FATAL POISONING OF A FOX SNAKE (Elaphe vulpina) BY FEEDING A TOAD (Bufo americanus)

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were indistinguishable from the polar granules.

The sporocysts measure 13 to 17 by 8 to 11 (15.2 by 9.1). Stieda bodies are present. Two sporocyst residual bodies occur on opposite sides of each sporocyst. Each body is round or ellipsoidal in side view; in end view it appears triangular in shape, with one convex outer margin, and two concave inner margins, which are adjacent to the two sporozoites. One residuum is usually situated near the middle of the sporocyst, whereas the other is displaced toward one end. In side view, the granules of each residuum appear loosely packed, especially in the central area of the body.

The sporozoites lie lengthwise in the sporocysts. Two refractile bodies are present in each sporozoite. The posterior body is round or ellipsoidal and is about twice as large as the round anterior body. The nucleus is located between the two refractile bodies.

Huizinga (1942, J. Parasit. 28: 167-168) did not describe a Stieda body, sporocyst residuum, refractile body or polar granule in the oocysts of *E. antelocaprae*. He reported oocyst residual material to be present only as a few irregularly shaped granules. Possibly the oocysts he examined had been sporulated for some time so that the oocyst residuum had disintegrated into the irregularly shaped particles that we observed.

Three oocysts of a different species of *Eimeria* were present in the sample of one animal from the National Bison Range. These oocysts were ovoid, measuring 34 to 35 by 17 to 20 microns. A granular oocyst residuum, 2 to 4 microns, in diameter was present. No polar granule was observed. The oocyst wall was about 2.5 microns thick and composed of two layers, the outer of which was rough. A distinct micropyle 3 to 4 microns in diameter was present. The micropyle was surrounded by a collar-like thickening of the outer wall. The sporocysts were 12 to 14 by 5 to 7 microns in diameter. A Steida body and sporocyst residuum were present. These oocysts were not observed before sporulation. Additional information concerning this form must be obtained before a conclusion can be reached as to whether it represents a new species from the antelope.

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FATAL POISONING OF A FOX SNAKE (Elaphe vulpina) BY FEEDING A TOAD (Bufo americanus)

An apparently healthy fox snake, 55 inches long, which refused food after being brought into captivity, was force-fed a live medium-sized common toad. Within two minutes after the toad was swallowed, the snake showed signs of discomfort and the live toad was ejected. This was followed by violent writhing and threshing about of the anterior parts of the snake's body and repeateded opening and closing of the mouth. This activity subsided within fifteen minutes. The animal's behaviour was interpreted as merely a temporary reaction to irritating properties of the toad's skin glands. Observation was discontinued. When its cage was checked six hours later, the snake was found dead.

Necropsy revealed that the lung was collapsed; the ventral thoracic wall was drawn into the rib cage to form a marked concavity. Lung tissues were congested and edematous. Petechial hemorrhages were scattered over the serosal surface of the stomach. The kidneys were congested. Histologic examination confirmed the gross findings.

Death of the snake was interpreted as the direct result of absorption through the mucous membranes of the mouth, esophagus, and stomach, of toxic secretions from skin glands of the toad. Absorption of a fatal dose of poison within two minutes attests to the potency of the toxin. It is of interest that the common toad is a preferred item of diet for the hognosed snake (*Heterodon platyrhynos*).

Schrietmuller and Lederer report poisoning of snakes by ingestion of the common European toad (*Bufo bufo*). (Schreitmuller, W. and Lederer, G., 1930. Krankheitserscheinungen bei Fischen, Reptilien and Lurchen. Wenzel. Berlin. : Cited by Reichenbach-Klinke, H. and Elkan, E. 1965. The principal diseases of lower vertebrates. Academic Press. New York. p. 527).

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AN ATTEMPT TO ISOLATE VIRUSES FROM LUNG TISSUE AND LUNG NEMATODES OF BIGHORN SHEEP

The reduction of populations of Rocky Mountain bighorn sheep (*Ovis c. canadensis*) has been documented and discussed by many authors (Hunter and Pillmore, 1954, Trans. No. Am. Wildl. Conf. 19: 117-129; Buechner, 1960, Wildlife Monographs 4: 94-110; Forrester and Senger, 1963, Mont. Wildlife, April: 2-7). Various disease conditions have been implicated as causes of this decline, but respiratory infections appear to be particularly important (Pillmore, 1958, Trans. Desert Bighorn Sheep Council: 57-63).

In recent years a lungworm-pneumonia complex has been suggested as a possible regulatory factor in populations of bighorn sheep (Buechner, *op. cit.*). The lung nematodes *Protostrongylus stilesi* and *P. rushi* are commonly associated with this complex (Buechner, *op. cit.*; Forrester and Senger, 1964, J. Wildl. Mgt. 28: 481-491), but the epizootic nature of the die-offs suggests that bacteria or viruses may be involved as well (Hunter and Pillmore, *op. cit.;* Pillmore, *op. cit.*). Marsh (1938, J. Mammal. 19: 214-219) and Post (1962, Wildl. Dis. 23: 1-14) have reported on bacteriologic studies of infections caused by *Pasteurella* and *Corynebacterium* spp. in bighorn sheep, and recently Howe *et al.* (1966, Bull. Wildl. Dis. Assoc. 2: 34-37) have published the first report on virologic studies. In the latter study significant antibody titers to bovine myxovirus parainfluenza-3 (PI-3) were found in sera from bighorn sheep in Wyoming and Montana, but no viral agents were isolated from nasal swabs and lung tissue cultured on bovine embryonic kidney (BEK) cell cultures.

The present study was undertaken in an attempt to isolate PI-3 viruses and/or other respiratory viruses from lung tissue and adult lungworms of apparently normal bighorn sheep in western Montana where pneumonia-like diseases are known to occur (Marsh, *op. cit.*).

The lungs of 22 adult male bighorn sheep which were killed by hunters during October and November of 1965 were collected by personnel of the Montana Fish and Game Department. Each lung was packaged individually and kept frozen until examined. The majority of the lungs (19) were from the Sun River herd; one lung was collected from the Kootenai Falls herd and two were taken from the Ural-Tweed herd (Fig. 1). Table 1 shows the number of lungs and the types of samples that were tested for virus. The lungs were shipped in frozen condition to California and kept in a mechanical freezer at -20°C until thawed and examined during January, February and March, 1966.

Lung tissue was cultured on BEK cell