

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

July 18, 1946

DEPARTMENT OF CHEMISTRY
R. M. HIXON, HEAD

Dr. Robert A. Kehoe,
Kettering Laboratory of Applied
Physiology,
University of Cincinnati,
Cincinnati 19, Ohio.

Dear Dr. Kehoe:

Thanks very much for the information contained in your letter of July 16, 1946 concerning the use of sheet lead for decorative purposes.

With kind regards.

Sincerely yours,

Henry Gilman
Henry Gilman

HG:he

July 16, 1946

Dr. Henry Gilman,
Department of Chemistry,
Iowa State College,
Ames, Iowa.

Dear Dr. Gilman:

Dr. Calingaert has raised some questions of me in relation to your letter of July 2 to him, with its enclosure of certain items of correspondence. After a conversation with Calingaert we agreed that it would be advisable to write to you directly on certain aspects of the correspondence.

The comments in "Mrs. Munn's fan mail" are not astonishing in any way, but, in fact, represent the more or less usual reactions of uninformed people who attempt to deal with matters of this kind. The response is usually emotional and not factual, and argumentative rather than soberly critical.

The real problems in this situation have been covered in very large part by the advice given to Mrs. Munn by Dr. Calingaert and yourself. There is one aspect of it, however, to which, so far as I know, no reference was made, and which should receive some consideration. The use of metallic lead or lead compounds of any kind for decorative or other purposes within the household is fully justified under most circumstances. On the other hand, there is one precautionary principle that should always be borne in mind. Metallic lead or lead compounds which are distributed within the environment of small children are a potential source of hazard. This situation should be controlled with meticulous care. The difficulty here arises from the fact that small children get their hands into everything and then put them in their mouths. Moreover, everything that they can pick up and everything that they can reach is likely to be chewed or licked or otherwise introduced in part into the alimentary tract. It is not possible to teach a baby personal hygiene, and as a consequence of this fact, any risk which can be kept completely out of the small child's environment should be so handled. One can go into great detail to explain the various aspects of this problem and to describe the many situations that have been seen coincident with illness and sometimes with fatalities. However, I think I need only say again that the only cure for this situation is to see to it that the small child does not have lead compounds of any kind within his environment. Obviously this applies to household decorations, toys, play-pens, beds, high chairs, kitchen and table implements, and the like.

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The hazard of dealing with metallic lead otherwise, in the case of adults, is primarily a matter of the avoidance of dust or fumes. Thus if metallic lead is scraped, sand papered or otherwise fragmented mechanically, or if its oxidized surface is subjected to mechanical operations of any kind, finely divided metal is likely to be thrown into the air to be breathed by anyone who is near enough to do so. Whether or not trouble occurs will depend upon the concentration of these materials in the air and the length of time over which individuals are exposed. Obviously in work such as Mrs. Munn is performing, this hazard can be avoided completely. Another and less important hazard arises from the fact that the handling of metallic lead on which there is almost always a film of oxide or carbonate, results in the contamination of the skin of the hands by which means food, beverages and/or other materials that may be put into the mouth will be contaminated. This is, generally speaking, a rather insignificant hazard, but it is one that is readily avoided by any prudent or ordinarily cleanly individual. One need not fear lead absorption through the skin under these conditions, for the absorption of inorganic lead compounds through the skin is of theoretical interest, but of no practical importance. This, as you will recognize, is not true of tetraethyl lead, but that is quite another matter.

I think I should not close this discussion without pointing out that any process of operation that involves the application of heat to lead or its compounds increases the risk of inhalation very markedly. Welding, cutting with heat, soldering, melting operations, and all of such procedures, especially the application of any local heat in excess of 800°C. , results in the creation of lead fume, the inhalation and absorption of which represents the most serious type of hazard with which we have to deal in industry. In this connection the present standards for safe occupational lead exposure require that the lead concentration in the air breathed throughout the working day should not be permitted to exceed 1.5 mgs. Pb per 10 cubic meters of air. Actually it is advisable to see to it that the concentration does not reach this level at any time, but if such concentration is not exceeded, the occurrence of lead poisoning even after months of daily exposure is not to be expected.

Finally it is to be remembered in connection with exposure to lead compounds, that it is not possible to live on this earth without taking in and absorbing into the body measurable quantities of lead. This is no excuse for carelessness in the handling of this element and its compounds, but it does clearly indicate that lead compounds in order to be poisonous at all must gain entrance to the body in adequate concentration. The limits of such concentrations are well on the way to being accurately

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definable, and therefore there is no longer much excuse for the kind of unreasonable beliefs and statements that have hitherto characterized lay and sometimes medical discussion on this subject.

Sincerely yours,

Robert A. Kehoe, M. D.

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