

Lead Industries Association, Inc.

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July 10, 1969

SUBJECT: ANNUAL REVIEW,
LEAD - 1968

To LIA's Board of Directors
Industry Development Committee
Members

Please find attached LIA's latest publication "Annual Review" - The U.S. Lead Industry - 1968." We sincerely hope you find the "Review" useful and informative. Extra copies are available upon request.

LIA is distributing roughly 3,500 copies to a mailing list that includes consumers, banks and brokerage firms, libraries, Universities and government agencies. We are also arranging for distribution of the "Review" to members of the American Association of Battery Manufacturers and the National Association of Secondary Materials Institute. A press release announcing its availability will also be sent out to the trade press.

If you have any other suggestions for further distribution or comments about the publication, we would appreciate hearing from you.

Sincerely,

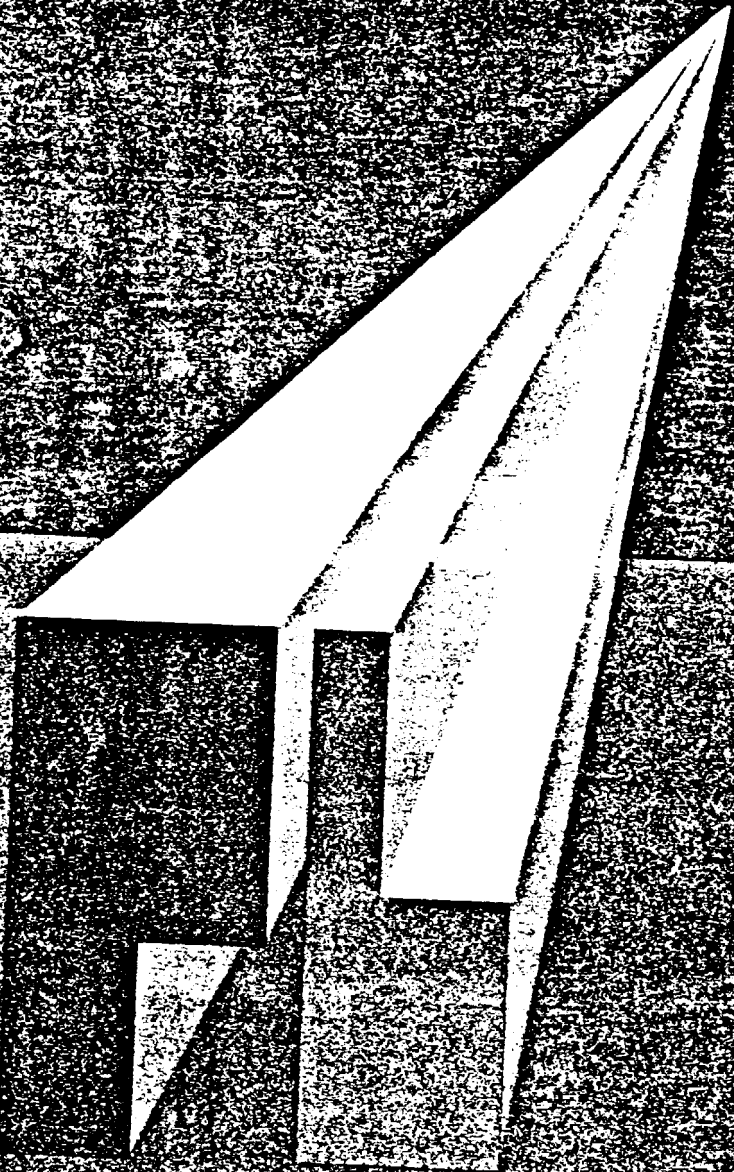


David M. Borcina
Secretary, Treasurer

DMB:so
Att: "Annual Review,
Lead - 1968"

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ANNUAL REVIEW



THE U.S. LEAD INDUSTRY-1968

Lead Industries Association, Inc.
David M. Borcina
SECRETARY-TREASURER

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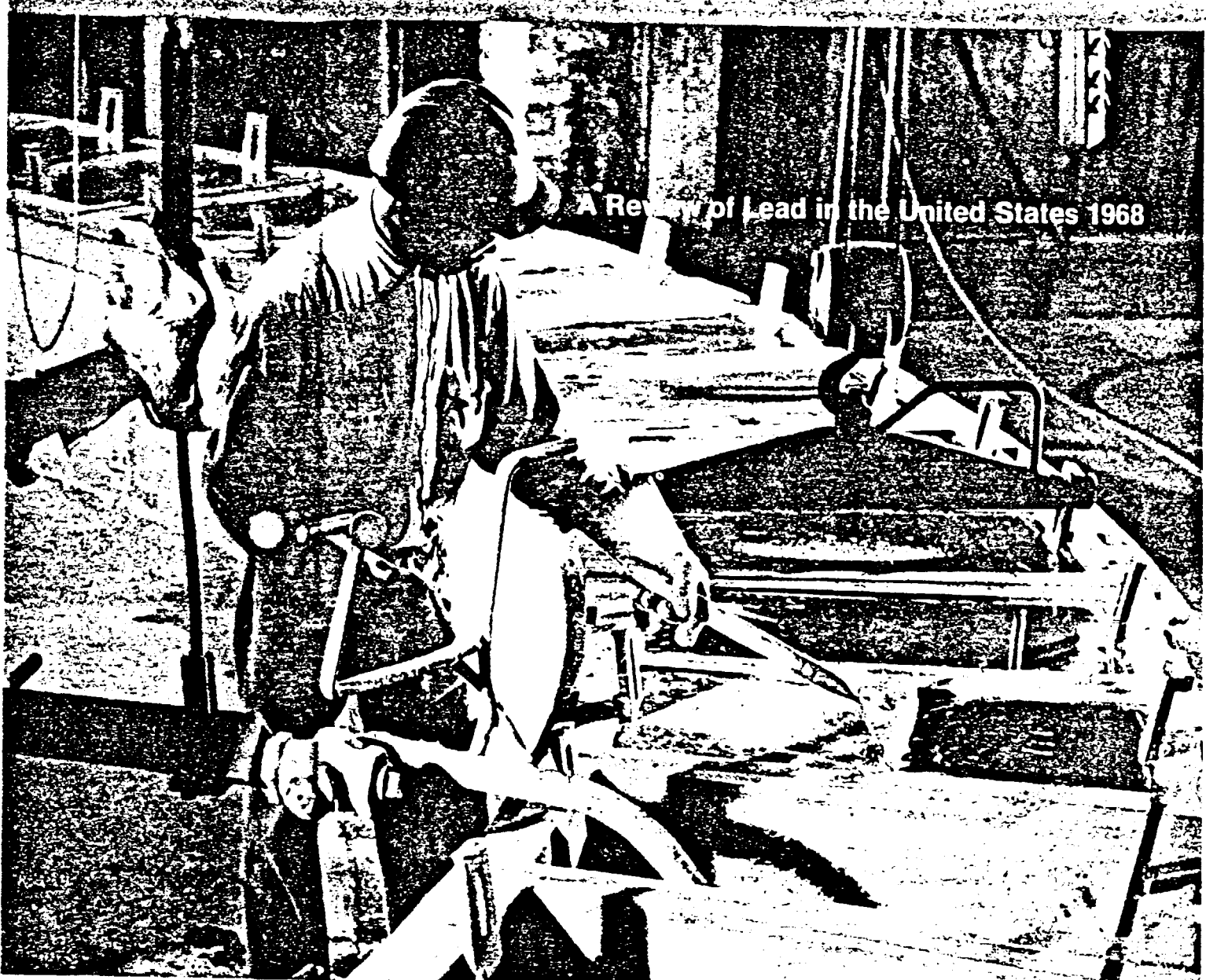


Summary of U.S. Lead Statistics*
(In thousands of short tons of lead content)

	Mine Production	Secondary Production	Imports			U.S. Stockpile Releases	Total Supply	E
			Ore, Matte, etc.	Pig, Bullion	Total			
1960	247	470	146	214	360	—	1,077	
1	262	453	147	262	409	—	1,124	
2	237	444	139	265	404	—	1,085	
3	253	493	148	241	389	—	1,135	
4	286	540	123	218	341	50	1,077	
5	301	576	123	227	350	36	1,053	
6	327	573	144	291	435	64	1,399	
7	317	554	124	374	498	27	1,396	
8a	360	560	86	338	424	28	1,372	

*Source: U.S. Bureau of Mines, Bureau of Census
• Estimated

A Review of Lead in the United States 1968



Summary of U.S. Lead Statistics*
(in thousands of short tons of lead content)

Total	U.S. Stockpile Releases	Total Supply	Pig Exports	Domestic Consumption	Imports of Lead Products
360	—	1,077	2	1,021	30
409	—	1,124	2	1,027	32
404	—	1,085	2	1,110	30
389	—	1,135		1,163	33
341	50	1,077		1,202	28
350	36	1,063		1,241	27
435	64	1,399		1,324	44
498	27	1,396		1,261	44
424	28	1,372		1,327	44

General Summary:

The consumption of lead in the United States in 1968 is estimated at 1,327,000 short tons, a new record slightly exceeding the previous high in 1966. The increase over that of 1967 is about 5 percent. Lead's two largest uses, storage batteries and gasoline antiknock additives together, reached the unprecedented level of 775,000 tons. Other outlets showing gains in 1968 were solder, ammunition, red lead and litharge. Cable, casting metals, collapsible tubes and white lead showed modest losses. Other uses remained at about the same level as in 1967. The use and production of the automobile was primarily responsible for the 1968 record, accounting for between 55 and 60 percent of the total.

U.S. Mine production was about 13 percent higher than in 1967, despite strikes in the early part of the year, the rise being directly attributable to the increased production in Missouri. At 360,000 tons, it was the highest since 1952. Secondary lead production increased slightly to 560,000 tons. Total Imports declined about 13 percent to 425,000 tons. Shipments from the U.S. Government stockpile to industry were slightly over 28,000 tons, which completed the release of 150,000 tons authorized by Congress in 1965. Another 50,000 tons authorized for release to government account has not been fully used. At the end of 1968 the stockpile was at 1,165,000 tons.

Stocks in the hands of primary smelters and refiners decreased heavily in smelter feed. Refined stocks were at low levels at year end. Stocks of pig in the hands of consumers and secondary smelters decreased sharply.

Exports of lead in 1968 were roughly 8,000 tons compared to 7,000 tons in 1967.

The U.S. price which had remained stable at 14 cents per lb., New York throughout 1967 and the first 4 months of 1968 declined in two steps to 12.50 cents in mid-year, then recovered in October to 13 cents where it was at year-end. Note: Since the first of 1969 the price has moved up in three ½ cent increments to 14½ cents per lb. N.Y. on April 8.

(See "Summary of U.S. Lead Statistics" inside front cover.)

Supply Supplies from domestic mines increased substantially during 1968 to roughly 360,000 tons (Table I) with Missouri accounting for 60 percent of the total, compared to less than 50 percent in 1967. Strikes starting in 1967 and carrying into the early part of 1968 affected production in other states, particularly Idaho and Utah, where substantial declines, (more than 10 percent) were reported.

Secondary lead (Table II) continued to provide a major part

TABLE I

U.S. Mine Production of Recoverable Lead*
(In short tons)

State	1964	1965	1966	1967	Prelim. 1968
Arizona	6,147	5,913	5,211	4,771	1,900
California	1,546	1,810	1,976	1,735	4,000
Colorado	20,563	22,495	23,082	21,923	20,300
Idaho	71,312	66,606	72,334	61,387	49,684
Illinois	2,180	3,005	2,285	2,384	1,490
Kansas	1,185	1,644	1,109	1,031	—
Kentucky	858	756	484	845	64
Missouri	120,148	133,521	132,255	152,649	210,800
Montana	4,538	6,981	4,409	898	1,890
Nevada	809	2,277	3,581	1,500	895
New Mexico	1,626	3,387	1,596	1,827	1,130
New York	732	601	1,097	1,653	1,404
Oklahoma	2,781	2,813	2,999	2,727	—
Utah	40,249	37,700	64,124	53,813	47,275
Virginia	3,857	3,651	3,078	3,430	3,498
Washington	5,731	6,328	5,859	2,762	—
Wisconsin	1,742	1,645	1,694	1,596	1,030
Other States	6	14	195	—	8,806
Total	286,010	301,147	327,368	316,931	354,166

*U.S. Bureau of Mines
* Incl. in "other states"

of total supply with an estimated 560,000 tons available during the year, up about 1 percent from 1967.

Imports (Table III) declined about 13 percent to 425,000 tons with the decline reflected in ore, matte and pig lead.

Total supplies in 1968 (Table IV) were 1,344,600 short tons, down about 1 percent from the previous year.

TABLE II

Secondary Lead Recovered in the U.S.*
(In short tons)

	1964	1965	1966	1967	1968
As metal:					
At primary plants	8,505	13,140	9,004	2,538	*
At other plants	140,702	168,774	147,215	147,806	*
Total	149,207	181,914	156,219	150,344	*
In antimonial lead:					
At primary plants	13,421	19,299	10,758	7,808	*
At other plants	257,101	251,354	272,977	280,911	*
Total	270,522	270,653	283,735	288,719	*
In other alloys	121,853	123,252	132,880	114,709	*
Grand Total	541,582	575,819	572,834	553,772	560,000 (est)

*U.S. Bureau of Mines
* Not yet available

Primary smelters and refiners stocks, and stocks in the hands of consumers and secondary smelters, (Table V) all declined during 1968. Total primary stocks opened the year at 184,100 tons, decreased sharply to 165,500 tons at the end of May, recovered rapidly to 185,400 tons on August 31 and then started another decline to the low of 162,000 tons at year-end.

Consumer and secondary smelter stocks (total) fluctuated in about the same manner as primary stocks, reaching a peak of 116,100 at the end of July and then declining to the year's low of 83,500 tons at year end.

Increased mine production along with primary smelters' capacity and the increasing availability of secondary supplies in the United States and the rest of the world augur well for the

TABLE III

U.S. Imports of Lead
(In short tons of lead content)

	1964	1965	1966	1967	Prelim. 1968
ORE, MATTE, ETC.:					
Australia	19,286	26,658	22,614	25,553	20,591
Bolivia	6,073	5,096	11,136	13,764	5,186
Canada	27,951	43,622	52,707	33,474	35,941
Colombia	—	677	445	561	1
Germany, West	—	—	—	4,371	—
Guatemala	5	18	35	197	—
Honduras	6,375	8,712	11,132	6,513	9,268
Mexico	1,069	760	624	314	239
Peru	28,243	26,419	41,610	36,734	13,975
Philippines	58	106	164	37	1
South Africa,	—	—	—	—	—
Republic of	34,080	10,570	1,394	359	607
Other countries	117	23	2,130	2,190	550
Total	123,257	122,661	143,991	124,067	86,359
BASE BULLION:					
Australia	2,786	448	1,283	—	—
Belgium-	—	—	—	—	—
Luxembourg	—	—	—	442	—
Canada	199	50	62	23	11
France	—	—	—	55	—
Germany, West	—	—	56	—	—
Mexico	1,250	43	547	95	54
Peru	603	25	64	66	—
United Kingdom	—	—	—	71	30
Total	4,838	566	2,012	752	95
PIGS AND BARS					
Australia	42,158	51,105	44,187	53,156	46,919
Belgium-	—	—	—	—	—
Luxembourg	—	197	2,535	23,281	18,649
Burma	—	—	5,532	2,548	—
Canada	30,728	31,697	34,283	37,238	60,161
Denmark	—	514	672	423	—
France	—	307	224	8,202	4,604
Germany, West	5,017	1,653	15,499	49,077	20,711
Japan	—	4,638	1,719	—	—
Mexico	71,728	73,546	75,294	57,271	56,518
Morocco	—	—	—	2,413	—
Netherlands	—	224	5,137	878	205
Peru	24,510	26,132	51,593	70,377	75,103
South Africa,	—	—	—	—	—
Republic of	—	3,165	11,986	6,989	8,297
Spain	949	243	—	—	—
Sweden	—	—	—	3,307	3,868
United Kingdom	562	514	3,101	17,680	22,918
Yugoslavia	30,544	28,640	31,322	30,478	19,775
Zambia	—	—	1,148	—	—
Other countries	1,648	38	1,157	280	391
Total	207,844	222,613	285,389	363,598	338,119
Grand Total	335,939	345,840	431,392	488,417	424,573

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declining to the year's low

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ty of secondary supplies in
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future supply position of lead.

The International Lead and Zinc Study Group representing essentially all of the producing countries of the world met most recently in Geneva during November 1968 and reported that a) lead consumption and production in 1968 on a world basis were essentially in balance at 2.9 million metric tons and b) that 1969 supplies of lead will exceed demand by about 5 percent. They pointed out however, that in recent years production has generally been overestimated and that any actual year end surplus may well be less than the early estimate.

1967	Prelim. 1968
25,553	20,591
13,764	5,186
33,474	35,941
561	1
4,371	—
197	—
6,513	9,268
314	239
36,734	13,975
37	1
359	607
2,190	550
124,067	86,359
—	—
442	—
23	11
55	—
—	—
95	54
66	—
71	30
752	95
53,156	46,919
23,281	18,649
2,548	—
37,238	60,161
423	—
8,202	4,604
49,077	20,711
—	—
57,271	56,518
2,413	—
878	205
70,377	75,103
6,989	8,297
—	—
3,307	3,868
17,680	22,918
30,478	19,775
—	—
280	391
363,598	338,119
488,417	424,573

TABLE IV

United States Lead Supplies
(In short tons)

	1967	Estimated 1968
Domestic Mine Production	316,900	360,000
Secondary Lead Recovered	553,800	560,000
Imports: Ore and Matte	124,100	86,400
Bullion	800	100
Pig Lead	363,600	338,100
Total Supplies	1,359,200	1,344,600
Change in Stocks at U.S. Smelters & Refiners	18,000 (Incr.)	22,100 (decr.)
Stockpile Shipments	27,500	28,400
Adjusted Supplies giving effect to changes in Stocks	1,368,700	1,395,100
Exports: Pig Lead	6,500	8,300
Total available	1,362,200	1,386,800

TABLE V

Lead Stocks — United States
(In short tons)

SMELTERS AND REFINERS^a

End of	In Ore and Matte and in Process	In Base Bullion					Total Stocks
		At Smelters & Refiners	In Transit to Refiners	In Process at Refiners	Refined Pig Lead	Antimonial Lead	
1964	63,954	12,920	1,117	20,438	35,978	3,775	138,182
1965	77,839	10,880	437	17,613	18,726	7,736	133,231
1966	108,547	15,870	223	17,532	17,604	6,284	166,060
1967	124,600	17,764	42	17,878	18,660	5,127	184,071
1968	106,074	21,706	600	18,129	11,956	3,483	161,948

CONSUMER'S AND SECONDARY SMELTER'S^b

End of	Refined Soft Lead	Antimonial	Lead In Alloys	Copper Base Scrap	Total
1964	69,361	35,163	7,933	987	113,444
1965	59,237	34,245	8,757	914	103,153
1966	42,376	32,872	9,236	956	85,440
1967	56,980	34,688	8,007	1,031	100,706
1968	40,959	33,578	8,319	590	83,446

^aAmerican Bureau of Metal Statistics

^bU.S. Bureau of Mines

Prices: After 20 months of a stable lead price, at 14 cents per lb., New York from October 10, 1966, the price moved to 13 cents on May 2, 1968, and to 12.50 cents on July 15, its low point for the year. On October 14, 1968 the price rose to 13 cents and, with continued strength, moved upward in ½ cent increments on January 9, January 30 and April 8, 1969.

Demand as of this writing (May 1.) continues strong. With producer and consumer stocks at low levels, the short-term price outlook would appear firm at 14.50 cents per lb., N.Y.

Consumption: The consumption of lead in the United States during 1968 amounted to 1,327,000 tons, roughly 5 percent better than 1967. With 1967 the lone exception, the consumption of lead has shown continued growth year by year since 1960 when it was at 1,020,000 tons. (Table VI) covers the details of consumption for the most recent 5 years.

Lead's largest market, storage batteries, took roughly 10 percent more in 1968 than during the previous year and was at the all time peak of 512,000 tons. This record breaking tonnage resulted from another record, shipments of 34,907,300 automotive replacement batteries, the highest level in history according to the Association of American Battery Manufacturers. Coupled with this was the U.S. new car requirement for about 8,800,000 units bringing total SLI batteries shipped in 1968 to almost 44 million.

TABLE VI
United States Consumption of Lead*
(In short tons)

	1964	1965	1966	1967	1968*
Ammunition	56,493	57,322	78,435	78,766	82,000
Bearing metals	22,754	21,600	21,588	19,561	19,000
Brass and bronze	23,328	23,699	25,447	20,467	20,700
Cable covering	56,225	59,645	66,491	63,037	54,000
Calking lead	73,628	66,584	63,250	48,789	49,300
Casting metals	6,961	5,046	6,671	10,083	9,000
Collapsible tubes	14,904	10,893	11,987	11,299	9,500
Foil	3,976	4,805	6,041	6,148	6,300
Pipe, traps and bends	20,480	19,837	19,984	20,184	20,400
Sheet lead	29,605	27,569	28,938	26,763	27,700
Solder	71,186	77,819	78,898	68,833	74,000
Storage batteries	429,348	455,347	472,492	466,665	512,000
Terne metal	1,609	2,109	1,966	1,620	1,500
Type metal	25,374	33,416	30,421	28,554	27,500
White lead	8,802	8,414	8,131	8,087	5,900
Red lead and litharge	74,802	79,853	89,500	76,589	87,500
Pigment colors	11,921	12,553	13,695	13,041	14,200
Other pigments	8,111	8,063	8,562	5,473	4,000
Gasoline antiknock additives	223,466	225,203	246,879	247,170	262,000
Misc. chemicals	451	346	614	609	600
Annealing	5,699	5,719	5,441	4,202	4,100
Galvanizing	1,592	1,775	1,639	1,854	1,500
Lead plating	179	240	428	532	700
Weights and ballast	12,760	14,135	18,090	15,794	16,700
Other uses unclassified	18,484	19,490	18,289	16,396	17,000
Total	1,202,138	1,241,482	1,323,877	1,260,516	1,327,100

* U.S. Bureau of Mines

* Estimated by L.I.A.

lead price, at 14 cents per lb., the price moved to 13 cents on July 15, its low point for the year. The price then rose to 13 cents and, by August 1, had increased in 1/2 cent increments on August 1, 1969.

Lead continues strong. With low levels, the short-term price is expected to rise to 14 cents per lb., N.Y.

Lead in the United States during 1968 was roughly 5 percent better than in 1967. The consumption of lead by year since 1960 when the details of consumption are given.

Lead batteries, took roughly 10 percent of the previous year and was at this record breaking tonnage of 34,907,300 auto batteries in history according to Battery Manufacturers. The car requirement for about 1968 was 34,907,300 batteries shipped in 1968 to

The next largest use for lead, also dependent on the production and use of the automobile, is gasoline antiknock additives which in 1968 was at another peak of 262,000 tons.

The increases in the demand for ammunition during the last three years have certainly been related to the Vietnam war but it is generally conceded that the strong upward trend in sporting ammunition, evident prior to 1966 is continuing. The use of calking lead declined sharply in the last two years as a result of substitute jointing materials in cast-iron soil pipe as used in small home and apartment construction. There is a likelihood that no further inroads in this market will take place. Lead for cable sheathing also lost ground, reflecting, for the most part, a cutback in the construction of the intercontinental defense communication system requiring lead-sheathed coaxial cable.

Other uses for lead which had shown declines in 1967, such as solder, red lead and litharge, recovered during 1968 to near their previous levels, and continued growth can be expected.

Among other applications for lead (sheet, pipe, brass and bronze, pigment colors), there are many that appear to represent stable markets. The tonnage figures are almost unchanged from one year to the next. Yet there is reason to believe that these materials may be declining in some older markets and growing in newer ones. Sheet lead is a case in point, its traditional market in the chemical construction industry has declined while other uses, nuclear and x-ray shielding and soundproofing, show strong signs of growth.

Short Term Outlook: The near-term outlook for lead is strong, with consumption in essentially all markets in the first half of the year expected to be maintained at the high level shown during most of 1968. Domestic supplies are expected to continue to increase slightly though the availability of imports remains uncertain. During the first quarter of 1969 imports were down about 45,000 tons from the same period in 1968. Stocks are at low levels at the primary smelters, consumers and secondary smelters, and replenishing stocks may well absorb excess supplies, if any, generated during the year. The U.S. Congress has under consideration several bills calling for releases of lead from the U.S. Government stockpile. Such if enacted could have significant bearing on the overall supply picture.

Of growing interest during 1969 will be an expanded effort by the lead industry through research, development and promotion in exploiting new areas of use while maintaining and expanding present markets. A part of this overall effort will incorporate a free world program (Zinc and Lead International Service-ZALIS) that will hopefully expand the consumption of lead in the developing areas of the world such as Latin America, South East Asia, South Africa, India, and the Near East.

Reports on Research and Other than U.S.: Incorporated in this review and which should be of interest are reports on other parts of the world as well as the joint research activities of the industry through the International Lead Zinc Research Organization and these will be found on pages 10 through 16.

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	1967	1968*
35	78,766	82,000
88	19,561	19,000
47	20,467	20,700
91	63,037	54,000
50	48,789	49,300
71	10,083	9,000
87	11,299	9,500
41	6,148	6,300
84	20,184	20,400
38	26,763	27,700
98	68,833	74,000
92	466,665	512,000
56	1,620	1,500
21	28,554	27,500
31	8,087	5,900
30	76,589	87,500
35	13,041	14,200
52	5,473	4,000
79	247,170	262,000
14	609	600
41	4,202	4,100
39	1,854	1,500
28	532	700
30	15,794	16,700
39	16,396	17,000
77	1,260,516	1,327,100

Lead Research

S. F. Radtke, Director of Research, International Lead Zinc Research Organization, Inc. New York, N.Y. 10017

International Lead Zinc Research Organization, Inc. (ILZRO) lead research and development work in 1968 was directed to fundamental and applications-based programs, including architectural and battery applications, cable sheathing, lead-coated steel, dispersion-strengthened (DS) lead, chemicals, paints and pigments, and ceramics.

A study of cast iron soil pipe jointing method showed that competitive materials may not have the long-term sealability required in the interest of public health and so adequately demonstrated by the historically successful service of lead tarred-oakum joints. The study demonstrated that the calked lead tarred-oakum joints are leak-proof in coated and uncoated cast-iron soil pipe under the elevated temperatures created by automatic appliances using large volumes of water. The coated pipe withstood temperatures of 170°F and 10 psi while the uncoated pipe had similar results at temperatures to 200°F.

In efforts to develop lead roofing shingles, research has indicated a variety of laminate combinations are suitable for further study. Another approach to expanding use of lead sheet for roofing involved development of a composite sheet produced by coating standard screens with lead. The leaded screen composite appears well-suited to continuous production techniques and research has been directed to this aspect. Success would make possible application of lead as roll roofing from long coils which also could be blanked into standard shingle configuration.

Another program involving lead-plastic composites sought to combine the respective benefits of each material to produce a superior cable sheathing. The research led to development of a modified polyethylene-lead composite which did not delaminate after exposure in a test chamber at 185°F and 100 percent humidity for seven days. A proprietary adhesive was used as the bonding agent. Research is continuing.

All parameters were satisfactorily determined to permit plating of lead and tin-lead alloys on steel by means of electro-deposition at speeds comparable to those achieved in tin plating. The electroterne process developed in this research has aroused considerable interest as an alternative to producing terne plate by the hot dipping method. A related program was initiated to study the operating parameters influencing the production of lead-coated steel in a low-tin or tin-free lead alloy bath. This objective would permit lower cost replacement for terne plate in such applications as automotive fuel tanks, oil pans, fire doors, air conditioners, and others.

In the organolead area, the first commercial pilot production and shipment of an organolead compound was made by an ILZRO licensee in April, 1968. The order consisted of 200 kilograms (440 pounds) of triphenyllead acetate and was shipped to a company for use in making 200 gallons of ILZRO Formula No. 1 anti-fouling paint ordered by the U.S. Navy for shipboard tests. Several other ILZRO licensees began production in pilot quantities.

Several new patents were granted in various countries covering use of organolead compounds as catalysts for production of

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lead, chemicals, paints and

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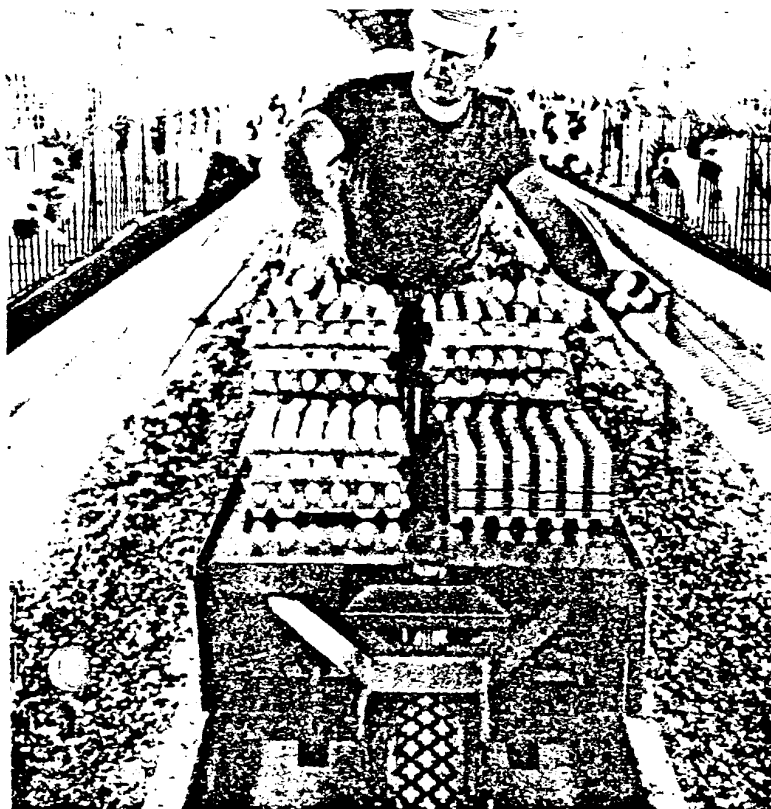
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polyurethane foams and as an organolead lubricant additive. A
total of 225 samples of 52 different organolead compounds were
distributed during 1968 to 78 individual applicants. In addition
to the applications already mentioned, the samples also were
being tested for use as cotton preservatives, bilharzia control,
anthelmintics, and rodent repellents.

In efforts to produce a lead-bearing enamel which has im-
proved properties of opacification, adherence and durability when
applied on aluminum, a series of low-melting leaded frits were
developed. These were white, chemically durable and self-opaci-
fied. Compositions and firing conditions for these frits were dis-
closed in patent applications.

The growing interest in ceramic or ferrite permanent mag-
nets, including oriented lead ferrites, is the object of a program
to develop materials and techniques for manufacturing oriented
lead-based magnetically hard ferrite bodies having properties
superior to currently used ferrites. In a former phase of this pro-
gram, it was learned how to make high-lead ferrites in the iso-
tropic (unoriented) form, with magnetic properties approximately
40 percent greater than conventional barium and strontium fer-
rites. A patent application was filed on the compositions and
firing techniques required to produce such lead ferrites.



Where "quiet" is a
must, lead-acid battery
powered vehicles will
be found, near the
putting green, outside
your motel room and
as here, gathering
eggs in a captive egg
factory.

Lead in the U.K.—1968

R. L. Stubbs, Director-
General, Lead Develop-
ment Association, Lon-
don, England

Consumption of lead in all forms at 385,000 metric tons was about 2½% less than in 1967. This set-back occurred despite substantial growth in lead for batteries and was mainly the result of a continuing recession in the manufacture of medium voltage power cables following the boom in 1964/65 when production probably responded to over optimistic forecasts of growth in power demand.

Consumption for batteries became in 1968 the biggest outlet for lead instead of cable sheathing. This growth reflects not only the greater number of new cars manufactured and on the roads, but also the expanding use of battery powered vehicles— industrial trucks, milk floats, etc. There was also a substantial rise in lead anti-knock compounds. Lead sheet continues to make progress as a building material, but with the decline in the use of lead pipe, consumption for these products together was at about the same level as in 1967, as were also the other main uses, solder and alloys, pigments and compounds.

The U.K. draws nearly half its lead supplies from scrap recovered at home, which is either refined or re-used directly by consumers. The production of English refined lead from secondary and scrap material, increased in 1968 to 143,900 metric tons; this does not include secondary antimonial lead. The production of refined lead from bullion imported from Mount Isa, Australia rose by 40% to 92,200 tons. Imports of refined lead, 121,300 tons, came largely from Australia (53,000 tons), Canada (49,600 tons) and S.W. Africa (13,000 tons) with smaller quantities from the Netherlands and Bulgaria.

U.K. Lead Consumption by end-uses
(In 100 of Metric Tons)

End use	1964	1965	1966	1967	1968
Batteries	87.6	86.3	85.1	87.2	96.2
Cable sheathing	122.9	134.6	115.9	102.6	80.8
Sheet and pipe	72.6	70.3	67.4	68.5	66.4
Other semi-manufactures (shot, foil, collapsible tubes, etc.)	15.1	15.3	12.8	11.0	11.3
Anti-knock compounds	35.2	36.7	35.2	36.9	40.4
Pigments and compounds	33.8	31.4	33.9	32.4	33.4
Solder and other alloys	40.6	39.8	39.3	34.6	34.5
Miscellaneous uses	20.2	20.7	21.1	21.8	22.1
Total consumption	428.0	435.1	410.7	395.0	385.1

U.K. Refined Lead Supplies
(In 100 of Metric Tons)

	1964	1965	1966	1967	1968
Production: refined lead from imported bullion	57.6	44.7	62.2	65.9	92.2
*Production: refined lead from secondary and scrap material	122.9	127.7	112.8	126.1	143.9
Imports refined lead	134.0	177.3	147.7	115.5	121.3
Exports and re-exports of refined lead	14.1	24.1	19.5	39.9	60.2

*secondary antimonial lead recovered from scrap not included

ms at 385,000 metric tons is set-back occurred despite is and was mainly the result ufacture of medium voltage 1964/65 when production tic forecasts of growth in

ne in 1968 the biggest out-ig. This growth reflects not manufactured and on the battery powered vehicles— ere was also a substantial ad sheet continues to make with the decline in the use products together was at were also the other main compounds.

lead supplies from scrap ined or re-used directly by sh refined lead from sec- in 1968 to 143,900 metric antimonial lead. The pro- imported from Mount Isa, s. Imports of refined lead, alia (53,000 tons), Canada) tons) with smaller quan- ia.

es

	1967	1968
.966		
15.1	87.2	96.2
15.9	102.6	80.8
17.4	68.5	66.4
2.8	11.0	11.3
15.2	36.9	40.4
13.9	32.4	33.4
19.3	34.6	34.5
11.1	21.8	22.1
0.7	395.0	385.1

A comparison between lead production 1968—total 273.-441 tons—and lead production 1967—total 288,948 tons— shows a certain decrease in 1968. Several factors are decisive for this decrease. One of them is that the German lead industry was engaged in a rather large exportation in 1967 (abt. 68,000 tons), mainly to the U.S.A. In 1968 a few works were shut down and some changes and investments for rationalization were made by the lead producers.

Lead consumption in 1968—as far as statistics are already available (I-III quarter)—was different in the individual fields of application. However, the sales figures in the battery market show a marked tendency upwards.

Lead in the Federal Republic of Germany—1968

Dietrich Boehr, Bleibe-
ratung E.V., Dusseldorf
4, Germany

Lead Consumption in the Federal Republic of Germany
(including West Berlin) by fields of application

	I-III Quarter 1968 in metric tons
Cables	63.231
Batteries	68.923
White lead, red lead, litharge, chemicals, etc.	43.371
Semi-finished products	40.677
Mould castings	3.987
Letter and bearing metals, lead-zinc alloys and similar	2.913
Surface protection, baths for heat treatment	946
Homogenous lead coating	358
Iron and steel industry	1.907
Powder	241
Total:	226.554

Lead Production 1968 in the Federal Republic of Germany

			Smelter soft, fine and hard lead ¹						Lead alloys		
66	1967	1968	Figures in metric tons	Total	Soft and fine lead	Hard lead	From total of inland and foreign ores	Other pre- melted and old material	Refined ingot lead	Total ²	Letter and bearing metals
2.2	65.9	92.2		Total 1968:	273.441	238.032	35.409	120.019	153.422	20.825	26.143
2.8	126.1	143.9									
7.7	115.5	121.3	Average								
9.5	39.9	60.2	per month	22.787	19.836	2.951	10.002	12.785	1.735	2.179	1.102

¹including production of battery firms. ²including alloyed ingot lead.

Lead in Italy—1968

Elemer Varady, Director,
Istituto Italiano del
Piombo e dello Zinco
Milano, Italy

During 1968 for the first time in Italy the production of lead bullion decreased as compared to the previous year of about 3,000 metric tons. The fact is a consequence of the renewal of the equipment of the Foundry by one of the Italian producers. The production of lead bullion from mineral and refining from 60,500 metric tons in 1967 is decreased to 57,600 metric tons in 1968.

It is expected that in 1969 the production will increase again to about 80,000 metric tons in consequence of the total employment of the production capacity by both the two producers.

During 1968 the consumption of lead at the first stage of transformation has registered an increase of 6,500 metric tons, i.e. about 4.5% as compared to the previous year. The increase is principally due to the consumption of lead in battery in consequence of the increased production of cars and to an increase in the use of lead for chemical purposes and particularly for antiknock compounds and for stabilizers of PVC.

The trend in consumption for short and medium time is favourable specially in consequence of the more increase in the automobile industry and for the chemical uses.

Imports of lead as bullion or scraps were of about 53,000 metric tons in 1968 and it is expected to decrease of about 10,000 metric tons in 1969.

The base price for lead bullion at the first 6 months of 1968 was L. 172 minimum and L. 186 maximum; in the second half of the year the price was L. 174 minimum and L. 186 maximum.

Italy-Lead Consumption by Industry
(in metric tons)

End uses	1966	1967	± %	1968	± %
Batteries	32,200	38,200		42,000	
Cables	18,000	20,500		18,000	
Chemical uses					
oxides	15,000	16,800		20,000	
antiknock comp.	9,600	13,400		13,500	
others	400	700		1,000	
Semifinished					
tube, sheet	31,000	33,000		34,000	
ammunitions	14,300	14,500		13,500	
Alloys					
solders	2,600	2,900		2,300	
others	2,900	2,900		3,700	
Others	4,000	6,100		3,600	
Total	130,000	149,000	+ 14,7	151,600	+ 17,4

in Italy the production of lead in the previous year of about 57,000 metric tons in consequence of the renewal of one of the Italian producers. From mineral and refining from 57,000 metric tons increased to 57,600 metric tons

the production will increase in consequence of the total output by both the two producers. In 1967 the production of lead at the first stage of increase of 6,500 metric tons, the previous year. The increase in production of lead in battery in consequence of cars and to an increase in other purposes and particularly for stabilizers of PVC.

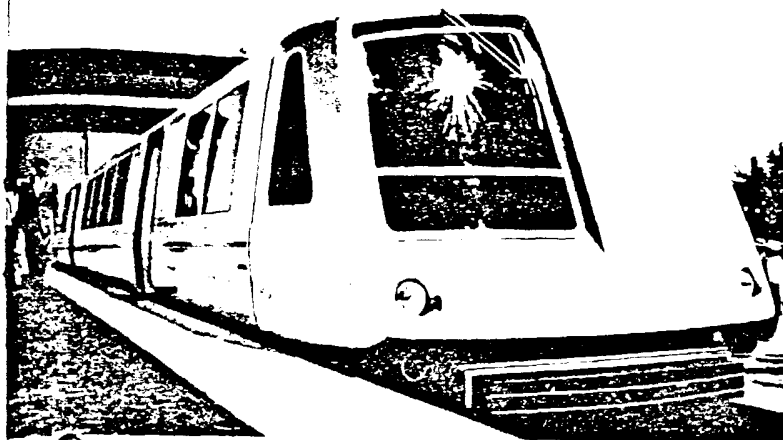
For short and medium time is expected the more increase in the chemical uses.

Scraps were of about 53,000 metric tons expected to decrease of about 10,000 metric tons

at the first 6 months of 1968 maximum; in the second half of 1968 minimum and L. 186 maximum.

Industry

%	1968	± %
	42,000	
	18,000	
	20,000	
	13,500	
	1,000	
	34,000	
	13,500	
	2,300	
	3,700	
	3,600	
7	151,600	+ 17,4



The 75-mile long San Francisco Bay Area Rapid Transit (BART) system uses lead-sheathed cable for critical 12-mile portion of electrical system that required direct underground burial.

Lead in Australia—1968

Neil A. Hanley, General Manager, Australian Lead Development Association, Melbourne, Australia

The sales of primary slab lead in Australia in 1968 were about 30,000 tons, down 10% on 1967 consumption of about 42,000 tons. In addition, it is estimated that 20,000 tons of secondary lead was used.

End use statistics for primary slab lead sales in Australia in 1964, 1965, 1966, 1967 and 1968 are given in the following table.

End Use	1964	1965	1966	1967	1968
Cables	8,962	5,928	10,145	11,227	10,377
Batteries—Metal	5,025	4,658	6,349	8,353	7,391
Batteries—Oxide	6,446	5,399	4,952	4,710	4,767
Other Oxides Compounds	5,775	4,878	4,503	4,240	4,230
White Lead	551	947	942	1,169	734
Sheet and Pipe	4,758	3,547	2,817	2,939	2,402
Foil and Collapsible Tube	32	254	39	41	35
Other rolled Extruded	2,369	1,869	1,840	2,015	1,279
Solder	3,191	2,314	2,762	3,307	3,782
Alloys	1,781	1,668	1,522	1,134	1,031
Miscellaneous	2,700	2,659	2,569	3,171	2,088
Total	41,590	34,121	38,440	42,306	38,116

The sales of primary slab lead in Australia have been stable in the area of 40,000 tons per annum for many years but there has been a steady increase in the quantity of secondary lead consumed. At this figure the sales of primary slab lead in Australia average around 7.3 lbs per head for the Australian population of about 12 million.

Lead in the Developing areas—1968

R. L. Stubbs, Director-
General, Lead Develop-
ment Association, Lon-
don, England

The developing areas of the world—India, South East Asia (excluding Japan), Latin America, the Middle East and Africa—have together steadily grown in importance as consumers of lead. Detailed and authoritative statistics are not available for all countries, but the following table gives a broad picture of refined lead consumption. It is based on statistics published by the International Lead and Zinc Study Group and information obtained by lead development associations.

Everywhere lead batteries are the most strongly expanding use of lead as in the world as a whole. In some countries, which have had long connections with European and US industry—notably India, South Africa, Brazil and Argentina—the range of uses include traditional ones, for example sheet and pipe, and scrap provides a useful subsidiary source of supply. Nearly half the lead consumed in Mexico is for making litharge which is mainly exported.

The rate of growth in consumption has varied from country to country. In India it has been hindered by a shortage of foreign currency but is now recovering again; in some Latin American countries lack of growth in recent years is attributed to sluggish economic conditions; and in South East Asian countries consumption is responding to stronger industrial and economic expansion. However in the developing areas as a whole, consumption, having reached 315,000 metric tons, is now about 11% of the free world total.

Some of the countries in the developing areas are important mine and metal producers of lead for the world market, notably Mexico and Peru in Latin America. South West Africa (administered by South Africa) has since 1964 also been a large source of supply; Zambia and Morocco are small producers.

CONSUMPTION OF REFINED LEAD
(In 1000 of Metric Tons)

	1964	1965	1966	1967	1968
India	42	32	40	55	60
S.E. Asia (excluding Japan)	14	18	19	26	29
Middle East (Pakistan, Israel, Iran, etc.)	6	8	10	15	22
Africa:					
South Africa	20	17	20	13	22
Other	16	16	16	20	21
Latin America:					
Argentina	31	38	36	35	39
Brazil	30	24	24	25	26
Mexico	54	56	60	65	68
Other	25	30	30	28	28
Total	238	239	255	282	315

Miscellaneous The balance of this review consists of tabulations covering supplementary world data.

World Lead Mine Production*
(In thousands of short tons)

	America's	Europe	Africa	Asia	Australia	Total
1964	936	376	237	107	412	2,068
1965	1,060	399	271	114	397	2,241
1966	1,113	470	241	120	399	2,343
1967	1,135	509	221	124	410	2,399
1968*	1,188	501	230	127	410	2,456

*Source: International Lead Zinc Study Group. Lead content by analysis of lead ores and concentrates plus the lead content of other ores and concentrates known to be intended for treatment for lead recovery.

* Estimated

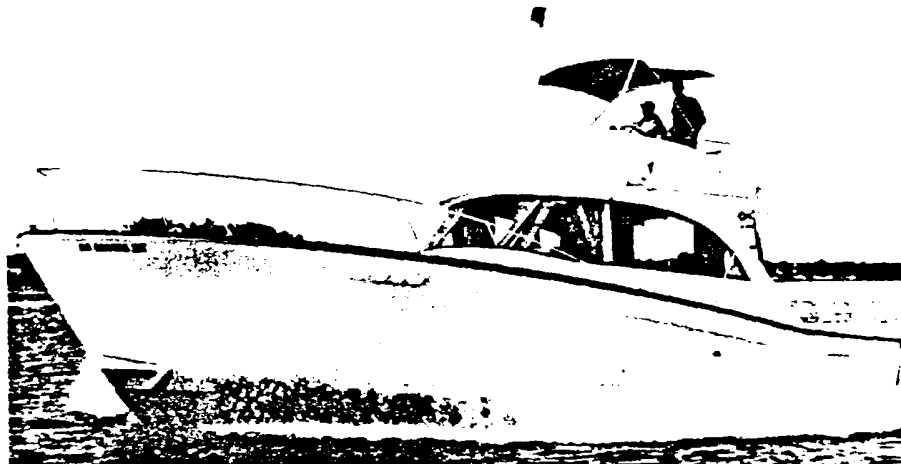
World Refined Lead Production*
(In thousands of short tons)

	America's	Europe	Africa	Asia	Australia	Total
1964	1,331	996	100	151	244	2,822
1965	1,359	1,027	132	143	241	2,902
1966	1,393	1,064	141	151	243	2,992
1967	1,316	1,164	138	184	239	3,041
1968*	1,419	1,210	131	197	224	3,181

*Source: International Lead Zinc Study Group. Total production by smelters or refineries of refined pig lead, plus the lead content of antimonial lead—including production on toll in the reporting country—regardless of the type of source material, i.e. whether ores, concentrates, bullion, alloys, mattes residues, slags or scraps. Remelted pig lead and antimonial lead are excluded.

* Estimated

Sleek, fast, seaworthy
... and quiet too.
Soundproofed with
1 lb. sheet lead,
conversation is com-
fortable on the
La Maria III.



World Refinery Stock Figures*
(In short tons)

	Dec. 31, 1968	Dec. 31, 1967
United States	33,606	29,664
O.E.C.D. Countries	56,220	58,398
All Other	73,301	93,169
Total	163,127^a	181,231^a

*Based on American Bureau of Metal Statistics—"Summary of Lead Refinery Statistics in U.S.A. and Outside USA."

^aRepresents approximately 85 percent of the Western World or 75 percent of the World Total.

World Refined Lead Consumption*
(In thousands of short tons)

	America's	Europe	Africa	Asia	Australia & New Zealand	Total
1964	1,274	1,308	39	264	70	2,955
1965	1,309	1,315	36	217	70	2,947
1966	1,412	1,307	40	228	76	3,063
1967	1,367	1,293	36	282	79	3,057
1968 ^a	1,444	1,343	47	315	77	3,226

*Source: International Lead Zinc Study Group. Includes consumption of the types of lead reported under "World Refined Lead Production" (above).

^aEstimated

Lead pigmented paints
are standard practice
wherever steel needs
protection from the
elements.



LIA01857

Dec. 31, 1967

29,664

58,398

93,169

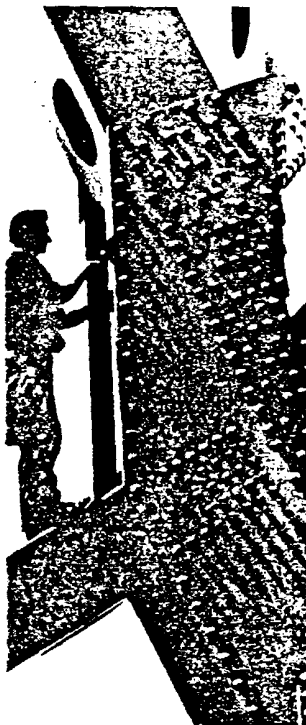
181,231^a

Summary of Lead Re-

World or 75 percent

ia	Australia & New Zealand	Total
4	70	2,955
7	70	2,947
8	76	3,063
12	79	3,057
5	77	3,226

s consumption of the
duction" (above).



The Lead Industries Association, Inc. was organized in 1928 and now includes fifty-nine corporate members representing all segments of the lead industry.

LIA is a non-profit trade association for the lead industry of the United States with sister associations in major countries throughout the world. The association neither produces nor sells lead, but collects and distributes information relative to the uses of this metal. A booklet entitled "Publications and Films" is available upon request.

An extensive library of lead information is housed at the Association's New York headquarters and data pertaining to lead and lead products may be obtained by letter or telephone inquiry to the technical service department. The staff of the Lead Industries Association will cooperate without obligation in the solution of your lead problems.

LIA01859

 **Lead Industries Association, Inc.**

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