July 15, 1964

W. B. Mayer, M.D.
The Nalle Clinic
1350 South Kings Drive
Charlotte 7, North Carolina

Dear Doctor Mayer:

We shall be entirely willing to carry out analyses for you, especially since you believe you have found symptoms of mild lead intoxication in persons whose blood and urine appear to contain quantities of lead which are insufficient to account for such symptomatology. We have never encountered any such situations in our own experience, and I do not believe they really occur. It is possible, of course, that you are incorrect in your interpretation of symptoms. However, it is also possible, and more likely, I suspect, either that the analytical procedure yields low results, or that the interpretation of the threshold value is incorrect. I have encountered this lately at two points which I would not have suspected. In any case, we shall be glad to check on the matter.

My suspicion that you are right and the analyses are wrong (or wrongly interpreted)is enhanced somewhat by your statement that the employees are not"careful to wear masks." If the situation in the smelting plant is such that it is necessary to wear masks much of the time in certain jobs, the control of the contamination of the atmosphere is inadequate. However, we need not speculate on these matters, but will find out about them.

We shall supply you with the containers for the collection of the specimens, together with instructions. I should like you to give us fairly full information concerning the men as indicated on the request sheet (for each sample). We need to know the nature of the man's job, the length of time he has been engaged in this and in other jobs in the plant, when he last worked (the date), the general state of his health, and if he is ill, the symptoms, onset and course (unless, of course, his is a definitely diagnosed non-occupational disease). With such information we can interpret the findings, but we can also know a great deal about the degree of hazard associated with the work. (I should point out to you, that we do not carry out analytical services, as such, for fees. We make a charge sufficient to cover the cost of the entire service involved, so as to preserve the funds earmarked for research. Our purpose, as physicians, is to help industry, our colleagues, and their patients, certainly, but our objectivesis to learn all we can about the lead trades as they actually perform, to give advice and guidance, and to prevent lead poisoning on the broad base of American industry so far as we can reach.)

Speaking of charges, the cost to us approximates $12.50 per sample. We obtain duplicate samples of blood, which we analyze by two methods, in parallel, but we charge for the two analyses as though they were one. (This procedure enables us to detect the contamination of samples when it occurs, and provides a check on the entire prodedure. This is necessary to us for our own purpose,

for we dare not be in error on the analytical side of this problem. As you will understand, if we are to deal precisely with the theshold value in the blood we must be able to differentiate the results that are on the borderline, from those beyond it. Since the analytical error of the analysis, by any method, is of the order of 0.01 milligram across the entire range of values expressed in milligrams per 100 grams of whole blood, we must at times have paired results in order to know where we are. That is to say that when a single analysis of 10 ml. of blood yields such a result as 0.08 mg. per 100 grams, we know that it may actually be 0.07 or 0.09, since the error is $\pm$0.01. If we have two analyses, we can appraise the error more adequately. This is important at this point, because 0.08 mg. per 100 grams is the critical point. On the other hand, if the result is 0.20 $\pm$ 0.01, the analytical error is unimportant.)

With respect to the coproporphyrin determinations, I consider them useful in diagnosis, but not in preventive medicine. Granted that a significant change in the urinary excretion of coproporphyrin is one of the earliest abnormalities in lead poisoning, it is still a sign of intoxication, and when it is due to lead, it comes too late as a preventive index. In my experience, if you keep the exposure so controlled that none of your men reach levels in excess of 0.07 mg. per 100 grams of blood, you will not find increased levels of excretion of coproporphyrin. Because this is the case, negative findings from the use of this test are reassuring, but you never know how near you are to the point of danger until it is upon you.

Cordially yours,

RAK:vr

Robert A. Kehoe, M.D.