March 25, 1941

Mr. Hoy A. Cranston
Laboratory of Polarographic Analysis
7002 South Halsted Street
Chicago, Illinois

Dear Mr. Cranston:

We have looked over your results as reported in your letter of March 17th with a considerable interest, and I am replying to you herewith for the most part with the words of Mr. Cholak, who has commented on the results.

The precipitate in the solutions is mostly silica, and because manipulations are kept at a minimum in the laboratory, these solutions, though not entirely clear, are not filtered. The samples are made up to a definite volume, depending upon the size of the sample, and suitable aliquots are extracted directly with dithizone. No trouble is encountered, especially if sufficient ammonium citrate is employed. The samples which we submitted were aliquots of samples thus analyzed.

Your blank of 6.44 gammas is high and, in our opinion, such blanks make the estimation of traces of lead quite difficult. By the use of dry ashing and the purification of reagents, such high blanks can be avoided. The dependability of the results is further enhanced in our hands by the fact that the rack blank is only 0.1 gamma.

The differences between the two sets of results are somewhat greater than check analyses obtained either by the dithizone or spectrographic methods. The difference should not exceed ± 0.01 mg. Pb/liter of urine. The fact that most of the values are on the positive side suggests that there may have been some contamination since, in our experience, the results of polarographic analyses are more likely to be low, due to slight losses from increased manipulation. In the main the results obtained are satisfactory for clinical purposes, but they are not as precise as can be obtained by other methods.

We should be glad to send you a few untreated samples of urine in the next shipment. These samples will be aliquots of samples which have been analyzed by spectro-chemical means.

I shall also be glad to follow your suggestion that we send our own results later. However, it has not seemed to us and does not now seem to us that you would be likely to go go all this trouble to analyze these samples, if you had any intention of falsifying the results. After all, this would be a little like cheating at solitaire.

With kindest personal regards, I am

Cordially yours,

RAK:is

Robert A. Kehoe, M.D.

COMMENTS ON MR. CRANSTON'S LETTER

The precipitate in the solutions is mostly silica. In our method, manipulations are kept at a minimum and therefore acid solutions of the ashed samples are not filtered. The samples are made up to a definite volume, depending on size of the sample, and suitable aliquots are extracted directly with dithizone. No trouble is encountered, especially if sufficient ammonium citrate is employed. Samples submitted for polarographic analysis were aliquots of samples thus analyzed in our laboratory.

A blank of 6.44 gammas is rather high and, in our opinion, such blanks in the estimation of traces are decidedly detrimental. Dry ashing techniques and the purification of reagents avoid these high blanks while the reliability is further enhanced by the fact that our rack blank is only 0.1 gamma.

The differences between the two sets of results are somewhat greater than check analyses obtained either by the dithizone or spectrographic methods. The difference should not exceed ±0.01 mg. Pb/liter of urine. The fact that most of the values are on the positive side is suggestive of some contamination. Our experience has indicated that polarographic analyses, following dithizone extractions, are more often slightly low due to losses in the increased manipulation. In the main, however, Mr. Cranston's findings are satisfactory for clinical purposes.

It will be possible to send a few untreated samples of urine in the next shipment. These will be aliquots of samples which have been analyzed by spectrochemical means.