Kehoe MSS
Box 99

ESSO RESEARCH AND ENGINEERING COMPANY

(FORMERLY STANDARD OIL DEVELOPMENT COMPANY)

P. O. Box 45, Linden, N. J.

MEDICAL RESEARCH DIVISION

TELEPHONE: WABASH 5-1600

January 8, 1962

Dr. Robert A. Kehoe
Kettering Laboratory
University of Cincinnati
College of Medicine
Eden Avenue
Cincinnati 19, Ohio

Dear Dr. Kehoe:

We have had an inquiry from our Texas affiliate about the sensitivity of cattle to lead and other heavy metals that might be used as pigments in paint. Apparently, several claims have been received by them, suggesting that cattle have been harmed by licking fences and other farm equipment painted with paint which contain these materials. I am wondering if you have any information on the sensitivity of cattle to lead and other heavy metals, and whether there is any information concerning the excretion of lead and other heavy metals by cattle which might be useful in diagnostic work with cattle that are claimed to have been made sick by the ingestion of pigments from various painted objects. Any help or assistance that you might be able to provide in this direction, would be very greatly appreciated.

Sincerely yours,

R. E. Eckardt

R. E. ECKARDT, M. D.,
Director

Rehe 488
Box 99

January 12, 1962

R. E. Eckardt, M.D., Director
Esso Research and Engineering Company
Medical Research Division
P.O. Box 45
Linden, N.J.

Dear Eckardt:

In the matter of lead intoxication in cattle there is not as much information as might be desired. The information with respect to the pattern of the toxic response, which would be useful in the recognition of such illness is especially scanty. It appears that these animals do not suffer from a form of intoxication similar to that of man. While this is not remarkable in view of the fact that few of our laboratory animals develop the so called chronic type of lead poisoning, it is not certain that this is not an expression of faulty observation with respect to the course of the disease. There is little doubt, however, that farm animals including cattle have sickened, refused to eat, lost weight and sometimes have died. The diagnosis has been made on presumptive evidence, as a occasionally rule, supplemented by analytical data derived principally from the tissues after death. There are few reliable data from which one could make a sound judgment as to the meaning of the concentration found in specific organs or in the tissues generally. No doubt the facts could be established in such a way as to provide satisfactory evidence of this type, but so far as I know this has not been done.

Feeding experiments have been carried out with calves and adult cattle in such a manner as to define roughly the ranges of oral dosage (rates of ingestion) which are compatible with freedom from illness (or at least with survival) or production of fatal intoxication. I attach a few notations which I assembled recently from a hasty examination of some of the published observations in response to a question which came from another source. I am not in position to say that this is the best information which is available from any source. However, a fairly comprehensive review of the literature by one of the members of our staff only a few years ago failed to turn up any more definitive evidence than this.

In considering the problem of the ingestion of toxic substances by cattle and other ruminants, one must reckon with the fact that

alimentary absorption is greatly facilitated by the prolongation of the period required to traverse the alimentary tract, and by the almost complete disintegration of the cellulose constituents in the diet.

As to the rate of excretion of metallic compounds by cattle in relation to toxic levels of dosage, there is no useful information, so far as I know. Therefore little purpose would be served by the collection and analysis of urine, unless one were prepared to gather data under varied conditions, to establish, or at least to suggest, their significance. Analyses of the tissues of deceased animals would be somewhat more useful if the results were widely divergent from the "normal" range of the finding in the tissues of various other species of animals, the lead content of bones (such as the rib which is readily obtainable) and liver, would be especially revealing. No doubt, blood obtained by venepuncture would be the best source of information concerning the status of living cattle.

Sincerely yours,

Robert A. Kehoe, M. D.

RAK:ss

Note Memorandum "on The Toxicity of Lead in Food & Water for Cattle" — enclosed with this letter. (A copy of this memorandum is filed in "Price Battery Corporation" file.)