

THE JOHNS HOPKINS UNIVERSITY
SCHOOL OF HYGIENE AND PUBLIC HEALTH
615 NORTH WOLFE STREET
BALTIMORE, MARYLAND

DEPARTMENT OF BIOCHEMISTRY

July 28, 1933

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

Dear Dr. Kehoe:

Upon returning this summer to the lead research, I find that Dr. Shipley has referred to me your letter of June 13, in which you very kindly describe for us the technique that you and Mr. Cholak are using in the spectrographic determination of lead. I deeply regret the delay in answering and hope that you will accept my sincere apologies.

It so happens that although we reported last fall on the spectrographic detection of lead in the blood, the pressure of other research of an immediate nature prevented me from continuing the lead work. The problem is only now being resumed; so I am afraid that our work is in a more preliminary stage than yours. However, I shall give you what little information I have available.

The purpose of our note in the Bulletin was to indicate that there was an easily detectable difference between the amounts of lead found in the blood of lead poisoning cases and of non-lead poisoning cases. We stated that the controls gave either negative results or questionable traces. The uncertainty in the statement was intentional, because at times the controls showed faint lines which could possibly have been caused by slight contamination during handling, a slight lead content in the distilled sulfuric acid, or a slight trace of lead in the graphite electrodes used. In view of these considerations, we were unable to ascribe certain significance to these faint traces. This does not mean, of course, that the lead line could not be brought out definitely by other workers. We had insufficient data to make a conclusion upon this point; so our results cannot at all be considered a refutation of your work on "normal lead".

Since we all must ingest small amounts of lead from food, and possibly from tobacco and other sources, at any time there should be a certain amount of lead in the blood.

J. Cholak has reprint and has recd this letter

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The question thus becomes quantitative rather than qualitative. Dr. Nitchie, of Bausch and Lomb, recently told me that he could detect a faint lead line in his spectrograms of blood. I believe that Dutoit and Zbinden, in Switzerland, reported that they could always detect lead when concentration methods were used before photographing the ash. Our results here, which are certainly not extensive, suggest that a definite line might be brought out even under great precautions to avoid contamination or introduction of impurity through the electrodes.

As indicated in our note, we used the lines 4057.83 A.U., 3683.47, and 3639.58 as raies ultimes, with the intensities decreasing in the order given. Nitchie, however, said that he used 2833.-- as his most sensitive line. Dr. Hoag, of the research laboratories of the American Can Co., also considered 2833 as the most sensitive, although upon examination of his plates, he was unable to state definitely that it was more sensitive than the lines that I first mentioned. Eder and Valenta, in their atlas, list 4057 as the most intense arc line; Hilger pamphlets also list 4057 as a raie ultime and of the highest intensity. From comparison spectra that I have made, it appears that under the conditions that I operate the arc and with the Hilger E1 instrument that is used, 4057.83 appears more intense than 2833 even in low concentrations. It might be, however, that although 4057 is more intense, 2833 might be more persistent. I hope to determine this soon by means of quantitative standards.

We were very glad to send you a reprint of the paper on the spectrograph analysis of milk ashes, according to your request.

Again I beg your pardon for the unavoidable delay, and assure you that we shall be glad to give you any further information that you may request. If you have them available, I should like very much to have reprints of your many publications on lead and lead poisoning.

Very truly yours,

Harold Plummer

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