June 24,1939

Mr. H. McComb
Chief Chemist
The Youngstown Sheet and
Tube Company
East Chicago, Indiana

Dear Mr. McComb:-

I am already familiar with the problem raised in your letter of June 13th concerning the addition of lead to steels which are being manufactured for special uses. I have seen the operations in two of the plants in which such work is being done, and I can say that without any doubt there are serious hazards in connection with these operations. The concentrations of lead fumes which are thrown out into the air in the immediate vicinity of workmen, are quite high unless very elaborate precautionary measures are taken either to remove the lead from the atmosphere or to make use of masks in the most hazardous places. I should point out, in connection with this last statement, that the use of masks for this purpose is undesirable except, perhaps, as accessory to other measures of protection. There is also no doubt that the lead which escapes into the atmosphere near workmen will be breathed into the lungs and will be fairly effectively absorbed. The only factor of safety in connection with this work lies in the fact that it is intermittent and if the periods between exposure are sufficiently long, the hazards will be greatly diminished by this intermittence. The magnitude of the hazard in any instance will be determined by the extent of the pollution of the atmosphere and the frequency and duration of the exposure. If, therefore, these severe exposures are not prevented by the removal of the lead from the atmosphere, and if the demand for the product increases to the point where the time spent in making such steel represents a considerable proportion of the working time, then the hazards will indeed be quite serious. It is fair to say that serious potential hazards exist in the pouring of ingots, in operating rolling mills and in "scarfing". There are probably hazards beyond these points but so far as I know, there is no indication of their magnitude.

It would be exceedingly difficult to give any opinion with respect to the magnitude of the dangers in your plant without having fairly precise information as to the concentrations of lead which occur at different points in your plant as well as the details of the frequency and duration of exposure of various types of workmen. The hazard, however, is potentially serious and I see no way in which it can certainly be recognized and controlled except to carry out routine periodic and rather complete examinations of workmen who are exposed. Such examinations in my opinion should be comprehensive with the idea of establishing precise data, departures from which could be recognized as time goes on. Certain laboratory procedures will also be necessary. I should consider it desirable to have a count made on each exposed person of the erythrocytes, the leucocytes, the various types of leucocytes and the number of erythrocytes which show basophilic reactions. The haemoglobin should also be determined. Each man should have a urinalysis in which at least the reaction of the urine, the presence or absence of albumin and sugar should be determined. With respect to basocphilic changes, some workers prefer to use McCords so-called Basophilic Aggregation Test. In our hands the study of properly made blood smears in which stippled erythrocytes are counted, is quite as satisfactory as any other test.

In addition to the above measures, it will be necessary, I believe, to have comprehensive data on the lead content of the atmosphere of all potentially exposed parts of the plant, and at such intervals as will permit one to recognize the magnitude of the contamination under all conditions. In certain other instances we have also suggested the advisability of studying the lead excretion of a small group of the most severely exposed workmen, in order to determine just how much lead exposure they have had up to the present time as a base line for the recognition of subsequent exposure.

I trust this will give you a general idea of my point of view on this matter. I may say that in my opinion this new project in the steel industry is one which should be looked at somewhat apprehensively in view of the fact that the risks of lead exposure will not necessarily be confined to manufacturing plants, but may be disseminated into the entire field of the uses of this leaded steel. I am not convinced that the dangers here are serious. On the other hand I am not at all certain that they will not be, and it is my feeling that these matters should be investigated rather carefully before the industry as a whole goes too far in the de-

velopment of wide uses of this type of metal.

Very truly yours,

RAK:is

Robert A. Kehoe, M.D.