

April 28, 1971

Mr. Charles L. Goodacre, C.Eng.
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Dear Charles;

It is a pleasure to hear from you again, and to find that I can, perhaps, be of some help to you in the matter of lead in the present environment of man, and some of the potential risks which are associated with its presence in the quantities indicated.

First, let me say something about Henry Schroeder. He is not an apostle of doomsday, nor is he a rabble-rouser, but is rather a thoroughly respectable and fairly widely respected physiologist, who is convinced that lead derived from the combustion of alkyl lead compounds in gasoline is a source of danger to the American public and to other people in the world. He is not correct, in my opinion, as to his interpretation of the present situation, but he has amassed a considerable amount of information, which, when interpreted in the manner of his thinking, carries considerable weight. Among other things, he distrusts me, I believe, and while that is not the reason for his views, it helps him maintain them, I think. However, he regards himself, in this and in the consideration of other trace metals, as a competent expert, and I believe he thinks of me as one who is biased on the other side, and perhaps is not as competent an investigator and as much committed to the welfare of people as himself. This aspect of the matter is not of prime importance, but is, I think, a part of the picture. Perhaps, prestige is involved. I must insist, however, that he is a respected investigator, and that his ideas carry weight. I cannot, here, go into detail in a critical examination of his thesis, but I may say that this is not the only field of his investigations with which I find serious fault. I do not hold with the confident expert who strives to extend his expertise into a wide variety of fields, and I think that he has worked superficially in too many directions. I am careful, however, not to be critical in print except on a strictly factual basis, for, as I say, I am suspected all over the public area of being committed to defend the lead trades.

As to the problem itself, there are many things to be said. I have been working for some 6 or 8 years, in the course of other investigations of the behavior of lead in the human organism in an effort to determine the tolerable level of the concentration of lead in the air (as a source of absorption which must be considered on the background of the ingestion of lead in food and beverages and the absorption of lead from that source into the body). I shall not go into detail in the design of experiments to that end and the results which have been obtained. But let me disabuse you of one idea which you have believed to be involved in the matter. The level of 200 micrograms of lead per cubic meter of air (or that previously considered to be the safe level, namely, 150 micrograms per cubic meter of air) has nothing to do with the case. This is the standard which (whether 200 or 150 makes little difference), is accepted as the concentration which is to be maintained for safety's sake, in industrial workplaces in which lead compounds are being produced or handled.

This is a satisfactory standard for industrial engineers to achieve and maintain (with men under adequate medical supervision also) in connection with a 40-hour week of work and exposure to lead. In the ambient atmospheric environment in which we live in our cities, the exposure to airborne lead, while variable from one place to another, the concentration of lead may now average 1.0, 2.0 (or even more) micrograms of lead per cubic meter of air over the entire twenty-four hour period of every day of one's life. How far upward can this go and yet not endanger anyone? This is what I've been trying to learn. After a period of years of investigation, here, and with my full approval, the sponsors of this experimental program decided to support some work in a prison, in which members of the staff of the University of Albany had found it possible to subject a group of volunteer prisoners to the level of lead in air, which I had suggested for critical testing, for a bit more than 22 hours per day on 7 days per week over a period of months. The concentration investigated in this manner (which I had found it impossible to do, and hence had to depend upon extrapolation from an increasing period of exposure to a given concentration) was 10 micrograms per cubic meter of air. This turned out to be (as I feared) too high, in my opinion, and the experiment is to be repeated at half of that concentration. Now, what you can see from this, our own experimental program, is that the margin of safety in the present situation in New York, Los Angeles and certain other American cities, while sufficient at present (our highest average value in any city thus far is about 2.5 micrograms per cubic meter, and it seems reasonably certain that no one outside of industrial establishments is really subjected to even that degree of severity of exposure), is not enormous.

There is much more to the whole matter than what I have told you above, but it is evident that the industry must go very slow in its protestations of "nonsense!" to those who manifest some concern about this matter. There are things which can be done to head off any increase in the content of lead in the ambient air of American cities, and the industry, if it is to survive, must find means of seeing that these things are done. For one thing, some of the lead must either be taken out of the stream exhausted from the tailpipes of automobiles, or else the overall lead in gasoline must be reduced. A more useful thing, however, will be to relieve the congested motor traffic in our cities by providing facilities for mass transportation of the people to and from their schools, industries and other places of work in the heart of cities. This must be done anyhow, if the population is to be doubled, without changing its ways, in the next several decades.

The questions here in the United States are, however: What will the authorities do, and how rapidly will they move? It has been decided, I am told at this time, and will take effect, no doubt, unless something dramatic is done, that lead is to be phased out of gasoline, during the next 10 years, more or less, which will be required to get the present types of automobiles off the streets and highways. While the automobile manufacturers and the gasoline makers adapt their products gradually to meet the situation, the lead in gasoline will go down and down, until it has been eliminated. All of this is stated to occur, and it will come to pass, unless good reasons are found for changing present views of the situation. Actually, I am also told, on good authority, that next year's automobiles will decrease their compression ratios to require nothing higher than 90 octane gasoline. (There will be other changes in motors and gasoline, "to meet the requirements of the prevention of pollution.")

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This, I think, represents statements of "baloney" made to the public for public favor, but since engine design is not in my field of competence, I may be entirely wrong. However, there has been so much "baloney" on so many aspects of this matter, such as public statements and advertising, that I may be forgiven, perhaps, if I am profoundly skeptical.

What I have said in this letter may be the opposite of helpful to you. Accordingly, I am sending you a reprint of mine which states the truth as I now see it, concerning this matter. What I would like to see emerge from this situation is a sensible set of precautions against future possible dangers. Nothing dangerous has appeared on the scene as yet and nothing dangerous should be permitted to occur. The potentialities are apparent, and in my opinion, the means of prevention are available. I hope that we are mature enough and wise enough to learn to live within the ranges of safety which can be defined for this and a variety of other technological developments of our time. We have insisted, generally, on bringing about technical developments without knowing the side results of their exploitation. We must learn to do otherwise. The handling of atomic energy, while not perfect, is an example of how to proceed. So also, has been the handling, thus far, of lead-containing antiknock agents. I deplore our going off on an emotional binge in this matter, because if that is the best we can do, we shall never be able to cope with the problems of a technological society, nor shall we ever be able to surmount the economic difficulties of an uncontrolled multiplying of our population. We must, somehow, for our own survival, be capable of learning how to get along with suitable biological, as well as technological expertise. Otherwise we are destined to return to primitive life, which after all in the historical sense, is probably the only means for the survival of a few members of an essentially stupid society.

With kindest regards,

Sincerely yours,

Robert A. Kehoe, M.D.
Professor Emeritus of
Occupational Medicine

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