December 22, 1969

Professor James E. McDonald
Institute of Atmospheric Physics
The University of Arizona
Tucson, Arizona 85721

Dear Professor McDonald:

I hope you will have obtained some of the information which you desired from the reprints which my secretary sent to you in response to your letter of September 23. Having now returned home, and having looked after some of my more immediately demanding affairs, I can now respond to some of my neglected correspondence.

I assume, from your reference to the solubility of Pb_2O_3, in relation to that of the halides, that you are interested in the whole problem of lead in the air, and it occurs to me to call your attention to two points with which you may be familiar without my comments. (1) First, it is dubious that the solubility (in water) of very finely divided solids is the most important factor in their absorption in the lungs, and in their effects upon the pulmonary tissues. It is certainly not the sole factor. (2) Second, the lead halides which occur in the discharges from the tail-pipe of the automobile in relatively high concentration appear to be coated with something (oil, likely, and other debris) which alters their solubility in water appreciably; or perhaps they are altered in other ways. I don't know the cause of their relatively poor solubility, nor do I know whether this fact is of great importance, practically. (3) Third, I do know, from our experiments that the very finely divided sesquioxide (mean diameter of 0.05 micron) is readily absorbed (whether completely or incompletely, I cannot be sure); that considerably larger particles (mean diameter of 1 micron) are diverted, to a considerable extent into the alimentary tract (by the mechanisms of pulmonary clearance) and that the pulmonary absorption is much diminished (it is likely, from the data, that the larger particles retained in the lung are relatively poorly absorbed). The extent to which particle size is a factor in absorption (in situ) is being investigated further.

Aside from the foregoing considerations, there are other factors to be taken into account. I have proposed certain physiological criteria which I believe to be valid in connection with the establishment of a tolerable level of concentration (of lead) in the ambient atmosphere. We have carried out experiments in pursuit of a number, and I believe we are very near a definitive answer. I am studying carefully the data of two recent experiments - the second of these is now being brought to termination, and all of the data will soon be available.

Meanwhile, I send you two additional reprints, which I believe, will be of interest in relation to lead in the air.

Sincerely yours,

THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

INSTITUTE OF ATMOSPHERIC PHYSICS

September 23, 1969

Dr. Robert A. Kehoe
Kettering Laboratory
Department of Preventive Medicine
and Industrial Health
College of Medicine
University of Cincinnati
Cincinnati 19, Ohio

Dear Dr. Kehoe:

Would it be possible to obtain from you reprints of two of your past publications on environmental lead problems?

Your Harben Lectures, 1960, were published in a journal not held at our university library, and if you still have reprints of those Lectures, I would very much appreciate receiving a reference copy of them. Rpt'd'd 12-6-69

Your 1961 paper in *Pure and Applied Chemistry*, on lead inhalation, is also inaccessibile here. Might it be possible for you to send me a reprint of that paper?

I have read your papers in the 1964 Archives of Environmental Health, concerning a number of your studies. Your use of lead sesquioxide particulates in your inhalation studies raises a question in my mind. The indicated solubility of Pb_2O_3, in chemical handbooks, is so very much lower than that of lead halides, that I am interested to see (possibly in one of the two requested reprints) what evidence there is for rapid absorption of the sesquioxide.

Sincerely yours,

James E. McDonald

James E. McDonald
Professor

JEM/vlm

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