Unexplained Death of 12 Calves In Oregon — March 2000

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On March 18, 2000, the carcasses of four calves of different ages were discovered by a rancher in a remote deserted area of Milican Valley, northwest of Brothers, Oregon, a couple of miles north of Highway # 20 going to Bend, Oregon (see Photo 1).

Photo 1. Deserted area where the mutilated calves were discovered

The Deschutes County Society Sheriff's Office and the Humane Society of Bend were called to investigate the case. The next day eight more dead calves were found in the same area, by a recreational vehicle user, about a half a mile farther north.

Kimball Lewis, the executive director of the Humane Society, who examined the carcasses, reported that they were scattered in pairs about a quarter mile apart. Of the twelve animals, eight were found partially skinned and their reproductive organs were missing (Photos 2, 3).

Photo 2. Two carcasses, one partially skinned, found close to each other

No vehicle tracks, footprints or blood were detected in the proximity.

Although the area is populated by a large number of coyotes, other wild predators and different species of birds, according to Kimball Lewis and a local veterinarian the carcasses were not touched. Some of the carcasses seemed to be over a week old, but were not disturbed. Endeavors to track down the owners of the dead calves were not successful. To date (April 20, 2000) nobody has come forward to claim the losses or to report their animals missing.

Two of these calves were also necropsied by a local veterinarian, who found their skin removed from just behind their front shoulders, down to the ankles (Photos 3, 4, 5). The hide on the head and neck was intact (Photo 3). No signs of jugular puncture or venisection were found. The veterinarian noticed an unusually low level of blood in the tissues, including in the heart vessels and cavities. The stomach contents indicated that the animals had been nursing. This allowed the conclusion that they were not stillborn. According to the veterinarian's findings the calves were dead before they were skinned. She collected two tissue samples (heart and lung)

Photo 3. Partially skinned carcass

from one of the necropsied calves and submitted them in 10% formadehyde solution to the Institute for Discovery Science, in Las Vegas, for further lab examination.

National Institute for Discovery Science (NIDS) staff interviewed both Mr. Kimball Lewis and the veterinarian regarding the animals and the circumstances in which they were found and necropsied. The microscopic examination of the submitted tissues by the NIDS veterinarian confirmed that the amount of blood in the capillaries and the larger vessels in the heart and lung was diminished compared to normal situations.

Histological examination

Microscopic examination of tissue sections prepared from heart showed a mild thickening of the epicardium, with few mononuclear inflammatory cell infiltration in the stroma. The sections from lung displayed a mild thickening of the pleura, with few mononuclear inflammatory cells infiltrating the stroma. Based on these mild pathologic changes it can be assumed that they were not the cause of the death of the animal.

Photo 4. Front legs partially skinned

Photo 5. Rear legs completely skinned

Elemental analysis

The purpose of the elemental analysis of the tissues was to rule out mineral deficiencies as a cause of death as well as to detect any evidence of extraneous added materials that might have contributed to death.

Because it is unusual for a veterinary lab to conduct elemental analysis on (a) cattle heart and lung tissue (as opposed to liver or kidney) and (b) tissues preserved in formalin, it was necessary for NIDS to include the following experimental controls and procedures in the ICPMS analysis:

1. For comparison purposes heart and lung tissue from a randomly chosen control bovine were analyzed by ICPMS.
2. The formalin (18 ml) in which the heart and lung tissue from Oregon had been shipped was separately analyzed by ICPMS.
3. A fresh sample of formalin from the same bottle used by the veterinarian in Oregon, was independently analyzed by ICPMS.
4. The elemental concentrations found in the tissues from Oregon were adjusted for the concentrations in fresh formalin, as well as for the elemental concentrations found in the formalin in which the heart and lung tissues had been stored. The corrected heart and lung elemental concentrations were judged to be a more accurate estimate of the elemental concentrations in the original tissues from Oregon, prior to them being placed in formalin by the veterinarian. These corrected elemental concentrations are shown in Tables 1 and 2 alongside the concentrations from the normal control animal.

The results show that when compared with the control tissues, *no* major differences in elements were found between the control tissues and the tissues from Oregon. The differences in potassium levels between the lung from Oregon and the control lung are not considered abnormal because the large quantities of intracellular potassium that leak into the tissues at death do so at different rates, depending on how the animal died. Interpretation of post-mortem potassium levels is notoriously difficult. We were especially interested in examining the levels of copper in heart and lung from the Oregon animal because of the trend in previous NIDS work showing low copper levels in liver from “mutilated” animals. No evidence of low copper was

found in the heart or lung from the Oregon. However, the following caveats need to be inserted regarding this analysis:

a. The mode of copper storage in liver is completely different from that in heart or lung. The main storage protein for copper in the liver is metallothionein. In the heart, the main source of copper (we surmise) was probably arterial or venous blood, in which case the copper binding protein was Ceruloplasmin. The liver is a much more accurate index of copper status in an animal than is the heart, so definitive statements about the copper levels in the animal from Oregon are difficult to make without having a sample from the animal's liver.

b. We found no major differences in heart and lung mineral levels between control animals and those from Oregon. Although we were able to assess the mineral status of heart tissue and lung tissue from a control animal in a direct comparison with the tissues from Oregon, such a comparison is difficult to make without obtaining data from up to a dozen animals and obtaining mean values for comparison. This, we did not do.

c. Although trace element values for liver, kidney and blood in cattle are readily available in the peer reviewed literature, normal multi-element values for cattle heart and lung are rare and not widely replicated. A search of Agricola, Medline, USDA and AVMA databases yielded very few publications on this topic. This adds to the difficulty in making interpretations of the data we found. In fact, it could be said that the mineral levels in this NIDS report for heart and lung in cattle are among the most comprehensive ever published.

In summary, the unusual features of this case were: the animals were skinned, reproductive organs were removed, the carcasses were not attacked by predators, scavengers or birds, and low levels of blood in the organs were confirmed by two veterinarians. The case remains open until the owners of the animals are found and more data are available.

Table # 1. Concentration of different elements in bovine heart tissue (ppm)

Samples Element	Bovine Formalinized Heart ppm	Bovine Normal Heart ppm
Ag	0.001	0.002
Al	1.095	0.449
As	0.007	0.028
B	<0.001	0.096
Ba	0.074	0.013
Be	0.002	<0.001
Ca	112.969	51.537
Cd	0.002	0.003
Co	0.005	0.004
Cr	0.177	0.25
Cu	2.309	3.43
Fe	42.1	36.256
K	3004.38	3592.82
Li	0.009	0.033
Mg	213.87	234.491
Mn	0.143	0.126
Mo	0.014	0.057
Na	615.225	584.571
Ni	<0.001	<0.001
P	2091	2676.019
Pb	0.005	0.003
Sb	0.012	0.07
Se	0.112	0.24
Si	23.973	26.044
Sn	0.002	0.004
Sr	0.075	0.057
Tl	0.001	0.002
V	0.02	0.035
Zn	15.135	20.233

Table # 2. Concentration of different elements in bovine lung tissue (ppm)

Samples Element	Bovine Formalinized Lung ppm	Bovine Normal Lung ppm
Ag	0.001	0.001
Al	0.0365	1.658
As	0.019	0.022
B	0.126	0.02
Ba	0.012	0.019
Be	<0.001	<0.001
Ca	156.527	76.153
Cd	0.001	0.001
Co	0.003	0.005
Cr	0.33	0.474
Cu	1.157	1.61
Fe	94.376	108.438
K	1229.103	2987.47
Li	0.012	0.023
Mg	77.104	150.211
Mn	0.043	0.121
Mo	0.053	0.231
Na	1520.248	1046.796
Ni	0.007	<0.001
P	2464.955	2734.892
Pb	0.009	0.017
Sb	0.01	0.026
Se	0.058	0.312
Si	31.801	22.628
Sn	0.001	0.003
Sr	0.062	0.094
Tl	<0.001	0.001
V	0.018	0.078
Zn	7.494	17.574