

July 31, 1958

Professor V. G. Heller
Department of Biochemistry
Division of Agriculture
Oklahoma State University
Stillwater, Oklahoma

Dear Professor Heller:.

My reply to your last letter is tardy, because of my preoccupation with various duties that have interfered with my correspondence, but I trust it may be helpful.

With reference to the lead and arsenic content of the water as listed, I am presuming that the results are expressed in parts per million, i.e. milligrams per liter of water. If this is not the case, I may be entirely in error. On this assumption the water is not dangerous from the aspect of acute poisoning, and while it is certainly too high for prolonged or indefinite periods of use, it is not to be regarded as very dangerous for intermittent use or for comparatively short periods of time.

I base this opinion, with respect to lead on experiments which we have carried out on human subjects. The administration of 3 mg. of lead per day as a soluble salt, in addition to the lead present incidentally in the diet, under carefully controlled balance experiments, resulted in a striking increase in the rate of excretion of lead and also in an accumulation of lead in the body. Within the period of six months, this accumulation did not occur to a dangerous extent, but it would have become dangerous at some point much later. The leeway in terms of time was considerable, but, naturally, the experiment was not continued to the point of danger. This level of intake in the human being is equivalent to the consumption daily of a liter of water containing lead at the level of 3 mg. per liter. I am not in position to say that cattle can take a proportionately large quantity of water of comparable lead concentration with safety, but I would hazard the opinion that they probably could. I think it likely, therefore, that this, the situation which you describe, would not be very dangerous, from the aspect of lead, unless this were the only source of drinking water throughout the entire year, season after season.

In view of the relative ease of the excretion of arsenic, I doubt very much if the concentration of arsenic which you have indicated would be dangerous under conditions similar to those referred to above in my comments on lead.

Professor V. G. Heller - (2) - July 31, 1958

I repeat that I cannot be sure of my ground because of my lack of experience with domestic animals, but the evidence of animal experimentation provides some basis for a generalization concerning the behavior of lead in the bodies of animals, and it would be my best and somewhat educated guess that what I have said is not far from the truth.

In any case, I give you my opinion for what it may be worth.

Sincerely yours,

Robert A. Kehoe, M.D.

RAK ef