

December 1, 1947

Dr. J. S. Felton,
Superintendent, Health Department,
Monsanto Chemical Company,
P. O. Box W,
Oak Ridge, Tenn.

Dear Dr. Felton:

Your letter of October 29 brings me to recognize that Monsanto Chemical Company is still concerned with Clinton Laboratories. I make mention of this, since I thought that they were no longer involved, and since some discussion some time ago of my acting as an occasional consultant there on their behalf has not been referred to lately. This is not especially important to me, and I mention it only to point out that if there would be any advantage in our getting together at some time, I should be very glad to arrange accordingly. Meanwhile, I am very glad to answer your questions as well as I can. First, the matter of the interpretation of analytical results on the blood and urine of exposed personnel must be based upon the use of methods of analysis which have an extremely high degree of precision. In general the samples obtained are required to be small, and therefore the analytical precision must be correspondingly great. Furthermore there must be a background of experience which enables one to interpret the results on a broad base. Let me say at the outset that there is no concentration or range of concentrations in the blood, urine or tissues which in and of themselves, denote toxicity. All that can be said is that lead intoxication does not occur until a certain range of concentrations has been reached. Above such a level intoxication need not occur, but it does occur with a frequency which increases the higher the concentrations go above a safe level. Our observations have established the fact beyond any question that safety requires that the lead concentrations in the urine should not regularly go much above 0.1 mg. per liter in the urine, or 0.06 mg. per 100 grams in the blood. There is more to it than this, but if an individual gives results regularly above these levels, his lead exposure is potentially hazardous. In our experience individuals should be promptly removed from exposure when the lead concentration in the urine remains regularly above 0.15 mg. per liter. This would correspond roughly to 0.07 or 0.075 mg. per 100 grams of blood. Lead intoxication occurs with a rather high frequency among individuals who give results above 0.20 mg. per liter in the urine and/or 0.08 mg. per 100 grams of blood. You will observe that the range of values in the blood is rather narrow and it is partly for this reason that it is necessary to have information on the urine. No treatment is required for any individual who is not ill, regardless of the levels of lead concentration in the blood or excreta. The only treatment required is removal from exposure. There is indeed no treatment of any kind which can be used practicably to bring about the more rapid elimination of absorbed lead from the body. Various methods employed or advised for employment in the past have been shown to be

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valueless in terms of achieving any quantitatively important effect. We have recently found that the administration of B.A.L. has a profound effect upon the lead content of the blood and that of the urine, decreasing the former sharply while increasing the latter comparably. Even this, however, has no practical usefulness at the present time, since the effect is fleeting and the total effect is too slight to be of any practical significance.

I should be very glad when the opportunity presents itself to show you the kind of results that can be obtained by the application of analytical methods in correlation with medical observations. By the suitable application of these methods one can be certain at all times of the safety or the degree of hazard of people who are under his supervision, and he can act accordingly. We have followed certain groups of workmen through their normal operations and through dangerous operations of industrial production, so that now it can be said that we are pretty clear on just what can be done and what has to be done. I hope to be able to get this material published in the not too distant future. Unfortunately, however, there are so many things to be done from day to day that I have been unable to find the time to study and put this material together for publication.

I trust that what I have said will be helpful. If you should care to raise further questions, I shall do my best to answer them.

Cordially yours,

Robert A. Kehoe, M. D.

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MONSANTO CHEMICAL COMPANY
CLINTON LABORATORIES

P. O. BOX W
OAK RIDGE, TENNESSEE

October 29, 1947

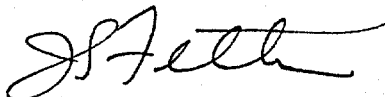
Dr. Robert A. Kehoe
Kettering Laboratory of
Applied Physiology
College of Medicine
Eden Avenue
Cincinnati 19, Ohio

Dear Dr. Kehoe:

As you may recall from previous letters and lead determinations you did for this office during the days of the Manhattan District Project, we have several of our employees engaged in lead work. Our blood and urine lead determinations have continued but I would like to have your present feeling as to the interpretation of the values. In other words, what do you feel to be the lowest blood and urine levels indicative of beginning lead toxicity? What is the range where observation of the patient solely should be carried on? At what range should the worker be taken off the job away from lead exposure? At what range should the patient actually be treated for lead poisoning if he is otherwise asymptomatic but shows high blood or urine levels? Your current opinion would be very greatly appreciated and would aid us considerably in guiding the lead workers we have.

In advance, my deepest thanks.

Very cordially yours,



J. S. FELTON, M.D.
Sup't., Health Department

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