

April 15, 1941

Mr. L. E. Ackerman
Assistant Purchasing Agent
Keystone Steel and Wire Company
Peoria, Illinois

Dear Mr. Ackerman:

A few days ago I saw one of the representatives of the Chicago office of Ethyl Gasoline Corporation, who showed me your two letters dated January 20th and March 15th respectively, in which you asked for information concerning the possible dangers of exposure to the exhaust gas of internal combustion engines operating on leaded gasoline. In view of the character of the question, I suggested that he leave the matter in my hands to write to you directly. Perhaps I should explain that in addition to being the Director of this laboratory, which has been concerned with the investigation of the hygienic problems arising from the use and distribution of leaded gasoline, as well as a number of other problems in industrial and public health, I am also the Chief Medical Advisor of the Ethyl Gasoline Corporation. This accounts for my offering to reply to your letters.

There is adequate evidence to indicate that the lead exposure involved in connection with the operation of gasoline motors using leaded gasoline, is an insignificant one. Numerous studies have been made, not only of the nature of the exhaust gas, but also on persons who have had the most prolonged and serious exposure over long periods of time. I am sending you herewith an article describing observations made in this field, and referring to other publications on this same subject. From this article you will see that no significant exposure to lead has been experienced, even by those who have had the greatest opportunities for exposure over the longest periods of time. Practically speaking, therefore, we have been unable to find any evidence that persons exposed to exhaust gases are running any risks in so far as their exposure to lead is concerned.

One may well ask why this is the case, since there is no doubt about the existence of lead compounds in the exhaust gas. First, let me

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point out that the exhaust gases from an internal combustion engine burning gasoline as a fuel, contain very large quantities of carbon monoxide. This is an acutely toxic material and, therefore, it must be disposed of at least to such an extent as will enable people in the vicinity to avoid serious consequences. The exhaust gas may contain as much as seven per cent of carbon monoxide, but is not possible for persons to endure exposure to concentrations greater than 0.03 per cent for more than short periods. Accordingly there must be this much dilution of the exhaust gas to permit even reasonable safety. If this is done, the lead compounds in the exhaust gas are so diluted as to be insignificant in their effects. Thus, so long as people are safe from undue exposure to carbon monoxide, they will suffer no ill effects from lead absorption. Another point in the factor of safety is that the lead which appears in the exhaust gas is only a portion of that which was in the gasoline, since considerable quantities of the lead are deposited within the exhaust system of the automobile. Under ordinary conditions this may be as much as seventy-five per cent of the available lead. Still another point is that the lead in the exhaust gas is so finely divided that it behaves essentially as a gas, and not only is it ordinarily diluted by the air currents, but it also tends to behave as a gas in the lungs and not to be deposited to the same extent as would other particulate lead compounds, such as lead dusts.

All in all, quite extensive observations have been made in the study of this problem over a period of years, not only by ourselves, but by others, including such governmental agencies as the United States Public Health Service, the United States Bureau of Mines, and the British Ministry of Health. No one has found any evidence of any danger to the public or to the more seriously exposed persons, such as employees of the type of your own. I think it is fair to assure you, therefore, that you need anticipate no difficulties in this connection.

It may be that you will have some additional questions on this subject. If so, I should be glad if you would let me have them, and I shall do my best to answer them.

Very truly yours,

RAH:ls

Robert A. Kehoe, M.D.