

ANNUAL MEETING OF THE MEMBERS OF THE
LEAD INDUSTRIES ASSOCIATION

St. Louis, Missouri

April 15-16, 1958

The annual meeting of the members of the Lead Industries Association was held on Tuesday and Wednesday, April 15-16, 1958, at The Chase-Park Plaza Hotels, St. Louis, Missouri.

MEMBERS PRESENT

Harold A. Cohn
Harold Hertzog
Clarence K. Conard
John J. Lennon
Jean Vuilleques
W. B. Clancy
A. J. Phillips
S. D. Strauss
Charles W. Ambler, Jr.
Carl H. Cotterill
Carl A. Underhill
Howard L. Young
Frank P. Barton
Julian S. Bers
Ralph H. Cutler

Aubrey Fletcher
Ivor Thompson
A. Y. Bethune
John D. Bradley
John W. Caldwell
Roger H. Cutting
Harold E. Lee
Emmett A. Torney
W. G. Woolf
I. L. Barker
R. C. Bell
J.F.M. Douglas
Robert Hendricks
A. D. Turnbull
A. Olaf Wolff
Henry L. Day
Wray D. Farmin
H. F. Jones
S. J. Stickley
W. D. Atteberry
Don R. Carter
Paul R. Hamilton
Kenneth W. Green
E. R. Anderson
J. A. Costello
A. M. Callis

Harvey Ferer
Hyman Ferer

REPRESENTING

Alpha Metals, Inc.
do
American Metal Climax, Inc.
do
do
American Smelting and Refining Co.
do
do
American Zinc Lead and Smelting Co.
do
do
do
G. A. Avril Co., Lead Products Division
Bers & Co. Inc.
The Broken Hill Associated Smelters Pty., Ltd.
(C. Tennant, Sons & Co., Agents)
do
do
The Bunker Hill Co.
do
do
do
do
do
do
Cerro de Pasco Corp.
Consolidated Mining & Smelting Co. of Canada, Ltd.
do
do
do
do
Day Mines, Inc.
do
E. I. duPont de Nemours & Co.
do
The Eagle-Picher Co.
do
do
The Electric Storage Battery Co.
Ethyl Corporation
do
Federated Metals Division,
American Smelting and Refining Co.
Aaron Ferer & Sons Co.
do

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Members Present

R. A. Gardiner, Jr.
 Alan Stevenson
 Donald P. Goldsmith
 W. P. Wilke, III
 Lewis S. Somers, III
 Clarence Glass

Frank H. Hurless
 Herbert M. Weed
 Howard T. Morgan
 W. F. Murdock
 John Jennings
 Phil W. Ruppert
 William J. Welch
 John J. Forst
 William A. Oakey
 J. J. Sharkey
 Jens Jensen
 Robert F. Doelling
 Andrew Fletcher
 C. D. Henderson
 Charles R. Ince
 W. T. Isbell
 Carleton C. Long
 R. J. Mechin
 John G. Wehn
 Felix E. Wormser
 Victor Besso

L. A. Creglow
 G. Howard LeFevre
 F. S. Mulock
 F. L. Warner
 S. K. Droubay
 Howard Novasol
 Reuben Viener
 Robert N. Quenell

Representing

Gardiner Metal Co.
 do
 Goldsmith Bros. Smelting and Refining Co.
 Hammond Lead Products, Inc.
 Imperial Type Metal Co.
 International Smelting and Refining Co.
 (Anaconda Sales Co., Agents)

do
 do
 J. R. MacGregor Lead Co.
 Murdock Lead Co.
 National Lead Co.

do
 do
 Olin Mathieson Chemical Corp.

do
 do
 Pend Oreille Mines and Metals Co.
 St. Joseph Lead Co.

do
 do
 do
 do
 do
 do
 Societe Miniere & Metallurgique de Penarroya
 (International Selling Corp., Agents)
 United States Smelting Refining & Mining Co.

do
 do
 do
 United Park City Mines Co.
 Victory White Metal Co.
 Hyman Viener & Sons
 Western Lead Products Co.

REPRESENTED BY PROXY

Knapp Mills, Inc.
 The Okonite Co.
 Revere Copper & Brass Inc.,
 Foil Division

Rochester Lead Works, Inc.
 John A. Roebling's Sons Corp.
 Shattuck Denn Mining Corp.
 White Metal Rolling and Stamping Corp.

GUESTS

V. C. Allen
 J. M. Bates
 Richard J. Bauer
 Philip R. Blanc
 Herman Becker-Fluegel
 Clifford C. Childress
 Bernard F. Desloge

Tri-State Zinc, Inc.
 Union Carbide Chemicals Co.
 Henning Bros. & Smith, Inc.
 Indussa Corp.
 W. R. Grace & Company
 John Robertson Co. Inc.
 Minerva Oil Co.

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GUESTS (CONTINUED)

E. W. Edge	The Northern Miner
Robert W. Farrell	Lawrence M. Marks & Co.
E. L. Frank	Philipp Bros. Ore Corp.
D. B. Fraser	Canadian Mines Branch
Arthur J. Gervais	International Minerals and Metals Corp.
Paul Higgins	O. S. Tyson and Co.
W. G. Hisecock	Consolidated Zinc Corp. Ltd.
Webster Hodge	Battelle Memorial Institute
E. F. Hommel	The O. Hommel Co.
W. D. Hook	W. R. Grace & Co.
Frederick R. Jeffrey	National Zinc Co. Inc.
P. R. Kalischer	Precision Metal Molding Magazine
Herbert L. Kee	Product Engineering Magazine
Richard V. Morrison	O. S. Tyson and Co.
Edward G. Orkin	Metal Traders Inc.
J. W. Orr	Gold Fields American Development Co.
D. W. Payn	Lead Development Association
George W. Potter	Potter and Sims
John B. Rodgers	Skidmore, Owings & Merrill
J. L. Romig	Atlas Powder Co.
A. A. Scharf	Philipp Bros. Ore Corp.
D. Nevin Smith	Association of American Battery Manufacturers, Inc. (Electric Storage Battery Co.)
James W. Stafford	American Metal Market
Henry Stone	General Electric Co. Knolls Atomic Power Laboratories
Mortimer J. Sullivan	International Minerals and Metals Corp.
C. Richard Walmer, M.D.	Industrial Hygiene Foundation of America
Kurt Weinberg	International Minerals and Metals Corp.
S. M. Wilson, Jr.	Atlas Powder Co.
Brian Wilson	Steel Magazine

GOVERNMENT REPRESENTATIVES

O. W. Bilhars	Office of Minerals Mobilization
	Department of Interior
H. Kenworthy	U.S. Bureau of Mines
Fred Netzeband	do

LEAD INDUSTRIES ASSOCIATION STAFF

Robert L. Ziegfeld, Secretary-Treasurer	Edward J. Mullarkey
David M. Borcina	Sid W. Turner
Manfred Bowditch	Homer S. Yetman

Dr. L. L. Carrick, Consultant
Dr. John H. Koenig, Consultant

The minutes of the previous meeting of April 24-25, 1957, were circulated to members after that meeting and no changes or corrections were received.

NOMINATING COMMITTEE

Mr. G. Howard LeFevre, chairman of the Nominating Committee, reported for his Committee, composed, in addition to himself, of Messrs. E. R. Anderson, K. T. Cordon, A. R. Mers and L. J. Randall, and placed in nomination the following slates:

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R. D. Bradford

Federated Metals Division
American Smelting and Refining Co.

J. D. Bradley

The Bunker Hill Co.

K. C. Brownell

American Smelting and Refining Co.

J. A. Costello

Ethyl Corporation

W. H. M. Cranmer

New Park Mining Co.

H. L. Day

Day Mines, Inc.

Andrew Fletcher

St. Joseph Lead Co.

Clarence Glass

International Smelting and Refining Co.
(Anaconda Sales Co., Agents)

K. W. Green

The Electric Storage Battery Co.

J. A. Martino

National Lead Co.

F. S. Mulock

United States Smelting Refining and Mining Co.

Reuben Wiener

Hyman Wiener & Sons

Jean Vuilleques

American Metal Climax, Inc.

William Wilke, III

Hammond Lead Products, Inc.

M.M. Zoller

The Eagle-Picher Co.

There being no further nominations, the slate was unanimously elected.

REPORTS OF DIVISIONS AND COMMITTEES

Reports of the Industry Development, Technical Steering, Ceramics Technical and Red Lead Technical Committees; the Advisory Committee of the Metallic Lead Products Division; Solder Committee; Health and Safety Division, and the Technical Director, were presented, and are attached. (Exhibit "B").

REPORT OF THE SECRETARY-TREASURER

The secretary-treasurer informed the membership that his report had been circulated to members on March 27, 1958. (Exhibit "C" attached). (Exhibit "D" attached.)

ADDRESSES AT MEETING

The following papers were also delivered at the annual meeting and, with the exception of "Lead in Building Construction - An Interim Report" by John B. Rodgers, are available to those members interested:

Review of World Production and Consumption - Lead and Zinc	Jean Vuilleques
Progress Report, Organizing Committee AZI-LIA Expanded	
Research Program	R.Hendricks
How Should We Promote and Sell Lead and Zinc	S.D.Strauss
Storage Batteries	D.Nevin Smith
Use of Lead in Reactor Shielding	Henry E.Stone
Cable Sheathing	C.C.Childress
Lead in Ceramics	Ernest F.Hommel
Lead in Building Construction - An Interim Report	John B.Rodgers
Health Maintenance Problems	C.R.Walner, M.D.
Tetraethyl Lead	J.A.Costello
Lead in Chemical Construction	J.M.Bates

REPORT OF THE PRESIDENT

The retiring president, Andrew Fletcher, commented briefly on the Association's progress during his three years in office. His remarks are attached as Exhibit "A." He then introduced the new officers as follows, and urged members

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to give them full support:

John D. Bradley
P. S. Mulock
Felix E. Wormser
Kenneth W. Green

President and Chairman of the Board
Vice President
Vice President
Vice President

LEAD DEVELOPMENT ASSOCIATION

Mr. D. W. Payn, general manager, Lead Development Association, London, England, was introduced by the chairman. He responded with brief remarks, offering the close cooperation of his organization with ours in market development and research activities and expressing the desire that the two organizations work closely together for the greater effectiveness of their activities, to avoid duplication of effort, and so that each might benefit the most from the experience and past work of the other.


Secretary

Exhibit "A"
April 15-16, 1958

Report of the President*

Andrew Fletcher, President
St. Joseph Lead Company

During the last three years in which I have had the privilege of serving as President of LIA, some rather important changes have been made both in the methods of operating the Association and in the activities, themselves.

In the first place, our method of financing the Association's promotional and research activities has been changed so that now the entire support of these activities comes from the sellers of pig lead whereas the entire membership continues to support only the general overhead, statistical work, health and safety and other things in which all members have a direct interest. The funds for promotion and research have approximately quadrupled during this three-year period and the ground work has been laid for even more extensive activities, particularly in the field of technical research. In the latter connection, as you heard yesterday, we are in process of establishing an expanded program jointly with the American Zinc Institute.

During my term of office the guidance of the Industry Development Committee and the Technical Steering Committee has been invaluable, and I would like to take this opportunity to thank the members of these committees, as well as the many other working committees of the Association, for the large amount of time they have devoted and the important contributions they have made to the guidance of our affairs. It is only through such wholehearted cooperation on the part of the members that the Association can hope to derive the greatest benefit from the monies spent. I also want to include the representatives of our manufacturing members who serve on the working committees, and have contributed so much of their knowledge of the markets we are attempting to expand.

Many of you who have not had an opportunity to be as close to the Association's activities as I have during the last three years probably do not realize how extensive and varied its work actually is and the magnitude of many of the problems which the Association has to face. I believe that the changes in our By-Laws made last year, which provide for the rotation of officers, is a step in the right direction in that it will bring more of you into closer contact with the details of our affairs.

As speakers at this meeting have demonstrated, there are many ramifications to our problems and efforts to develop markets for our products are just as important as efforts to find the raw materials to supply these markets.

*Presented at the 30th Annual Meeting, Lead Industries Association,
St. Louis, Mo., April 15-16, 1958

Exhibit "B"
April 15-16, 1958

Report for Industry Development Committee*

C. R. Ince, Vice President
St. Joseph Lead Company

Before reporting on the activities of the Industry Development Committee, I would like to take a few minutes to give you the background and origin of the committee. Up until three years ago the cost of the promotional activities of the Association were shared jointly by consumer and producer members and any research, chiefly of an applied nature, was undertaken by joint committees of producers and fabricators specifically interested in the field involved. Under these circumstances, it is obvious that the promotional and research activities of the Association were very much circumscribed. After all, the development of new outlets and promotion of existing markets for lead are primarily the concern of the producers and secondarily that of our fabricator members many, if not all of whom, are either equipped to or actively engaged in using their facilities to process other metals than lead. Confronted with this situation and realizing that collective action by the producers could accomplish more at less cost than individual company effort, it was decided to establish an Industry Development Fund, financed entirely by the producers, to provide monies for promotion and research, both basic and applied. The Fund is underwritten by subscriptions based on domestic sales of the representative producer members and the allocation to promotion and research programs is worked out jointly by means of sub-committees on which there is manufacturer representation. In this way funds have been provided during the past three years for the Metallic Lead Products Division, the Pigments and Chemicals Division, Ceramics Division as well as the Technical Steering Committee and its Cable Sheathing Task Group. The use of the funds and the activities of these various divisions will be fully reported during this meeting.

The Committee is composed of representatives of ten member companies who are sellers of pig lead in the United States. I would like to give you their names so that they may have the recognition of the membership for their diligent work in passing upon the promotional activities of the Association and on the technical activities recommended by the Technical Steering Committee. They are:

J. J. Lennon
S. D. Strauss
Clarence Glass

Brian H. Taylor

R. H. Cutting
A. R. Mars
Robert Hendricks

J. Iche

C. R. Ince
G. H. LeFevre

American Metal Clinax, Inc.
American Smelting and Refining Co.
Anaconda Sales Co. (Agents, International
Smelting and Refining Co.)
The Broken Hill Associated Smelters Pty.
Ltd. (S.E. Sweet, C. Tennant, Sons & Co.)
The Bunker Hill Co.
Cerro de Pasco Sales Corp.
The Consolidated Mining and Smelting Co. of
Canada, Ltd.
Societe Miniere & Metallurgique de Penarroya
(V. Besso, International Selling Corp.)
St. Joseph Lead Co.
United States Smelting Refining and Mining
Co.

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Mr. C. R. Ince

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Report for Industry Development
Committee

The Industry Development Committee since its founding in 1955, has steadily stepped up its efforts to assist in the development of new uses and promote and expand the present known applications of lead, as evidenced by the growth of its annual budget. In 1956 this was \$57,000, last year \$115,000 and for 1958 a budget of \$204,800 has been approved.

In 1957 the Committee approved the recommendation of the Technical Steering Committee for the study of research needs of the Association, now completed by Battelle Memorial Institute, and for the study which is underway of the use of lead in building construction, recommended by the Advisory Committee of the Metallic Lead Products Division.

In addition to these special studies, it approved specific programs for the promotion of lead in ceramics, metal protective paints, radiation shielding, chemical construction and building construction for 1958, funds for which in the aggregate are 60 per cent greater than the funds for similar activities approved for 1957. It also approved addition to the Association staff of another technical man to perform technical service work. The idea in expanding this work is that by working with manufacturers of all kinds of products and supplying them with technical data about lead, we can encourage more people to try lead as a solution to the problems they have with their own products and also to develop completely new products which utilize the characteristics of lead.

Based on the study by Battelle Memorial Institute, which I referred to earlier, the Technical Steering Committee has recommended an enlarged research program which will require an appropriation of \$103,000 during this year in addition to the budget which has already been approved. This request will be presented to the Board of Directors at their meeting this afternoon. While it is in addition to the approved budget, it was recognized at the time that the 1958 budget was adopted, additional recommendations would be submitted when the Battelle report had been received and evaluated by the Technical Steering Committee. The Industry Development Committee appreciates the fact that a joint research program with the American Zinc Institute is in the process of being established. It is the feeling of the Committee, however, that no time should be lost in getting the recommended research program underway and that eventually when the joint organization has been established and in operation the research could be transferred to the new program.

The increase in the funds for 1958, approved late in 1957, in addition to the expansion of our technical service, provided for more trade paper and direct mail advertising, more publicity, more field work and more technical research than did the funds for 1957.

I think you can see that our Committee is attempting to develop a well balanced program for the Association which will leave no promotional or research tool unused that we think can help expand our markets.

ANNUAL REPORT OF THE L.I.A. TECHNICAL STEERING COMMITTEE*

Harold E. Lee, Chairman
Vice President, The Bunker Hill Co.

A brief historic review is felt necessary as background to this particular report.

The Technical Steering Committee is one of the most recent additions to the L.I.A. organization. It was established only a few years ago for the twofold purpose of;

1. Screening and evaluating proposed research projects
2. Assembly and submittal of research budget recommendations

The T.S.C. was inaugurated under the able and pleasant Chairmanship of Dr. A. J. Phillips. With his guidance, an active group interest in Lead Industry problems was generated and salient areas of attack were delineated. During this formative period the effective and continuing Ceramic, Red Lead, Cable Sheathing and Solder Task Groups, for example, were created. Separate and detailed reports from these respective activities are programmed on the agenda of this meeting.

By mid 1956, the T.S.C. developed "growing pains". It became quite disturbed that its prevailing practice of considering individual proposals, per se, without the availability of some long-term reference structure, might readily lead to "wheel spinning" and program imbalance.

Out of this concern was developed the T.S.C. recommendations, of last year, for the approval of funds to cover an external audit of the research needs of the L.I.A.; this request being for the purpose of exposing existing procedure and programs to a critical "new look" and the obtaining of recommendations for the setting up of long-term research policy and targets.

Upon approval of this project, its prompt and full realization was set as the T.S.C.'s immediate goal. Through joint consultant/T.S.C. meetings, the study was motivated, held within well defined limits and completed on schedule. Subsequently the report was passed on to the Industry Development Committee accompanied by a detailed T.S.C. evaluation and its recommended modifications.

The report encompasses evaluations covering both existing L.I.A. research programs and the completeness and presentation of the forthcoming L.I.A. Handbook. It provides recommendations for the selection of research programs and the exploitation of results. It not only outlines, in detail, wide areas of potential research but also suggests opportunities for cooperative research. In summary, it comprises a complementary endorsement of existing programs supplemented by a healthy influx of new potential and suggestion. Through this joint consultant/T.S.C. effort it is felt that a useful tool for continuing, long-term program guidance has been established.

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The L.I.A. Technical Steering
Committee

The T.S.C.'s 1958 Research Budget Recommendations are heavily weighted toward basic research. Accompanying such submittal to the Industry Development Committee was advice that careful consideration had been given to proper applied vs basic balance. It was further pointed out that basic research represents the hand that feeds applied research and that the relationship must be flexible. Also, that at the outset of an expanded program, greater emphasis will usually be required on the basic side until sufficient areas for applied efforts are developed. The T.S.C. intends to continuously watch this relationship to ensure proper balance.

Of a \$130,000 total 1958 budget recommendation, \$27,000.00 represents funds already approved for research of basic nature in the Ceramic field. As already mentioned, a report on this specific program is scheduled for this session.

Of the residual \$103,000.00, \$15,000.00 has been allocated to applied, and \$75,000.00 for basic research. Another \$13,000.00 is also earmarked as a contingency fund to care for situations which might require prompt action as a result of interim developments in the projects approved. It should also be pointed out that the T.S.C. has appointed competent sub-committees to supervise the planning and conduct of each project or related group of projects.

Specifically, and in addition to the Ceramic Fund, a brief resume of 1958 Budget content is as follows:

APPLIED RESEARCH

(a) Reinforced lead and lead alloys \$5,000

The remarkable strength imparted to lead via fiberglass reinforcing, coupled with its moderate fabricability, would seem to portend interesting developments.

The Owens-Corning Fiberglas Corp. has already spent some \$10,000 to \$20,000 in developing a method of reinforcing lead with glass fibers. However, determinations have not been made with regard to fatigue and creep properties. Upon our offer of cooperation, they have suggested that tests be run in our member laboratories on samples applied by Owens-Corning. Under this procedure the cost necessary to complete this preliminary exploratory work should be moderate.

The Subcommittee has already met with Dr. Siefert and his associates at Owens-Corning to initiate this work. Arrangements have been made for obtaining samples to be tested at the Asarco, Central Research Laboratories, the data to be reported both to Owens-Corning and the T.S.C.

(b) Heat emissive properties of lead compounds \$10,000

Through L.I.A. contacts, the black body properties of certain lead compounds in the heat range of the spectrum have been called to attention. These properties which might become very useful in commercial heating and cooling applications have been exploited to only a limited extent. A program to determine the possibilities of wider application has been deemed advisable.

Mr. Harold E. Lee

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The L. I. A. Technical Steering
CommitteeBASIC RESEARCH

- (a) Lead Alloys and related powder metallurgy and insoluble suspension studies \$50,000.

About 75% of the metallic uses of lead demand properties not inherent to lead itself. The protection of existing usages and the possible expansion of such outlets deserves continuing and aggressive research to develop the best possible position of quality and competition.

It has been recommended that this wide area of study be initiated via literature and present knowledge reviews with reference to similar work under way by others.

- (b) Lead Compounds \$25,000

Information pertaining to the properties of Lead Compounds such as the Chelates, Hydrides and Perfluorinated Organo forms is very meager. While the potential of such basic studies is necessarily nebulous, the development of effective antioxidants or reducing agents could portend new tonnage usages. In the case of perfluorinated organo lead investigations, it is possible to develop new forms of matter.

Projects of this category would be pursued primarily through graduate research fellowships.

In closing I might add that the items included in the 1958 Research Budget recommendations, by no means span the assembled field of potential research. During 1958, the T.S.C., with the aid of the L.I.A. staff, will explore the possible further development of areas of cooperative research; with Inland Steel for the expanded uses of leaded steels, Owens-Corning Fiberglas and DuPont for the possible development of lead silicate as a weighing material for nylon and other synthetics, and Ethyl Corporation for the possible development of lead coating procedure via the decomposition Tetraethyllead vapor or other organo lead compounds.

REPORT OF THE CERAMICS TECHNICAL COMMITTEE*

Dr. John H. Koenig, Director
School of Ceramics
Rutgers University

Chairman, Ceramics Technical Committee, L.I.A.

In reporting for your Ceramics Technical Committee this year, I would like to refer briefly to the various phases of the overall program. There has been an intensification of the effort, as for example, the research program on which we will comment first.

L.I.A. University Fellowships

The major purpose of the L.I.A. sponsored University fellowships is not only to encourage more research on lead but also to keep the use of lead in the foreground at the ceramic schools. At the same time most of these researches involve new potential fields for use of lead.

The Committee favors awarding the fellowships to a number of qualified schools rather than concentrating them in a few in order to interest as many students and instructors as possible in lead research. Another advantage of the University type fellowship is the desire on the part of all schools to publish their findings.

Three L.I.A. fellowships were sponsored by L.I.A. during the present 1957-1958 academic year; these were:

- (a) University of Illinois - low temperature porcelain enamels for aluminum and steel.
- (b) Ohio State University - lead glazes for sewer pipe and sanitaryware.
- (c) Rutgers - lead fluxed bodies.

It is too early to evaluate the products of these first three fellowships which are still in progress. However, speaking momentarily as from Rutgers and not as a member of the Committee - we believe that we will have a good paper on lead fluxed bodies, which will be presented at either the Fall meeting of the Electronics or White Wares Division of the Ceramic Society. Lead fluxed bodies are very interesting for electronic uses. We have yet to explore a number of their other possible applications.

The L.I.A. fellowship program is being enlarged considerably during the 1958-59 academic year, the cost of the total already approved program amounted to \$27,000; nine fellowships of \$3000 each.

New ceramic schools which will receive fellowships include:

- (a) Alfred University - lead in glass. The scope of this work is not as yet finalized.

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Ceramics Technical Committee

- (b) University of California - lead containing ferro-electrics. These provide ferroelectricity over a wider temperature range.
- (c) Clemson University - lead glazes for structural ceramics. This school has done considerable work on glazed brick, some of the glazes containing lead. More technical information is needed on the advantages of lead glazes and the best lead glazes to use for this application.
- (d) Pennsylvania State University - further investigations of phase diagrams involving lead. This involves more basic or long term research which is also needed.

In addition to these a second fellowship has been provided for the work on enamels at Illinois (this to be an adherence study of the leaded porcelain enamels) and also a second fellowship has been awarded to Rutgers to intensify the lead-fluxed body research. This overall program involves both applied and basic research. The Committee believes it will result in a large number of very good publications in the ceramic technical journals. This is also a likely source of supplements for the Manual.

Supplements to Manual

The Manual as you probably know has been most favorably received by the ceramics industry. We can take some pride in that it was awarded a Certificate of Merit by the New York Employing Printers Association on the basis of design, printing quality, overall appearance and presentation of material. As previously mentioned, most of the credit for this should go to Mr. Ziegfeld and his staff.

So far there have been two supplements issued which we believe are outstanding contributions to the Manual.

The two which have been circulated are:

- (a) "Glass or Enamel Colors" - Ray Andrews of Drakenfeld. Lead oxide is the preferred fluxing agent for these low temperature colors.
- (b) "Low Temperature Glasses as Bonding Materials for Crystals" by A. J. Monack. This is a basic approach to the glass bonded mica type of ceramic although other crystalline phases are considered. The findings here show the lead glasses to advantage.

Questions raised on these have indicated real interest; most of the questions are being answered by the staff at headquarters although in some instance by committee members.

Some of the supplements under consideration include:

- (a) Properties of Some Low Temperature-Solder Glass

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Ceramics Technical Committee

- (b) Aging Characteristics of Piezoelectric Lead Compounds.
- (c) Lead Fluxed Ceramic Bodies
- (d) Lead Enamels for Aluminum
- (e) Lead Glazed Brick

It is anticipated that three more supplements will be issued during the present year.

Advertising Program

This program was initiated a little over a year ago with the first advertisements appearing in the March issues of the "Ceramic Industry" and the "Bulletin of the American Society." The reaction to these advertisements has been favorable resulting in a number of questions being received and answered as well as more requests for copies of the Manual.

The program has been increased this year with 12 pages each in "Ceramic Industry," "Ceramic Age," and the "Bulletin of the American Ceramic Society" and 6 pages in the "Ceramic News" - the West Coast periodical. The Committee is trying to select those subjects which will do most good. Each ad includes mention of the general benefits derived from lead in ceramic products. An attempt is being made to come up with a good slogan to use in these ads, e.g., "Look Ahead With Lead," which appeared in this year's March ad showing a new tunnel involving lead glazed wall tile on the sides and a lead enameled aluminum ceiling.

Papers To Be Presented On Lead

at Annual American Ceramic

Society in Pittsburgh this Month

- (a) "Lead in Zero Shrinkage Bodies" - Rutgers. Lead aluminosilicate is the principal phase in these bodies. Some of these data, along with other data, will be used in a supplement to the Manual.
- (b) "Phase Relations in Lead Niobate," W. R. Cook, Jr., Clevite Research Center.
- (c) "Polymorphism and Ferroelectricity of Lead Metatantalate," E. C. Subbarao et al, Westinghouse.
- (d) "Ceramic Coatings for a Concrete Sewer Pipe Mix," T. M. Giles, Ohio State.

Committee Action on Battelle Recommendations

The Battelle Memorial Institute Evaluation of a Research Program for the L.I.A. makes several recommendations to augment and reinforce the ceramic research program.

Dr. John H. Koenig

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Ceramics Technical Committee

(a) The first of these concerned a leachability-test development, especially for porcelain enamels (in relation to the potential toxicity hazard). Work has been initiated along these lines within ASTM Committee C-21.

(b) A further recommendation was to have a literature resumé including abstracts on all the articles involving the use of lead in ceramics. The Committee believes that such a resumé can be compiled from the reports of the various L.I.A. fellowships.

There were other suggestions given in the Battelle Report under deferred ideas. These for the most part are being covered in the fellowships being sponsored by the L.I.A. during the 1958-59 academic year.

Permanent Ceramic School Displays

School Displays

Displays, such as you see exhibited here, have been prepared and are being submitted to the twenty schools offering courses in ceramics or ceramic engineering. Considerable effort went into showing the diverse use of lead in ceramics and bringing out the important reasons why lead is used. Since these exhibits are being sent out now, we can't as yet report on the reaction but we believe that it will have great long term value in terms of the students being acquainted with the diverse uses of lead and the advantages. It undoubtedly will also find instructional use. The exhibit has been designed so that changes can be made at later dates simply by sending out new small sections or panels which can be easily attached in place of present ones. It is planned to have one of these exhibits at the forthcoming annual meeting of The American Ceramic Society.

Although these exhibits were only offered to the 18 accredited schools on March 19th, by April 1st 12 of these schools had written accepting the offer. They are: Universities of Washington, Utah, Illinois, Texas, West Virginia, Pennsylvania State, Missouri School of Mines, Virginia Polytechnic Institute, North Carolina State College, Iowa State College, New York State College of Ceramics at Alfred, and Rutgers.

In summation - the Committee believes that a good, aggressive program is underway. On behalf of the Committee, I express appreciation to the Technical Steering Committee for approving this current effort and to the L.I.A. for providing the necessary funds.

REPORT OF THE RED LEAD TECHNICAL COMMITTEE*

Dr. L. L. Carrick
University of Michigan
Ann Arbor, Michigan
Chairman, Red Lead Technical Committee

The number of paint pigments available to the paint industry for formulating paints of all kinds is growing constantly. This is particularly true of the anti-corrosive paints. Where once red lead was the only pigment for such use, we are now faced with dozens of non-leaded competitive pigments that have generally one thing in common - they are lower priced than red lead.

Emphasis therefore has been placed by the lead industry on developing lead pigments and lead paint formulations that would compete somewhat in cost and still maintain the high standards of quality that lead pigments now enjoy. One of the biggest advantages we have working for us is the fact that practically everyone agrees that red lead is the finest anti-corrosive paint on the market but, unfortunately, not everyone is willing to pay the price for such quality.

As a result, a number of new lead pigments have been developed that are less costly than red lead and some of these show considerable promise. How they will fare, of course, will depend on the future. Many of these new lead pigments are currently being evaluated in test projects being conducted by your Red Lead Technical Committee. L.I.A. Project 25 for example is evaluating calcium plumbate and L.I.A. Project 26 includes the new lead silico-chromate pigment.

Prior to the test projects just mentioned, your committee was primarily involved in formulating and testing red lead paints that would meet the requirements of formulators for red lead paints for specific types of service, cost, better surface wetting properties, lower film permeability to moisture, faster drying times and better all-around film characteristics.

All of these requirements have been successfully met as a result of 26 research programs, 18 of which have been completed since the inauguration of the Red Lead Technical Committee. The data obtained are used to guide future research and to help promote the sale of lead pigments. In this connection, the completed projects have resulted in the issuance of 12 Red Lead Technical Letters providing paint formulators with the results of the completed test projects. Three more "Letters" based on this research will be issued in the near future.

Much of this research has involved the formulation of the vehicle used with a red lead pigment to obtain the desirable characteristics we were after but we have not forgotten the addition of extender pigments to red lead paints in an attempt to provide paints of high quality at comparatively low cost.

The importance of these Red Lead Technical Letters has been brought home to us many times by the fact that many of the recommended red lead paints have been adopted as standard by paint consumers, both public and private. The most recent example was the incorporation of L.I.A. Formula 3-7 into Standard Oil's Engineering Specification 810-A.

* Presented at the 30th Annual Meeting, Lead Industries Association, St. Louis, Mo., April 15-16, 1958.

Dr. L. L. Carrick

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Red Lead Technical Committee

Early in 1957, your committee made a survey of the painting practices of State highway departments and found red lead to be the overwhelming favorite for highway structural steel. Forty-seven of the 48 State highway departments have specifications for red lead primers. This situation as good as it is may lead to a feeling of complacency which is the last thing we can afford to let happen. You can bet your life that every paint manufacturer, as a result of the Government's road building program, is going after this business as hard as he can. It is up to us, therefore, to supply ammunition that will combat a change in State highway specifications to non-lead paints for primers, field and top coats.

We are presently doing this. In 1957, an advertising program was initiated in "Engineering News-Record," a magazine that reaches almost all of the highway engineers. In 1957, we had a program calling for 6 pages a year and in 1958, we are doubling this program.

In addition, we distributed in 1957 "Red Lead Technical Letter No. 12 - Painting Highway Structural Steel" to a mailing list of almost 10,000 names. We were able to issue this particular "Letter" soon after the Government's road building program was announced because the data we needed were available as a result of our test programs, another example of our test programs being an effective source of reliable data.

Another area where red lead is being attacked is the American Water Works Association specification for the painting of the interior of potable water tanks and standpipes. After 50 years of almost perfect service, the use of red lead is under attack on the basis of its toxicity. As far as we can determine, no case of lead intoxication has ever occurred from this use of red lead. Despite this record, red lead's use for this purpose is being challenged. Fortunately, L.I.A.'s Health and Safety Division, in conjunction with the Red Lead Technical Committee, has a study underway, which has been going on now for seven years, that definitely indicates that the soluble lead content of potable water is well below maximum limits. These data are being presented to the American Water Works Association, and I am sure that Manfred Bowditch in his report will elaborate on this situation.

An important addition to our promotional activities the first of this year was employment of Owen Shobe on a part-time basis. Mr. Shobe was a member of the Red Lead Technical Committee for many years, representing The Glidden Company from which he is now retired after 39 years. He will presently concentrate his activities in the highway field, making personal contacts with as many highway engineers as possible.

While it would appear that we are concentrating on the highway and water works fields from my remarks up to now, we are not overlooking other fields. Our program for 1958 includes the publication of three "Technical Letters" based on our research activities. One of these will be on the painting of rusted galvanized, new galvanized and aluminized steel with red lead, another on the painting of steel bottoms of ships with L.I.A. Paint No. 328. This paint was placed on exposure on two ship bottoms, along with a Government paint that is far more expensive, and the results achieved were about equal.

The third Technical Letter planned will be a compilation of all previous "Letters" incorporating up-to-date information.

Also, our advertising, though it stresses highway painting, includes a subsidiary photograph pointing up the advantages of red lead for other uses.

REPORT OF THE METALLIC LEAD PRODUCTS DIVISION*

G. Howard LeFevre
Vice President, United States Smelting Refining & Mining Co.,
Chairman, Metallic Lead Products Division, L.I.A.

The Division is primarily concerned with the promotion of metallic lead products in building construction, in the chemical industries as a construction material, and in solder.

During the year the Division had three exhibits, at the Home Builders' Show in Chicago, which show was a part of the annual meeting of the National Association of Home Builders, at the annual meeting of the National Association of Plumbing Contractors in Dallas, and at the National Chemical Exposition in New York.

At the Home Builders' Show a new four-page leaflet detailing the use of lead for roofing, and the use of lead for flashing of small homes was presented.

The 1958 issue of Sweet's Catalogues for architects and for builders of light construction will carry two four-page insertions, one detailing the use of lead in plumbing, and the other the use of lead for roofing and flashing. Preprints of these insertions are available for distribution. The Sweet's Catalogues have a circulation of some forty-six thousand.

Skidmore, Owings and Merrill, internationally-known architects and engineers with offices in New York, Chicago, San Francisco, and Portland, Oregon, were retained to make a study of means to further develop the use of lead in construction work. The study began in January 1958.

Plumbers' Forum, which was on a basis of two issues a year to some 25,000 plumbers, was discontinued and a page of the quarterly publication Lead was devoted to the plumbing industry. Inclusion of articles on lead in plumbing in "Lead" gave more frequent and wider coverage.

The book "Lead Work for Modern Plumbing" is now the official textbook on lead work in the training program sponsored by the International Plumbers' Union. The supply of these textbooks is nearly exhausted, and we have approximately recovered the cost of the initial 10,000 copies.

L.I.A. awarded prizes to the three best lead workmen at the Apprenticeship Contest held at Purdue by the International Plumbers' Union. During this Contest at Purdue, L.I.A. conducted a one-week course for instructors on the best methods of teaching lead work.

The installation of more than 3,000 feet of 3-pound hard lead gutter on a new building at Duke University was completed; this installation plans and specifications were prepared by L.I.A.

*Presented at the 30th Annual Meeting, Lead Industries Association
St. Louis, Mo., April 15-16, 1958

Mr. O. Howard LeFevre

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Report of the Metallic Lead
Products Division.

The third L.I.A. "Lead Building Construction Bulletin", which dealt with lead in chemical laboratory installation, was circulated to some 20,000 architects and engineers.

Three Bulletins on "Lead in Chemical Construction" were issued and distributed in 1957. In addition a chemical Bulletin on the performance of lead in the production of bead catalysts was prepared and circulated to members. Also prepared was an article on the use of lead in handling corrosion chemicals, which article was accepted for early publication in the "Petroleum Refiner."

The Solder Committee has now completed the text of the Soldering Manual, which manual is sponsored by the American Welding Society. The manual runs to nineteen chapters and should be a valuable manual of instruction and reference guide.

The chapter on lead which appeared in the original American Chemical Society Monograph on Corrosion of Metals, was rewritten for a new edition of the Monograph, and the text is now about in final form.

The field work of the Division continued through the year with personal calls on architects, plumbers, and government officials.

REPORT OF THE SOLDER COMMITTEE*

David M. Bercina
Lead Industries Association
Chairman, Solder Committee

As chairman of the Solder Committee, I am glad to report that, at long last, all of the material for the Solder Manual has been turned over to the American Welding Society for publication. As you all probably know, your Solder Committee has been working on this project for more than five years and when the manuscript was turned over to the Welding Society there were audible sighs of relief from all of the committee members.

At this point, I would like to express my own personal thanks to the committee for a job well done and in particular to Elbert Minarcik of National Lead Company and Carl Sohl, American Smelting and Refining Co. who served on the committee with me from the very beginning. Also to Fred Disque of Alpha Metals who joined us later and to others too numerous to mention whose advice and counsel were sought from time to time. Of course, none of the work accomplished would have been possible without the cooperation of our member companies.

The technical secretary of the American Welding Society has told us that it is their hope and desire to have the Manual printed and available for distribution before the end of the year.

They do not yet know at what price the Manual will be offered but a manual of a similar nature on brazing was sold at \$4.75 per copy. However, the Brazing Manual was printed and sold by a publishing Company and it is the Welding Society's intention to publish the Soldering Manual themselves. They thus feel that it will sell at a lower figure.

No matter what the final decision as to price is, a discount will be offered to members of the committee. This will amount to 20 per cent on 25 or 50 books with larger discounts as the quantity is increased, up to 500 books. Above 500 copies, direct negotiation is advisable.

The present plan is to print 7,500 copies with hard covers. If anyone is interested in purchasing several thousand copies, they can be obtained with the hard cover at a substantial discount and even further savings can be realized if paper covers are selected.

In the preparation of the Handbook, there were many technical problems that had to be overcome, problems that were not answered by available technical literature and could not have been answered except by your committee's action.

We also found that there still are areas in which additional technical knowledge about solder is needed. Furthermore new developments in product design, we are sure, will develop other areas where more information is required. Your Committee feels that the continued functioning of this Committee is necessary to keep abreast of new developments and to outline future joint research projects on solder as required.

*Presented at the 30th Annual Meeting, Lead Industries Association, St. Louis, Mo., April 15-16, 1958.

Mr. David M. Borcina

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Report of the Solder Committee

One of the things that the committee has discussed is the need for research on solder. Solder, having been around for so long, you would imagine that there was available a thorough knowledge of and agreement on its physical properties. Unfortunately, this is not so. We do know, however, that there is plenty of data available in various laboratories, both in and outside of our industry, that is authoritative and if coordinated and published, would be a major boon to solder users.

In some instances, however, test procedures have differed and the resulting values vary from laboratory to laboratory. It is this sort of variance that leads to misunderstanding and often misapplication of solder that accelerates research for other means of joining.

One of the largest consumers of solder, now and for many years, has been the manufacture of automobile radiators. A considerable share of this is a dip soldering operation and only recently in the preparation of the material for the Solder Handbook we found that there was a wide difference of opinion as to the allowable limits of copper contamination that could be tolerated by the solder. The opinion of the A.W.S.'s full committee on Brazing and Soldering ranged from 0.2 to 0.4 per cent copper contamination as the point at which solderability would be affected. Unfortunately, there were no acceptable data that would justify either limit. It is situations of this kind and others like it that suggest the need for research.

Among the research needs that have been discussed by your Solder Committee are the following:

1. Search of the literature.
2. Study of the physical properties of solder and an authoritative presentation of such data.
3. Standard test procedures.
4. Study to evaluate alloying elements in solder that may result in greater creep and fatigue strengths.
5. Study to evaluate limits of contaminating elements in solder, particularly in dip soldering operations.
6. Study of the physical properties of solder at sub-zero temperatures.

We feel quite sure that some of the necessary research could be conducted jointly with consumers of solder. As a matter of fact, one organization has sounded us out already as to our attitude for joint research efforts. They are tentatively planning a study on the shear strength of soldered joints. What they are looking for basically is a solder that will provide them with greater shear strength than the solder they are currently using, a 50-50 solder. They of course are not wedded to a tin-lead solder. We are told that this use now involves an estimated 125,000,000 joints with perhaps an average of 1/4 oz. of solder per joint. It involves roughly 1,000 tons of solder containing 500 tons of lead. Of course, the possibilities of any such research developing a lead-free solder that would have as many advantages, practical and economical, as the solder presently used is perhaps remote, but the fact remains that they are looking for one.

Mr. David M. Borcina

-3- Report of the Solder Committee

We believe that it is the lead industry's job to forestall such efforts and one important way that this can be accomplished is to have authoritative industry-wide research data readily available to consumers.

To close, perhaps on an optimistic note, the use of solder has grown tremendously since World War II, present consumption of lead being almost double what it was in the war years. This very growth, however, is probably the reason other methods of jointing are taking steady aim at our market.

REPORT OF HEALTH AND SAFETY DIVISION*

Manfred Bowditch, Director
Health and Safety Division
Lead Industries Association

In carrying out this annual function of reporting on twelve months of highly varied health and safety activities in the short space of five minutes, I feel a bit like the magician who draws an endless series of rabbits and other paraphernalia from a hat, for it represents a condensation of 21,000 to one. Again asking your indulgence for some pretty dry statistics, let me say that, during 1957, 10 national and 15 local meetings and conferences were attended, that, of 32 visits paid, in 12 states from coast to coast, 23 were to industrial plants and offices, the balance being to hospitals, clinics and medical offices, governmental agencies and educational institutions, and that, of 129 inquiries responded to of which records were kept, 52 per cent were from industrial and 32 per cent from medical sources, 9 per cent from governmental units and the small balance from industrial workers and other individuals. These inquiries represented an increase of 26 per cent over the year before, surely a healthy sign, and let me say again that not a few of them involved far more work than the mere response to a letter. Explanation of some aspects of these bare figures is now in order.

LEGISLATION and PRECAUTIONARY LABELING

Few legislative projects importantly inimical to our interests, other than in the field of precautionary labeling of potentially hazardous industrial products, were noted during 1957. However, as had been anticipated, a veritable wave of such projects swept the country, with the introduction of bills to this purpose in the U. S. Congress and in the legislatures of 18 of the 48 states and that of the Territory of Hawaii. In such of these as were enacted, our efforts to secure uniformity of requirements, in which we co-operated with the Manufacturing Chemists' Association, the National Paint, Varnish and Lacquer Association and the Associated Industries of New York State, were on the whole successful. A juridical event of major importance was the reversal, by the Supreme Court of North Carolina, of a county court decision holding a pigment supplier guilty of negligence in having failed to apply poison labels to a shipment of litharge. Watching for adverse legislation in our many states is an important part of our work and one in which the help of our members with installations in various parts of the country is again and earnestly asked.

SERVICES TO INDUSTRY

As has been noted, somewhat more than half of the inquiries to which we respond stem from industrial sources. Directly or indirectly, the intent of all our health and safety work is to be of service to industry, but certain of its components are so specifically of that nature as to warrant mention in this category.

*Presented at the 30th Annual Meeting, Lead Industries Association,
St. Louis, Mo., April 15-16, 1958.

Outstanding here has been the effort to forestall the publication by the Public Health Service of a report inevitably damaging to the 50-year-old custom of coating the interiors of potable water tanks with red lead paints, a proposal reactivated last fall by the producer of a competitive paint. Fortunately, the findings of a study carried on for us in Massachusetts over a seven-year period are such as to in large measure negate any contention of hazard from this practice. Also of importance has been the adoption by the American Conference of Governmental Industrial Hygienists, which sets such standards for the several states, of an increase of 33 1/3 per cent in the allowable concentration of lead dust and fume in the air of work places, an upward revision first proposed by a subcommittee of the American Standards Association of which the speaker is chairman. Other activities of direct concern to industry have been the reprinting and distribution, through the frit manufacturers, of the chapter on safe handling of lead from our manual "Lead in the Ceramic Industries," the preparation, by arrangement with the Industrial Hygiene Foundation, of a section on lead hygiene for the Monograph on Lead to be published by the American Chemical Society, assistance rendered to the American Industrial Hygiene Association in the preparation of a Hygienic Guide on Lead, distribution of four Health and Safety Bulletins to our members, and arrangements made for the delivery of papers on subjects of industrial health at the annual meetings of the American Ceramic Society, the American Association for the Advancement of Science and our own Association. Of considerable potential usefulness have been the friendly relations maintained with a substantial number of state and local health departments, as have been, it is thought, the speaker's continued service on six committees of four national organizations.

SERVICES TO PHYSICIANS

Though the instruction given in our medical schools on subjects of industrial health is probably improving in quality and quantity, it remains far short of the ideal, and the professional ignorance of the basic facts of plumbism is consequently still as widespread as it is understandable. In addition to responding to the written and telephoned requests of physicians for factual information, our efforts to offset this shortcoming have centered mainly in the maintenance of a reprint service, now comprising some fifty publications on subjects of lead hazard control, continued distribution of Dr. Johnstone's "Facts and Fallacies of Plumbism" to medical schools and individual physicians, and support of the movement to establish so-called "Poison Control Centers," of which there are now upwards of a hundred, in some ninety cities, giving 24-hour advisory service to the doctors of their communities. Efforts to promote the proper use of the drug EDTA, an essential in the treatment of many cases of lead absorption, and to minimize its abuse, have continued. Dr. William E. George of Australia, whose extended U.S. sojourn and presentation at our 1957 meeting will be recalled by many, was but one of several medical visitors from overseas for whom visits to industrial plants and medical centers were arranged. Initial plans for our Lead Hygiene Conference, to be held in Chicago early next winter, were made during the year, and it should perhaps be injected at this point that this conference will be similar to the highly successful one held in the same city ten years ago, that much new material will be presented, and that it is hoped that all our members can be represented at The Drake on November 6th and 7th.

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Report of Manfred Bowditch

CHILDHOOD LEAD POISONING

One can readily understand why, to the operator of a smelter in California or a lead products plant in Texas, the doings of slum children in our eastern cities may seem of little consequence, and it is with the hope of emphasizing the adverse effects on the Lead Industries, in terms of continuing detrimental publicity, of the extremely difficult problem of childhood lead poisoning, that this subject has been deferred to the close of my report. The study of plumbism in children made for us at The Johns Hopkins Medical School was brought to conclusion by the publication of three papers by two Baltimore physicians early last year. Our support of work in this field at the Children's Medical Center and Massachusetts General Hospital in Boston continues, though at quite minor cost. Late in the year, a commercially motivated telegraphic warning relative to the alleged hazard of lead-painted imported toys, sent to some forty health departments throughout the country, brought us an avalanche of inquiries and was finally offset by statements issued by the Public Health Service and by the American Academy of Pediatrics. No municipal health department is more alive to the implications of lead poisoning in children than is that of the City of Baltimore. In concluding this subject and my report, let me read to you a recent letter sent by its Health Commissioner to the Mayor of that city:

"Dear Mayor:

There is transmitted to you herewith the Weekly Morbidity and Mortality Statistical Report of Baltimore for the week ending March 27, 1958.

A tragic note was struck in the city's health picture on Monday of this week when a two-year-old child died of lead paint poisoning. This is the first death from the ingestion of lead paint particles reported this year, and the 112th Baltimore child to die of lead poisoning since the Baltimore City Health Department began to battle this danger. The child this week was the youngest of three children in a family that resided on the second floor of a multiple family dwelling in the central area of the city. The child was taken to the hospital on March 19 when he suffered convulsions. Investigation by the public health nurse revealed that the parents were aware of the lead paint poison danger and had seen the child chew paint on various occasions, and each time had tried to discourage the child from this dangerous habit. They stated that there were no other symptoms except for some irritability about a week before the child was admitted to the hospital. Everything possible in the way of treatment was done to save the child's life.

This death plus 4 additional cases so far in 1958 makes evident once more the need for stronger preventive measures in the city. Any preventable death is a tragic circumstance, but in lead paint poisoning in children the outlook is bleak for those who do not recover from the disease. There may be a permanent brain damage and paralysis, and the child becomes a life-long drain on the family, if it can bear the expense and the mental strain, or on the community.

It is my firm conviction that lead paint poisoning is preventable if action is taken to eliminate all existing potential lead paint poisoning conditions

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Report of Manfred Bowditch

in Baltimore. This is the goal the City Health Department has set for the city. Everyone concerned will wish to help win this battle.

Since 1931 there have been 607 cases of lead poisoning in Baltimore children.

Very truly yours,

(Signed)

Huntington Williams, M. D.

Commissioner of Health*

SOME NEW DEVELOPMENTS IN LEAD*

Report of the Technical Director
Edward J. Millarkey
Lead Industries Association

Gentlemen, I have been asked by the secretary to expand on the important new developments in lead which have come to our attention this year in order to point out that the possibilities for lead are by no means exhausted but in fact are on the upturn. As industry representatives, technically speaking, we know where we've been, where we are, and perhaps less, where we are going. Considerable attention has been given recently to the so-called exotic metals and their newly found markets and to other technological accomplishments -- to the comparative exclusion of lead. Technical firsts last year have been many and varied and are, I believe, the best indication of where we are going as a technical-minded nation and industry. Our space accomplishments need no further comment and as significant as these and other developments are, the revelations with respect to lead are in the very least and contrary to popular belief, proportionately as great.

Lead's firsts would have to include a newly developed use in connection with a high temperature structural material, its first practical use as a superconductor, the realization if not the revelation that a certain lead compound is virtually a black body, that lead has an important place in the future of electronic or electroluminescent lighting, and that lead as an anode has found use in cathodic protection circles, that lead because of sound attenuation properties has developed as a requisite material for missile guidance and control system calibration studies, and that lead alone or in combination with various organic materials has found new applications in the nuclear field. Of these latter uses, one in particular may be as explosive in impact to the lead industry as the application is to the purpose for which it is intended.

To further elaborate, the implications with respect to the above firsts in terms of lead tonnages consumed might be considerable and on the other hand they may not. What I have to say will in the very least arouse your imagination and will indicate clearly that the future for lead is indeed a bright one.

Offhand, it would be difficult to imagine a structural application for lead in excess of 1,000°F. However, it has developed that titanium, a modern metal, is benefited by as much as two weight percent lead at high temperatures. Lead has the ability, because of diffusion and solubility characteristics, to move with imperfections or dislocations in the metal and thereby maintain the properties of the bulk material. Tonnagewise, in this case, we are geared to titanium consumption which may or again may not be larger.

*Presented at the 30th Annual Meeting, Lead Industries Association,
St. Louis, Mo., April 15-16, 1958.

Mr. Edward J. Mullarkey

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Some new developments in lead

You may also be aware of the superconductive behavior of lead at low temperatures, on the order of -452°F., and the difficulty in finding a practical use for such an elegant property. But, IPM reports lead's use as a durable superconducting connection to solder or film-coated wire for various electronic uses, an indication of things to come.

I think you have all heard of or had experience with radiant heating, that is, the heating of home or factory by heat emitted from the walls, floors and ceilings. Little do we realize that we can absorb useful heat only as a minor fraction of that produced by such means. In a sense, comfortwise, we respond to only a very limited portion of the heat spectrum. To expand further, as based on the behavior of white lead which is virtually a black body, it appears that lead compounds or combinations of them can be manufactured to absorb perfectly and emit characteristic or important frequencies of radiation and as such would be infinitely more efficient than existing materials for this purpose. One can cite the heat trap devices slated for the future home, which in daylight would be used to absorb, use and transmit to storage excess heat from the sun for heating purposes. In the same sense, lead compound coatings for walls or decorations, heated electrically, might be used as inconspicuous radiators at unheard-of efficiencies. To further explore this possibility the LIA has under consideration specific research proposals. Needless to say, tonnages could be considerable. The efficacy of heat or comfort in the home, factory or office at low cost is always attractive to the consumer or builder.

Electronic lighting, a large potential consuming industry for phosphor compounds holds promise for lead, again as an additive or making up approximately two mole percent of the total used. Such companies as Westinghouse, General Electric and Sylvania are active in this field — which have in the offing as consumer products, multicolored wall-hung or ceiling panels for decorative and lighting purposes, wall-hung T.V. and so forth. Lead has the ability in this case to enable the tungstate phosphors or compounds to operate at peak luminous efficiency. Again it is too soon to tell, but already such electroluminescent panels are being used on dial radios and cabinets for both decorative and functional purposes. In future we may be able to light up our walls and ceilings at the flick of a switch thus dispensing with such unnecessary as the floor lamp. The February issue of "Reader's Digest" has an excellent coverage of this "new kind of light." This feature of lead is also being considered by LIA as an area for research.

Our English friends have brought forth the use of lead as an insoluble anode for cathodic protection purposes. They are now being used or engineered for use by American firms, Ebasco in particular, for ship hull, steel pier and pipe line protection purposes. Lead has always been important in the areas of general chemical, water and soil corrosion and its use as an impressed current anode serves to round out the applications picture.

Concomitant with the demands of the space age, lead has moved into the "white noise" room at Minneapolis-Honeywell Regulator Co.'s new Florida Inertial Guidance Center at St. Petersburg. This particular installation uses approximately 25 tons of lead as part of a mass balanced on a knife edge, for the support of vibration equipment. This use of lead is quite unique as it forms

Mr. Edward J. Mullarkey

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Some new developments in lead

part of a sandwich construction, the purpose of which is twofold, (1) to isolate transmission of vibration to adjacent ground and structure and (2) to assist in preventing undesired planes of vibration in missile component test equipment so that the vibratory motion will be confined to a single plane. This new and provocative use harks back to the older use of lead for vibration damping in building construction.

And finally, in the areas of shielding, I can offer two new items differing both in importance and potential consumption. First, I should mention lead's use in connection with neutron reflection which is new to a material heretofore used primarily as a gamma shield. Atomics International is producing a portable research reactor making use of this property -- 3,800 lb. of it. Secondly, the use of lead-impregnated plastic to shield components sensitive to radiation levels lower than those that affect man. In this regard, all I can say is that the University of California Radiation Laboratory at Berkeley has the material under study for classified purposes. But it remains as a new and practical use.

Exhibit "C"
April 15-16, 1958

ANNUAL REPORT OF THE
SECRETARY-TREASURER
FOR THE YEAR 1957

In my report to the members a year ago I explained the change in the method of financing the industry development activities of the Association and the reasons therefor. The wisdom of the change has become evident during 1957. In that year the pig lead producers supported a substantially increased Industry Development Fund, which they have further increased for 1958. At the same time manufacturing members of the Association have given enthusiastic support through the contribution of time of expert personnel to the various committees which guide the actual operations of our several promotional and research programs.

Despite the fact that 1957 was somewhat disappointing market-wise to the lead industry and followed the general business trend, it is felt that a sound ground-work was laid which will eventually benefit the over-all position of the lead industries. In addition to the expansion of promotional activities, the industry in 1957 for the first time had an outside critical appraisal made of its research needs. While this is in no sense considered to be a complete answer to our research problems, it has both stimulated thinking along these lines and high-lighted the fact that we still have a lot to learn about our products as they relate to modern technology.

We are also expanding our activities in other areas. In 1957 for the first time in many years space advertising in trade papers in certain fields was employed. We are expanding our staff to provide better technical service to users and potential users of lead both to help keep them satisfied with present applications and to encourage experimentation with new uses. A new study of the use of lead in the construction industry by a leading architectural firm should help us plan a more effective program in this important field. A more comprehensive publicity program for lead and its products was initiated.

I can not help but feel that great progress was made last year toward a more effective approach to the problem of expanding the markets for lead. We can not expect that progress will be spectacular and we must be prepared to drive surely and patiently forward. Lead is an old metal. Industrial thinking must be molded to the concept that, old as lead is, it is highly adaptable to modern technology, that it has just as important a place in the missile age as in the middle ages, and that industry can benefit if it "looks ahead with lead."

My sincerest thanks are extended to the entire membership for its staunch support of the Association's activities. In particular I would like to express my appreciation to the many committee members, directors and officers who have assisted so much with valuable contributions of time, knowledge and judgment, and to our president, whose quick perception and sound decisions have never left me hanging. To the staff, also, goes my sincerest thanks for jobs loyally and capably performed.

A summary of the Association's major activities in 1957 follows. More detailed accounts of many of these activities are to be found in the Committee reports presented at the 1958 annual meeting.

GENERAL

1. Our magazine, "LEAD," published quarterly was mailed to a mailing list of approximately 50,000 users and potential users of lead.
2. The annual meeting was held in Chicago, with a one half-day session held jointly with the American Zinc Institute.
3. Annual review articles were prepared for "Engineering and Mining Journal," "Steel," "Industrial and Engineering Chemistry," and "Year Book" of the American Bureau of Metal Statistics.
4. The Association staff maintained liaison with many other organizations whose activities are related to lead in one way or another and was represented at annual meetings of AIME, American Society for Testing Materials, American Society for Metals, Association of American Battery Manufacturers, American Ceramic Society, Building Research Institute, American Mining Congress, National Association of Corrosion Engineers, and others.
5. The annual Battery Conference sponsored by the U. S. Army Signal Engineering Laboratories was attended. A list of papers presented was provided members and copies of the complete proceedings were obtained for interested members at reduced cost.
6. Several lectures were presented including one before the U. S. Naval Reserve Composite Company in New York and two before graduate students at the Newark College of Engineering.
7. Permission to reprint a paper on developments in storage batteries, delivered by a Ford Motor Co., representative before the Society of Automotive Engineers, was obtained and it was circulated to members.
8. Information Bulletins were circulated to members monthly.
9. The statistical services of the Association were continued without major change and many economic inquiries from members, banks, brokers and others were handled.
10. In addition to the more than quarter of a million pieces of literature on lead sent out in general mailings, a large number of inquiries are received for Association publications as a result of listings in trade papers and in "Lead." These average in the neighborhood of 300 per month.
11. The number of publicity releases issued by the Association was stepped up and resulted in a constant flow of material relating to lead or the Association's activities appearing in the trade press.
12. The Directors approved preliminary organizational steps toward a joint L.I.A.-A.Z.I. research set-up to be financed by lead and zinc producers on a world-wide basis and to provide for a greatly expanded research program. A committee of seven, composed of the presidents, secretaries, Technical Steering Committee chairmen and one additional member of both associations, has been working out the organizational details and taking steps to find a suitable research director.

HEALTH AND SAFETY

1. Gratifying evidence of the value of the "American Standard Specification to Minimize Hazards to Children from Residual Surface Coating Materials," developed at our instance, was shown by its use by the Health Commissioner of Baltimore in opposing a Maryland bill which would have been materially damaging to our interests.
2. Several conferences were held with representatives of the plastics industry in planning for a study of the use of lead stabilizers in plastic pipe.
3. In the interest of promoting the use of lead in ceramics, speakers on medical and engineering health control were secured for the annual meeting of the American Ceramic Society. For the same purpose the chapter on safe handling of lead from "Lead in the Ceramic Industries" was reprinted and several thousand copies distributed through print manufacturers.
4. Four Health and Safety Bulletins were distributed to members.
5. The demand has continued for reprints of Dr. Johnstone's "Facts and Fallacies About Plumbism," delivered at our 1956 annual meeting. It has been used for instruction in three medical schools.
6. With the publication of three reports, the study of childhood plumbism financed by L.I.A. at Johns Hopkins Hospital came to a close. Many requests were received for reprints of the reports. The work at the Children's Medical Center in Boston continues.
7. The American Academy of Pediatrics suggested that we arrange for delivery of one or more papers on plumbism at one of its meetings. There are now more than 100 "Poison Control Centers" throughout the country, sponsored by the Academy, which offer prompt and correct diagnosis, a major factor in the childhood lead problem.
8. The American Conference of Governmental Hygienists, in publishing its "Threshold Limit Values for 1957," increased the allowable limit for lead in the atmosphere of working places from 0.15 to 0.20 milligrams per cubic meter. This 33-1/3 per cent increase followed recommendations of an American Standards Association subcommittee of which our Health and Safety Director is chairman.
9. In 1949 the Army questioned the safety of using red lead paints for interiors of potable water tanks, based on an opinion of an official of the U.S. Public Health Service. Field tests sponsored by us caused the Army to remove its objection. Recently the controversy was reactivated by a manufacturer of a competitive paint and has lead the American Water Works Association to consider revision of its specification which calls for red lead. Fortunately our field testing was continued through the intervening years and is proving helpful in refuting the adverse propaganda. However, the matter is undecided and we are continuing to work closely with A.W.W.A., U.S.P.H.S., and others to prove the safety of red lead for this application.
10. So far our efforts, in close cooperation with the Manufacturing Chemists' Association, have been successful towards obtaining uniform regulations for warning labels throughout the states, but it is an endless task as more and more states turn to labeling legislation.

11. Measurements of lead in street air obtained from a half-dozen cities are proving invaluable in refuting repeated statements that lead in automobile exhaust fumes is a public health hazard.

12. Allegations that lead-painted toys constituted a hazard to children, brought about by imports from Japan, were effectively put at rest by statements of the Surgeon General of the U. S. Public Health Service and the American Academy of Pediatrics.

13. Our Health and Safety Director is active in many industrial health organizations and serves on a number of important committees of those groups. Cordial relations are maintained with them, as with public health officials throughout the country.

METALLIC LEAD PRODUCTS

1. Lead products were exhibited at the Home Builders Show in Chicago in connection with the annual meeting of the National Association of Home Builders, at the Show held in conjunction with the annual meeting of the National Association of Plumbing Contractors in Dallas, and at the National Chemical Exposition in New York.

2. A 4-page leaflet on lead roofing and flashing for small homes was prepared and distributed at the Home Builders Show.

3. Two 4-page insertions, one on plumbing and one on roofing and flashing, were prepared for the 1958 issue of Sweet's Catalogs for architects and for light construction builders. Preprints were obtained. The Catalogs will have 46,000 circulation.

4. Over 1,000 copies of our text book for plumbers' apprentices were sold in 1957 for a total of about 10,000 copies. It has been made the official text on lead work in the training program sponsored by the International Plumbers' Union. Practically all of our original cost of this book has now been recovered and a new printing will probably be needed by next year.

5. L.I.A. awarded prizes to the three best lead workers in the International Plumbers' Apprenticeship Contest held at Purdue and a staff member served as judge of this work.

6. We provided a man to teach instructors how to teach lead work at a one-week course conducted during the foregoing Contest.

7. Our Solder Committee continued its work on the Soldering Handbook to be published by the American Welding Society and at the year end all but one chapter had been completed.

8. Installation of more than 3,000 sq. ft. of 3-lb. hard lead gutter linings was completed on a new building at Duke University on plans and specifications prepared by L.I.A.

9. The third of our Lead Building Construction Bulletins, this one dealing with lead chemical laboratory installations, was completed and distributed to over 20,000 architects and others.

10. An article on the use of lead to handle corrosive chemicals in the petroleum refining industry was prepared and accepted for publication in "Petroleum Refiner."
11. A Chemical Bulletin on the performance of lead in the production of lead catalysts was prepared and circulated to members.
12. The chapter on lead which appeared in the original American Chemical Society Monograph on Corrosion of Metals was rewritten for a new edition and is close to its final form.
13. A contract was signed with the internationally known firm of architects and engineers, Skidmore, Owings and Merrill, to make a study of means to further develop the market for lead and lead products in building construction. The study got under way in January, 1958.
14. Our field work consisting of personal contacts with plumbers, architects, builders and government officials was continued throughout the year.

CERAMICS

1. The technical data book "Lead in the Ceramic Industries" was distributed to more than 5,000 people in the ceramic industries. Incidentally it won a special merit award in the annual competition of the New York Employing Printers Association.
2. The first supplement to the aforementioned book, dealing with lead-bearing glass colors, was prepared, printed and mailed to those who had received the book and others requesting it.
3. An advertising schedule of monthly full-page ads in "Ceramic Industry" and the "Bulletin" of the American Ceramic Society was started in March and maintained throughout the year.
4. Three graduate research fellowships were established during the year. They are at Rutgers, Illinois and Ohio State and deal with lead in ceramic bodies, in low-firing porcelain enamels and in glazes, respectively.
5. See Item 3, under "Health and Safety."
6. A design was developed, approved, and construction started on 20 permanent educational exhibits on lead in ceramics to be placed in all universities having accredited courses in ceramics. They are expected to be ready for distribution in March, 1958.
7. The annual and fall meetings of the American Ceramic Society were attended by the chairman and several members of the Ceramics Technical Committee and a member of the staff. The Committee also met several times during the year to supervise the program's activities and plan future work.
8. A number of papers on lead in ceramics were presented at technical meetings during the year, some as a result of work sponsored by L.I.A.

RED LEAD

1. A new advertising schedule on red lead paints, aimed primarily at the highway construction market but embracing general construction as well, was started in April and ran for six consecutive months with full-page ads in "Engineering News Record."
2. Red Lead Technical Letter No. 12 on red lead paints for highway structures was prepared, printed and mailed to a list of about 11,000 names.
3. The Red Lead Technical Committee met several times during the year, one of these meetings being to inspect test panels on exposure. Also considerable Committee time was devoted to the attempt to upset the American Water Works Association specification for red lead paints for potable water tank interiors. See Item 9 under "Health and Safety."
4. A new series of exposure tests to evaluate new lead pigments like calcium plumbate was initiated.
5. L.I.A. continued its support of the Steel Structures Painting Council and to have representatives on its Technical Committee.
6. All files and reports of the 25 research projects conducted by the Red Lead Technical Committee over the past 15 years were reviewed, condensed and brought up to date.
7. Two Navy destroyers whose hulls were painted three years ago with a Navy paint and a red lead paint developed by the Red Lead Technical Committee were dry-docked and inspected. Both paints performed about equally, but the L.I.A. paint, being considerably less expensive, appears to offer excellent future possibilities.
8. D. B. Steinman, one of the country's leading bridge engineers and designer of the Mackinac Bridge, ordered 1,000 reprints of the article in "Lead" describing the painting of this Bridge with red lead. Although he offered to pay for them, they were supplied gratis because of the invaluable publicity to be gained from distribution by such an authority.

RADIATION SHIELDING

1. A staff member obtained secret "Q" clearance permitting his access to classified information, and admission to secret atomic installations.
2. Visits were made to a number of installations involving lead shielding, including Oak Ridge, industrial laboratories and educational institutions.
3. Attendance at meetings dealing with the atomic industry was included, among them the Nuclear Congress.
4. The L.I.A. exhibit at the National Chemical Exposition included a display of lead shielding materials because of the ever expanding employment of radio-isotopes in the chemical processing industries.
5. L.I.A. cooperated with the American Society for Testing Materials in formation of a Task Group to explore possible specifications for sheet lead for nuclear shielding and are represented on the committee which met for the first time in December.

-7-

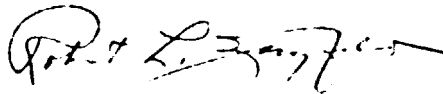
Annual Report for
the Year 1957TECHNICAL STEERING COMMITTEE

1. The Cable Sheathing Task Group of this Committee arranged with a leading manufacturer of extrusion presses to construct a press for experimental continuous extrusion of lead alloys. The press is expected to be ready about April 1, 1958. The experimental program will be conducted cooperatively by our Task Group and the press manufacturer.
2. After entertaining three proposals, the T.S.C. awarded a contract to Battelle Memorial Institute for an "Evaluation of Research Needs and Formulation of a Research Program" for the lead industry. After several meetings of the Committee with Battelle personnel, the study was completed and a report filed in December. In early 1958 the T.S.C. evaluated the report and made specific research budget recommendations to the Industry Development Committee.
3. This Committee reviewed and approved research recommendations of the Ceramics Technical Committee for 1958.

INDUSTRY DEVELOPMENT COMMITTEE

1. This Committee has the responsibility of passing on all budget recommendations, whether they come from the Secretary, the Technical Steering Committee, or other committees or sources, before they go to the Board of Directors. In that capacity it approved the Battelle Research study, the survey of building construction by Skidmore, Owings and Merrill, and all other 1958 activities. As a result the budget for research, advertising, promotion and technical service was upped about 60 per cent for 1958 over 1957, with certain additional recommendations still under consideration.

Respectfully submitted,



Secretary.

Report #27
April 15-16, 1958

HASKINS & SELLS
CERTIFIED PUBLIC ACCOUNTANTS

87 BROAD STREET
NEW YORK 4

March 20, 1958.

ACCOUNTANTS' CERTIFICATE

Lead Industries Association:

We have examined the balance sheet of Lead Industries Association as of December 31, 1957 and the related statement of income, expenses, and reserves for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying balance sheet and statement of income, expenses, and reserves present fairly the financial position of the Association at December 31, 1957 and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Haskins & Sells

LEAD INDUSTRIES ASSOCIATIONBALANCE SHEET, DECEMBER 31, 1957A S S E T S

CASH:

Pension Fund savings bank deposits.....	\$ 98,193.46	
Other (including savings bank deposit; \$39,193.85).....	109,143.57	\$207,337.03
ACCOUNTS RECEIVABLE.....		1,360.00
ADVANCES FOR TRAVEL EXPENSES.....		1,675.00
AIR TRAVEL DEPOSIT.....		425.00
TOTAL.....		<u>\$210,797.03</u>

LIABILITIES AND RESERVES

ACCOUNTS PAYABLE.....		\$ 2,922.75
RESERVES:		
Employees Retirement and Pension Plan Fund..	\$98,193.46	
Ordinary Fund.....	50,194.50	
Safety and Hygiene Fund.....	25,552.32	
Metallic Lead Products Division Fund.....	12,204.15	
Pigments and Chemicals Division Fund.....	4,324.72	
Industry Development Fund.....	17,504.00	
Ceramic Fund.....	(1,020.61)	
Radiation Shielding Fund.....	921.74	207,874.28
TOTAL.....		<u>\$210,797.03</u>

() Denotes red figure.

NOTES:

(1) The cost of furniture, fixtures, and equipment has been written off to expense.

(2) The employees retirement and pension plan fund reserve is based on an actuarial report and covers both past service and current costs.

LIA21020

LEAD INDUSTRIES

STATEMENT OF FINANCE, BY
FOR THE YEAR 1957

	TOTAL	ORDINARY FUND	SAFETY AND HYGIENE FUND
INCOME:			
Membership assessments.....	\$218,677.00	\$101,915.00	
Transfers between funds.....		(19,417.56)	\$20,000.00
Interest on savings bank deposits.....	3,761.13	446.33	313.30
Sales of publications.....	1,154.46	117.00	
Total income.....	\$223,632.59	\$ 83,060.77	\$20,313.30
EXPENSES:			
Salaries.....	\$ 81,382.17	\$ 42,153.02	\$16,054.15
Social security taxes.....	1,421.05	586.12	231.47
Rent and light.....	11,750.30	11,750.30	
Office supplies.....	2,440.61	2,094.39	198.12
Travel.....	17,776.06	4,764.20	2,408.34
Association dues.....	632.06	192.18	138.50
Entertainment and luncheons.....	1,936.01	438.70	573.76
Meetings (net of fees \$2,360.00).....	2,126.30	1,141.69	12.50
Telephone and telegraph.....	2,482.05	1,712.75	302.44
Books and subscriptions.....	1,059.22	367.33	464.34
Printing - net.....	1,669.79	940.15	81.17
Mailing.....	2,235.41	1,479.48	195.92
Cost of publications:			
"Lead".....	18,667.90	12,767.90	
"Lead in the Ceramic Industries".....	1,614.71		
"Lead in the Ceramic Industries" - Supplement.....	1,002.31		
Building construction bulletins.....	2,386.36		
Red lead technical letters.....	1,941.11		
Sweet's catalogs.....	6,068.89		
Advertising space.....	9,835.92		
Advertising production.....	2,772.06		
Publicity.....	3,024.58		
Battelle research survey.....	20,000.00		
Research fellowships.....	7,500.00		
Conventions and exhibits.....	15,070.53		
Furniture and fixtures.....	17.46	17.46	
Illustrations.....	1,036.69	50.34	250.42
Research and research materials.....	1,482.18		227.70
Consultation fees.....	5,505.00		
Apprenticeship contest.....	511.55		
Miscellaneous.....	3,445.11	2,108.62	816.38
Expenses - net.....	\$228,793.39	\$82,564.63	\$21,955.21
EXCESS OF INCOME (EXPENSES) FOR THE YEAR.....	\$ (5,160.80)	\$ 496.14	\$ (1,641.91)
RESERVES, JANUARY 1, 1957.....	213,035.08	49,698.36	27,194.23
RESERVES, DECEMBER 31, 1957.....	\$207,874.28	\$50,194.50	\$25,552.32

() Denotes red figure.