

October 8, 1933

Dr. Edward R. Hermann
Associate Professor
Environmental Health Engineering
Northwestern University
Evanston, Illinois

Dear Doctor Hermann:

I extend my belated thanks for you for your letter of August 6th, and for the accompanying data and discussion concerning the excretion of lead of certain painters. Having been out of town through the greater part of September and having been hard-pressed to put the affairs of the Laboratory in order prior to my departure, my correspondence was somewhat neglected.

I am sure that your examination of the Harben Lectures will have demonstrated some points of disagreement with the values listed on the first page of the attachment, and with their interpretation. Of more importance, however, is the fact that the significance of the exposure to, and absorption of, lead in inorganic form is much more readily established by the determination of the lead content of the blood of exposed persons, than by that of the urine.

The main problem that is involved in the use of biological criteria of safety or danger in relation to exposure to lead is one of physiology and medicine. The attempt to reduce these criteria to single numbers without relation to the manner and frequency of sampling, as well as the factor of time as it enters into the picture in a number of ways, is doomed to failure.

In order to be specific in one instance, at least, instead of seeming to be generally critical, I call attention to a statement in the discussion, which as phrased without qualification is simply untrue. "Individuals excreting more than 0.12 milligrams per liter should be considered as having absorbed enough lead that some adverse effect could result if future exposures are not limited so as to permit their excretion values to return to normal." The fact is that the normal range of the concentration of lead in the urine, as observed in samples that are the result of one voiding, extends up to 0.14 mg. per liter. The significance of this criterion depends therefore on the type of sample under consideration and when and under what conditions (especially of the preceding intake of water) the sample was obtained. This qualification is only one of a number that have to be made in relation to the urinary lead concentration in order to make it an acceptable standard for action. If a man

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were to be removed from employment on the basis of the application of the quoted statement above, such action would be completely unjustified in many instances.

Because of the problems that arise in relation to industrial hygiene, I have been careful to present the practical methods and their physiological bases in the chapter on industrial lead intoxication in Volume II, Chapter XXVI, of the second revised edition of the work edited originally by Patty (Fassett and Irish in the Second Edition), entitled, "Industrial Hygiene and Toxicology" Interscience Publishers (a division of John Wiley and Sons), New York. I suspect you will be interested in this if you have not seen it.

Sincerely yours,

RAK:vr

Robert A. Kehoe, M.D.

NORTHWESTERN UNIVERSITY
EVANSTON, ILLINOIS

August 6, 1963

THE TECHNOLOGICAL INSTITUTE

R. A. Kehoe, M.D.
The Kettering Laboratory
Department of Preventive Medicine
and Industrial Health
College of Medicine
University of Cincinnati
Cincinnati, Ohio

Dear Dr. Kehoe:

Here is a brief summary of results obtained from a lead control program for a large group of painters in a large oil refinery. I feel that it may be of interest to you. Thank you for the copy of the 1960 Harben Lectures that you sent to me after the last AIHA meeting.

Sincerely yours,



Edward R. Hermann
Associate Professor
Environmental Health Engineering

ERH:sb

Enclosure

N 6019.01

Employees engaged in the preparation, application and removal of paints may absorb excessive amounts of lead from the leaded pigments of some paints. To check on the efficacy of control measures aimed at preventing inhalation and ingestion of lead by painters, annual surveys are made of all employees within the Paint Department engaged in painting operations. Urine specimens are collected from these individuals and analyzed for their lead content. Results of tests for lead excreted in the urine of painters are shown on the attached figure. The years of record are from 1949 to 1962. The number of employees examined for urinary lead excretion during this period has ranged from 116 in 1952 to 69 in 1951. A marked reduction in the lead excretion of painters took place between 1949 and 1961. However, the last survey showed an increase in the lead excretion of painters. Whereas the average value for lead in the urine of ~~Refinery~~ Refinery painters was 0.025 milligrams per liter in 1961, the 1962 average value had risen to 0.044 milligrams per liter. A urine lead value of 0.023 milligrams per liter is sometimes cited as average for the general population of the United States.

The significance of the lead excretion values may be gained by comparing the three index levels plotted in the figure with the interpretive scale shown in Table I.

Table I
Interpretation of Urinary Lead Analyses

Urine lead mg/liter	
0.00 to 0.08	Normal lead absorption Non-occupational
0.08 to 0.12	Permissible lead absorption in those occupationally exposed to lead.
0.12 to 0.20	Excessive lead absorption May be hazardous Re-check Remove from exposure
More than 0.20	Absorption compatible with lead intoxication Re-check Recommend medical investigation

Although the 1962 survey shows a considerable rise in the proportion of painters excreting more than 0.04 milligrams per liter and 0.08 milligrams per liter, these two levels are plotted primarily as control indices and have no direct significance regarding health effects. Individuals excreting more than 0.12 milligrams per liter should be considered as having absorbed enough lead that some adverse effect on their health could result if future exposures are not limited so as to permit their excretion values to return to normal. None of the painters excreted more than 0.20 milligrams of lead per liter of urine in the 1962 survey. The few painters excreting more than 0.12 milligrams per liter have apparently decreased their lead exposures since the time of the 1962 survey which was run during August. Subsequent rechecks have indicated that the urinary lead excretions of these men have returned to 0.08 milligrams per liter or less.

A handwritten signature in cursive script, reading "E. R. Hermann". The signature is written in dark ink and is positioned above the printed name.

E. R. Hermann, CE, PhD.

ERH/db

