

April 11, 1936

Mr. H. C. Rouster
207 West 11th Avenue
Columbus, Ohio

Dear Mr. Rouster:

Your letter of March 3rd addressed to the Medical College of the University of Cincinnati has been referred to me for reply in as much as this laboratory has been concerned for some years with the general problem of the lead exposure and lead absorption of the American population. Unfortunately we have not been much involved directly in the spray residue problem although it is undoubtedly one factor in the lead intake of the population. We are anticipating some precise studies on the seriousness of this question but we have no results at the moment which are worthy of your attention. However, I can tell you, I believe, what the general status of this question is and I can cite you to some of the literature on the subject which is worth your consideration.

In expressing the present problem in its most practical terms, I should like to point out that the Department of Pure Food and Drugs in the Department of Agriculture has established the permissible quantities of lead and arsenic which may occur on or in food materials in interstate commerce. The tolerance for lead is about 2-1/2 p.p.m. and that for arsenic is about 1 p.p.m. Any fruits or vegetables which are found by the agent of this department to be in excess of these tolerances in interstate commerce are condemned and destroyed. As to the tolerances themselves, they have been established as a result of the judgement of a group of experts who have definite opinions on this subject. Undoubtedly the best judgement of these men has been exercised in establishing the tolerances. Unfortunately, however, there is no present sound scientific basis for these tolerances. Judgement has been arrived at on the basis of indirect observations and on the basis of analogies from animal observations. We do not know precisely whether the tolerances should be lower than they are or whether they might with safety be considerably higher. On the other hand it is quite well known that many fruits, and particularly apples, as they are picked from the trees have on their surfaces quantities of lead and arsenic very much in excess of the tolerance. The quantities may be eight or ten times more than the tolerance permits. This means, of course, that these materials are destined for

interstate shipments, they must be cleaned to the level of the tolerance before they can be dispatched. The Federal Department maintains some supervision, and presumably most of this material which gets into interstate commerce is fairly adequately cleaned. The extent to which uncleared material may be used within the states depends upon the regulations and the enforcement of such regulations within the state. There is a very considerable lack of uniformity on this score, some of the states having rather effective programs, and some having none.

The extent of the actual danger to the community is conjectural. So far as I know no adequate clinical or experimental information has been obtained to indicate that the dangers in this respect are serious. Some investigators have reported vague cases which they presume to be the result of lead and arsenic absorption. A few cases have apparently been reported in which children have been made definitely ill, and acutely ill. On the whole, however, the evidence here is exceedingly scanty and unconvincing. To the best of my belief, persons who regularly ingest as much as 2 milligram of lead a day are likely to develop plumbism. It is easy to calculate how much lead would be ingested from eating an apple a day when the fruit has on its surface 3 or 4 times the tolerance. At the present tolerance, one apple represents about .4 mgs. of lead. It is apparent, therefore, that in the present state of our knowledge, there is good reason for regarding the tolerance level as not unreasonably low. Despite the difficulties associated with washing fruits, therefore, I am inclined to believe that there is nothing unreasonable in the demands of the Department of Agriculture. Obviously if they are to be mistaken at all, they should err on the side of safety. The mere fact that it is difficult for a fruit grower to follow these specifications at present is certainly no reason for subjecting a community to undue risks.

The opinion of the majority of persons who are supposed to be authorities on this subject is that the present tolerance for lead is too high. The Department authorities share this opinion, I believe, and they think eventually it will be decreased. They also think that the ideal thing is to eliminate lead arsenate as a spray material. Obviously until it has been shown beyond a doubt that it is entirely safe to ingest certain quantities of lead in excess of that which is inevitable from the natural lead content of food materials, the logical thing is to eliminate from the dietary all avoidable lead. I think here it is not safe to wait until clinical evidence has accumulated to show that lead poisoning is actually developing in the community as a consequence of spray residues. I am quite skeptical of there having been any considerable danger to the public health as the result of spray residues up to the present. On the other hand, I know that there has not been such thorough-going investigation on the subject as would enable us to say with certainty that there have not been numerous cases of mild poisoning. Thus until there is more adequate investigation

of the matter than has been carried out, and until there is more certain evidence of where the margin of safety is, and until this entire problem has been brought under such general regulation that wide variations in the lead content of fruit have been prevented, we must regard this as a potentially important problem. There is every justification, I believe, for the tolerances which have been established, and there is every justification for insistence on the part of the Federal government and the states that fruits which are in excess of the tolerance be adequately washed until they have been brought within the tolerance. There is now no adequate control and there is no adequate information on the present significance of this matter to the public health. I have my opinions on it, various other people have theirs, and the best that can be said is that all of these are only opinions based on inadequate and, for the most part, indirect evidence. There are a very large number of articles which I could cite from the literature but most of them have missed the main point, and few of them have any very direct relation to the question of the safety of the public health. A recent review of this question by W. A. Ruth of the University of Illinois presents fairly well both the point of view of the government and the point of view of the fruit growers. In general I consider this a fair statement of the situation and it cites some of the literature on the subject, among which I call particular attention to the second reference on the first page.

I have gone to some length to point out a number of facts which I consider of importance. I confess that I think the great need at the moment is not for more discussion of this subject but more investigation.

Very truly yours,

RAK:is

Robert A. Kehoe, M.D.