

MINER YEARBOOK

1 9

Volume I of Three

METALS AND MINERALS

(EXCEPT FUELS)



Prepared by the staff of the
BUREAU OF MINES

DIVISION OF MINERALS

Charles W. Merrill, Chief

Frank D. Lamb, Assistant Chief

N49783

An article described laboratory and pilot plant flotation of kyanite from a schist in the Sudbury area, Ontario, Canada. Flowsheets of the operations were included.¹²

A study was made on the effects of grain size, forming pressure, firing temperature, length of soaking time at the maximum temperature, and small additions of other materials on the densification of domestic kyanite when fired to high temperatures. It was necessary to grind domestic kyanite finer than 325-mesh to obtain dense test pieces at 2,800° F. The degree of densification of kyanite increases with decreasing grain size, increasing forming pressure, increasing firing temperature, and increasing soaking period at maximum temperature.¹³

East African kyanite and sillimanite rock from Arnarn were among various refractory material on which flaking tests were made.¹⁴

The formation of mullite in various materials was investigated by means of X-rays, and results verified with the electron microscope.¹⁵

Experiments were conducted to determine whether mullite melts congruently or incongruently. A single crystal boule had a melting point 100° C. higher than that of mullite.¹⁶

The subsolidus relations between mullite and iron oxide were studied to increase the understanding of the properties of fired clay products. It was found that mullite and ferric oxide formed a limited series of solid solutions when fired in air to temperatures between 1,000° to 1,300° C. The solid solutions were characterized by an increase in the lattice dimensions of mullite, by increases in the indices of refraction, and by changes in color.¹⁷

Samples of zircon-mullite were fired to 1,300°, 1,400°, 1,500°, 1,600°, and 1,700° C. for 4 hours. The porosity, bulk density, and chemical composition at different temperatures were tabulated.¹⁸

Data on bonded mullite and zircon refractories for use in glass contact areas, superstructure, and feeder forehearth of the glass furnace were presented. Special reference was made to grain structure, mineralogical composition, chemical reaction, and destruction of mullite and zircon refractories in service. Photographs of zircon after service were included to illustrate the application and results obtained.¹⁹

¹² Wyman, R. A., Flotation of a Canadian Kyanite: Min. Eng., vol. 10, No. 1, January 1958, pp. 111-112.

¹³ Wilson, H. H., and Bole, G. A., Note on the Densification of Domestic Kyanite at High Temperatures: Bull. Am. Ceram. Soc., vol. 37, No. 6, June 1958, pp. 269-271.

¹⁴ Wyde, J. H., Recent Work on the Flaking of Refractories: Gas Council (Gt. Brit.) Research Commun., GC40, 1957, pp. 1-36; Ceram. Abs., vol. 41, No. 3, Mar. 1, 1958, p. 711.

¹⁵ de Keyser, W. L., [Contribution to the Study of the Formation of Mullite Studied by X-rays and Electron Microscopy]: Bull. soc. franc. ceram., No. 35, 1957, pp. 9-19; Ceram. Abg., vol. 41, No. 1, Jan. 1, 1958, p. 30g.

¹⁶ Neuhaus, A., [Growing of Single Crystals of Mullite]: Keram. Zhur., vol. 9, No. 8, 1957, p. 438; Ceram. Abs., vol. 41, No. 4, Apr. 1, 1958, p. 103g.

¹⁷ Brownell, W. E., Subsolidus Relations Between Mullite and Iron Oxide: Jour. Am. Ceram. Soc., vol. 41, No. 6, June 1, 1958, pp. 226-230.

¹⁸ Marantz, A. G., and Kamenchik, A. E., [Behavior of Fusion Cast Zircon-Mullite Ware on Heating]: Steklo i Keram., vol. 15, No. 1, 1958, pp. 16-18; Ceram. Abs., vol. 41, No. 5, May 1, 1958, p. 117d.

¹⁹ Knauff, R. W., Smith, K. W., Thomas, E. A., and Pittman, W. C., Bonded Mullite and Zircon Refractories for the Glass Industry: Bull. Am. Ceram. Soc., vol. 36, No. 11, November 1957, pp. 412-415.

Lead

By O. M. Bishop¹ and Edith E. dem²



Contents

	Page	
Legislation and Government programs.....	636	Domestic production—
United Nations program.....	636	Smelter
Import quotas.....	636	tion—
Exploration programs.....	637	Other
Barter program.....	637	Consumption
Stockpiling.....	637	Lead pig
Domestic production.....	638	Production
Mine production.....	638	Consumption
Smelter and refinery production.....	643	Prices
Refined lead—primary		Foreign trade
and secondary.....	643	World review
Antimonial lead—primary		Technology
and secondary.....	644	

SUPPLY of lead exceeded demand by a resulting in rapid stock buildups and low prices, in almost unprecedented quantity, with domestic output for an increased share of the United States market. Domestic mine production, whereas world production declined only 3 percent, acquisitions of lead, that in previous years, severity of world surpluses, were greatly reduced. In the final quarter of the year quotas were reduced, ports into the United States, there was a moderate consumption, as well as a rise in the market price, but encouraging increase in domestic mine production and consumers' stocks continued to

¹ Commodity specialist.

² Statistical assistant.

³ Figures on imports and exports compiled by Mae B. Price and Edith E. dem, Bureau of Mines, from records of the U.S. Department of Commerce.

TABLE 1.—Salient statistics of the lead industry, in short tons

	1949-53 (average)	1954	1955	1956	1957	1958
United States:						
Production:						
Mine production of recoverable lead...	392,341	325,419	338,025	352,826	338,216	267,377
Value (thousands).....	\$119,100	\$89,165	\$100,731	\$110,787	\$96,730	\$62,566
Primary lead (refined).....						
From domestic ores and base bullion.....	375,455	322,271	321,132	349,188	347,675	269,082
From foreign ores and base bullion.....	98,363	164,441	158,025	193,120	185,858	201,074
Antimonial lead (primary lead content).....	17,345	12,797	14,586	13,657	19,870	16,446
Secondary lead (lead content).....	474,120	480,925	502,051	506,755	489,229	401,787
Imports:						
Lead in ores and matte.....	103,375	161,261	177,479	196,452	198,479	201,028
Lead in base bullion.....	1,850	41	31	31	84	460
Lead in pigs, bars, and old.....	870,692	281,941	284,729	283,392	333,492	375,022
Exports of refined pig lead.....	1,510	596	403	4,628	4,339	1,359
Stocks (lead content).....						
At primary smelters and refineries.....	107,253	137,039	89,443	97,043	143,916	234,290
At consumer plants.....	115,200	124,641	117,458	123,995	129,310	122,900
Consumption of metal, primary and secondary.....	1,142,569	1,094,871	1,212,644	1,209,717	1,138,115	985,387
Price, common lead, New York, average, cents per pound.....	16.22	14.05	15.14	16.01	14.06	12.11
World:						
Mine production.....	1,945,000	2,270,000	2,420,000	2,480,000	2,610,000	2,520,000
Smelter production.....	1,900,000	2,210,000	2,240,000	2,400,000	2,610,000	2,490,000
Price, common lead, London, average, cents per pound.....	15.76	12.08	13.19	14.52	12.05	9.13

LEGISLATION AND GOVERNMENT PROGRAMS

United Nations Program.—Concerned over the apparently chronic world oversupply of lead, the United Nations, through the U.N. Interim Coordinating Committee on International Commodity Agreements, held talks in London in September designed to explore areas of possible agreement among interested nations to effect stabilization of world lead-zinc supply. Size of the U.S. market and distress of the domestic mine producers qualified the United States as principal participant. A lead-zinc subcommittee was established that met in Geneva in November. The dimensions of the problem were thoroughly reviewed and a framework for possible multilateral corrective action was discussed.

Import Quotas.—Pursuant to an Escape Clause investigation under authority of the Trade Agreement Extension Act of 1951, as amended, the Tariff Commission, in April, announced its findings that increased imports, in part caused by trade concessions granted under General Agreements on Tariffs and Trade, were causing serious injury to the domestic lead-zinc industry and recommended appropriate remedial measures to the President. Action on the Tariff Commission's recommendations was deferred pending Congressional consideration of the Administration's proposed Minerals Stabilization Plan. The Plan was not enacted, and on September 22, President Eisenhower issued a proclamation imposing import quotas on lead and zinc ores, intermediate smelter products, and refined lead and zinc metal. The quotas, effective October 1, 1958, were established at 80 percent of the United States average annual

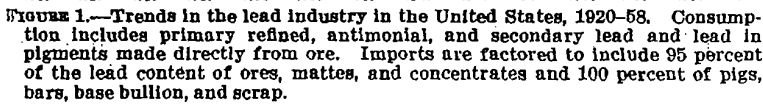
competitive import rate in the 5-year period. Imports were on a quarterly basis and major export allowances for individual quota allowances. For lead, imports in 1958 totaled 354,720 short tons annually, or approximately one-third less than the lead import rate in 1957.

Exploration Program.—Public Law 701 was enacted by Congress to establish the Office of Minerals Exploration in the Department of the Interior. The new office was created by the transfer of the functions of the Defense Minerals Exploration Program, which legally passed from existence June 30, 1958, to the new Government program for exploration of minerals. The program is a financial risk with private industry in exploration of increasing the Nation's mineral resources. The program is considerably more restrictive than its predecessor. Loans under OME provisions were required to be repaid, and funds could not be obtained from commercial sources at interest rates. Government participation was limited to a \$250,000 maximum.

During 1958, 15 new contracts were made for lead bearing ores. Total authorized expenditures for these contracts was \$1,363,651.

Barter Program.—The 85th Congress extended the farm surplus disposal law (PB 480) to the minerals. Under authority the U.S. Department of Agriculture, through the Commodity Credit Corporation (CCC), may purchase surplus agricultural products for lead and zinc of foreign origin. In 1958 the CCC contracted for 55,438 tons of lead (55,438 tons in 1957) to be added to the Government stockpile. Modifications to barter program during the year liberalized considerably the requirements of country of origin and kinds of materials. Producers were relieved of the burden of procuring materials. Products would increase the net exports of lead. However, the new rules contained adequate minimum requirements for markets and prevent substitution of barter for sale.

Stockpiling.—Under authority of the Strategic Materials Stockpile Act of 1946 and supplemental legislation, in accord with directives from the Office of Management and Budget, the monthly purchases of lead from domestic sources during the first half of the year for addition to the Strategic Materials Administration (GSA) stockpile. The final authorization for lead was issued May 26, 1958 and delivered to the end of the year, thereby concluding the program for lead. Quantities of lead in the stockpile and additions thereto were not published. In 1958, 41,686 tons of foreign bartered lead to GSA were added to the Government's supplemental stockpile.



MINE PRODUCTION

Western States.—Western States contributed 53 percent of mine output of recoverable lead. However, the Western States total of 142,800 tons was 25 percent less than that of 1957. Declines in individual producing States ranged from 550 tons in Arizona to 18,000 tons in Idaho.

Western States.—Western States contributed 53 percent of mine output of recoverable lead. However, the Western States total of 142,800 tons was 25 percent less than that of 1957. Declines in individual producing States ranged from 550 tons in Arizona to 18,000 tons in Idaho.

...load and five in the United States in 1958, in short tons 1

[illegible]

Idaho produced 53,600 tons, ranking it first among the lead-producing Western States and second in the United States. The largest production in the State came from the Bunker Hill mine of the Coeur d'Alene district. Operations at this property, as well as the Page mine of American Smelting and Refining Co. were curtailed during most of 1958 owing to large industry inventories and low metal prices. The improved market situation in the last quarter of the year prompted return to a 5-day week at both the Bunker Hill and Page mines. Development of deeper ore continued uninterrupted in most mines of the Coeur d'Alene district.

Utah was the second largest producer among the Western States with a recorded output of 40,400 tons. The United States and Lark mine continued to be the largest producer in the State. Among other important producers were United Park City, Mayflower-Park Galena and Ophir mines. In June DMEA approved a contract for a half-million dollar exploration project seeking deep ore reserves in the Mayflower mine of the New Park Mining Co. Work at the Ophir mine was suspended by McFarland & Hullinger, contract miners of the Ophir unit since 1944.

Lead output from Arizona mines declined only slightly during the year to total 11,900 tons. The Iron King mine of Shattuck Denn Mining Corp. at Humboldt was again the State's largest producer.

TABLE 3.—Mine production of recoverable lead in the United States, by States, in short tons

	1949-53 (average)	1954	1955	1956	1957	1958
Western States and Alaska:						
Alaska.....	46	.....	1	1	0	2
Arizona.....	20,658	8,385	9,517	11,999	12,441	11,890
California.....	11,906	2,671	8,265	9,206	3,458	140
Colorado.....	27,293	17,823	15,805	19,866	21,063	14,112
Idaho.....	80,873	69,302	64,163	64,321	71,637	53,603
Montana.....	20,029	14,820	17,025	18,642	13,300	8,434
Nevada.....	7,669	3,041	3,291	6,384	6,979	4,160
New Mexico.....	4,922	887	3,206	6,042	5,264	1,117
Oregon.....	7	6	3	7	5	1
South Dakota.....	4	.....	.....	.....	.....	.....
Texas.....	72	.....	.....	.....	.....	.....
Utah.....	48,002	44,072	50,482	49,555	44,471	40,355
Washington.....	0,512	0,938	10,340	11,657	12,734	9,020
Wyoming.....	.....	.....	.....	.....	.....	.....
Total.....	230,993	171,844	182,461	197,768	190,331	142,824
West Central States:						
Arkansas.....	0	.....	.....	.....	.....	.....
Kansas.....	7,494	4,033	5,498	7,035	4,257	1,299
Missouri.....	128,198	125,250	125,412	123,783	120,345	113,123
Oklahoma.....	16,320	14,204	14,126	12,350	7,183	3,692
Total.....	152,021	143,487	145,036	143,768	137,785	118,114
States east of the Mississippi River:						
Illinois.....	3,473	3,232	4,544	3,832	2,970	1,610
Kentucky.....	95	80	.....	228	411	516
New York.....	1,371	1,187	1,037	1,608	1,667	879
Tennessee.....	82	.....	.....	.....	.....	.....
Virginia.....	2,931	4,324	2,999	3,045	3,152	2,634
Wisconsin.....	1,375	1,265	1,948	2,582	1,900	800
Total.....	9,327	10,088	10,528	11,300	10,100	6,439
Grand total.....	392,341	325,419	338,025	352,826	338,216	267,377

¹ Includes 4 tons from North Carolina in 1954, 2 tons in 1955, 10 tons in 1956, and 9 tons in 1957.

² Includes 4 tons from Iowa.

McFarland & Hullinger operated the San X year. Cyprus Mines Corp. closed its Old in April. Nash and McFarland leased the Trench mill near Patagonia.

Washington mine production of lead total less than in 1957. The Grandview mine of Smelting Co. and Pend Oreille mine of Pen Co. were the major producers. Curtailed oures were in force at the two properties but

Ores rich in gold and silver from the Ri the Eureka Corp., Ltd., yielded the major p ered from Nevada mines. A significant q produced as a by-product of processing ma

The Idarado Mining Co. mine unit in C to be Colorado's largest lead producer. Ne ated the Eagle mine at Gilman on a full company's mine in Eagle County was the S producer. At mid-year Emperious Mining Creede, the first general shutdown in 25 year backs in late 1957 which continued throu fell 33 percent to 14,100 tons.

Lead production in New Mexico fell ne tons. New Jersey Zinc Co. closed its Hano

West Central States.—Output of lead reco in Kansas, Missouri, and Oklahoma dropp tons. As in prior years Missouri was first States of the Nation. Low metal prices d mining operations in Kansas and Oklahoma

Despite cutbacks and listless markets, the Missouri Lead Belt produced 113,100 tons o 42 percent of the National total. Output percent below the 1957 quantity, however. A Joseph Lead Co.'s mine-mill units in Marc reduction, contributed to the decrease. Co prompted National Lead Co. to reduce oper in May. In June St. Joseph Lead Co. an in mine-mill operations, and in July Mine mine and mill unit indefinitely. Although tailed in the district throughout the second sinking progressed on the new Viburnum Lead Co. and development was announced

Lead output of the traditionally produ Northeast Oklahoma, Southeast Kansas, and 5,000 tons—less than half the 1957 output. pended operations at its Ballard mine nea in January. The mines and Central mill produced at a curtailed rate during the fi were closed completely in July. Thereaft was reported from the Tri-State district m

States East of the Mississippi River.—Lea States was derived almost exclusively from which lead occurs in minor quantities. A

output during the year reflected decreases in zinc mining chiefly in Wisconsin, New York, and Virginia.

TABLE 4.—Mine production of lead in the principal districts¹ of the United States, in terms of recoverable lead, in short tons

District or region	State	1957	1958
Southeastern Missouri region.....	Missouri.....	126,323	113,123
Coeur d'Alene region.....	Idaho.....	67,125	52,488
West Mountain (Bingham).....	Utah.....	20,490	27,446
Park City region.....	do.....	9,421	9,195
Metalline.....	Washington.....	11,971	8,971
Big Bug.....	Arizona.....	6,833	7,728
Summit Valley (Butte).....	Montana.....	9,617	5,192
Tri-State (Joplin region).....	Kansas, southwestern Missouri, Oklahoma.....	11,462	4,091
Austinville.....	Virginia.....	3,143	2,934
Upper Mississippi Valley.....	Iowa, northern Illinois, Wisconsin.....	3,691	1,770
Pima (Sierritas, Papago, Twin Buttes).....	Arizona.....	750	1,397
Crescent.....	Colorado.....	2,231	1,233
Harshaw.....	Arizona.....	2,545	1,163
Kentucky-Southern Illinois.....	Kentucky-southern Illinois.....	1,590	1,159
Ophir.....	Utah.....	1,418	886
Rush Valley & Smelter (Tooe County).....	do.....	1,977	825
St. Lawrence County.....	New York.....	1,067	570
Tintic.....	Utah.....	1,775	388
Magdalena.....	New Mexico.....	1,214	377

¹ Districts producing 1,000 short tons or more in either year.

TABLE 5.—Twenty-five leading lead-producing mines in the United States in 1958, in order of output

Rank	Mine	District or region	State	Operator	Type of ore
1	Federal.....	Southeastern Missouri.....	Missouri.....	St. Joseph Lead Co.....	Lead.
2	United States & Lark.....	West Mountain (Bingham).....	Utah.....	U.S. Smelting, Refining & Mining Co.....	Lead-zinc.
3	Bunker Hill.....	Coeur d'Alene.....	Idaho.....	The Bunker Hill Co.....	Do.
4	Leadwood.....	Southeastern Missouri.....	Missouri.....	St. Joseph Lead Co.....	Lead.
5	Indian Creek.....	do.....	do.....	do.....	Do.
6	Bonne Terre.....	do.....	do.....	do.....	Do.
7	Iron King.....	Big Bug.....	Arizona.....	Shattuck-Donn Mining Co.....	Lead-zinc.
8	Star.....	Coeur d'Alene.....	Idaho.....	The Bunker Hill Co.....	Do.
9	Treasury Tunnel-Black Bear-Smuggler Union.....	Upper San Miguel.....	Colorado.....	Idarado Mining Co.....	Copper-lead-zinc.
10	Page.....	Coeur d'Alene.....	Idaho.....	American Smelting & Refining Co.....	Lead-zinc.
11	Pend Oreille.....	Metalline.....	Washington.....	Pend Oreille Mines & Metals Co.....	Do.
12	Butte Mines.....	Summit Valley.....	Montana.....	The Anaconda Co.....	Do.
13	United Park City.....	Utah.....	Utah.....	United Park City Mines Co.....	Do.
14	Desloge.....	Southeastern Missouri.....	Missouri.....	St. Joseph Lead Co.....	Lead.
15	Lucky Friday.....	Coeur d'Alene.....	Idaho.....	Lucky Friday Silver-Lead Mines, Inc.....	Lead-zinc.
16	Madison.....	Southeastern Missouri.....	Missouri.....	National Lead Co.....	Lead-copper.
17	Eagle.....	Red Cliff (Battle Mountain).....	Colorado.....	The New Jersey Zinc Co.....	Copper-lead-zinc.
18	Mine La Motte.....	Southeastern Missouri.....	Missouri.....	St. Joseph Lead Co.....	Lead.
19	Mayflower.....	Blue Ledge.....	Utah.....	New Park Mining Co.....	Lead-zinc.
20	Grandview.....	Metalline.....	Washington.....	American Zinc, Lead & Smelting Co.....	Do.
21	Richmond-Eureka.....	Eureka.....	Nevada.....	Eureka Corp., Ltd.....	Lead.
22	Austinville.....	Austinville.....	Virginia.....	The New Jersey Zinc Co.....	Zinc-lead.
23	Sunshine.....	Coeur d'Alene.....	Idaho.....	Sunshine Mining Co.....	Silver.
24	Sidney.....	do.....	do.....	Sidney Mining Co.....	Lead-zinc.
25	San Xavier.....	Pima.....	Arizona.....	McFarland & Hullinger.....	Do.

LEAD

TABLE 6.—Mine production of recoverable lead in short tons

Month	1957	1958	
January.....	30,218	26,123	August.....
February.....	29,081	23,827	September.....
March.....	30,962	18,440	October.....
April.....	31,700	25,896	November.....
May.....	30,104	24,628	December.....
June.....	27,366	22,981	
July.....	27,306	21,142	Total.....

SMELTER AND REFINERY P

Refined lead produced in the United States from domestic mine production, imported bullion, and scrap material (treated largely as bullion). It was recovered at primary refineries and at small quantities of scrap and at secondary refineries. Refined lead and antimony were produced by both primary and secondary sources. A large quantity of hard lead (such as battery lead) was produced by secondary smelters, the output from this type of lead being principally antimonial lead.

The list of primary smelters and refineries in the United States in 1958 was unchanged in the first half of the year. The Midvale plant of United States Smelting and Refining Co. was shut down during the last half. On the other hand, the plant was closed early in the year.

Refined Lead—Primary and Secondary.—A total of 470,200 tons of refined lead was produced in the United States in 1958. From this total, 322,271 tons of refined lead and 47,400 tons of lead in antimony were produced.

Of the 470,200 tons of refined lead produced in 1958, 57 percent came from domestic ores and bullion (65 percent and 35 percent of the total). Approximately 35 percent of the ore imported came from Union of South Africa, and the remainder from other foreign sources.

Primary lead smelters also produced 1,177 tons of refined lead from scrap and secondary lead smelters produced 1,177 tons of refined lead from a total of 586,200 tons of refined and remelted lead.

TABLE 7.—Refined lead produced at primary refineries from source material, in short tons

Source	1949-53 (average)	1954
Refined lead:		
From domestic ores and base bullion.....	375,455	322,271
From foreign ores.....	91,688	164,863
From foreign base bullion.....	1,675	88
Total from primary sources.....	468,818	487,122
From scrap.....	7,971	5,066
Total refined lead.....	476,789	492,178
Average sales price per pound.....	\$0.152	\$0.137
Total calculated value of primary refined lead (thousands).....	\$144,944	\$133,359

¹ Excludes value of refined lead produced from scrap at primary refineries.

Antimonial Lead—Primary and Secondary.—Primary and secondary smelters produced 218,400 tons of antimonial lead in 1958 (199,400 tons lead content)—about 23 percent less than in 1957. Of the primary smelters output of 47,443 tons (lead content), 65 percent came from scrap most of which was battery-lead plates, 18 percent from primary domestic sources and 17 percent from foreign sources. Secondary smelters produced 152,000 tons (lead content) of antimonial lead, 22 percent less than in 1957. Of all lead- and tin-base scrap melted by all plants in 1958, 59 percent was battery lead plates, recovery from most of which was antimonial lead.

TABLE 8.—Antimonial lead produced at primary lead refineries in the United States

Year	Production (short tons)	Antimony content		Lead content by difference (short tons)			
		Short tons	Percent	From domestic ore	From foreign ore	From scrap	Total
1949-53 (average).....	57,049	4,247	7.5	10,430	6,915	35,457	52,802
1954.....	59,873	3,521	5.9	8,136	7,051	43,555	56,252
1955.....	64,044	3,555	5.6	8,259	9,327	45,993	60,489
1956.....	66,826	3,348	5.0	6,739	6,918	49,821	63,478
1957.....	67,786	3,064	4.5	10,271	9,599	44,852	64,722
1958.....	50,246	2,803	5.6	8,256	8,190	30,997	47,443

TABLE 9.—Stocks and consumption of new and old lead scrap in the United States in 1958, gross weight in short tons

Class of consumers and type of scrap	Stocks beginning of year ¹	Receipts	Consumption			Stocks end of year
			New scrap	Old scrap	Total	
Smelters and refiners:						
Soft lead.....	2,863	43,108	-----	43,026	43,026	2,945
Hard lead.....	1,900	15,523	-----	16,491	16,491	938
Cable lead.....	3,273	25,765	-----	25,815	25,815	2,223
Battery-lead plates.....	17,497	320,027	-----	304,850	304,850	32,674
Mixed common babbitt.....	1,650	5,557	-----	6,148	6,148	1,160
Solder and tinny lead.....	315	11,330	-----	11,254	11,254	397
Type metals.....	1,561	24,801	-----	24,857	24,857	1,505
Drosses and residues.....	22,372	70,090	77,234	-----	77,234	15,228
Total.....	51,437	516,307	77,234	433,441	510,675	57,069
Foundries and other manufacturers:						
Soft lead.....	127	356	2	386	388	95
Hard lead.....	100	353	50	254	304	105
Cable lead.....	61	294	-----	321	321	34
Battery-lead plates.....	12	110	-----	10	10	112
Mixed common babbitt.....	183	8,200	-----	8,088	8,088	295
Solder and tinny lead.....	55	623	557	91	658	20
Type metals.....	-----	-----	-----	-----	-----	-----
Drosses and residues.....	365	180	238	-----	238	307
Total.....	909	10,126	857	9,150	10,007	1,028
Grand total:						
Soft lead.....	2,990	43,464	2	43,412	43,414	3,040
Hard lead.....	2,012	16,886	50	16,745	16,795	1,103
Cable lead.....	3,334	26,059	-----	27,136	27,136	2,257
Battery-lead plates.....	17,509	320,137	-----	304,860	304,860	32,786
Mixed common babbitt.....	1,833	13,857	-----	14,236	14,236	1,454
Solder and tinny lead.....	370	11,959	557	11,345	11,912	417
Type metals.....	1,561	24,801	-----	24,857	24,857	1,505
Drosses and residues.....	22,737	70,270	77,472	-----	77,472	15,535
Total.....	52,346	526,433	78,091	442,591	520,682	58,097

¹ Revised figures.

Other Secondary Lead.—In addition to the scrap as soft lead, and 183,000 tons recovered in lead (90,100 tons of lead was recovered in lead metals, babbitts and cable lead), 13,000 and a small quantity in tin-base alloys.

All secondary lead recovered in 1958 scrap totaled 402,000 tons, a decrease of 10 percent from 1957, and the lowest secondary lead and copper smelters recovered from primary lead smelters 8 percent, and from secondary lead smelters 2 percent.

TABLE 10.—Secondary metal recovered¹ from lead scrap in 1958, by type of products, gross weight in short tons

Products	Lead	Tin
Refined pig lead.....	93,415	-----
Remelt lead.....	22,642	-----
Lead foil.....	-----	-----
Total.....	116,057	-----
Refined pig tin.....	-----	3,-----
Remelt tin.....	-----	-----
Total.....	-----	3,-----
Lead and tin alloys:		
Antimonial lead.....	182,953	-----
Common babbitt.....	14,777	-----
Genuine babbitt.....	45	5,-----
Solder.....	20,719	2,-----
Type metals.....	29,832	-----
Cable lead.....	24,803	-----
Miscellaneous alloys.....	1,472	-----
Total.....	274,101	9,-----
Composition foil.....	37	-----
Tin content of chemical products.....	-----	-----
Grand total.....	890,195	14,-----

¹ Most of the figures herein represent actual reported recovery of metal content of shipments as in years before 1956.

TABLE 11.—Secondary lead recovered in the United States in 1958, by type of products, gross weight in short tons

	1949-53 (average)	1954
As refined metal:		
At primary plants.....	7,972	5,066
At other plants.....	135,534	114,941
Total.....	143,506	120,007
In antimonial lead:		
At primary plants.....	35,457	43,555
At other plants.....	182,113	195,284
Total.....	217,570	238,839
In other alloys:		
At primary plants.....	113,044	122,079
Grand total:		
Short tons.....	474,120	480,925
Value (thousands).....	\$144,132	\$131,773

TABLE 12.—Lead recovered from scrap processed in the United States, by kind of scrap and form of recovery, in short tons

Kind of scrap	1957	1958	Form of recovery	1957	1958
New scrap:			As soft lead:		
Lead-base.....	51,536	53,456	At primary plants.....	3,263	2,338
Copper-base.....	5,487	4,779	At other plants.....	123,808	118,719
Tin-base.....	323	283	Total.....	126,571	119,057
Total.....	57,346	58,518	In antimonial lead ¹	240,151	182,953
Old scrap:			In other lead alloys.....	95,132	90,069
Battery-lead plates.....	255,208	202,007	In copper-base alloys.....	27,279	12,673
All other lead-base.....	146,265	123,481	In tin-base alloys.....	96	45
Copper-base.....	30,404	17,795	Total.....	362,658	285,780
Tin-base.....	0	0	Grand total.....	489,229	401,787
Total.....	431,853	343,289			
Grand total.....	489,229	401,787			

¹ Includes 44,882 tons of lead recovered in antimonial lead from secondary sources at primary plants in 1957 and 30,997 tons in 1958.

CONSUMPTION AND USES

Domestic consumption of lead was 13 percent below the 1957 level, the lowest since 1949, and 20 percent below the peak of 1950. Of all lead consumed, 66 percent was soft lead, primary and secondary; 24 percent was lead content of antimonial lead; 4 percent was lead in alloys; 1.5 percent was lead in copper-base scrap; 4 percent was lead content of scrap which went directly to an end product; and 0.5 percent was lead recovered from ore in the production of leaded zinc oxide and other pigments.

Monthly consumption varied from a low of 72,100 tons in February to a high of 92,600 tons in October but in only 1 month (December) did it surpass or even equal consumption in the comparable months of 1957.

Approximately 71 percent of all lead used went to the manufacture of metal products (including storage batteries), 10 percent was used in pigments, 16 percent in chemicals (including tetraethyl fluid), and 3 percent in miscellaneous and unclassified uses. Storage batteries accounted for 32 percent of all lead consumed, tetraethyl 16 percent, and cable covering 8 percent. These products together required 99,000 tons less than was consumed in 1957.

The Association of American Battery Manufacturers, Inc., reported shipment of 25.2 million units of batteries in 1958 or 3 percent less than the 25.9 million units shipped in 1957.

Nine States accounted for 72 percent of the total lead consumed (excluding scrap) in 1958: New Jersey used 14 percent, Illinois 11 percent, California 10 percent, Indiana 7 percent, New York 6 percent, Missouri and Pennsylvania each 5 percent, and Louisiana and Texas together 14 percent.

TABLE 13.—Consumption of lead in the United States, by product and type of metal

	1957	1958	
Metal products:			Pigment
Ammunition.....	42,609	40,216	W
Bearing metals.....	20,987	18,980	R
Brass and bronze.....	24,491	20,379	P
Cable covering.....	108,225	74,981	O
Calking lead.....	65,634	70,807	
Casting metals.....	12,072	8,074	
Collapsible tubes.....	10,316	8,432	
Foil.....	4,839	4,586	Chem
Pipes, traps, and bends.....	24,739	23,044	T
Sheet lead.....	27,474	25,104	M
Solder.....	70,884	59,653	
Terne metal.....	1,642	1,227	
Type metal.....	28,720	26,740	Misc
Total.....	448,948	382,822	A
Storage batteries:			C
Antimonial lead.....	185,617	159,795	L
Lead oxides.....	175,398	182,830	V
Total.....	361,015	312,725	Other

¹ Includes lead content of leaded zinc oxide and other pigments.
² Includes lead which went directly from scrap to fabrication.

TABLE 14.—Consumption of lead in the United States, by month

Month	1957	1958	
January.....	102,952	82,385	Aug
February.....	95,788	72,096	Sept
March.....	98,822	77,723	Oct
April.....	96,189	79,969	Nov
May.....	96,443	76,214	Dec
June.....	92,100	81,131	
July.....	85,669	80,635	

¹ Includes lead content of leaded zinc oxide and other pigments to fabricated products.

TABLE 15.—Consumption of lead in the United States, by product and types of metal

	Soft lead	Antimonial lead
Metal products.....	221,128	
Storage batteries.....	182,930	
Pigments.....	90,610	
Chemicals.....	162,635	
Miscellaneous.....	8,784	
Unclassified.....	15,638	
Total.....	651,825	

¹ Excludes 35,883 tons of lead that went directly from scrap to fabrication contained in leaded zinc oxide and other pigments.

TABLE 16.—Lead consumption, by States, in 1958, in short tons¹

State	Refined soft lead	Lead in antimonial lead	Lead in alloys	Lead in copper-base scrap	Total
California.....	67,220	22,108	3,217	898	93,443
Colorado.....	1,300	1,279	121	213	2,913
Connecticut.....	12,209	9,874	16	1,070	23,169
District of Columbia.....	109	77			186
Florida.....	1,938	2,882			4,820
Illinois.....	68,330	28,252	5,807	2,499	104,888
Indiana.....	40,847	28,237	2,475	982	69,021
Kansas.....	4,371	7,497	21	330	12,219
Kentucky.....	12	2,245	1		2,258
Maryland.....	8,590	8,415	714		17,720
Massachusetts.....	5,242	3,594	528	371	9,735
Michigan.....	8,873	8,359	1,155	508	18,895
Missouri.....	39,372	2,616	174	1,221	43,383
Nebraska.....	11,257	3,200		38	14,495
New Jersey.....	101,753	20,674	7,480	574	130,481
New York.....	44,622	7,989	6,005	922	59,538
Ohio.....	20,063	13,622	3,180	1,084	38,949
Pennsylvania.....	29,003	19,081	757	2,045	50,886
Rhode Island.....	4,434	255	93		4,782
Tennessee.....	510	5,199	307	318	6,334
Virginia.....	2,048	958	715	981	4,702
Washington.....	8,501	2,844	20		12,371
West Virginia.....	13,320	2,677			16,006
Wisconsin.....	708	2,833	80	105	3,726
Alabama and Georgia ²	21,122	8,773	858	621	31,374
Iowa and Minnesota.....	1,834	5,208	1,049	267	8,448
Montana and Idaho.....	10,967				10,967
New Hampshire, Maine, and Delaware.....	3,678	945	959	237	5,819
Arkansas and Oklahoma.....	1,990	1,515	12		3,523
Hawaii and Oregon.....	826	2,138		170	3,134
North and South Carolina.....	67	2,359			2,426
Louisiana and Texas.....	115,556	11,270	1,255	354	128,435
Utah, Nevada, and Arizona.....	90	617			713
Undistributed.....	378	282			660
Total.....	651,625	241,544	36,705	15,489	945,363

¹ Excludes 35,833 tons of lead which went directly from scrap to fabricated products and 5,141 tons of lead contained in leaded zinc oxides and other pigments.

² The following States are grouped to avoid disclosure of individual figures.

LEAD PIGMENTS⁴

A mixed trend was experienced in the major lead-pigment-consuming industries, the overall effect of which was a decline in shipments of the reported pigments; the production of automobiles and trucks and consumption of rubber declined 29 and 7 percent, respectively, but construction and production of paints increased over 1957.

TABLE 17.—Salient statistics of the lead pigments¹ industry of the United States

	1949-53 (average)	1954	1955	1956	1957	1958
Shipments:						
White lead (dry and in oil).....short tons.....	32,165	25,671	25,575	25,698	23,574	18,360
Red lead.....do.....	31,510	27,163	29,272	27,975	26,998	21,992
Litharge.....do.....	149,766	139,877	148,511	131,525	100,788	92,165
Black oxide ².....do.....	73,892	79,233	118,874	106,956	127,583	120,324
Value of lead pigments.....	\$72,845,600	\$61,766,000	\$60,133,000	\$67,106,000	\$54,148,000	\$39,442,000
Value per ton received by producers:						
White lead (dry).....	377	883	392	413	416	388
Red lead.....	347	323	342	364	384	289
Litharge.....	325	303	326	346	321	277
Foreign trade:						
Value of exports.....	964,600	872,000	978,000	1,105,000	1,404,000	1,094,000
Value of imports.....	550,200	149,000	195,000	1,465,000	1,895,000	1,759,000
Export balance.....	414,400	723,000	781,000	-359,000	-492,000	-665,000

¹ Excludes basic lead sulfate; figure withheld to avoid disclosing individual company confidential data.

² Revised figure.

³ Production.

⁴ Prepared by Arnold M. Lansche, commodity specialist and Esther B. Miller, statistical assistant.

Production and Shipments.—Lead consumed lead pigments totaled about 235,000 tons compared in 1957, a decline of 11 percent.

White lead, red lead, litharge, and black refined lead and constituted 99 percent of all. The lead content of leaded zinc oxide made percent. Basic lead sulfate is not reported here. Lead zinc oxide; lead silicate, inasmuch litharge, is included with litharge.

A list of lead pigment manufacturer plants

Manufacturer:

White lead:

Euston Lead Co.....	Scr
W. P. Fuller & Co.....	Sou
John R. MacGregor Lead Co.....	Ch
National Lead Co.....	Ch
Do.....	Oa
Do.....	Per
Do.....	Ph
Do.....	St.

Red lead and litharge:

Bunker Hill Co., The.....	Sea
Eagle-Picher Co., The.....	Jop
W. P. Fuller & Co.....	Sou
Hammond Lead Products Co.....	Ha
Linklater Co.....	Mo
John R. MacGregor Lead Co.....	Atl
National Lead Co.....	Br
Do.....	Ch
Do.....	Ch
Do.....	Da
(Morris P. Kirk & Son).....	Lo
National Lead Co.....	Oa
Do.....	Per
Do.....	Ph
Do.....	St.
Western Lead Products.....	Lo

Black oxide:

Bunker Hill Co., The.....	Sea
Eagle-Picher Co.....	Jop
Electric Auto-Lite Battery Corp.....	At
Do.....	Ni
Do.....	Oa
Do.....	Ok
Do.....	Ov
Do.....	Vi
Electric Storage Battery Co., The.....	Ph
General Motors Corp. (Delco-Remy Div.).....	De
Gould National Batteries.....	St.
Hammond Lead Products, Inc.....	Ha
Linklater Co.....	Mo
Price Battery Corp.....	Ha
Standard Electric Co.....	Se
Western Lead Products Co.....	Lo
Willard Storage Battery Co.....	Ch
Do.....	De

¹ Plant closed May 9, 1958.

TABLE 18.—Production and shipments of lead pigments¹ in the United States

Pigment	1957				1958			
	Production (short tons)	Shipments			Production (short tons)	Shipments		
		Short tons	Value ¹			Short tons	Value ¹	
			Total	Average			Total	Average
White lead:								
Dry.....	15,280	14,898	\$6,193,571	\$416	12,760	12,589	\$4,883,065	\$388
In oil ²	7,494	8,676	4,072,920	469	5,548	5,771	2,692,295	467
Red lead.....	27,094	26,998	9,566,096	354	21,834	21,992	6,363,384	289
Litharge.....	106,312	106,788	34,315,347	321	92,070	92,165	25,603,104	277
Black oxide.....	127,583				120,324			

¹ Except for basic lead sulfate and orange mineral; figures withheld to avoid disclosing individual company confidential data.

² At plant, exclusive of container.

³ Weight of white lead only, but value of paste.

⁴ Revised figure.

TABLE 19.—Lead pigments¹ shipped by manufacturers in the United States, in short tons

Year	White lead			Red lead	Litharge	Black oxide ²
	Dry	In oil	Total			
1949-53 (average).....	20,029	12,136	32,165	31,610	149,756	73,892
1954.....	17,235	8,336	25,571	27,163	139,877	70,233
1955.....	17,858	7,717	25,575	29,272	148,511	113,874
1956.....	17,448	8,250	25,698	27,976	131,525	106,956
1957.....	14,898	8,676	23,574	25,998	106,788	127,883
1958.....	12,589	5,771	18,360	21,992	92,165	120,324

¹ Excludes basic lead sulfate and orange mineral; figures withheld to avoid disclosing individual company confidential data.

² Production by battery manufacturers.

³ Revised figure.

TABLE 20.—Lead content of lead and zinc pigments¹ produced by domestic manufacturers, by sources, in short tons

Pigment	1957				1958			
	Lead in pigments produced from—			Total lead in pigments	Lead in pigments produced from—			Total lead in pigments
	Ore		Pig lead		Ore		Pig lead	
	Domestic	Foreign			Domestic	Foreign		
White lead.....			18,219	18,219			14,646	14,646
Red lead.....			24,561	24,561			19,883	19,883
Litharge.....			98,870	98,870			85,625	85,625
Black oxide.....			124,109	124,109			115,228	115,228
Leaded zinc oxide.....	3,231	1,253		4,484	2,675	727		3,402
Total.....	3,231	1,258	205,759	270,243	2,675	727	235,882	238,784

¹ Excludes lead in basic lead sulfate and orange mineral; figures withheld to avoid disclosing individual company confidential data.

² Revised figure.

Consumption and Uses—White Lead.—Paintmaking required 83 percent of the white lead shipments in 1958 compared with 82 percent in 1957. Shipments to ceramics makers furnished 1 percent of total distribution in 1958. Other uses for the pigments were as plasticizers, stabilizers, base for dry colors, and unspecified purposes.

LEAD

A substantial part of the unspecified under paint.

Basic Lead Sulfate.—Substantial quantities as an intermediate product in production.

Red Lead.—The paint industry received 4 percent, oil refining 3 percent, rubber 88 percent was classified as "Other" which consisted of storage batteries, ceramics, insecticides, floor covering lead chemicals, and unspecified uses.

Orange Mineral.—No production of this mineral in 1958.

Litharge.—Battery makers continued to ship to industry; chrome pigments 4 percent, oil refining 3 percent, rubber 88 percent was classified as "Other" which consisted of storage batteries, ceramics, insecticides, floor covering lead chemicals, and unspecified uses.

Battery makers produced 120,000 tons of lead, mostly termed black or gray suboxide, for filling the interstices of battery plates.

TABLE 21.—Distribution of white lead (dry and in oil) in short tons

Industry	1949-53 (average)	1954	1955
Paints.....	20,835	20,929	19,883
Ceramics.....	1,224	487	1,207
Other.....	4,106	14,155	1,207
Total.....	32,165	25,571	22,297

¹ Excludes basic lead sulfate; figures withheld to avoid disclosing individual company confidential data.

² Includes the following tonnages for plasticizers and stabilizers: 1,207 tons for plasticizers and 1,207 tons for stabilizers.

³ Figures for plasticizers and stabilizers withheld to avoid disclosing individual company confidential data.

TABLE 22.—Distribution of red-lead shipments in short tons

Industry	1949-53 (average)	1954	1955
Paints.....	13,230	12,568	12,568
Storage batteries.....	14,827	12,062	12,062
Ceramics.....	799	1,207	1,207
Other.....	2,645	1,326	1,326
Total.....	31,510	27,163	27,163

¹ Included with "Other."

TABLE 23.—Distribution of litharge shipments in short tons

Industry	1949-53 (average)	1954	1955
Storage batteries.....	95,658	94,656	94,656
Ceramics.....	20,143	17,118	17,118
Chrome pigments.....	9,377	4,335	4,335
Varnish.....	4,741	4,162	4,162
Insecticides.....	5,845	2,501	2,501
Oil refining.....	5,340	5,771	5,771
Rubber.....	2,285	1,768	1,768
Floor coverings.....	690	596	596
Other.....	6,177	10,966	10,966
Total.....	149,756	139,877	139,877

¹ Included with "Other."

² Revised figure.

Prices.—The quoted price of white lead ranged from 16.50 to 17.75 cents a pound or \$330 to \$355 a ton; average value of shipments for dry white lead was \$388 down \$28 from 1957, the in oil variety was off \$2 to \$467 a ton. The quoted price of red lead ranged from 14.00 to 16.25 cents a pound (\$280 to \$325 a ton); average value of shipments for red lead was \$289 off \$65 from 1957. The quoted price of litharge ranged from 13.25 to 15.75 cents a pound (\$265 to \$315 a ton); average value of shipments for litharge was \$277 off \$44 from 1957.

Foreign Trade.—Imports of lead pigments and salts declined 7 percent in value and less than 1 percent in quantity, below 1957. Imports of white lead were nearly eight times greater than in 1957 and closely approached the 814-ton average for the period 1949-53. Imports of red lead and litharge declined 75 percent, and 5 percent, respectively, below 1957.

Exports of lead pigments and salts declined in value and quantity 9 and 1 percent, respectively, below 1957. Exports of lead arsenate increased 73 percent above 1957.

TABLE 24.—Value of lead pigments and salts imported into and exported from the United States

(Bureau of the Census)

	Imports for consumption			Exports		
	1956	1957	1958	1956	1957	1958
Lead pigments:						
White lead.....	\$5,980	\$25,508	\$235,725	\$199,528	\$272,363	\$1,094,509
Red lead.....	30,705	60,040	13,243	147,517	242,166	(¹)
Litharge.....	² 1,388,733	1,794,078	1,509,165	758,978	838,686	(¹)
Other lead pigments.....	30,241	16,961	694	(¹)	(¹)	(¹)
Total.....	² 1,484,660	1,896,587	1,758,827	(¹)	(¹)	(¹)
Lead salts:						
Lead arsenate.....				675,745	231,495	412,411
Other lead compounds.....	65,610	15,003	10,770	22,574	18,332	(¹)
Total.....	65,610	15,003	10,770	698,319	249,827	412,411
Grand total.....	² 1,550,270	1,911,590	1,769,597	(¹)	(¹)	(¹)

¹ Beginning Jan. 1, 1958, exports not separately classified.

² Data known to be not comparable to other years.

³ Data not available.

TABLE 25.—Lead pigments and salts imported for consumption in the United States

(Bureau of the Census)

Year	Short tons							Total value
	White lead (basic carbonate)	Red lead	Litharge	Lead suboxide	Lead pigments n.s.p.f.	Lead arsenate	Other lead compounds	
1949-53 (average) ..	814	62	529	27	7	18	46	\$575,538
1954.....		2	596	25			86	1,100,477
1955.....		3	751	34	6		852	250,615
1956.....	20	118	5,371	78			259	1,530,270
1957.....	92	255	8,118	33	1		63	1,911,590
1958.....	724	64	7,712		2		55	1,769,597

¹ Data known to be not comparable with other years.

LEAD

TABLE 26.—Lead pigments and salts exported (Bureau of the Census)

Year	Short tons		
	White lead	Red lead	Litharge
1949-53 (average).....	755	606	1,2
1954.....	951	335	1,2
1955.....	957	825	1,4
1956.....	654	352	2,0
1957.....	812	622	2,8
1958.....			1,446

¹ Beginning Jan. 1, 1958, not separately classified.

² Data not available.

STOCKS

Producers' Stocks.—Stocks of lead at primary smelters which in 1957 had reached the highest point in the survey in 1943, increased by 90,400 tons. Although small gains occurred in stocks of lead in bullion and stocks of lead in ore and concentrates, refined lead was added to inventories of refined lead was added to inventories of refined lead. Data represent physical inventories at the ownership, and do not include material in process at refineries and about 35,000 tons of bullion in transit to refineries, 1 process at refineries and about 35,000 tons of bullion in transit to refineries, 1 smelters—a total of nearly 300,000 tons of lead in stock at these plants.

Consumers' Stocks.—Consumers' and secondary stocks of lead decreased 5 percent with all classes of lead.

TABLE 27.—Stocks of lead at primary smelters and secondary stocks at end of year, in short tons

	1949-53 (average)	1954
Refined pig lead.....	40,935	78,928
Lead in antimonial lead.....	9,221	13,253
Lead in base bullion.....	11,859	14,834
Lead in ore and matte.....	45,238	29,924
Total.....	107,253	137,939

TABLE 28.—Consumer stocks of lead in the United States, in short tons, lead

Year	Refined soft lead	Antimonial lead	Unmelted white scrap
1954.....	82,039	17,573	3,199
1955.....	73,480	23,081	2,914
1956.....	73,673	40,226	
1957.....	80,708	39,375	
1958.....	76,924	37,611	

¹ Beginning 1956, consumer stocks of scrap were added to secondary stocks.

ZINC PIGMENTS AND SALTS¹⁰

Production and Shipments.—Production of the principal zinc pigments, of zinc and leaded zinc oxide, and of the principal zinc salts, zinc chloride and zinc sulfate, was adequate for all the requirements of the domestic market.

Production of lead-free zinc oxide and the leaded variety was down 13 percent and 14 percent, respectively, from 1957 output. The reduced output of lead-free zinc oxide resulted from cutbacks of 7 percent in rubber manufacture. Zinc chloride and zinc sulfate production increased 4 percent and 2 percent, respectively, owing to moderate gains in building activity.

The pigments and salts were manufactured from various zinc-bearing materials, including ore, slab zinc, scrap, and residues. The zinc in pigments and salts produced directly from ore exceeded 83,000 tons, that in zinc oxide and zinc chloride produced from slab zinc exceeded 13,100 tons, and zinc in pigments and salts produced from scrap zinc exceeded 35,700 tons.

Lead-free zinc oxide was made by several processes; 66 percent was produced from ores and residues by the American process, 24 percent from metal by the French process, and 10 percent by "Other" processes from scrap residues and scrap materials. Leaded zinc oxide was made from ores, zinc chloride from slab zinc and secondary zinc materials, and zinc sulfate from ore and scrap zinc materials.

Three grades of leaded zinc oxide classified according to lead content were produced. There was no production of 5 percent or less leaded zinc oxide reported; the more-than-5- through 35-percent

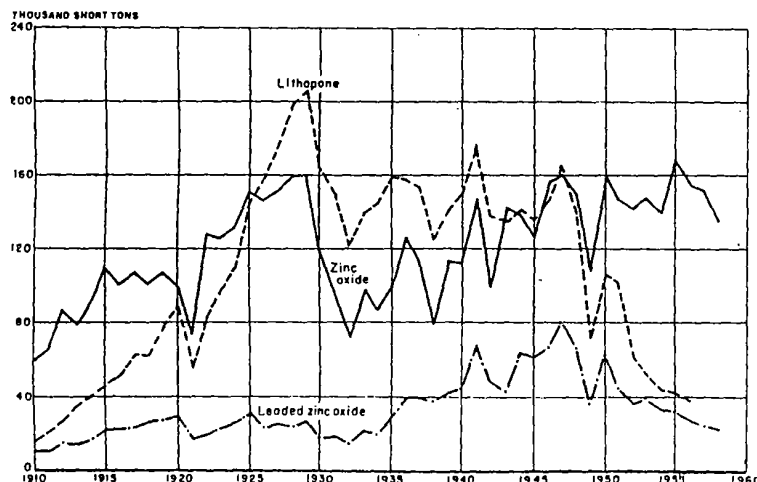


FIGURE 2.—Trends in shipments of zinc pigments, 1910-58.

¹⁰ Prepared by Arnold M. Lonsche, commodity specialist and Esther B. Miller, statistical assistant.

ZINC

TABLE 18.—Salient statistics of the zinc pigments¹ industry

	1949-53 (average)	1954	1955
Shipments:			
Zinc oxide.....short tons..	141,903	140,285	168,841
Leaded zinc oxide.....do....	44,628	33,972	32,601
Value of pigments.....dollars..	61,809,000	50,438,000	58,031,000
Value per ton received by producers:			
Zinc oxide.....dollars.....	276	255	258
Leaded zinc oxide.....do....	278	258	259
Foreign trade:			
Value of imports.....do.....	454,820	475,913	685,186
Value of exports.....do.....	1,845,149	897,055	771,021
Export balance.....do.....	1,390,329	421,162	80,435

¹ Excludes lithopone; figure withheld to avoid disclosing individual company data.
² Due to changes in tabulating procedures by the U. S. Department of Commerce, comparable to earlier years.

grade constituted the bulk of production; smelted zinc oxide produced in the more-than-35- through 50-percent grades. Total shipments of leaded zinc oxide were 4 percent below 1957. Output in 1958 (compared with 1957) for the 35-percent lead and under grades, and 680 (1,600) tons of over 35-percent lead.

Both ordinary lithopone and high strength lithopone were made.

A list of zinc pigment manufacturers and their products is given below:

Manufacturer:	
Zinc chloride:	
American Cyanamid Co.....	
American Smelting & Refining Co.....	
Do.....	
Do.....	
Do.....	
Chemical & Pigment Co., The.....	
Chemicals Inc.....	
E. I. du Pont de Nemours & Co.....	
Do.....	
Jordan Co.....	
Mallinckrodt Chemical Works.....	
Marathon Battery Co.....	
Maryland Pigment & Research Co.....	
Zinc sulfate:	
Bunker Hill Co.....	
Chemical & Pigment Co., The.....	
E. I. du Pont de Nemours & Co.....	
Eagle-Picher Co., The.....	
Mallinckrodt Chemical Works.....	
Maryland Pigment & Research Co.....	
Merck & Co., Inc.....	
Sherwin-Williams Co., The.....	
Tennessee Corp.....	
Virginia Smelting Co.....	
Zinc oxide and leaded zinc oxide:	
American Chemet Corp.....	
American Zinc Co. of Illinois.....	
American Zinc Oxide Co.....	
Chemical & Pigment Co., The.....	
Eagle-Picher Co., The.....	
Do.....	
Monsanto Chemical Co.....	

Manufacturer—Continued

Zinc oxide and leaded zinc oxide—Continued

New Jersey Zinc Co.	Palmerton, Pa.
Pacific Smelting Co.	Torrance, Calif.
Rohm & Haas Co.	Bristol, Pa.
Royce Chemical Co.	Carlton Hill, N.J.
St. Joseph Lead Co.	Josephstown, Pa.
Sherwin, Williams Co., The.	Coffeyville, Kans.
Superior Zinc Corp.	Bristol, Pa.
United Industrial & Chemical Corp.	Bayonne, N.J.

Combined shipments of lead-free and leaded zinc oxide approximated 159,000 tons, 9 percent below 1957; shipments of the two zinc salts reported on approximated 99,500 tons, up 8 percent. Shipments of lead-free zinc oxide and the leaded variety declined 10 and 4 percent, respectively. Shipments of zinc chloride increased 12 percent; there was a slight increase for zinc sulfate. Value of shipments of lead-free zinc oxide declined \$1 per ton to \$270, leaded zinc was up \$14 to \$263, zinc chloride increased \$6 to \$133, and zinc sulfate was down \$14 to \$146 compared with 1957.

Consumption.—Lead-free zinc oxide.—Total zinc oxide shipments were 10 percent below 1957, primarily because of a reduction of 17 percent in the requirements of the rubber industry which normally consumes half of all zinc oxide. Shipments of zinc oxide to the coated fabrics and textiles, floor covering, and other industries

TABLE 19.—Production and shipments of zinc pigments and salts¹ in the United States

Pigment or salt	1957				1958			
	Production (short tons)	Shipments			Production (short tons)	Shipments		
		Short tons	Value ¹			Short tons	Value ¹	
			Total	Average			Total	Average
Zinc oxide ²	152,730	151,267	\$41,007,424	\$271	132,504	135,091	\$30,671,702	\$270
Lended zinc oxide ²	26,420	24,203	6,028,233	249	22,844	23,288	6,125,033	263
Zinc chloride, 50° B.	61,180	58,559	7,455,739	127	63,503	65,761	8,754,543	133
Zinc sulfate	33,752	33,020	5,368,063	160	34,513	33,737	4,927,162	146

¹ Excludes lithopone; figure withheld to avoid disclosing individual company confidential data.

² Value at plant, exclusive of container.

³ Zinc oxide containing 5 percent or more lead is classed as leaded zinc oxide. In this table data for leaded zinc oxide include a small quantity containing less than 5 percent lead.

TABLE 20.—Zinc pigments and salts¹ shipped by manufacturers in the United States, in short tons

Year	Zinc oxide	Leaded zinc oxide	Zinc chloride (50° B.)	Zinc sulfate
1949-53 (average)	141,003	44,528	58,001	21,862
1954	140,285	33,972	48,262	19,027
1955	108,541	32,061	54,161	23,864
1956	154,055	27,161	53,201	32,200
1957	151,267	24,203	58,559	33,020
1958	135,091	23,288	65,761	33,737

¹ Excludes zinc sulfide and lithopone, figures withheld to avoid disclosing individual company confidential data.

ZINC

TABLE 21.—Zinc content of zinc pigments¹ and salts² by manufacturers, by sources, in short tons

Pigment or salt	1957					Zinc oxide
	Zinc in pigments and salts produced from—				Total zinc in pig- ments and salts	
	Ore		Slab zinc	Second- ary ma- terial ³		Ore
	Do- mestic	For- eign				
Zinc oxide.....	61,309	10,300	19,423	22,129	122,251	60,096
Leaded zinc oxide..	9,599	6,334	-----	-----	15,933	9,164
Total pig- ments.....	-----	-----	19,423	22,129	138,184	69,260
Zinc chloride.....	-----	-----	(⁴)	13,873	13,873	-----
Zinc sulfate.....	(⁴)	(⁴)	-----	11,948	11,948	(⁴)

¹ Excludes zinc sulfide and lithopone; figures withheld to avoid disclosing individual company confidential data.

² These figures are higher than those shown in the report on Secondary include zinc recovered from byproduct sludges, residues, etc., not classified as waste.

³ Figure withheld to avoid disclosing individual company confidential data.

declined to 2,300 tons, 971 tons, and 22,000 tons, respectively, in 1958.

Shipments of zinc oxide to the paints and coatings industry increased 2 percent and 8 percent, respectively, over 1957.

Leaded Zinc Oxide.—Paint manufacturing used leaded zinc oxide. Rubber and miscellaneous uses accounted for the remainder.

Lithopone.—Lithopone was used in the paint and coatings industry, and in coated fabrics, rubber, floor covering, and printing inks.

Zinc Chloride.—Statistics on end-use distribution are not available. The principal uses of the salt are in tinning fluxes, battery making, galvanizing, preserving wood, refining oil, and fungicides.

Zinc Sulfate.—Rayon and agriculture were the principal uses of zinc sulfate, receiving 60 and 33 percent of total shipments, respectively. The remainder was consumed in varnish processing, flotation reagents, glue manufacturing, and medicinal trade.

Prices.—The quoted price of lead-free zinc oxide declined from 14.50 cents a pound to 16.75 cents, carlots the average value of shipments of this common variety was \$1 less than 1957. Leaded zinc oxide average value was \$263 a ton up \$14 compared with 1957; the price of leaded zinc oxide ranged from 15.13 to 15.50 cents, carlots (about 100 tons) to \$133. Zinc sulfate shipments declined in value in 1958.

Foreign Trade.—Imports of zinc pigments and salts increased in value and quantity 89 and 90 percent, respectively, over 1957. Pigments and salts imported totaled about 13,000 tons, quantity imported since 1922. Zinc oxide comprised about 80 percent of these imports.

TABLE 22.—Distribution of zinc oxide shipments, by industries, in short tons

Industry	1949-53 (average)	1954	1955	1956	1957	1958
Rubber.....	72,832	71,058	86,677	80,450	81,745	68,176
Paints.....	32,437	31,157	33,932	32,485	32,005	33,335
Ceramics.....	9,821	8,980	10,617	10,160	8,459	9,086
Coated fabrics and textiles ¹	6,750	6,322	11,263	8,447	3,623	2,327
Floor coverings.....	2,810	1,740	2,281	1,430	1,240	971
Other.....	17,744	21,009	23,771	21,968	23,580	22,067
Total.....	141,003	140,285	168,541	154,955	151,267	135,991

¹ Includes the following tonnages for rayon: 1954—8,803; 1955—5,709 (revised); 1956—7,721; 1957—2,538; 1958—1,140.

TABLE 23.—Distribution of leaded zinc oxide shipments, by industries, in short tons

Industry	1949-53 (average)	1954	1955	1956	1957	1958
Paints.....	48,000	33,090	32,178	26,825	23,904	22,021
Rubber.....	99	7	483	339	209	267
Other.....	529	275				
Total.....	44,528	33,972	32,661	27,164	24,203	22,288

TABLE 24.—Distribution of zinc sulfate shipments by industries, in short tons

Year	Rayon		Agriculture		Other		Total	
	Gross weight	Dry basis	Gross weight	Dry basis	Gross weight	Dry basis	Gross weight	Dry basis
1949-53 (average).....	9,814	7,726	8,540	4,732	6,409	4,846	21,862	17,304
1954.....	6,615	5,740	7,067	6,139	5,345	4,278	19,027	16,157
1955.....	10,732	9,537	8,187	7,080	4,046	3,723	23,864	20,348
1956.....	21,083	18,825	7,051	6,201	4,060	3,190	32,200	28,306
1957.....	19,903	17,785	9,818	8,261	3,899	3,405	33,620	29,511
1958.....	19,706	17,747	11,628	9,819	2,416	2,191	33,737	29,767

TABLE 25.—Value of zinc pigments and salts imported into and exported from the United States

	Imports for consumption			Exports		
	1956	1957	1958	1956	1957	1958
Zinc pigments:						
Zinc oxide.....	\$770,180	\$1,043,629	\$2,263,865	\$846,883	\$985,325	\$780,995
Zinc sulfide.....	186,675	104,930	91,273	(¹)	(¹)	(¹)
Lithopone.....	10,931	8,124	9,307	239,892	177,891	122,462
Total.....	\$946,786	\$1,156,683	\$2,364,445	\$1,086,775	\$1,163,216	\$912,457
Zinc salts:						
Zinc arsenite.....	2,570		3,770	(¹)	(¹)	(¹)
Zinc chloride.....	112,702	104,408	92,046	(¹)	(¹)	(¹)
Zinc sulfate.....	84,058	74,710	60,171	(¹)	(¹)	(¹)
Total.....	199,330	179,208	155,993	(¹)	(¹)	(¹)
Grand total.....	\$1,146,092	\$1,335,891	\$2,520,438	(¹)	(¹)	(¹)

¹ Data not available.

² Data known to be not comparable to other years.

ZINC

Exports declined in value and quantity 22 percent, compared with 1957. Exported zinc 19 percent, and lithopone down 38 percent.

TABLE 26.—Zinc pigments and salts imported for consumption, by States

Year	Short tons				
	Zinc oxide		Lithopone	Zinc sulfide	Zinc chloride
	Dry	In oil			
1949-53 (average).....	1,687	8	410	11	2
1954.....	2,348		65	108	2
1955.....	3,320		30	205	8
1956.....	3,667		143	810	0
1957.....	5,245		57	342	6
1958.....	11,720		69	295	5

¹ Less than 1 ton.

² Data known to be not comparable to other years.

TABLE 27.—Zinc pigments exported from the United States

Year	Short tons		Total value	Year
	Zinc oxide	Lithopone		
1949-53 (average).....	5,523	11,040	\$3,045,090	1956.....
1954.....	3,111	3,013	1,351,826	1957.....
1955.....	2,649	1,892	1,072,581	1958.....

STOCKS

National Stockpile.—Inventories in the Nation's beginning of 1958 equalled or exceeded the minimum level. During the year, inventories were nearing the long-term objective level. During the year of 1958, 34,488 tons of domestically produced zinc were shipped to Government for long-term objective. The total of all such shipments for 1945 through 1958 was 1,170,951 tons. GSA has acquired 294,307 tons of foreign zinc in 1958, under barter contracts with the Agricultural Trade Development and Assistance Act and amendments. The 294,307 tons acquired in 1958 were placed in the supplemental stockpile.

Producers' Stocks.—Smelters stocks of slab zinc at 155,800 tons and reached a peak of nearly 258,000 tons in July. Thereafter improved consumption and export quotas acted to reduce stocks to 184,000 tons by the end of the year.

¹ Kimberley, J. L. A Review of the Zinc Industry in the United States. American Zinc Institute, 60 East Forty-Second St., New York 16 pp.