L E A D A N D Z I N C I N D U S T R Y

STATISTICS FOR 1960 COMPARED WITH OTHER YEARS

ARIZONA, UNITED STATES AND FREE WORLD

COMPILED BY

ARIZONA DEPARTMENT OF MINERAL RESOURCES
FAIRGROUNDS,
PHOENIX 7, ARIZONA

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LEAD INDUSTRY

CONTENTS

L E A D

PHYSICAL PROPERTIES *

Lead is one of the most important industrial nonferrous metals used in substantial quantities in the metallic form; it is also important for the properties it imparts to its alloys.

Is the softest and heaviest of the common metals. It can be rolled to a foil of less than 0.0005 inches in thickness but is not ductile enough to be drawn into fine wire. Very malleable. Lead cannot be hardened except by alloying.

Some of the physical properties of lead are as follows:

Symbol - Pb. Atomic Weight - 207.21. Spec. Gravity - 11.34

Melting Point - 327.35°C (621.2°F). Boiling Point 1,740°C (3164°F)

Specific Resistance (20°- 40°C) (68°- 104°F) - Microhm 20.65

Hardness (Mohs' scale)- 1.5. Tensile Strength #/sq.in. - 3,000

Crystal Structure - Face-centred cubic. Valences - +4 & +2

* U.S.B.M.'s "MATERIALS SURVEY" - September, 1952

LEAD INDUSTRY IN 1960

Mineral Market Report MMS No. 3272

Prepared July 27, 1961 by G. Richards Gwinn and Edith E. den Hartog under the supervision of P. F. Yopes, Chief, Branch of Nonferrous Metals, Division of Minerals.

Increases in output of lead at primary refineries, lead recovered at secondary smelters, and lead-base and tin-base scrap consumed, and declines in mine output of recoverable lead, consumption, and in imports of metal, characterized the lead industry in 1960, according to the Bureau of Mines, United States Department of the Interior. Import quotas remained in effect throughout the year. The price of common grade lead (New York market) remained at 12 cents a pound until December 13 when it declined to 11 cents a pound. This latter price held through the remainder of the year. The import quotas established in October 1958 by Presidential proclamation continued without revision throughout 1960.

Production. - Mines in the United States produced 246,700 short tons of recoverable lead in 1960, the lowest domestic mine output reported since 1900. Production increased slightly through the first quarter, declined through the second quarter, turned upward in August, and then declined through the remainder of the year. Labor strikes in the Coeur d'Alene region of Idaho, beginning in May 1960, reduced national output 10 percent during the last 6 months of the year.

The four largest producing States were Missouri, 111,900 short tons, Idaho, 42,900 tons, Utah, 39,400 tons, and Colorado, 18,100 tons for a total of 212,300 tons -- 86 percent of the United States output. Missouri retained its place as the largest lead-mining State in the Nation. The output of lead from the mines of the Southeast Missouri Lead Belt represented about 45 percent of the United States total and was 6 percent above 1959. Idaho retained its position as the second largest lead producing State in the United States and as the largest in the Western States. Output, however, represented a decline of 31 percent from the 1959 total. The decrease was attributed largely to the seven-month labor strike which closed the Bunker Hill Company and American Smelting & Refining Company's (AS&R) mines in the Coeur d'Alene region.

The remaining 14 percent of United States output of lead came from 15 States. The major producers of this group with a combined output of 23,100 tons, about 9 percent of the total output, were Arizona, Washington, Montana, and New Mexico. States east of the Mississippi River, California and Nevada of the Western States, and Wisconsin, Kansas, and Oklahoma of the Mississippi Valley lead-zinc region accounted for the remaining 5 percent.

Domestic primary lead smelters and refineries produced 387,200 tons of refined lead and 28,700 tons of lead in antimonial lead. Lead content of primary raw materials consumed was 425,900 tons; that of scrap was 34,100 tons. Domestic ores were the source of 60 percent of the 382,400 tons of refined lead produced from primary sources, and foreign ores and bullion supplied 40 percent (66 and 34 percent, respectively, in 1959). Primary lead smelters also produced 4,800 tons of refined lead from scrap and secondary smelters 143,400 tons from scrap. Refined and remelt lead from all sources was 530,700 tons.

Antimonial lead production at primary and secondary smelters was 221,700 tons (207,900 tons lead content), 28,700 tons (lead content) from primary smelters and 179,200 tons from secondary smelters. Scrap was the source of 92 percent of the primary smelter output (mostly battery-lead plates), 4 percent came from domestic ores and 4 percent from foreign ores. Battery-lead plates accounted for 63 percent of the total lead-base scrap melted, and antomonial lead was the major product recovered.

Secondary lead recovered by all plants consuming lead-base and tin-base scrap totaled 470,000 tons -- an increase of 4 percent over 1959. Secondary lead smelters recovered 86 percent of the total in 236 plants, primary lead smelters 7 percent in 4 plants, and manufacturers, foundries and secondary copper smelters combined, 7 percent.

Consumption. - The relatively high level of industrial activity in the first quarter, combined with a substantial drawdown in domestic producer stocks of lead, gave rise to optimistic forecasts of rising consumption of lead metal. Monthly consumption through the first quarter confirmed the forecasts, but a downtrend began in the second quarter which continued through the third and fourth quarters. Consumption for the year was 6 percent below 1959. The development of competitive materials and technological improvements were partly responsible for the decline. Consumption decreased for all uses except tetraethyl lead, red lead and litharge, annealing and galvanizing, terne metal, type metal, and weights and ballast, which showed slight increases.

Soft lead, primary and secondary, accounted for 66 percent of the total consumed; 24 percent was lead content of antimonial lead; 4 percent was lead in alloys; 1.6 percent was lead in copper-base scrap; 4 percent was lead content of scrap which went directly to an end product; and 0.4 percent was lead recovered from ore in the production of leaded zinc oxide and other pigments. Monthly consumption varied throughout the year. The high of 91,100 tons and the low of 75,400 tons were reached in March and July, respectively.

Of all lead consumed during the year, 71 percent went to metal products, the largest quantity being for storage batteries (35 percent of all lead consumed), which took antimonial lead for grids and posts, and soft lead for oxides. The second largest quantity (16 percent) was used for chemicals, 98 percent of which was for tetraethyl lead. Lead pigments used approximately 10 percent, and about 76 percent of the lead used in pigments was for manufacturing red lead and litharge. The two largest uses of lead, batteries and tetraethyl lead, which together represented about 50 percent of the total consumption, were related directly to the automotive industry.

Nine states accounted for 74 percent of the total lead consumed (excluding scrap). New Jersey used 15 percent; Louisiana and Texas combined 13 percent; California and Illinois 10 percent each; Indiana 9 percent; Pennsylvania and Missouri 6 percent each; and New York 5 percent.

Stocks. - The decline in stocks of refined lead at primary producing plants, which began in March of 1959, continued through the first quarter of 1960 to a low of 95,400 tons on March 31. An upturn began in April, however, and continued through the remaining three quarters of the year. Yearend stocks, which represented physical inventories at the plants, irrespective of ownership, and did not include material in process or in transit, were 250,100 tons. Stocks reported by the American Bureau of Metal Statistics showed an additional 25,000 tons of bullion in process at or in transit to refineries and about 24,000 tons of ore in process at smelters -- a total of nearly 299,100 tons of primary raw materials in stocks at these plants.

Consumer and secondary smelter stocks of lead increased from 120,500 tons on January 31 to 128,200 tons on May 31, declined slightly in June, reached a peak of 128,400 tons by the end of August and then declined to 97,300 tons by the end of December. The yearend total was 23 percent below 1959.

Prices. - The quoted New York price for common lead was 12 cents a pound on January 1. This price held constant until December 13 when the price dropped to 11 cents and remained at that level to the end of the year. The weak domestic market caused by decreased consumption and increases in stock was largely responsible for the decline in prices.

Quotations on the London Metal Exchange ranged from a low of £61.75 per long ton on December 29 (equivalent to 7.74 cents a pound U.S. currency - computed on the average monthly rate of exchange) to a high of £78.50 (9.83 cents a pound) on May 24. The bid quotation on December 31 was £62.00 a long ton (7.77 cents a pound) and the average for the year £72.15 (9.04 cents a pound).

Imports. - General imports of lead were 12 percent under 1959. The decline was attributed partly to the failure of Peru and Mexico to meet import quota goals. Imports of ore and concentrate increased 5 percent, and bullion 266 percent, but pigs and bars, and scrap decreased 22 and 8 percent, respectively. About 57 percent of the lead imported was pigs and bars, 41 percent ores and concentrates, and the remaining 2 percent scrap and bullion. Mexico, Australia, Yugoslavia, Canada, and Peru were the major suppliers of lead metal. Imports of ores and concentrates were supplied largely by the Union of South Africa, Peru, Canada, and Australia.

Exports. - Total lead exported, although slightly more than in 1959, totaled only 5,843 tons. The increase was accounted for entirely by larger exports of scrap, ore, matte, and base bullion as exports of pigs and bars declined from 2,756 tons in 1959 to 1,967 tons in 1960.

Tariff. - The duties on pig lead and lead content of ores and concentrates remained 1-1/16 cents and 3/4 cent a pound, respectively. Duties on scrap were the same as on pig lead.

World Production. - World production of lead in 1960 was essentially equal to that of 1959 as voluntary curbs on output by some of the major free-world producing countries and United States import quotas continued in force. World smelter production was estimated at 2.6 million short tons and free-world consumption at 2.4 million tons, resulting in a further increase in stocks. This imbalance in supply and demand was one of the major problems of the free-world lead mining and refining industries. Demand for lead continued at a relatively strong rate in the European markets throughout the year and Soviet lead was admitted to trading on the London Metal Exchange during the year.

TABLE I

SALIENT U. S. LEAD STATISTICS FOR 1958, 1959 AND 1960

ARIZONA, UNITED STATES AND WORLD MINE PRODUCTION OF RECOVERABLE LEAD

Source: U. S. B. M. Unit: Short Tons

	Year 1958	Year 1959	Year 1960
Producers' Stocks Beginning of Period	143,916	234,290	171,079
U.S.Mine Production Recoverable Lead	267,377	255,586	246,669
Secondary Lead Recovered From Old & New Scrap ...	401,787	451,387	469,903
Imported Lead in Ore & Matte, Base Bullion	202,088	139,396	146,246
Imported Lead in Pigs, Bars	368,452	263,412	206,033
Imported Lead in Reclaimed Scrap, etc.	6,570	8,279	7,641
TOTAL SUPPLY	1,390,190	1,352,350	1,247,571
Producers' Stocks at End of Period	234,290	171,079	250,142
Exported Lead in Ore, Matte & Base Bullion	1,012	224	1,297
Exported Lead in Pigs and Bars	1,359	2,756	1,967
Exported Lead in Scrap	1,015	1,141	2,579
SUB-TOTAL	237,676	175,200	255,985
NET APPARENT CONSUMPTION	1,152,514	1,177,150	991,586
REPORTED CONSUMPTION	986,387	1,091,149	1,021,172
UNACCOUNTED FOR (Stockpiles, etc.)	166,127	86,001	29,586
PRODUCTION OF REFINED PRIMARY LEAD:			
From Domestic Ores & Base Bullion	269,082	225,270	228,899
From Foreign Ores & Base Bullion	201,074	115,661	153,537
ARIZONA MINE PRODUCTION	11,890	9,999	8,495
WORLD MINE PRODUCTION	2,560,000	2,530,000	2,560,000
U.S. MINE PRODUCTION AS % OF REPORTED CONSUMPTION	27.11%	23.42%	24.16%
MINE PRODUCTION & SECONDARY AS % OF " "	67.84%	64.79%	70.17%
AVG. PRICE OF LEAD - N. Y. (E. & M.J.)	12.109¢	12.211¢	11.948¢

Arizona Department of Mineral Resources September, 1961

TABLE II

MINE PRODUCTION OF RECOVERABLE LEAD IN THE UNITED STATES, BY STATES

Short Tons — Source: U.S.B.M.
Years 1951-55 Average, 1956,1957,1958,1959,1960

State	1951-55 (average)	1956	1957	1958	1959	1960
Alaska	6	1	9	2	-	23
Arizona	12,309	11,999	12,441	11,890	9,999	8,495
Arkansas	8	-	-	-	38	-
California	8,953	9,296	3,458	140	227	440
Colorado	23,157	19,856	21,003	14,112	12,907	18,080
Idaho	71,701	64,321	71,637	53,603	62,395	42,907
Illinois	3,718	3,832	2,970	1,610	2,570	3,000
Kansas	5,548	7,635	4,257	1,299	481	781
Kentucky	60	228	411	516	409	558
Missouri	125,901	123,783	126,345	113,123	105,165	111,948
Montana	18,876	18,642	13,300	8,434	7,672	4,879
Nevada	4,928	6,384	5,979	4,150	1,357	987
New Mexico	3,999	6,042	5,294	1,117	829	1,996
New York	1,256	1,608	1,667	579	481	775
North Carolina	-	10	9	-	-	424
Oklahoma	13,869	12,350	7,183	3,692	601	936
Oregon	3	5	5	1	-	-
South Dakota	3	-	-	-	-	-
Tennessee	8	5	-	-	-	-
Texas	20	-	-	-	-	-
Utah	47,521	49,555	44,471	40,355	36,630	39,398
Virginia	3,082	3,035	3,143	2,934	2,770	2,152
Washington	10,218	11,657	12,734	9,020	10,310	7,725
Wisconsin	1,739	2,582	1,900	800	745	1,165
Total	356,883	352,826	338,216	267,377	255,586	246,669

Arizona Department of Mineral Resources — September, 1961

TABLE III

WORLD MINE PRODUCTION OF RECOVERABLE LEAD, BY COUNTRIES

IN THOUSAND SHORT TONS

Source: U.S.B.M.

Year	U.S.	Mexico	Canada	Peru	Australia	Rest of Free World	Total Free World	Communist Controlled Countries	Total World (Estimated)
1956	353	220	189	142	335	682	1,921	569	2,490
1957	338	237	181	151	373	728	2,008	602	2,610
1958	267	223	186	148	366	728	1,918	642	2,560
1959	256	210	187	127	354	707	1,841	689	2,530
1960	247	210	205	142	341	708	1,853	707	2,560

TABLE IV

TOTAL LEAD IMPORTED INTO THE UNITED STATES, AND EXPORTED FROM U. S.

Source: Bureau of The Census — In Short Tons

	IMPORTS	EXPORTS	NET IMPORTS
Avg. 1948-1952	434,909	3,500	431,409
1953	552,278	4,547	547,731
1954	443,243	4,592	438,651
1955	462,208	4,720	457,488
1956	479,875	7,819	472,056
1957	532,055	6,130	525,925
1958	577,110	3,386	573,724
1959	411,087	4,121	406,966
1960	359,928	5,843	304,085

TABLE V

CONSUMPTION OF LEAD IN UNITED STATES

Source: U. S. B. M.

Year	Metal Products	Storage Batteries	Pigments	Tetra-ethyl Lead	Other Uses	Total
1950	515,527	398,409	166,387	113,846	43,329	1,237,981
1951	500,009	375,384	139,504	128,407	41,489	1,184,793
1952	476,542	350,930	122,299	146,723	34,301	1,130,795
1953	501,482	367,575	129,590	162,443	40,514	1,201,604
1954	442,384	337,272	116,409	160,436	38,370	1,094,871
1955	495,320	380,033	131,435	165,133	40,723	1,212,644
1956	489,586	370,771	120,370	191,990	37,000	1,209,717
1957	448,948	361,015	115,361	177,001	35,790	1,138,115
1958	382,822	312,725	95,901	159,412	35,527	986,387
1959	407,520	380,732	103,671	160,020	39,206	1,091,149
1960	369,731	353,196	98,541	163,826	35,878	1,021,172

TABLE VI

U. S. LEAD CONSUMPTION - YEARS 1958, 1959 & 1960

Source: U. S. B. M.

	1958	1959	1960
Metal Products:			
Ammunition	40,215	45,328	43,577
Bearing metals	18,980	23,298	20,717
Brass and bronze	20,379	24,264	20,485
Cable covering	74,981	61,626	60,350
Calking lead	70,807	80,091	66,527
Casting metals	8,674	8,395	7,023
Collapsible tubes	8,432	9,442	8,705
Foil	4,586	3,745	3,684
Pipes, traps and bends	23,044	24,825	22,119
Sheet lead	25,104	28,158	26,607
Solder	59,653	68,871	60,013
Storage battery grids, posts, etc.	159,795	187,284	175,458
Storage battery oxides	152,930	193,448	177,738
Terne metal	1,227	1,511	1,765
Type metal	26,740	27,966	28,159
Total	695,547	788,252	722,927
Pigments:			
White lead	13,589	10,955	8,432
Red lead and litharge	64,892	74,116	74,901
Pigment colors	11,853	13,827	11,445
Other 1/	5,567	4,773	3,763
Total	95,901	103,671	98,541
Chemicals:			
Tetraethyl lead	159,412	160,020	163,826
Miscellaneous chemicals	3,233	4,485	2,806
Total	162,645	164,505	166,632
Miscellaneous Uses:			
Annealing	5,114	5,129	5,153
Galvanizing	1,226	1,184	1,383
Lead Plating	438	302	218
Weights and ballast	7,577	8,748	9,045
Total	14,355	15,363	15,799
Other uses, unclassified	17,939	19,358	17,273
Total Reported 2/	986,387	1,091,149	1,021,172

1/ Includes lead content of leaded zinc oxide production.

2/ Includes lead content of scrap used directly in fabricated products.

Arizona Department of Mineral Resources September, 1961

TABLE VII

QUARTERLY IMPORTS AND EXPORTS OF LEAD INTO AND FROM UNITED STATES

YEAR 1960

Source: A.B.M.S., U.S. Dept. of Commerce

Country of Origin	1st Qtr. 1960	2nd Qtr. 1960	3rd Qtr. 1960	4th Qtr. 1960	Year 1960
Ore, Matte, etc. (Lead Content):	45,204	35,314	40,714	24,729	145,961
Canada	12,038	4,328	7,015	3,066	26,447
Mexico	384	280	298	286	1,248
Guatemala	-	1,705	176	-	1,881
Honduras	1,369	1,028	1,410	1,099	4,906
Colombia	12	341	-	353	706
Peru	8,304	7,799	9,978	10,294	36,375
Bolivia	2,015	2,185	3,633	1,189	9,022
Chile	1,176	-	106	-	1,282
Argentina	-	103	-	-	103
Philippines	78	43	22	71	214
Korea	25	-	176	74	275
Union of So. Africa	11,494	11,683	12,444	3,730	39,351
Australia	6,236	3,956	5,395	2,750	18,337
Morocco	1,763	1,795	-	1,805	5,363
Other Countries	310	68	61	12	451
Base Bullion	43	250	-	-	293
Canada	1	-	-	-	
Peru	40	-	-	-	
Mexico	2	250	-	-	
Pigs & Bars (lead content)	53,093	48,961	53,215	50,764	206,033
Canada	6,927	6,191	6,357	6,613	26,088
Mexico	21,310	13,891	17,317	17,413	69,931
Sweden	-	1,110	-	-	1,110
Peru	6,178	6,768	6,439	5,812	25,197
Denmark	-	-	-	-	-
United Kingdom	-	6	-	-	6
Netherlands	-	-	-	-	-
Belgium-Luxembourg	323	287	-	-	610
France	-	2	-	276	278
W. Germany	-	314	237	-	551
Spain	1,875	300	711	1,229	4,115
Yugoslavia	6,275	8,217	7,986	7,549	30,027
Morocco	-	224	-	1,104	1,328
Australia	10,205	11,651	14,168	10,759	46,783
Other Countries	-	-	-	9	9
Reclaimed Scrap etc.	999	3,242	1,561	1,839	7,641
GRAND TOTAL	99,339	87,767	95,490	77,332	359928
TOTAL EXPORTS	491	1,650	1,840	1,764	5,843

SUMMARY OF U. S. LEAD IMPORTS & EXPORTS

	1955	1956	1957	1958	1959
Total Lead Imports	462,208	479,875	531,441	577,110	411,087
Total Lead Exports	4,720	7,819	6,130	3,386	4,121
Excess Lead Imports	457,488	472,056	525,311	573,724	406,966

Z I N C I N D U S T R Y

C O N T E N T S

Z I N C

PHYSICAL PROPERTIES *

Zinc is a bluish white, hard, brittle metal with a microscopic crystalline structure when broken. The commercial metal is now known in the U. S. as slab zinc, rather than by the older term spelter.

The commercial importance of zinc is based largely upon its properties as a corrosion inhibitor especially as a protective coating on steel in galvanized products and upon its use in alloys. On account of low strength and brittleness, the pure metal, when used alone, has few uses except as sheet metal and other rolled forms.

Zinc compounds are important as pigments, fillers, and chemicals, with a wide range of end uses.

Symbol - Zn. Atomic Weight - 65.38. Specific Gravity - 7.13

Melting Point - °F - 787.03. Boiling Point, °F - 1,663

Electrical Resistivity - Microhm per c.c. - 5.916

Tensile Strength, cast, lb. per sq. in. - 9,000. Rolled - 21,000

Crystal Structure - close packed hexagonal. Valence - 2

* U.S.B.M.'s "MATERIALS SURVEY" - September, 1952

Arizona Department of Mineral Resources September, 1961

ZINC INDUSTRY IN 1960

Mineral Market Report MMS No. 3291. Prepared August 16, 1961, by H. J. Schroeder and Esther B. Miller, under the supervision of P. F. Yopes, Chief, Branch of Nonferrous Metals, Division of Minerals.

The domestic zinc industry in the United States in 1960 recorded slightly larger mine and smelter production although output was hampered by closures due to labor strikes during the period from May through December, according to the Bureau of Mines, United States Department of the Interior. Consumption of slab zinc was at relatively high levels in the first six months but declined considerably in the latter half of the year and totaled 8 percent less than in 1959. Producer stocks increased and consumer stocks decreased by approximately the same quantity resulting in little change in total industry stocks. No contracts were made for zinc to be added to Government stockpiles. Import quotas remained in effect and imports decreased 12 percent for ores and concentrates and metal combined. Foreign demand was high and United States exports of slab zinc increased six-fold to 75,100 tons.

Prices increased from 12.5 cents to 13.0 cents a pound, East St. Louis, in early January and remained at this level until December when two ½-cent reductions in price resulted in a 12.0-cent quotation at yearend.

The international Lead-Zinc Study Group held two meetings and concluded that the anticipated excess of world production over consumption was not large enough to require action.

Production. - Mines in the United States produced 435,400 tons of recoverable zinc in 1960, an increase of 2 percent over that of 1959, thus maintaining the slow rise from the unusually low output of 412,000 tons in 1958. Production in the early months continued the rising trend established in late 1959. However, labor strikes at mines in Idaho from May through December and at mines in Colorado, Pennsylvania, Tennessee, and Virginia from August through November, curtailed production during these months. States east of the Mississippi River represented 55 percent of total output; Western States 43 percent; and West Central States 2 percent.

Tennessee established a new record in mine production and maintained the position as the largest producing State in the Nation. New York produced 66,400 tons of recoverable zinc and regained its position as second ranking State. Idaho was third in the Nation despite a 34-percent decline in production due to labor strikes closing mines of the American Smelting & Refining Co. and the Bunker Hill Co. in the Coeur d'Alene district from May until late December.

Mines in Kansas, Oklahoma, and Missouri produced about 7,300 tons of zinc, less than 2 percent of the Nation's total and only a fraction of the output from what was the largest zinc-producing district in the United States for 60 years prior to 1950.

Domestic smelter output of slab zinc increased 2 percent over 1959. The reported 872,400 tons of slab zinc produced included a quantity of molten zinc used directly in alloying operations. Of the output, 803,700 tons was primary metal and 68,700 redistilled secondary zinc. Primary production was 42 percent from domestic ores and 558 percent from foreign ores; 40 percent was electrolytic and 60 percent distilled slab zinc. Primary smelters produced 58 percent of the redistilled secondary slab zinc; the remainder was obtained from secondary smelters.

The Anaconda and Great Falls, Montana, plants of The Anaconda Co., that had been closed since August 1959, resumed operations by February 1960. The electrolytic zinc plant at Anaconda was closed again by the end of the year but the Great Falls plant continued to treat current intake of zinc concentrates. A strike in May closed the smelter of The Bunker Hill Co. and in August The New Jersey Zinc Co. smelters at Depue and Palmerton were shut down by labor strikes. By the end of November, The New Jersey Zinc Co. had settled its strike and by the end of December employees of The Bunker Hill smelter had returned to work. Athletic Mining and Smelting Co. at Fort Smith, Ark., shut down on December 31, 1959, resumed operations during 1960.

Consumption. - Slab zinc consumption, as reported by 700 plants, declined 8 percent below the 1959 total but was 1 percent higher than the 1958 total. Slab zinc used in galvanizing steel products increased 3 percent to 371,600 tons (42 percent of the total) and regained the position of the largest industry use. Die castings and zinc-base alloys consumed 13 percent less slab zinc in 1960 than in 1959 but accounted for 39 percent of the total. Slab zinc used in brass products declined 30,000 tons to 99,000 tons and represented 11 percent of the total. The remaining 8 percent was used in rolled zinc, zinc oxide, slush castings, wet batteries, zinc dust, chemicals, bronze powders, desilverizing lead, light-metal alloys, and zinc used for cathodic protection.

Stocks. - Stocks of slab zinc at producer plants began the year at 156,200 tons, rose to over 200,000 tons by the end of July and declined to 182,000 tons at the end of November but increased to 188,000 tons by the end of the year. Stocks of slab zinc at consumer plants were 102,400 tons at the beginning of the year but declined almost steadily during the year. During the first quarter the stocks remained close to the 100,000-ton level but by November they had declined to approximately 65,000 tons and on December 31 were 67,760 tons. An additional 4,000 tons of slab zinc was in transit to consumer plants. At the average monthly rate of consumption, consumer stocks plus metal in transit represented about 4 weeks' supply.

Prices. - The quoted price for Prime Western zinc at East St. Louis was 12.50 cents per pound at the beginning of the year. On January 8, the price increased to 13.00 cents where it held until December 13 when it dropped one-half cent to 12.50 cents. On December 19, the price again dropped one-half cent to 12.00 cents where it remained for the balance of the year.

The average monthly zinc quotation on the London Metal Exchange was £88.412 a long ton (equivalent to 11.05 cents per pound computed at the exchange rate recorded by the Federal Reserve Board). The average price for January was £91.747 (11.47 cents per pound) and by March the average had declined to £88.899 (11.11 cents per pound). By May the price had increased to £91.452 (11.43 cents per pound) but thereafter an almost continual decrease brought the price to the low level of £82.747 (10.34 cents per pound) in December.

Foreign trade. - Import quotas imposed October 1, 1958, by Presidential Proclamation 3257, dated September 22, 1958, remained in effect throughout 1960.

General imports (imports for immediate consumption plus entries into bonded warehouses) show all physical entries of unmanufactured zinc into the United States.

In 1960 general imports declined 9 percent to 456,200 tons for ores and concentrates and decreased 23 percent to 120,800 tons for zinc metal.

Exports of slab zinc increased to 75,100 tons in 1960. Most of the slab zinc was shipped to the United Kingdom, Japan, India, Sweden, West Germany, Netherlands, Brazil, and Mexico.

Tariff. - The duty on slab zinc remained at 0.7 cent a pound, that on zinc contained in ore and concentrate at 0.6 cent a pound, and that on zinc scrap at 0.75 cent a pound throughout 1960.

World production. - World mine production of zinc increased to 3,510,000 tons. Zinc mining increased in all continents, exception South America which declined 7 percent. United States continued to be the leading zinc mining country of the world, accounting for 12 percent of the world total.

World smelter output of zinc increased 4 percent to an estimated total of 3,220,000 tons. United States output was 25 percent of the total world output.

TABLE I

SALIENT STATISTICS OF THE U. S. ZINC INDUSTRY

ARIZONA AND WORLD MINE PRODUCTION OF RECOVERABLE ZINC

YEARS 1958, 1959 & 1960

Source: U.S.B.M. Unit: Short Tons

	Year 1958	Year 1959	Year 1960
Producers' Stocks, Beginning of Period	155,833	184,025	156,210
U.S.Mine Production, Recoverable Zinc	412,005	425,303	435,427
Imports-Ores & Concts., Zinc Content	462,008	496,381	456,221
Imports-Zinc Metal	195,199	156,860	120,767
Redistilled Secondary	46,605	57,818	68,731
TOTAL SUPPLY	1,271,650	1,320,387	1,237,356
Producers' Stocks, End of Period	184,025	156,457	187,981
Exports - Slabs, Pigs, Blocks	1,736	11,636	75,144
SUB-TOTAL	185,761	168,093	263,125
APPARENT CONSUMPTION	1,085,889	1,152,294	974,231
REPORTED CONSUMPTION-SLAB ZINC	868,327	956,197	877,884
CONSUMED DIRECTLY IN ORES	94,900	108,100	88,275
TOTAL REPORTED ZINC CONSUMPTION	963,227	1,064,297	966,159
UNACCOUNTED FOR (Stkpiles & Smelter Ores) ..	122,662	87,997	-
Production of Primary Slab Zinc:			
By Sources: From Domestic Ores	346,240	348,443	336,875
From Foreign Ores	435,006	450,223	466,845
By Methods: Electrolytic	326,449	280,813	319,777
Distilled	454,797	517,853	483,943
ARIZONA MINE PRODUCTION	28,532	37,325	35,811
WORLD MINE PRODUCTION	3,350,000	3,390,000	3,510,000
U.S. MINE PROD.-% OF REPORTED CONSUMPTION ..	42.77%	39.96%	45.07%
AVG. PRICE OF ZINC,E.ST.LOUIS(E.& M.J.)	10.309¢	11.448¢	12.946¢

Arizona Department of Mineral Resources September, 1961

TABLE II

MINE PRODUCTION OF RECOVERABLE ZINC, BY STATES, IN 1959-1960

Source: U.S.B.M. (Short tons)

State	1959	1960
Arizona	37,325	35,811
Arkansas	49	50
California	78	465
Colorado	35,388	31,278
Idaho	55,699	36,801
Illinois	26,815	29,550
Kansas	1,017	2,117
Kentucky	673	869
Missouri	92	2,821
Montana	27,848	12,551
Nevada	217	420
New Jersey	---	---
New Mexico	4,636	13,770
New York	43,464	66,364
Oklahoma	1,049	2,332
Pennsylvania	16,718	13,746
Tennessee	89,932	91,394
Utah	35,223	35,476
Virginia	20,334	19,885
Washington	17,111	21,317
Wisconsin	11,635	18,410
Total	425,303	435,427

Arizona Department of Mineral Resources September, 1961

TABLE III

WORLD MINE PRODUCTION OF RECOVERABLE ZINC, BY COUNTRIES

In Thousand Short Tons - Source: U. S. B. M.

	U.S.	CANADA	MEXICO	PERU	ITALY	AUSTRALIA	REST OF FREE WORLD	TOTAL FREE WORLD	COMMUNIST CONTROLLED COUNTRIES*	TOTAL WORLD ESTIMATED
AVG. 1949-1953	622	343	228	117	106	225	569	2,210	390	2,600
1954	473	377	246	175	130	283	620	2,434	496	2,930
1955	515	433	297	183	132	287	776	2,623	587	3,210
1956	542	423	274	193	135	312	865	2,744	676	3,420
1957	532	414	268	170	145	326	917	2,772	738	3,510
1958	412	424	247	142	151	295	904	2,575	775	3,350
1959	425	396	291	158	145	279	880	2,574	786	3,360
1960	435	406	289	149	141	325	938	2,683	827	3,510

* Communist Controlled Countries: U.S.S.R., Bulgaria, E. Germany, Poland, N. Korea.

TABLE IV

TOTAL ZINC IMPORTED INTO UNITED STATES, AND EXPORTED FROM U.S.

Source: Bureau of Census - In Short Tons

	IMPORTS			EXPORTS	NET IMPORTS
	Ores	Blocks, Pigs or Slabs	TOTAL	Slabs, Pigs or Blocks	
1948-1952	307,274	115,976	423,250	46,277	376,973
1953	513,724	234,576	748,300	17,969	730,331
1954	455,427	156,858	612,285	24,994	587,291
1955	478,044	195,696	673,740	18,069	655,671
1956	525,350	244,978	770,328	8,813	761,515
1957	526,014	269,007	795,021	10,785	784,236
1958	462,008	195,199	657,207	1,736	655,471
1959	496,381	156,860	653,241	11,636	641,605
1960	456,221	120,767	576,988	75,144	501,844

TABLE V

CONSUMPTION OF SLAB ZINC IN UNITED STATES

Source: U.S.B.M. - Short Tons

	Galvanizing	Brass Products	Zinc Base Alloy	Rolled Zinc	Zinc Oxide	Other Uses	Total Consumption
1950	441,686	139,373	289,527	68,444	18,187	9,917	967,134
1951	400,279	143,292	296,434	64,085	18,223	11,658	933,971
1952	377,688	155,608	236,689	51,318	17,205	14,275	852,783
1953	406,988	178,182	307,445	54,649	20,675	17,988	985,927
1954	403,463	108,268	290,846	47,486	18,701	15,535	884,299
1955	451,141	146,243	430,807	51,589	22,433	17,599	1,119,812
1956	439,146	124,004	360,507	47,359	19,160	18,614	1,008,790
1957	367,757	112,390	376,039	41,269	20,428	17,737	935,620
1958	381,229	101,375	316,830	40,616	13,331	14,946	868,327
1959	361,027	129,278	389,331	42,949	18,248	15,364	956,197
1960	371,589	99,023	338,373	38,696	15,593	14,610	877,884

Arizona Department of Mineral Resources September, 1961

TABLE VI

SLAB ZINC AVAILABLE TO CONSUMERS

YEARS 1958, 1959 AND 1960

Source: U. S. B. M. Units: Short Tons

	Year 1958	Year 1959	Year 1960
SUPPLY:			
Stocks at Primary Smelters Jan. 1st	153,338	182,111	152,657
Stocks at Secondary Plants Jan. 1st	2,495	1,914	3,800
Production - Primary	781,246	798,666	803,720
- Secondary	46,605	57,818	68,731
Imports of Slab Zinc	195,199	156,860	120,767
TOTAL AVAILABLE	1,178,883	1,197,369	1,149,675
WITHDRAWN:			
Exports of Slab Zinc	1,736	11,636	75,144
Shipments to Gov't Account 1/	34,488	3,000	-
Stocks at Primary Smelters - End of Period .	182,111	152,657	180,308
Stocks at Secondary Smelters-End of Period .	1,914	3,800	7,673
TOTAL WITHDRAWN	220,249	171,093	263,125
AVAILABLE TO CONSUMERS	958,634	1,026,276	886,550
REPORTED CONSUMPTION	868,327	956,197	877,884

1/ As reported by the American Zinc Institute

U. S. CONSUMPTION OF SLAB ZINC

	1958	1959	1960
GALVANIZERS	381,229	361,027	371,589
DIE CASTERS	316,830	389,331	338,373
BRASS PRODUCTS	101,375	129,278	99,023
ROLLED ZINC	40,616	42,949	38,696
ZINC OXIDE & OTHER	28,277	33,612	30,203
TOTAL SLAB ZINC CONSUMPTION ...	868,327	956,197	877,884

Arizona Department of Mineral Resources September, 1961

TABLE VII

QUARTERLY IMPORTS AND EXPORTS OF ZINC INTO AND FROM UNITED STATES

YEAR 1960

Source: A.B.M.S., U.S. Dept. of Commerce

COUNTRY OF ORIGIN	1st Qtr. 1960	2nd Qtr. 1960	3rd Qtr. 1960	4th Qtr. 1960	Year 1960
Ores(Zinc Content):	124,247	121,024	111,879	99,071	456,221
Australia	1,053	5,608	10,142	1,045	17,848
Bolivia	771	138	260	46	1,215
Canada	31,457	33,617	29,920	24,972	119,966
Honduras	2,464	549	1,094	607	4,714
Mexico	48,988	50,814	42,377	47,890	190,069
Peru	21,423	18,042	19,646	20,905	80,016
Spain	12,722	6,191	-	-	18,913
Union of So. Africa	5,063	4,464	1,681	1,092	12,300
Other Countries	306	1,601	6,759	2,514	11,180
Blocks, Pigs or Slabs:	30,553	29,795	29,098	31,321	120,767
Australia	-	-	450	-	450
Belgian Congo	2,555	1,645	2,443	2,664	9,307
Belgium-Luxembourg	2,042	1,820	282	1,580	5,724
Canada	18,640	18,564	18,344	18,620	74,168
Germany, West	441	555	110	1,574	2,680
Italy	987	1,172	882	476	3,517
Mexico	3,436	3,155	1,186	1,173	8,950
Peru	1,729	2,030	1,709	2,049	7,517
Rhodesia & Nyasaland	338	-	-	277	615
United Kingdom	-	165	56	112	333
Yugoslavia	385	689	2,259	1,187	4,520
Other Countries	-	-	1,377	1,609	2,986
TOTAL IMPORTS:	154,800	150,819	140,977	130,392	576,988
EXPORTS (Slab Zinc)	13,302	15,958	19,087	26,797	75,144
EXCESS IMPORTS	141,498	134,861	121,890	103,595	501,844

SUMMARY OF U.S. ZINC IMPORTS & EXPORTS

	1956	1957	1958	1959	1960
TOTAL ZINC IMPORTS	770,328	794,764	657,207	653,241	576,988
TOTAL ZINC EXPORTS	8,813	10,785	1,736	11,636	75,144
EXCESS ZINC IMPORTS	761,515	783,979	655,471	664,877	501,844

Arizona Department of Mineral Resources September, 1961

ARIZONA LEAD AND ZINC PRODUCTION IN 1960

Source: U.S.B.M.

Shattuck Denn Mining Corporation (Iron King mine) and Nash & McFarland (Flux mine) accounted for the bulk of the output for lead and zinc. Test drilling was conducted on the main ore structure in the Iron King mine to depths below the presently developed levels and, according to the company, confirmed the continuation of the mineralized structure. Metallurgical research was aimed at the development of new products, such as soil conditioners and plant food supplements, from the sulfur and iron contained in the mill tailings. Ore from the Flux mine and some custom ore were treated in the Nash & McFarland Trench mill.

The Iron King mine, operated by Shattuck Denn Mining Corp., was again by far the principal zinc producer followed by the Old Dick (Cyprus Mines Corp.), Atlas (B.S. & K. Mining Co.), Johnson Camp (McFarland & Hullinger), and the Flux (Nash & McFarland). Cumulatively these mines accounted for 99 percent of the State's zinc output.

See U.S.B.M's Table 7, next page, showing details of Arizona's production of lead and zinc in 1960.

TABLE VII

MINE PRODUCTION OF GOLD, SILVER, COPPER, LEAD AND ZINC IN ARIZONA IN THE YEAR 1960, BY CLASS OF ORE IN TERMS OF RECOVERABLE METALS

Source: U.S.B.M. Final Figures

Source	Number of mines 1/	Material sold or treated (short tons)	Gold (troy ounces)	Silver (troy ounces)	Copper (pounds)	Lead (pounds)	Zinc (pounds)
Lode ore:							
Dry gold	21	4,476	883	9,520	32,100	.....	.....
Dry gold-silver	7	121,761	700	33,210	2,786,200	1,500	1,400
Dry silver	14	92,263	1	14,073	1,145,700	1,900	100
Total	42	218,500	1,584	56,803	3,964,000	3,400	1,500
Copper	44	66,032,439	115,602	3,689,622	993,370,700	800	300,500
Copper-zinc	4	147,541	92	50,555	8,454,400	31,600	17,270,500
Lead	9	4,202	128	33,738	7,200	495,400	24,200
Lead-zinc	4	337,070	24,493	919,054	837,500	16,423,600	46,930,200
Zinc	1	19,370	.....	1,027	62,600	.....	7,073,200
Total	65	66,540,622	140,315	4,693,996	1,002,732,400	16,951,400	71,598,600
Other "lode" material:							
Gold tailings	1	15,240	740	11,898	29,100	.....	.....
Gold-silver and silver tailings	2	15,542	10	779	77,400	.....	.....
Copper cleanup	(2)	10,215	56	7,237	3,284,600	.....	.....
Copper precipitates	11	44,929	.....	.....	66,691,000	.....	.....
Lead cleanup	(2)	8	.....	184	.....	9,100	400
Lead tailings	1	70	.....	123	.....	13,500	400
Lead-zinc mill cleanup	(2)	32	5	392	400	5,600	3,300
Zinc cleanup	(2)	86	217	503	300	6,200	11,000
Uranium ore	.....	.....	10	3,068	430,800	800	6,800
Total	.....	86,122	1,038	24,184	70,513,600	35,200	21,900
Total "lode" material	106	66,845,244	142,937	4,774,983	1,077,210,000	16,990,000	71,622,000
Gravel(placer operations).	5	.....	127	9	.....	.....	.....
Total, all sources	111	66,845,244	143,064	4,774,992	1,077,210,000	16,990,000	71,622,000

1/ Detail will not necessarily add to totals because some mines produce more than 1 class of material.

2/ From properties not classed as mines.

Arizona Department of Mineral Resources

September, 1961

TREMENDOUS LOSSES SUFFERED BY LEAD-ZINC INDUSTRY SINCE 1952

The following table (Table I) indicates the tremendous losses suffered by the U. S. lead-zinc industry during the past eight years, and it is not surprising that the U. S. Tariff Commission found, in three separate findings, "serious injury" to the industry due to excessive imports.

During the six-year period (1947-1952) lead production averaged 398,960 tons per year with a value of $126,422,000, and an average price of 15.844 cents per pound. For the eight-year period (1953-1960)the average annual lead production was only 308,345 tons with a value of $85,564,000 and an average price of 13.875 cents per pound. This was an annual loss of $40,858,000, a drop in price of almost 2 cents per pound, and a loss in annual production of 90,615 tons.

For the six-year period (1947-1952), zinc production averaged 638,559 tons per year with a value of $180,546,000, and an average price of 14.137 cents per pound. For the eight-year period (1953-1960) the average annual zinc production was 485,298 tons with a value of $113,656,000 and an average price of 11.710 cents per pound. The result an annual loss of $66,890,000, a drop in price of almost 2½ cents per pound, and a loss in annual production of 153,261 tons of zinc.

This combined annual loss of 243,876 tons of lead-zinc, worth $107,748,000 would never have happened if the lead-zinc industry had been given sufficient protection against excessive imports of lead and zinc. The combined price of lead and zinc should be at least 30 cents per pound and the annual production of lead should be at least 400,000 tons, and of zinc 650,000 tons, and the tariff should be high enough to accomplish this. A tariff of 4 cents per pound of metal and 2.8 cents per pound of lead or zinc in ores and concentrates should be sufficient to offset the wage and grade differentials of foreign ores, and the devaluation of foreign currencies. Our first aim should be to save the strategic metals of our domestic industry before "pouring our substance all over the world in futile tribute to mercurial friends!" Why should our State Department be so heedless of the depression that has fallen upon our domestic lead-zinc industry, and oblivious to the devaluation in foreign currencies which has been a principal cause of depression?

Arizona Department of Mineral Resources September, 1961

TABLE I

U. S. MINE PRODUCTION OF LEAD AND ZINC

VALUE OF PRODUCTION BY YEARS FROM 1947 TO 1960 INCLUSIVE

	LEAD			ZINC		
	U. S. Mine Production Tons	Avg. Price cts/lb.	Value thousands	U. S. Mine Production Tons	Avg. Price cts/lb.	Value thousands
1947	384,221	14.673	$112,750	637,608	10.500	$ 133,898
1948	390,476	18.043	140,907	629,977	13.589	171,215
1949	409,908	15.364	125,957	593,203	12.144	144,077
1950	430,827	13.296	114,566	623,375	13.866	172,874
1951	388,164	17.500	135,857	681,189	18.000	245,228
1952	390,162	16.467	128,496	666,001	16.215	215,984
TOTAL	2,393,758		$758,533	3,831,353		$1,083,276
6-Yr. Average	398,960	15.844	$126,422	638,559	14.137	$ 180,546
1953	342,644	13.489	$ 92,438	547,430	10.855	$ 118,847
1954	325,419	14.054	91,470	473,471	10.681	101,143
1955	338,025	15.138	102,340	514,671	12.299	126,599
1956	352,826	16.013	112,996	542,340	13.494	146,367
1957	338,216	14.658	99,151	531,735	11.399	121,225
1958	267,377	12.109	64,753	412,005	10.309	84,947
1959	255,586	12.211	62,419	425,303	11.448	97,377
1960	246,669	11.948	58,944	435,427	12.946	112,741
TOTAL	2,466,762		$684,511	3,882,382		$ 909,246
8-Yr. Average	308,345	13.875	$ 85,564	485,298	11.710	$ 113,656

Arizona Department of Mineral Resources September, 1961

REMARKS ON LEAD-ZINC AT THE WESTERN GOVERNORS' CONFERENCE,

SALT LAKE CITY, MAY 14-17, 1961

Lead-Zinc mining continues to operate under depressing conditions, despite three separate findings by the Tariff Commission of "serious injury" in the last decade due to excessive imports. Temporary relief programs of stockpiling and barter and the application of quotas in late 1958 have failed to halt the industry's decline. Quotas imposed were too liberal as to foreign tonnages permitted and domestic mine curtailment has continued.

Western States produced 61% of the nation's lead in 1947-49; 56% in 1956-57, and only 50% in 1960. As to zinc, Western States produced 58% in 1947-49; 56% in 1956-57, and only 43% in 1960.

1960 domestic production was only 62% of the lead and 70% of the zinc produced in 1947-49. Western States in 1960 produced only 51% of the lead and 52% of the zinc which they produced in 1947-49.

The Tariff Commission reported 912 domestic lead-zinc mines operating in 1952; 544 in 1956, and only 290 in 1958. There have been further curtailments since. As to employment, the Tariff Commission reports 25,570 men in U. S. lead-zinc mines and mills in the first quarter of 1952, and only 9,504 in the third quarter of 1959.

Time and space will not permit discussion of the adverse impact on related business activity, local, state and federal tax income, etc., but suffice it to say that the Western States, in the loss of some 300,000 tons of lead-zinc production in 1960 as compared with 1947-49, suffered at least a $35,000,000 economic loss from direct production. The loss in related activities would be multiplied several fold.