

December 30, 1949

Dr. R. E. Eckardt,
Standard Oil Company (New Jersey),
30 Rockefeller Plaza,
New York City 20.

Dear Doctor Eckardt:

In reply to your letter of December 14, I should like first to raise a question. I assume from the fact that you have not stated otherwise, that the lead exposure of your group of workers arises from their work with inorganic lead compounds and not with tetraethyl lead or its decomposition products. If I am mistaken in this assumption, I should like to know, since, as you may be aware, we have undertaken to keep a very close watch on all situations that lead to hazard in the handling of tetraethyl lead or leaded gasoline.

From what you have told me about the urinary lead concentration encountered among these men, there appears to be some significant exposure. It is necessary to be cautious, however, in the interpretation of analytical results on the urine, and especially on small samples of urine. Therefore, if there is any question of the significance of the situation, you would be well advised to analyze samples of blood as well as of urine. If I can be of any assistance to you in this regard, do not hesitate to let me know.

With respect to the medical examinations, and specifically the hematologic examinations, I should advise you not to put much faith in the significance of either the stippling or the basophilic aggregation test for the purpose of estimating the significance of lead exposure. There is very little to choose between the two tests. Either one is satisfactory, and the one is about as satisfactory as the other if done properly and if interpreted properly. However, their value is limited, and I would suggest that if you wish to get an idea of the blood picture of these men in relation to their absorption of lead, you should go further than a test for stippling, obtaining the complete blood picture. The anemia of lead poisoning is that of a microcytic type, and you are likely to have some drop in the hemoglobin, as a first expression of this anemia. Stippling is found before the anemia develops, and it is likely to reach fairly considerable proportions at the time of the onset of the illness. However, it is fair to say of stippling or of the basophilic aggregation test that their principal value, for diagnostic purposes, lies in the fact that it is indeed rare to see a case of lead poisoning that does not show some changes of

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this type. Indicative findings, therefore, or findings within normal limits, argue against the likelihood that the illness is due to lead. This should be taken, however, as only one of the clinical signs. It is obvious that it is not a specific sign.

We have had occasion to see anxiety states and emotional disturbances, as well as frank evidence of central nervous system irritation in association with clinical lead poisoning of the more characteristic types. A frank encephalopathy following absorption of lead, is rare, except in the case of children (in which this is the most common clinical syndrome), and with the further exception of lead poisoning due to the absorption of tetraethyl lead (in which central nervous system involvement is the inescapable rule). The physical and laboratory findings of true lead encephalopathy in the adult are somewhat variable, and the diagnosis cannot be made by the examination of the spinal fluid. The pressure and the cerebrospinal fluid is variable and may show little abnormality. Protein content and cells are likely to be increased, but are not invariably so to a significant degree. Analysis of the spinal fluid for lead in the present state of our knowledge is unwarranted. The diagnosis is made from the clinical picture and from the finding of excessive quantities of lead in the urine or blood or both, or in fatal cases, in the tissues, including the brain. In our experience, concentrations of lead in the brain of the order of magnitude of 0.3 mg. per hundred grams or more of fresh tissue are found regularly in association with fatal encephalopathy. I distrust the subjective evidence of anxiety and emotional instability as expressions of cerebral plumbism if there is any basis for anxiety in connection with the work. Dramatic changes in personality, however, without reasons for apprehension, are to be regarded very seriously on the other hand. - Generally speaking, physical evidences of central nervous system irritation associate themselves with abnormal mental states when the latter are brought about by intoxication, rather than by simple apprehension.

Finally, I should like to say that if you have any occupational situation involving significant or serious absorption of lead, you should bend every effort toward the elimination and satisfactory control of such types of exposure. Prevention is the only satisfactory treatment of this problem, and the costs of inadequate prevention are extensively excessive in these days, as compared with the cost of the procedures and the equipment required to eliminate the difficulty.

Sincerely yours,

Robert A. Kehoe, M. D.

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Dictated but not read.
C.C.: Dr. J. P. Holt