

There are some statements in the literature that exposure to lead preceding pregnancy may affect the pregnancy. Reid (22) cites the high incidence of miscarriages and stillbirths among mothers who worked in the lead industries before marriage as shown in table 11. Aub (21) quotes some experimental work which appears to support this as well as some contradictory evidence. According to Kehoe (Kehoe, R.A. Personal communication) "lead exposure preceding pregnancy is a potentially dangerous matter since the lead concentration in the blood, tissues, body fluids and excretions of persons who have absorbed considerable quantities of lead, especially if they have done so over long periods, remains elevated for a long time (many months). The lead concentration in the circulating blood and in the foetal tissues may be toxic to the latter without causing serious or demonstrable signs of intoxication in the mother. For this reason, a woman who has reason to consider pregnancy as a likelihood, should not be employed in hazardous lead trades. Such persons should, however, not be excluded from occupations in which the lead exposure is regularly controlled so as to be well below the safe limits as defined for adults".

It is claimed that lead may affect menstruation in women. Legge and Goadby (23) reported that a "considerable number of women working in lead processes suffer from amenorrhea and often from periods of menorrhagia and dysmenorrhea." The evidence for this was not presented.

In addition to the direct effect of certain substances, such as lead, on the foetus and uterus, damage to the foetus may result indirectly through the effects on the mother of such toxic substances as mercury, arsenic, chloroform, etc.

Furthermore, the breast fed child is subjected to the hazards of intoxication from absorbed materials that are secreted into the milk.

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December 6, 1944

19

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Dear Dr. Baetjer:

I have been very glad to go over the manuscript which you sent with your letter and I have made certain pencil notations here and there in the manuscript, some of which are related to the subject on which you asked my opinion, and some being merely the result of my habit of editing everything that comes over my desk. I will have to ask you to forgive my efforts in that direction, for once one has started on that path, there is no turning backward.

With respect to the statements about lead I think they are quite sound in the main. However, I have made a few pencil notations at one or two points and I wish to augment them with a few additional remarks. I think there is no need to comment extensively on the one or two notations which tend to limit a little your conclusions. In one instance I have suggested "suspect" for "believe", and in another I have spoken of a "likelihood" rather than a certainty. My only real exception to what has been said has to do with your statement concerning the release of lead from the bones. I think I should comment on this phase of the matter somewhat more extensively than I have done in my pencil notes.

There is no question, of course, about the accumulation of lead in the skeleton in relatively high concentration. On the other hand, there is very great question about any very great increase in the rate of elimination of lead from the skeleton as the result of various metabolic changes and disturbances. I do not consider that any of the evidence on this subject is in any way convincing. Moreover, inasmuch as most of the experimental work on this subject has had to do with experimental animals, there is no very satisfactory evidence that there is an important application to the human adult. This is not the proper place to go into a lengthy discussion of this subject, but more and more experimental evidence has accumulated to cast doubt upon the likelihood of any metabolic disturbance capable of releasing large

KE 0019853

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Dr. Anna M. Baetjer - (2) - December 6, 1944

quantities of lead from the skeleton. Most of the evidence, and particularly that of recent years, seem to demonstrate that the rate of loss of lead from the skeleton of the adult is subject to very little variation as the result of known factors. Indeed it is very difficult to disturb the relationships between lead in the skeleton and lead in the tissues, blood, and excreta. The mechanisms here are remarkably stable. I am not greatly surprised at these facts, for the reason that if it were otherwise, one would expect to see a great many cases of lead poisoning among persons whose lead exposure had been discontinued weeks, months, or even years before the onset of acute symptoms. Instead cases of lead poisoning occur rarely if ever, except in direct time relationship to significant lead exposure. I have been looking for years for cases of lead poisoning set off by extraneous factors well after the discontinuance of lead exposure. I have never seen a single one. You will see, therefore, that I doubt the importance of this matter on both theoretical and practical grounds.

I do not mean to indicate, however, that lead retained in the body of the mother is unimportant in relation to the growing foetus or the young baby. Lead exposure preceding pregnancy, in my opinion, is a potentially dangerous matter. The effect of such lead exposure needs no explanation on the basis of any remarkable change in the distribution of lead in the body by reason of metabolic disturbance. Actually the lead concentration in the blood, tissues, body fluids and excretions of persons who have absorbed considerable quantities of lead, especially if they have done so over long periods, remains elevated for a long time (many months). The lead concentration in the circulating blood and in the foetal tissues may be toxic to the latter without causing serious or demonstrable signs of intoxication in the mother. For this reason, in my opinion, a woman in the child-bearing age - or better - one who has reason to consider pregnancy as a likelihood should not be employed in hazardous lead trades. Such persons should not be excluded from certain occupations in which the lead exposure is regularly controlled so as to be well below the safe limits as defined for adults.

Something should be said also in your section on lead and other toxic materials about the women with small children. For example, the breast-fed child is subjected to the hazards of intoxication from absorbed materials that are secreted into the milk. Moreover, the woman who is caring for her child or children, and otherwise looking after her household while at home, is subject to fatigue, loss of sleep, and worry over ailing children, quite independent of her working hours in industry. I am not prepared to say how important these things are as factors in susceptibility to a variety of intoxications. There can be very little question, however, that these are matters that have to be taken into ac-

Dr. Anna M. Baetjer - (3) - December 6, 1944

count in dealing with a plant population in which there is any sizable number of married women.

I hope what I have said above will be helpful to you in some measure and I am certainly glad to be of any possible help. I shall be very much interested in seeing the results of your work if and when they are published.

I am returning your manuscript as you requested.

With kindest personal regards,

Sincerely yours,

Robert A. Kehoe, M. D.

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