

August 22, 1960

Mr. Wilbur L. Thomas, Jr.
Center for the Biology of Natural Systems
Washington University
St. Louis, Missouri 63130

Dear Mr. Thomas:

I am, of course, interested in your approach to the problem of lead poisoning in children in St. Louis. This problem is of long standing in the older cities of the United States, and if I may say so, there is little need of new information in dealing with this problem. It will be a decade, at least, I should say, before the information concerning the lead content of hair, in its relation to the recognition of hazardous exposure to lead, and to the diagnosis and therapy of lead poisoning, can compete with the presently available knowledge of the significance of lead in the blood (and urine). In my view, this source of information is unlikely ever to be as useful as that of the blood, for the reason that the basic physiology of the hair in this relationship is essentially unknown. In consequence of this situation, I would not waste my time and the facilities of the laboratory (for that is what I believe it would be) in testing out the hair as a present source of environmental information, but would undertake to learn the facts as to the basic metabolic activities of the hair in relation to lead. I am being brutally frank in speaking thus, but I hardly think it is understood that three or more decades of clinical, epidemiological and physiological investigation, on a large scale, in the community, generally, and in industry have gone into the establishment of the relationships which obtain between various types and degrees of human exposure to lead and the rates of absorption, excretion and distribution of lead in the various tissues of the body. The relationships of lead in the skin and hair have not been included in these investigations, partially, at least, for the reason that it is difficult (and will continue to be) to be sure of the extent of the external contamination of the integument and its appendages. There is, of course, a large body of information on the physiology (including the biochemistry) of the hair, and this I think should be explored minutely before embarking upon any investigation relating to the mineral (including the trace metal) metabolism. So far as I know from the literature, none of the fairly large number of people in this and other countries, have undertaken this type of survey of the available information. I recommend this to you as a preliminary to your work on this tissue.

As to the case of which you have spoken, there is one serious obstacle to my venturing any opinion of this case. Your reference to such a value as 413 mg. % of lead in the blood stops me cold. I presume that this is a typographical error and that the figure is 413 micrograms per 100 grams of whole blood. This value, while in the highly dangerous range, is not necessarily associated with illness of any type. I am surprised, therefore, that Dr. Lattimer finds it difficult to understand why no neurological manifestations of intoxication were found. There is in fact no level of lead concentration in the blood or any other tissue (with the possible exception of the central nervous system) which, of itself, is indicative of lead intoxication. High concentrations, above a certain level, are clearly

indicative of unusual and potentially dangerous degrees of absorption within comparatively recent periods of time, and under such conditions the onset of symptoms may occur at any time, but may not be inferred. We have seen much higher concentrations of lead in the blood than that which I believe to have been found in this instance without any concurrent evidence of intoxication. This is more common in adults than in children, but the fact remains, which many inexperienced people simply cannot bring themselves to believe, that the diagnosis of lead intoxication is made, not on the basis of the findings of the laboratory, but on strictly clinical grounds. The question to be asked by the clinician is, "Is this person, child or adult, ill, and if so what is the nature of the illness?" Those of us, who have had wide experience with lead poisoning in industry and in the community have been reiterating this fact for many years, but it seems not to have made any impression on any but the wisest and most experienced clinicians.

I emphasize this fact in writing to you, for the reason that you speak of investigating the effects of low levels of exposure to lead upon people. This is, undoubtedly, the most difficult problem in the entire scope of the occurrence of lead in the human environment. There has been an almost infinite amount of confused thinking on this subject, especially by people who are not familiar with the facts. Lead poisoning has been known (in varying degrees of completeness) for centuries, and some of the best and most thorough clinical observations known to medical experience (those, for example, of Tanquerel Des Planches) have been made and described in this relationship. And yet, the clinical novices speak pseudo-learnedly of "subclinical effects" of lead intoxication, without realizing that a subclinical effect of this much studied disease is one which no clinician can recognize, identify or describe. What does one mean by this term, if not that "there may be injurious effects of a very subtle type (presumably disturbances of the cellular metabolism induced by enzymatic impairment) of which, at present, physicians have no knowledge." Since such a statement can be made in relation to any disease known to man, I cannot but wonder why it is so seemingly impressive when made about the effects of lead upon the human body.

You will forgive me, I trust, for my emphasis upon a point of view which I believe to be founded entirely upon baseless apprehension concerning matters which we do not understand fully. Our problem as investigators is, of course, to use our imagination in the design of investigations of unknown phenomena. This, I believe, is not a reason for playing upon the apprehensions of people, generally, including our own, in the field of the public health. Having lived and worked for a long time, and so being full of years and some, I hope, profitable experience, I am fully aware of some of the uncertainties of the medical sciences in particular, and of life generally. However, they rarely keep me awake at night, or in a state of apprehension in the daytime.

Sincerely yours,

Robert A. Kehoe, M.D.
Professor Emeritus of
Occupational Medicine

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CENTER FOR THE BIOLOGY OF NATURAL SYSTEMS

WASHINGTON UNIVERSITY
ST. LOUIS, MISSOURI 63130

July 23, 1969

Dr. Robert A. Kehoe
Kettering Laboratory
College of Medicine
University of Cincinnati
Cincinnati, Ohio 45219

Dear Dr. Kehoe:

Thank you very much for the complimentary copy of the Harben Lectures sent in reply to Miss Webb's letter. It has been of tremendous help to her work in our program. However, Miss Webb who is a graduate student will be returning to school in the fall, therefore I am writing in reply to your interest in our lead poisoning study.

In your letter you inquired as to the aspect of lead poisoning in which we were interested. Our present interest centers around lead poisoning in children in the St. Louis area. We wish to lend assistance to neighborhood organizations and relevant agencies interested in the detection, treatment, and prevention of lead poisoning in ghetto areas. However, we eventually hope to start research in determining the health effects of exposure to low concentrations of lead.

It is our hope to start a screening program using hair as the sample for analysis according to the Kopito method. We would like to continue the research concerning the suitability of hair as a sample for mass screening and the reliability of values obtained in this analysis. We would certainly appreciate any opinions or suggestions you may have towards this end. I met with you briefly in New York at the Air Pollution Control Association Meeting and posed this research possibility to you. However, at that time we were not able to talk in great detail and thus you only indicated the difficulties of this line of research. Therefore, any

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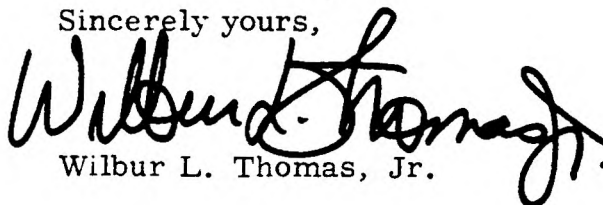
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suggestions you may have concerning this would be most helpful. It may be possible that we could send for you later this fall to speak with our group. Would you be interested?

In a recent communication with Dr. Agnes Lattimer, Chairman of the Chicago Committee Against Lead Poisoning and a pediatrician at Michael Reese Hospital, a lead poison case was brought to my attention which I thought you may be able to help in interpreting. The patient is a four year old female who was admitted to Michael Reese's Mandel Clinic on July 6, 1969. Two blood samples analyzed for lead both gave values of 413 mg % lead. The child had symptoms of vomiting and slight constipation, but no neurologic symptoms were evident. When treated with calcium versinate, the child excreted 2.6 mg of lead in the urine in the first 24 hours. There is a history of pica, however when the child was screened less than a year ago, there was no evidence of elevated blood lead. Dr. Lattimer is interested in why there are no neurologic symptoms with such a high blood level. We would like your opinion on this case.

Again thank you for the lectures.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Wilbur L. Thomas, Jr.", with a stylized, cursive script.

Wilbur L. Thomas, Jr.