May 10, 1933

Dr. Lawrence T. Fairhall
School of Public Health
Harvard University
55 Van Dyke Street
Boston, Massachusetts

Dear Dr. Fairhall:

Allow me to thank you for your letter of May 5th. I do not doubt that your interest is in the establishment of the facts in the matter of normal lead. In this same spirit, I am replying, and for the present declining your invitation to come to your laboratory. It is impossible for me to absent myself from my work before the second week of June, because of a teaching schedule which cannot be altered just now. However, I should be glad to offer the same facilities to you which you have tendered to me. I and my associates will be glad to have you at your convenience, and we will be pleased to work out our differences as soon as you choose, and in any manner which seems mutually desirable. I trust that what I have to say in the next paragraph of my letter will not influence your willingness to accept this invitation as an expression of my personal cordiality.

In the matter of our analytical methods, I should like to point out the critical differences, the importance of which you can establish for yourself with a minimal amount of time. Without commenting upon slight differences in the preparation of samples, or the necessity of the sulphate step, or the advisability of separating bismuth, - all of which are important - I wish to call your attention to your use of 2 c.c. of glacial acetic acid in excess, at the chromate precipitation. If you will modify your procedure at this point to the use of dilute acetic acid (2 c.c. of 5%) you will find that amounts of lead below 0.5 milligrams will be precipitated as chromate, whereas with your method all such amounts will be largely or entirely lost. By this slight change, the large proportion of all our discrepancies will be ironed out. Let me cite a recent experience in our laboratory, as an example of the importance of this variation. In a recent study of a normal subject, as a preliminary control on observations which were to be made, the results had been of the characteristic type for several weeks when a series of thirty successive faecal samples were found to yield "nils". A prompt investigation established that one of my

assistants had used 2 c.c. of glacial acetic acid at the chromate step. (The reagent bottles were similar, and by sheer accident the glacial acetic acid bottle had been placed where the 5% acetic acid should have been. Concentrated acid was added to every sample in that batch, and every result was lost.) With this error corrected, the subsequent samples were found to contain the customary amounts of lead.

I wish to stress further, the fact that we do not use aliquots of samples, but complete and large samples, so as to reduce the experimental error. Therefore, we are not dealing with questionable amounts of lead, except in rare instances, but rather amounts which are well outside the realm of spectrographic traces. Moreover we have preserved the lead obtained from subjects employed in prolonged observations, in the form of chromate, so that it can be seen, identified and weighed. We are thus under no illusions as to whether or not we have isolated some other metal.

The final determination may well be a matter of choice. Thus we do not trust the thiosulphate titration in dealing with small amounts of lead, we prefer the S.diphenyl carbazide colorimetric reaction to the sulphide or the Ivanov reaction.

May I, without intending offence, make one further comment. This controversy was brought to light as early as 1925. I have not said much on it, but what I have said has been to the point and the methods employed by Edgar and Thamann and me have been available in the literature. Our results have been confirmed by Leake, (for the faeces) by Francis, by Taylor working with Badham, by Fretwurst, and more recently by Weyrauch, the methods of all these being somewhat different. Moreover they are being additionally confirmed by spectrographic methods. Under these circumstances, I feel that I may be justified in suggesting that you try out the modifications which we or others have introduced into the chemical methods, in order to see for yourself whether they are "clearly not in the direction of increasing the accuracy of recovery of lead".

Cordially yours,

RAK:IS