

February 21, 1947

Dr. A. P. Miller,  
Medical Department,  
E. I. du Pont de Nemours and Co.,  
Old Hickory Plant,  
Davidson County, Tenn.

Dear Dr. Miller:

I have your letter of February 13 with its attachments in relation to the case of Roy Greener.

Before giving careful consideration to the details of the case I should like to raise the question of the adequacy and accuracy of the results of lead analyses on the urine of this man. I observed that a series of analyses have been made and that the results as tabulated are reasonably consistent. High values are recorded from time to time, however, and somewhat irregularly. These would seem to indicate that the lead exposure was rather variable from time to time. Otherwise it would mean that the analytical results are subject to more variation than they should be. I point this out, because I must be quite frank in saying that I am very skeptical about analytical results obtained in an industrial laboratory. These results may be highly accurate, but considering the difficulties not only of the analytical procedures, but of the methods employed in the collection of samples, I beg leave to be skeptical. In our experience it has not been possible to obtain satisfactory analytical results on biological materials from plant laboratories. If these results are trustworthy, I can assure you that they are quite the exception to common experience. Accordingly I raise the question of the methods employed by your medical personnel in collecting the samples and by your analysts in making the determination. If you will give me the information on these matters, I shall then be prepared to accept the analytical results or to discard them as the case may be, on reasonably adequate information. For the present I must take the position, on the basis of my own experience, that these results cannot be trusted, and that I shall have to draw my conclusions from the clinical data alone. This position is based on the fact that such analytical evidence must be correct beyond any peradventure, or else it is wholly deceiving.

I should like also to point out that our systematic experimental and clinical observations over a period of years have satisfied us completely that the demobilization of lead by means of calcium therapy, and its mobilization by means of ammonium chloride, are complete impossibilities. The deposition of lead in the skeleton

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is not materially influenced in the reasonably normal individual by the administration of calcium, nor is it influenced appreciably for more than the briefest period of time by the administration of ammonium chloride or by any of the other agents that have been proposed for this purpose. I do not express these points of view in order to be critical of what has been done, but merely to state the position on which I proceed with the consideration of this case.

It would appear from the acceptable facts presented in your description of the case that this employee has had significant lead exposure. This coincides completely with our experience in the matter of lead burners, especially when the latter work rather steadily at their job of lead burning. It appears also that this man had some degree of clinical lead intoxication, this conclusion being justified by the symptomatic picture. The absence of characteristic evidence of microscopic blood changes (stippled erythrocytes) makes this interpretation questionable, but again this is a question of method of examination and sensitivity of the specific procedure employed. Accepting these things as facts, for the sake of the argument, I would take the point of view that this man has had intermittent exposure to lead over some considerable period of time and that he has accumulated lead in his body. I think you can take it as certain that he has never had ample time at any time to excrete the lead thus accumulated, and therefore it takes less additional lead exposure to produce significant lead absorption, than would be the case in a previously unexposed new employee. Accordingly when he is exposed to lead again, he develops symptoms more rapidly than would be anticipated in a previously unexposed person. This is the basis of his "susceptibility," if he can be said to be more susceptible than another individual. If this man were given time to eliminate his retained lead, he would then be no more susceptible than any other individual, assuming that he is otherwise reasonably normal and healthy.

I would say that what is necessary in this case is to establish his present status with reference to lead absorption. If he has absorbed appreciable quantities of lead, above normal levels, he will show an elevation of the lead content of his blood and urine. Moreover, if he is kept out of lead exposure, the concentration of lead in the blood and urine will decrease to the normal levels. This may require months or perhaps even years, dependent upon the length and severity of his previous exposure. He should not be permitted to resume his lead exposure, assuming that he has had significant exposure, until such a time as he shows substantially normal values in both the blood and urine.

By way of establishing the facts at this time, I would suggest that you obtain samples of blood and urine for us in our containers,

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following our instructions. On the basis of this information I can better advise you as to what should be done. If, at the same time, you should wish to check the accuracy of the analytical results obtainable in your own laboratory, you might obtain samples at about the same time for their analysis, so that the results of the two laboratories can be compared. I should warn you that samples ought not to be divided as between the two laboratories, since the handling incident to this division is much too likely to result in contamination.

If we can help you in the manner indicated above, we should be glad to do so, and moreover, if what I have said raises further questions in your mind, I should be glad to answer them to the best of my ability if you will propose them.

Cordially yours,

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Robert A. Kehoe, M. D.

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