naphthalenesulfonic acid.
Phenyl J acid	7-Anilino-4-hydroxy-2-naphthalenesulfonic acid.
Phenyl peri acid	8-Anilino-1-naphthalenesulfonic acid.
POPOP	1,4-Bis[2-(5-phenyloxazolyl)]benzene.
Pseudocumene	1,2,4-Trimethylbenzene.
Pyrazoleanthrone	Anthra[1,9-cd]pyrazol-6(2H)-one.
Pyrazoleanthrone yellow	[3,3'-Bianthra[1,9-cd]pyrazole]-6,6'-(2H,2'H)dione.
Pyrazolone T	5-Oxo-1-(p-sulfophenyl)-2-pyrazoline-3-carboxylic acid.
Quinizarin	1,4-Dihydroxyanthraquinone.
2-Quinizarinsulfonic acid	9,10-Dihydro-1,4-dihydroxy-9,10-dioxo-2-anthracenesulfonic acid.
Quinoline yellow base	Quinophthalone.
R salt	3-Hydroxy-2,7-naphthalenedisulfonic acid, disodium salt.
RG Acid (Violet acid)	4-Hydroxy-2,7-naphthalenedisulfonic acid.
Rhoduline acid (J Acid Imide)	7,7'-Iminobis[4-hydroxy-2-napthalenesulfonic acid].
RR acid	3-Amino-5-hydroxy-2,7-naphthalenedisulfonic acid.
S Acid	4-Amino-5-hydroxy-1-naphthalenesulfonic acid.
Schaffer's acid	6-Hydroxy-2-naphthalenesulfonic acid.
Silver salt	9,10-Dihydro-9,10-dioxo-2-anthracenesulfonic acid and salt.

TABLE 3.--Cyclic intermediates: Glossary of synonymous names--Continued

Common name	Standard (Chemical Abstracts) name
Solvent Yellow 1	p-Phenylazoaniline and hydrochloride.
Solvent Yellow 3	4-(o-Tolylazo)-o-toluidine.
SS Acid (Chicago acid)	4-Amino-5-hydroxy-1,3-naphthalenedisulfonic acid.
o-Sulfobenzaldehyde	o-Formylbenzenesulfonic acid.
Thioindoxyl	3(2H)-Thianaphthenone.
Thiosalicylic acid	o-Mercaptobenzoic acid.
Tobias Acid	2-Amino-1-naphthalenesulfonic acid.
TODI	Bitolylene diisocyanate.
o-Tolidine	3,3'-Dimethylbenzidine.
α-Toluic acid	Phenylacetic acid.
α-Tolunitrile	Phenylacetonitrile.
4-m-Tolylenediamine	Toluene-2,4-diamine.
Trimellitic anhydride	1,2,4-Benzenetricarboxylic acid, 1,2-anhydride.
Trimethyl base	1,3,3-Trimethyl-2-methyleneindoline.
Trinitrophenol	Picric acid.
Urea J Acid (J Acid Urea)	7,7'-Ureylenebis[4-hydroxy-2-naphthalenesulfonic acid .
Vinyltoluene	ar-Methylstyrene.
Violet acid (RG Acid)	4-Hydroxy-2,7-naphthalenedisulfonic acid.

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Appendix includes: Directory of manufacturers, p. 352-364; U.S. imports of benzenoid chemicals and products, p. 365-366; Cyclic intermediates: glossary of synonymous names, p. 367-369.

1. Coal-tar products. 2. Petroleum industry and trade--U.S. 3. Intermediates. 4. Dyes and dyeing. 5. Drugs. 6. Flavoring essences. 7. Plastics industry and trade--U.S. 8. Rubber industry and trade. 9. Elastomers. 10. Cleaning compounds. 11. Pesticides. 12. Chemicals--Manufacture and industry--U.S.--Directories. I. Title.

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