

March 31, 1950

Dr. H. W. Elley,
Director, Technical Division,
Organic Chemicals Department,
E. I. Du Pont de Nemours and Co.,
Wilmington 98, Delaware.

Dear Doctor Elley:

I think it time to report to you on the progress of the investigation of the ultimate fate of inhaled lead which we are undertaking under the partial financial sponsorship of your Company.

The chamber has been erected and Mr. Roberts of our staff is engineering the accessory equipment, most of which is installed or available for installation. We had gone slowly and step-wise into the purchase and installation of equipment, since this type of situation has not been met before. One of the problems relates to the supply of particulate lead, which must be dealt with in a precise manner. Some weeks have been spent in creating a source of finely divided lead. I wish to introduce into the chamber the nearest approximation to lead in the exhaust of automobiles, and at the same time to avoid the use of an internal combustion engine. It now appears that the combustion of tetraethyl lead in an air stream led through a gas burner will give us what we want in the form of lead oxide, without other undesirable constituents. The uniformity of the oxide, with respect to rate of production, particle size and physical form (amorphous or crystalline) is an important matter, and it appears that we shall be able to get what we require. Other methods suggest themselves for obtaining other lead compounds in other states of subdivision, but we shall not try to deal with these, at least for the purpose of the first experiment, if the present methods prove to be satisfactory.

The problem of uniform mixing of lead-laden and uncontaminated air streams has apparently been solved satisfactorily, but perhaps I am optimistic. The removal of the particulate lead from the effluent air can be handled by electrostatic precipitation (2 Precipitrons in series). The uniform distribution of the mixed air throughout the chamber can be accomplished without serious difficulty, we believe.

The foregoing features of the experiment are those that provide the more serious difficulties in the establishment of adequately controlled experimental conditions. I have not ignored these difficulties previously, realizing that their adequate solution was the foundation of the work, but I have not made proper allowance for the time they would take, since I was thinking primarily of physiolo-

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gical rather than engineering factors. Some further time will be required to solve them completely.

Meanwhile we are not standing still. As a preliminary to the exposure of an experimental subject (or subjects) in the respiratory chamber, I had to find a suitable subject and make the basic observations on which the experimental work could be extended. One subject has been found and engaged. He will begin his work on the first of April. The completion of preliminary and control observations will require three to four months, and by that time provision for the technique of exposure in the chamber will have been made.

This may all seem deliberate and indeed slow of accomplishment, but it is necessary to be sure as we go, since otherwise part of a costly program of experimentation will be wasteful or perhaps even worthless. We cannot afford to make errors that will ruin the suitability of an experimental subject for long-term observations, since human subjects for work of this type are difficult to obtain and to keep. Moreover this work will require years to come to fruition, and therefore there is no good reason for rushing into an inept beginning. I have been compelled to wait for several years for the facilities with which to begin this work and I have been irked by the delay. I want no more lost time than that which is unavoidably associated with careful procedure.

Your visit to the Laboratory can be made at any mutually convenient time you may choose from now on. The nature of the experimental program can now be presented realistically, despite the fact that the subject will not be exposed to abnormal quantities of lead in the air, and the actual methods of procedure, aside from certain final details of the operation of the chamber, can be discussed in some detail. Open dates, with the exception of Saturday, April 8, are not available until Friday, April 14. I shall be here, however, on April 17, 18, 19, 20 and 21 (having certain classes on these days, I am sure to make no plans for being out of town). The week of April 23 is filled by an out-of-town meeting, but April 28 and May 1 and 2 are open. On the other hand if you prefer to wait until the chamber is operating, I'll let you know about this later.

Cordially yours,

Robert A. Kehoe, M. D.

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