

December 27, 1965

Carl A. Nau, M.D., Director
Institute of Environmental Health
The University of Oklahoma
Medical Center
800 Northeast Thirteenth Street
Oklahoma City, Oklahoma 73104

Dear Carl:

Mr. Cholak showed me your letter of December 17 with its questions about lead, and both of us considered it appropriate for me to write about the nature of the lead compounds that occur in the tissues and body fluids of the animal organism. Not that I can answer them, but I can show why the answers are not available.

With respect to the compounds of lead that are formed in the tissues of the body, including the blood, and in the excreta, e.g. the urine, there is no information, nor is it likely that there will be for some time to come, if ever. You are enough of a physiologist and chemist to appreciate the problem involved in establishing those facts. I have no doubt that the lead in the urine that comes from the introduction of inorganic lead compounds in the body, and is in solution (rather than in suspension or in the sediment) is linked to such anionic radicals as are available in the solution, according to the appropriate chemical equilibrium. I have little doubt that some of it is hooked up to the organic acids present in the urine. Undoubtedly some of it, as the urine is voided, is in suspension and eventually in the sediment composed of phosphates, oxalates perhaps.

When the lead in the tissues, blood and urine is derived in some part from the chemical degradation of tetraethyllead (or other lead alkyl), some or much of it may be in the form of tri-ethyl lead salts. At any rate, at this time, it is largely in some organic form, since it behaves quite differently from the inorganic compounds, in failing to be taken up on or in the erythrocytes. (No one knows whether the lead is adsorbed on the surface of the erythrocyte, or is bound within its substance.) Here again

it is difficult, almost to the point of impossibility, to determine the nature of the compounds, since one has to destroy the organic material in a specimen before determining the metallic element. We know that under these circumstances some only partially decomposed tetraethyllead occurs in the urine (possibly as tri-ethyl and di-ethyl lead salts) since the urine must be digested vigorously before all of the lead can be determined.

I'm afraid this is the best information I can give you.

With kindest regards and the season's greetings.

Sincerely,

Robert A. Kehoe, M.D.

RAK:rms

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December 22, 1965

Carl A. Nau, M.D., Director
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800 Northeast Thirteenth Street
Oklahoma City, Oklahoma 73104

Dear Dr. Nau:

In reply to the first query in your letter of December 17, I am enclosing a reprint, "Symposium on Lead," which considers various aspects of lead poisoning, including a reprint by Hirschler on page 109 at the bottom of the page (or page 297 at the top). This article discusses the nature of lead in automobile exhaust gas. Mr. Hirschler has probably carried out the most exhaustive and extensive studies on this subject, and he and his associates have published other papers on the subject as indicated by the references at the end of the article in the "Symposium." You might also look at page 126 (or 314) in the "Symposium" at an article which deals with the trends of the concentrations of lead in the air of a number of cities, particularly Cincinnati.

In addition you should try to obtain the final report, "Size Distributions of Atmospheric Lead Aerosols," prepared by the Stanford Research Institute for the International Lead Zinc Research Organization.

The copy of the typed material which I have enclosed carries a brief abstract of the more important findings of the SRI study plus facts concerning atmospheric lead gleaned from other sources. I trust that this information will meet your immediate needs.

Insofar as the second query in your letter is concerned, the biological and medical aspects are so complex that I have considered it wiser to have Dr. Kehoe reply to this section. Therefore, I expect that you will be hearing from him shortly.

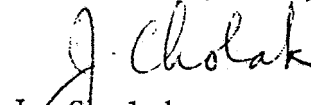
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Carl A. Nau, M.D.
December 22, 1965

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It was nice to hear from you, and I hope that the holiday season will be a pleasant one for you and that the New Year will be a very satisfying one.

Sincerely yours,


J. Cholak
Professor of Environmental
Health Engineering

JC:egm

cc: Dr. Robert A. Kehoe