

September 6, 1939

Dr. A. G. Kammer
Medical Director
Inland Steel Company
East Chicago, Indiana

Dear Doctor Kammer:-

In response to your letter of August 8th, to which I have not replied because of my absence from the laboratory on a vacation, I am glad to authorize you to quote me on the stand of two milligrams per 10 cubic meters of air. If you will examine my report made to you on January 20th, you will see on Page 2, the following statement: "At present it can be said that the general consensus of opinion, as well as certain official and semi-official agencies, favors a permissible concentration somewhere between 1 milligram and 2 milligrams of finely particulate lead per 10 cubic meters of air. My experience has indicated that the higher figure, i.e. 2 milligrams per 10 cubic meters of air, is a safe one, regardless of the type and subdivision of the lead compound, provided general hygienic conditions are maintained in a satisfactory state in industrial plants, and provided medical supervision serves to eliminate the definitely unfit worker from the plant population". If you intend to quote me, I would suggest that you do so with the provisos which I have stated above. My reasons for this are that there are plants in which workmen are not properly advised against risks of lead ingestion, and in which rigid precautions are not taken against this supplemental means of lead absorption. I do not mean by this to indicate that I regard lead ingestion in and of itself as an important cause of industrial lead intoxication, but unless ingestion is prevented, it makes a significant contribution to the hazard which is provided by contaminated air.

I must regretfully point out that the statement which I made at the Northwestern University Medical School was in error. This statement was made in something of an aside and at the time it was made, I was laboring under the impression, since corrected, that Bloomfield's figures referred to the lead intake per day rather than the concentration of lead in the atmospheric air. Actually the article which I had in mind was not Bloomfield's but Leonard Greenberg's. The latter and his colleagues in a study of a storage battery plant came to the conclusion that the daily

inhalation of 1.45 milligrams of lead would not produce lead poisoning within a year, but might produce lead poisoning within a period of two and a half years. On the basis of Dr. Duckering's figure, this would be equivalent to approximately 3 milligrams per 10 cubic meters of air since Duckering took 5 cubic meters as the average amount of the respired air in a working day. Bloomfield called my attention to the error which I had made and cited his statement to the effect that 1.5 milligrams per 10 cubic meters was the threshold adopted by himself and his colleagues. Public Health Bulletin No. 205 entitled "Lead Poisoning in a Storage Plant" by Russell, Jones, Bloomfield, Britton and Thompson may be cited as evidence of Bloomfield's stand. I have looked through a number of Bloomfield's articles and this is the only place where I have found a definite statement to this effect. The statement will be found on Page 31. I regret very much the incorrect citation of Bloomfield but perhaps you will realize that there has been some confusion introduced into this matter by the various statements in the literature, some of which expresses the toxic level in terms of lead inhaled per day, and some in terms of the lead concentration in the atmosphere. The reference to Greenberg which I gave above will be found in Reprint No. 1299 - Public Health Reports - Volume 44 - July 12, 1929.

For a discussion of the inadequacies of the air sampling methods as a means of measuring occupational exposure, I refer you again to my report of January 20th. As you are well aware, I have never regarded analyses of air samples as an entirely satisfactory means of measuring occupational lead exposure. Obviously, therefore, I do not regard the threshold of toxicity in terms of air sampling as being clearly established for all types of lead exposure. This is no excuse for having misquoted Bloomfield but perhaps it is some slight justification for the avoidance of too hard and fast statements as the limits of toxicity in terms of air analyses.

Cordially yours,

RAK:ls

Robert A. Kehoe, M.D.

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