

March 18, 1946

Dr. F. Wm. Sunderman,
701 Maloney Building,
Philadelphia 4, Pennsylvania.

Dear Dr. Sunderman:

We shall analyze the samples forwarded to us in accordance with your letter of March 14 and will report results in due course. However, I hasten to call your attention to what may turn out to be a serious difficulty in connection with the urine sample before we complete the analysis. The division of a 24-hour, or other large sample of urine, into separate portions for analysis is always fraught with grave danger. If there is any settling out of phosphates, or if the sample is turbid in any way, the aliquot taken for analysis will not be representative, since the lead compounds tend to separate out in part with the precipitate. Therefore, if you still have the remainder of the 24-hour sample, it would be wise to forward it to us for analysis, unless you are absolutely certain that there was no turbidity or sedimentation at the time the sample was divided. It is for this reason that our instructions are so specific. We never want to touch samples for analysis that have not been obtained directly into the container we supply, for not only is there the possibility referred to, but also in most instances laboratory workers cannot be trusted to handle such samples. The chances of contamination are always present and, therefore, there must be the absolute minimum of manipulations.

Your comment with reference to the analysis of blood samples in preference to urinary samples is correct from one point of view and incorrect in another. The variations in the lead content of the blood in response to lead exposure and absorption are not so extensive as those in the urine. Therefore, an actually representative sample of urine is much more useful in determining the extent of the absorption of lead than is the lead concentration in the blood. As a matter of fact, conclusions can be drawn with much greater precision from the analysis of both blood and urine, than from either one singly.

There is no advantage in a 24-hour sample as compared to any large representative sample. The available data permit one to draw conclusions on the basis of the lead concentration in the urine, quite as effectively as on the quantity of lead excreted over some period of time. For this reason when we collect samples on men who are working, we require that a large sample be collected by the men at their homes, during periods of freedom from exposure,

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Dr. F. Wm. Sunderman - (2) - March 18, 1946

and after they have changed clothes and bathed. In this way we get samples of large volume, without undue risk of contamination. The size of the sample irons out the variations based on the rate of water elimination and permits us to see the representative level of lead excretion.

I do not wish to burden you with unnecessary discussion, but the problem of sampling is one of the most important aspects of this matter, and I think this discussion may be useful to you in connection with situations you may have to deal with subsequently.

With final reference to the matter of spot samples, these are extremely useful because of their convenience in transportation and because they can be obtained under the direct supervision of responsible persons. When interpreted on the basis of their specific gravity, and also in relation to the lead concentration in the blood they provide all of the information that is necessary for diagnostic purposes in most instances, in-so-far as laboratory information is concerned. This is true only because there is such a background of analytical information, that with the associated information on the exposure of the patient one can arrive at a very sound conclusion so far as the potential hazard is concerned. Obviously the facts as to illness must be established in every instance by clinical means.

Sincerely yours,

Robert A. Kehoe, M. D.

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P. S. I herewith acknowledge with thanks receipt of your check in the amount of \$10.00, covering the above analyses.

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