

ANNUAL MEETING OF THE MEMBERS OF THE LEAD INDUSTRIES ASSOCIATION

June 6, 1940

The annual meeting of the members of the Lead Industries Association was held on Thursday, June 6, 1940, at 12:30 P.M. at the Pennsylvania Hotel, New York, N.Y.

Present

R. N. Zimmer
K. C. Brownell
F. O. Case
A. W. Rockwell
C. W. Chapin, Jr.
T. H. Cornell
C. H. Crane
F. F. Colcord

A. Lamberg
H. Lamberg

F. E. Wormser, Secretary-Treasurer
A. L. Ziegfeld, Assistant Secretary

Representing

American Metal Co. Ltd.
American Smelting & Refining Co.
International Smelting & Refining Co.
National Lead Co.
St. Joseph Lead Co.
St. Joseph Lead Co.
St. Joseph Lead Co.
United States Smelting Refining & Mining Co.
White Metal Rolling & Stamping Corp.
White Metal Rolling & Stamping Corp.

REPRESENTED BY PROXY

Baker Lead Mfg. Co.	Hacia Mining Co.
Bunker Hill & Sullivan Mining & Concentrating Co.	Johnston Tin Foil & Metal Co.
Chief Consolidated Mining Co.	Kansas City Smelting Co.
Crown Metal Co.	Marks Lissberger & Son, Inc.
Division Lead Co.	John R. MacGregor Lead Co.
The Eagle-Picher Lead Co.	Northwest Lead Co.
The Fleets Lead Co. Inc.	Park Utah Consolidated Mines Co.
W. P. Fuller & Co.	River Smelting & Refining Co.
General Lead Mfg. Co.	Rochester Lead Works, Inc.
Glidden Co. (Euston Lead Co.)	Sherrin-Williams Co.
(Metals Refining Co.)	Silver King Coalition Mines Co.
Hammond Lead Products Inc.	Silverstein & Pinsof, Inc.
Tintic Standard Mining Co.	Standard Rolling Mills, Inc.

The minutes of the Annual Meeting of May 16, 1939, were approved.

REPORT OF THE SECRETARY

The report of the Secretary was approved and is attached as Exhibit "A".

ELECTION OF BOARD OF DIRECTORS

A quorum being present, in person or by proxy, the following Directors were duly nominated, and there being no other nominations, and all nominees being eligible, the following were

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unanimously elected Directors of the Lead Industries Association for the ensuing year:

B. N. Zimmer	representing American Metal Co. Ltd.
F. H. Brownell	American Smelting and Refining Co.
Clarence Glass	Anaconda Sales Co.
S. A. Easton	Bunker Hill & Sullivan Mining & Concen. Co.
A. E. Bandelari	The Eagle-Picher Lead Co.
E. L. Newhouse, Jr.	Federated Metals Division of American Smelt. & Ref. Co.
L. E. Hanley	Hecla Mining Co.
P. L. Sprague	Metals Refining Co.
F. W. Rockwell	National Lead Co.
O. N. Friendly	Park Utah Consolidated Mines Company
C. H. Crane	St. Joseph Lead Co.
James Ivers	Silver King Coalition Mines Co.
J. W. Wade	Tintic Standard Mining Co.
F. F. Colcord	United States Smelting Refining & Mining Co. Inc.

The meeting adjourned at 1:25 P.M.

H. W. Lamm
Secretary

The report on the audit of the accounts of the Association as of December 31, 1939, by Haskins and Sells, was read by the Treasurer and accepted, as follows:

LIA20648

HASKINS & SELLS

CERTIFIED PUBLIC ACCOUNTANTS

22 EAST 40TH STREET
NEW YORK

ACCOUNTANTS' CERTIFICATE

Lead Industries Association:

We have examined the balance sheet of Lead Industries Association as of December 31, 1939, and the statements of income and expenses for the year ended that date, have reviewed the system of internal control and the accounting procedures of the Association, and have examined or tested its accounting records and other supporting evidence by methods and to the extent we deemed appropriate.

In our opinion, the accompanying balance sheet, with the footnote thereon, and related statements of income and expenses fairly present the financial condition of the Association at December 31, 1939, and the results of its operations for the year ended that date, in conformity with generally accepted accounting principles followed by the Association on a basis consistent with that of the preceding year.

Haskins Sells

New York,

March 1, 1940.

LEAD INDUSTRIES ASSOCIATIONBALANCE SHEET, DECEMBER 31, 1939ASSETS

CASH.....	\$46,648.92
DUE FROM MEMBERS.....	1,095.00
ADVANCES FOR TRAVELING EXPENSES.....	<u>1,450.00</u>
TOTAL.....	<u>\$49,193.92</u>

LIABILITIES
AND RESERVES

ACCRUED SOCIAL SECURITY TAXES.....	\$	909.58
RESERVES:		
Ordinary Fund.....	\$14,827.42	
Lumber Products - Better Paint Campaign Fund.....	3,305.49	
Plumbing Promotion Fund.....	7,550.67	
Sheet Lead Promotion Fund.....	3,002.00	
White Lead Promotion Fund.....	<u>19,598.76</u>	<u>48,284.34</u>
TOTAL.....	<u>\$49,193.92</u>	

NOTE: The cost of furniture, fixtures, and equipment has been written off to expense.

LEAD INDUSTRIES ASSOCIATION

STATEMENT OF INCOME AND EXPENSES
OF WHITE LEAD PROMOTION
FOR THE YEAR ENDED DECEMBER 31, 1939

INCOME FROM MEMBERS' ASSESSMENTS FOR 1939.....	<u>\$234,999.24</u>
EXPENSES:	
Salaries.....	\$ 4,262.54
Travel expense.....	1,017.39
Advertising space.....	180,738.48
Printing.....	5,647.52
Illustrations.....	567.27
Mailing expense.....	2,371.22
Cost of publication - Lead.....	2,360.87
Stationery and office supplies.....	163.51
Entertainment, luncheons, etc.....	130.45
Furniture, fixtures, and equipment.....	1,105.65
Publicity.....	7,023.47
Advertising production.....	9,084.40
Miscellaneous.....	<u>927.51</u>
Total.....	<u>\$215,400.48</u>
NET INCOME FOR THE YEAR.....	\$ 19,598.76
RESERVE AT BEGINNING OF YEAR.....	<u>Nil</u>
RESERVE AT END OF YEAR.....	<u>\$ 19,598.76</u>

Income (exclusive of White Lead Promotion):

Income tax assessment for 1939.....	\$105,286.66
Less refund of 1938 overassessment.....	276.00
Remainder.....	<u>\$105,010.66</u>

EXPENSES (exclusive of White Lead Promotion):

Salaries.....	\$ 46,145.02
Travel expense.....	17,283.26
Medical research.....	2,000.00
Advertising.....	6,944.50
Conventions and exhibits.....	4,533.63
Printing.....	1,216.31
Illustrations.....	200.02
Mailing expense.....	1,573.50
Cost of publications:	
Plumbers' Forum.....	6,680.72
Lead.....	6,228.18
Rent and light.....	4,340.10
Telephone and telegraph.....	780.65
Association dues.....	435.00
Stationery and office supplies.....	897.86
Social security taxes.....	1,830.35
Books and subscriptions.....	384.91
Entertainment, luncheons, etc.....	1,267.03
Furniture, fixtures, and equipment.....	491.99
"Seal of Approval" inspection expense.....	18.95
Miscellaneous.....	<u>2,472.80</u>

Total expenses..... \$105,724.78

NET INCOME (LOSS) FOR THE YEAR (exclusive of White Lead Promotion)..... \$ 714.12

PROCEEDS FROM SALE OF AUTOMOBILE TRAILER..... 200.00

RESERVES AT BEGINNING OF YEAR..... 29,199.70

RESERVES AT END OF YEAR (exclusive of White Lead Promotion)..... \$ 28,685.58

\$48,689.21	\$24,113.13	\$32,484.32	
56.00		220.00	
<u>\$48,633.21</u>	<u>\$24,113.13</u>	<u>\$32,264.32</u>	
\$26,575.12	\$10,869.90	\$ 8,700.00	
642.45	8,453.75	8,187.06	
2,000.00			
		6,944.50	
	2,789.45	1,744.18	
615.74	417.67	182.90	
200.02			
836.21	356.17	381.12	
		6,680.72	
6,228.18			
4,340.10			
780.65			
267.00		168.00	
897.86			
1,830.35			
384.91			
74.20	444.06	748.77	
491.99			
		18.95	
519.45	1,293.61	659.74	
<u>\$46,684.23</u>	<u>\$24,624.61</u>	<u>\$34,415.94</u>	
\$ 1,948.98	\$ 511.48	\$ 2,151.62	
	200.00		
12,878.44	3,616.97	9,702.29	\$3,002.00
<u>\$14,827.42</u>	<u>\$ 3,305.49</u>	<u>\$ 7,550.67</u>	<u>\$3,002.00</u>

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Exhibit "A"
June 8, 1940REPORT OF THE SECRETARY

Summarizing the activities of the
Lead Industries Association for
1939

The Lead Industries Association became eleven years old
on November 28, 1939.

MEMBERSHIP

Membership in the Association consists of 55 companies,
with two resignations and one new member during the year.

STATISTICS

Our statistical work has proceeded uninterruptedly with-
out any noteworthy development.

RECIPROCAL TRADE AGREEMENTS

The Lead Industries Association continued to act for our
industry in those trade agreement negotiations of the United
States which might adversely affect any lead product. Although
several treaties were negotiated, only the renewal of the one
with Belgium listed commodities of interest to the Association -
lead pigments, particularly white lead - which face a possible
tariff reduction in a renewal of the trade agreement with that
country.

With the approval of the Executive Committee, a brief was
prepared outlining our position which was submitted to the
State Department at Washington and distributed to all members.
No revision of the Belgium agreement was consummated because of
the outbreak of the war and it is now problematical when final
disposition will be made of it.

With the renewal of the reciprocal trade agreement legis-
lation by Congress for three years, it is likely that our in-
dustry will be faced with future trade treaty negotiations that
will include consideration of the existing tariffs on various
lead products. Of course, the present war and the chaotic
condition of foreign exchange will slow up the drive for further
trade agreements. Nevertheless, there is a definite prospect
that we shall, from time to time, be called upon to defend the
present tariff schedule in Washington not only in the negotiation
of new treaties but in the renewal or revision of existing ones.

LEAD HYGIENE AND SAFETY

The large amount of space given to lead by medical colum-
nists in the daily press, by the medical profession, by consumer
organizations and by authors of scientific subjects has in-
creased the amount of attention that we have had to give to the
subject of lead toxicology in 1939. Despite the constantly
growing knowledge that has been obtained on lead over the past
fifteen years, mostly of a reassuring nature, many people in

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REPORT OF THE SECRETARY

medical circles, evidently, are not familiar with the latest discoveries for they make assertions about lead that can not be substantiated.

As an illustration, consider an episode that occurred in January, 1940. The Journal of the American Medical Association, in an article by two doctors, stated that a child 22 months old had been acutely lead poisoned from drinking orange juice squeezed in an aluminum toy cup. The child was alleged to have contracted an attack of acute lead poisoning from the ingestion of .01 milligram of lead. Not only did the American Medical Association print this paper but it was used by the American Medical Association in a nationwide broadcast on a medical hour. It was referred to in the magazine "Hygeia" sponsored by the American Medical Association, and it was used as the basis of a warning in Dr. Dafoe's syndicated medical newspaper column throughout the United States. It is fair to assume, therefore, that millions of people have had this case called to their attention.

This office immediately made an investigation, consulting three of the most eminent lead poisoning authorities in the United States. They all expressed the opinion to me that the article was absurd or unsound, yet I am confident it will be seized upon by consumer organizations and other avenues for alarming the American public, and will do us a great amount of damage in years to come. A full report of this case was made to the members.

This case indicates how lead items, when they appear in the medical literature, are accepted as accurate and built upon by other medical investigators until the limit of absurdity is reached. This is not a situation which we can view with much complacency as the attacks upon lead cause curtailment in the use of many lead products.

The Association continues to act for the industry in meeting this difficult situation. The Board of Directors has authorized the continuation of our fundamental medical research on lead at Harvard. The counsel of Dr. Aub at Harvard in many matters pertaining to lead poisoning has been invaluable to us. A report covering his activities was circulated to our entire membership in March, 1940, and is attached as Exhibit "B."

Believing that it would be helpful to our members to procure from time to time bulletins on lead hygiene and safety work generated through correspondence with this office or from knowledge which it acquires in studying current literature, we have begun the distribution, at irregular intervals, of bulletins on the subject to help our members.

WHITE LEAD PROMOTION PROGRAM

The largest single activity since the founding of the Association eleven years ago is its white lead promotion program, an important nation-wide effort to increase the consumption of white lead in the United States and to combat the

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REPORT OF THE SECRETARY

substitution of inferior pigments for white lead. A detailed step by step account of the progress of the campaign has been furnished periodically to subscribing members, consisting of mining, smelting and white lead manufacturing companies.

The campaign begins its second year with many intricate problems of organization and coordination solved, and with interest in the progress and support of the work growing. It will be a long hard struggle to regain the ground that has been lost over the last seventeen years but with the unexcelled merit of the product as a basis, and with the inspiring example of unanimity set by our mining, smelting and manufacturing members in the first year of the campaign as a background, I am confident of the ultimate satisfying outcome.

One beneficial result of our campaign is the good will it is building up for lead in general. I have always felt that the cultivation of good will for our metal and publicity about the indispensable work it does for mankind is something that lead needs more than other common metals because lead in many forms is constantly under attack on account of its toxic qualities. Our campaign helps to meet this issue.

One of the most interesting results of the campaign has been the growing tendency of paint manufacturers to add a product to their line consisting of 100% prepared white lead paint, in colors. This important step overcomes the barrier of inconvenience which has placed white lead paint at a competitive disadvantage.

It is also noteworthy that attacks on white lead, which was one of the reasons for undertaking our campaign, have declined greatly and that more articles of national interest, specifically endorsing white lead, have appeared in the press during the last year than for any period to my recollection. Moreover, government and other specifications are giving increasing recognition to white lead.

LUMBER PRODUCTS - BETTER PAINT CAMPAIGN

The Lumber Products - Better Paint Campaign continued to function during the year and covered the southwest and Pacific Coast, areas not hitherto reached, as well as parts of the middle west. Detailed reports have been furnished subscribing members periodically. Lumber associations continued distributing, at their own expense, thousands of painting leaflets recommending white lead or the highest grade prepared paints to be used on their products. The National Door Manufacturers Association is the latest to use painting leaflets in cooperating with us. The close relations that have been cemented with important lumber associations through the campaign and the good will of the lumber industry were also of great assistance to the Lead Industries Association in our white lead promotion program. Many important testimonial letters from regional lumber associations such as Western Pine, Red Cedar Shingle Bureau, Southern Cypress and others were used in our advertising copy.

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REPORT OF THE SECRETARYPLUMBING PROMOTION PROGRAM

The Plumbing Promotion Program was carried forward during 1939 by the same methods used in previous years. The work of our three field men, with plumbers' organizations and water works engineers in various cities and states, is the central feature of the work, supported by our magazine, PLUMBERS' FORUM, advertising in the plumbing and water works trade papers and publicity. A detailed report of the progress made during the year was submitted to those members subscribing to the program and periodic reports of the activities of the field men were also provided. Much attention has also been given to the use of lead in Federal housing projects.

The amount of space devoted to lead plumbing goods by the trade papers now as compared with a few years ago, and the increasing amount of lead used in public housing projects, even where not required by local ordinance, are a good indication that our work is bearing fruit. In addition, several more cities revised their plumbing ordinances to require more lead than formerly.

Progress has also been made in obtaining the specification and use of Lead Industries' Seal of Approval material.

Further simplification of our standard for lead fittings has now been approved by the lead manufacturers and only awaits approval by the National Association of Master Plumbers and finally, our Board of Directors, to be put into effect.

As long as a situation exists whereby the use of plumbing goods is governed by ordinances, the work of the association in this field is indispensable.

MAGAZINE "LEAD"

The magazine, "Lead" was expanded to twelve pages in 1939 so as to carry more data about white lead and to help support our white lead promotion program. The magazine continues to have an excellent reception and is the reason for many inquiries for assistance in the proper use of many forms of lead.

USE OF LITHARGE

During 1939, the members manufacturing litharge have been investigating, through this office, the continued use of litharge in the petroleum industry. It appears that competitive processes, particularly the use of copper chloride, threaten to make inroads in the use of some 6,000 to 8,000 tons of litharge in the "sweetening" of gasoline. Not only is litharge threatened but also the use of alkali and sulphur, chemicals that are required with litharge in the "doctor" treatment of gasoline.

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Competitively, the litharge system is still unexcelled but the industry does face the prospect of having this outlet reduced unless some effort is made either by the litharge producers individually or cooperatively to protect their market. Further study and investigation is being made.

Last year I reported briefly on the use of litharge in enamel manufacture. This is also an outlet where lead is definitely being displaced by materials that are not as good for the purpose. It would also seem well worth while to study the best method of protecting our existing enamel ware market and endeavoring to increase it.

SHEET LEAD

Several of our members have been anxious to have us launch a program for the promotion of hard sheet lead in small home construction and plans are being laid to establish such a program when, as, and if the sheet lead fabricators desire to begin. We already have funds, collected from the mining companies several years ago in anticipation of this program.

A home constructed by one of our staff in 1939 at Stamford, Conn., at his own expense, was a vivid demonstration of what can be done if an intelligent effort is made to introduce sheet lead for flashing and building in small home construction. This one job has resulted in several additional sheet lead installations in the vicinity.

We have a large amount of detailed information which we are ready to use whenever the membership desires to have us proceed.

GENERAL

The Chairman, secretary and a few members of the Board were invited by the Army and Navy Munitions Board to serve on the Lead Sub-Committee, which they gladly did.

CONCLUSION

The Lead Industries Association represents many branches of the lead industry from mine to finished product. Its large scope gives each component unit of the lead industry in the Association a picture of the other parts to which it is related. Moreover, it enables the basic group, namely, the lead mining and smelting industry, from which the whole industry stems, an opportunity to use its resources to best advantage in helping to further the interests of the manufacturers of lead products on whose success in marketing white lead, lead plumbing goods, sheet lead and other lead merchandise, the prosperity of the mines and smelter depends. The Lead Industries Association enables the lead industry to be organized from mine to finished product for self-defense and for promotional work in a manner that parallels the aluminum and nickel industries which are compactly organized by

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virtue of their original establishment and growth. Organization on an industry basis is important nowadays because it is becoming increasingly apparent that competition today is between industries as well as between individual companies in each industry.

At any rate, looking back on the first eleven years of its existence, there are many activities and accomplishments of the Association any one of which would have justified the cost of maintaining it and of which the Association can well be proud.

J. E. Johnson
Secretary

MEMBERS OF THE LEAD INDUSTRIES ASSOCIATION

June 8, 1940.

Alpha Metal & Rolling Mills, Inc.	363 Hudson Ave.	Brooklyn, N.Y.
The American Metal Co. Ltd.	61 Broadway	New York, N.Y.
American Smelting & Refining Co.	120 Broadway	New York, N.Y.
The Andrews Lead Co. Inc.	30-48 Greenpoint Ave.	Long Island City, N.Y.
Baker Lead Mfg. Co.	28 Cherry St.	Worcester, Mass.
Bunker Hill & Sullivan Mining & Concentrating Co.		
Cambridge Smelting Co.	100 Pacific St.	Kellogg, Idaho
Chief Consolidated Mining Co.		Cambridge, Mass.
Crown Metal Co.	117-9 E. Washington St.	Bureau, Utah
Dayrock Mining Co.		Milwaukee, Wis.
Dickson Weatherproof Mail Co.	P.O. Box 334	Wallace, Idaho
Division Lead Co.	836 W. Kinsie St.	Evanston, Ill.
The Eagle-Picher Lead Co.	Temple Bar Bldg.	Chicago, Ill.
The Electric Auto-Lite Co.		Cincinnati, Ohio
Euston Lead Co. (The Glidden Co.)	500 Penn Ave.	Toledo, Ohio
Evans Lead Company		Seranton, Penna.
Federal Mining & Smelting Co.	120 Broadway	Charleston, W. Va.
Federated Metals Division of American Smelting & Refining Co.		New York, N.Y.
The Flann Lead Co. Inc.	120 Broadway	New York, N.Y.
W. P. Fuller & Co.	Bradley Ave. & School St.	Long Island City, N.Y.
Cardiner Metal Co.	301 Mission St.	San Francisco, Cal.
General Lead Manufacturing Co.	4820 S. Campbell Ave.	Chicago, Ill.
Goldsmith Bros. Smelting & Refining Co.	2132 Market St.	Denver, Colo.
Hammond Lead Products Inc.	58 E. Washington St.	Chicago, Ill.
Hecla Mining Co.	First Trust Building	Hammond, Ind.
Hercules Mining Co.		Wallace, Idaho
Hudson Smelting & Refining Co.	85-95 Hyatt Ave.	Wallace, Idaho
Imperial Type Metal Co.	3400 Aramingo Ave.	Newark, N.J.
International Smelting & Ref. Co. (Anaconda Sales Co. Agents)		Philadelphia, Pa.
The Johnston Tin Foil & Metal Co.	25 Broadway	New York, N.Y.
Kahn Brothers	6016-6120 E. Broadway,	St. Louis, Mo.
Kansas City Smelting Co.	785 Humboldt St.	Brooklyn, N.Y.
The Lewin Metals Corp.	2215-23 Guinotte St.	Kansas City, Mo.
Marks Lieberger & Son, Inc.	Monsanto Post Office	East St. Louis, Ill.
John R. MacGregor Lead Co.	23-01 Borden Avenue	Long Island City, N.Y.
Metals Refining Co. (The Glidden Co.)	4520 W. 15th St.	Chicago, Ill.
National Lead Co.		Hammond, Ind.
North American Smelting Co. Inc.	111 Broadway	New York, N.Y.
The North-Western Metal Mfg. Co. Lake	Edgemont and Tioga Sts.	Philadelphia, Pa.
Northwest Lead Co.	St. & New Hampshire Ave.	St. Louis Park, Minn.
Park Utah Consolidated Mines Co.	2700 - 16th Ave. S.W.	Seattle, Wash.
River Smelting & Refining Co.	Continental Bank Bldg.	Salt Lake City, Utah
Rochester Lead Works, Inc.	4195 Bradley Road	Cleveland, Ohio
St. Joseph Lead Co.	380 Exchange St.	Rochester, N.Y.
Sherman Lead Co.	250 Park Ave.	New York, N.Y.
The Sherwin-Williams Co.		Wallace, Idaho
Silver King Coalition Mines Co.	101 Prospect Ave. N.W.	Cleveland, Ohio
Silverstein & Pinsof, Inc.	1010 Kearns Building	Salt Lake City, Utah
Standard Rolling Mills, Inc.	1708-1720 Elston Ave.	Chicago, Ill.
Tamarack & Custer Consolidated Mining Co.	143 Jewell St.	Brooklyn, N.Y.
Tintio Standard Mining Co.		Wallace, Idaho
United American Metals Corp.	Walker Bank Building	Salt Lake City, Utah
United States Smelting Refining and Mining Co. Inc.	196 Diamond St.	Brooklyn, N.Y.
White Metal Rolling & Stamping Corp.	57 William St.	New York, N.Y.
Winchester Repeating Arms Co.	80 Moultrie St.	Brooklyn, N.Y.
		New Haven, Conn.

* Associate Member

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Exhibit "B"
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Progress Report of Work Financed By
THE LEAD FUND
given by
THE LEAD INDUSTRIES ASSOCIATION
to
HARVARD UNIVERSITY

For the last few years our investigation in relation to lead may be summarized as follows:

I. A number of rats were studied in regard to the production of lead poisoning by arsenate of lead. Over a prolonged period, they were fed as much as 2 mg. of arsenate of lead in their daily ration. They showed no signs of lead poisoning, and the amount of lead stored in their bodies was found to be extremely small. This is valuable evidence in regard to the government attitude toward permissible concentration of food insecticides.

II. An extensive investigation has been made with radio-active lead, using it as a tracer of the position of lead in the bones. Radio-active lead is one of the break-down products of radium, and we obtain it from our old radon tubes. It was the great advantage of having a very long life, during which it gives off weak emanations, analogous to radium though in smaller amounts. Chemically, it reacts exactly like lead. By mixing an extremely small portion of this with inert lead one can easily quantitate the lead in tissues as for instance in the bones. The method has the advantage of great accuracy in minute dilutions. We have done two types of experiments on dogs with this preparation:

1. Showing the position of deposited lead in bones.
2. Studying the amount of radio-activity in the excreta.

In the first experiment, several interesting observations have been made in regard to the deposition of lead in the bones. It has been shown that shortly after lead is given intravenously an average of twelve times as much lead is stored in the bone trabeculae as in the bone cortex. We have previously reported that several months after lead exposure there is about twice as much lead in the trabeculae as in the cortex; and from a study of several radium poisoning cases we have established the fact that many years after exposure the radium is in equilibrium in the trabeculae and cortex. We have also been able to show that lead is stored in the dentine of teeth and not in the enamel. These findings are of importance in regard to treatment of such metal poisonings and the conclusion may be summarized as follows:

- a. Active deleading of patients is of great value only in the first few months after exposure, and vigorous treatment at that time is desirable inasmuch as a fair proportion of the lead may be affected by the treatment. However, if some months have elapsed after exposure, the greater accumu-

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(Continued)
Progress Report of Work Financed
by the Lead Fund

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lation of lead into the hard bone means that only a relatively small proportion of the lead can be withdrawn from the body. This is dependent upon the fact that most of the lead which is affected by treatment comes from the trabeculae and relatively little from the solid bony cortex.

- b. It is highly improbable that lead manifestations and lead poisoning will develop long after exposure has ceased, because only a relatively small proportion of the lead would be stored in the trabeculae at that time and therefore the sudden liberation of a large quantity of lead would be unlikely.

The second experiment was undertaken in order to be able to determine the relative amount of lead circulating in the blood stream in relation to lead excretion. However, the amount of lead found in the blood stream was so small that it could not be determined, and therefore the primary reason for these observations was not fulfilled. We did encounter an interesting phenomenon, however, inasmuch as these animals did not respond to deleading treatment by an increased lead excretion. It seems probable that this was due to the radio-activity of the lead which damaged the kidneys sufficiently to cause death in uremia. Control animals with the same amount of lead, but without radio-active lead, remained well. This we are still investigating, by giving even smaller doses of radio-active lead.

III. We are also investigating the interesting phenomenon of the deposition of lead in teeth. We have shown that lead is deposited in the dentine of teeth and not in the enamel, and are now anxious to see whether this lead can be removed. We are just finishing one observation of six months duration to see whether the radio-activity is reduced over this period of time in the teeth. We have removed one tooth shortly after the injections of radio-active lead and now have a mate to it six months later. This is an important problem for two reasons: (1) because of the deleterious effect of lead on teeth; and (2) because it will show whether teeth have a true exchange of inorganic salts. This is a fundamental problem in dentistry.

IV. This year we are continuing this type of investigation, but with radio-active materials made with the new cyclotrons at Harvard University and at the Massachusetts Institute of Technology. By using inorganic salts which are made temporarily radio-active, we can readily follow them in the body, because their radio-activity is detectable in extraordinarily minute concentrations and because the normal body salts have no radio-activity.

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(Continued)
Progress Report of Work Financed
by the Lead Fund

By means of this we hope to determine the distribution of these salts in soft tissues. In order to do this work, we have obtained the aid of Dr. Waldo Cohn, who has had much previous experience with the products from the first cyclotron at the University of California. This work promises to be of great interest. It certainly is a technique by which much fundamental information can be obtained. We think we have largely solved the important problems of technique, and have already begun to make observations. The problem can not be confined solely to lead but will involve other inorganic salts as well. This is nevertheless important for the lead problem as it will involve the way that normal and tumor cells absorb various inorganic salts such as phosphates, calcium, and potassium which are of such importance in the lead problem. We hope to study the permeability of living cells both in regard to the absorption and the excretion of inorganic salts. We are very anxious to continue such work for several years.

(Signed) Joseph C. Aub, M. D.

February 1, 1940