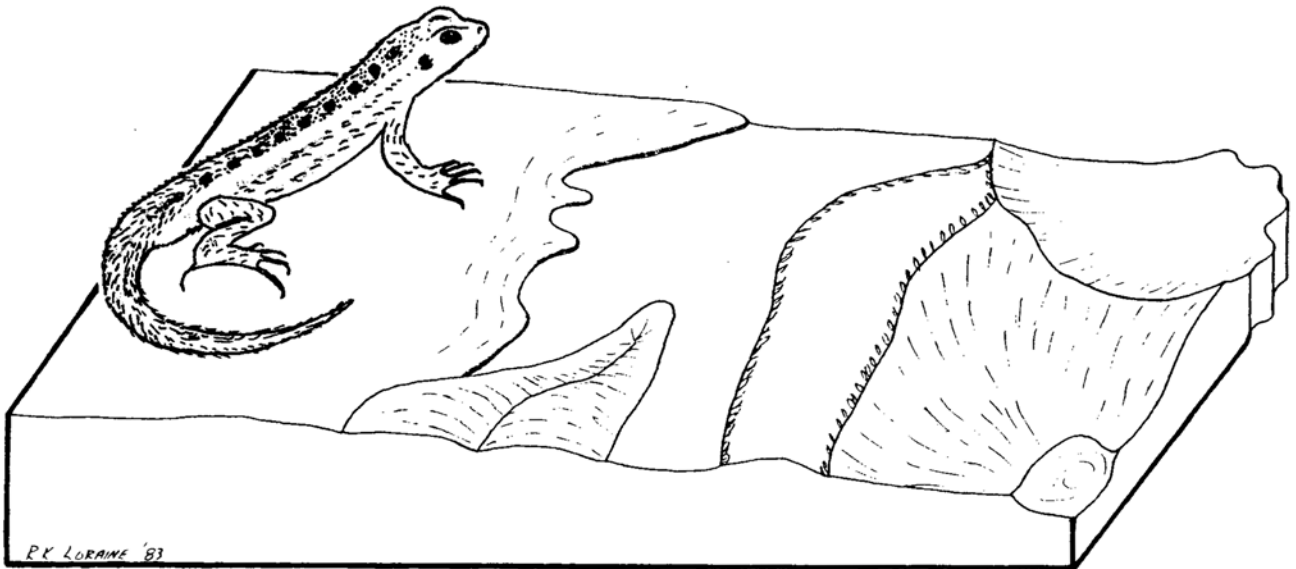


Kansas Herpetological Society



Newsletter

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Mike Coker — Topeka Zoo
Eddie Stegall — Sedgwick County Zoo

The illustration on the front cover was drawn by Raymond K. Loraine, and depicts the physiographic provinces of Kansas, with a fence lizard astride the High Plains.

1983 KHS MEETING AND ONE MORE FIELD TRIP

Field Trip 16-18 September, Bourbon County State Lake
Host: Larry Miller (316) 845-2680

10th Anniversary Annual Meeting 12-13 November
Museum of Natural History, University of Kansas
Host: Joseph T. Collins (913) 864-4920

This two-day extravaganza should not be missed. A variety of interesting speakers, stunning color slides, and exciting coffee breaks are planned. Attendance is mandatory for all KHS members.

FIRST KHS FIELD TRIP OF 1983 A SUCCESS

Only 7 KHS members appeared at Toronto Reservoir in Woodson County April 29-30 for the first 1983 KHS field trip. However, this did not dampen their determination, and 7 new county records were collected on Saturday.

The first members arrived on Friday evening, the last of them finding their way there after dark. Saturday morning, after all present were awake and coherent, the group went to a nearby grocery store/cafe (known as "Hilltop") and enjoyed a hearty breakfast. Leaving there, we trekked back across to the east side of the lake to a site where there is a huge layout of sandstone rock outcroppings. We collected and observed the following herps at this outcrop:

Prairie Kingsnake, Lampropeltis calligaster calligaster
Red Milksnake, Lampropeltis triangulum sypila
Eastern Yellowbelly Racer, Coluber constrictor flaviventris
Lined Snake, Tropidoclonion lineatum
Western Worm Snake, Carphophis vermis
Prairie Ringneck Snake, Diadophis punctatus arnyi

Great Plains Skink, Eumeces obsoletus
Five Lined Skink, Eumeces fasciatus

Northern Snapping Turtle, Chelydra serpentina serpentina
Ornate Box Turtle, Terrapene ornata ornata
American Toad, Bufo americanus

After leaving the east side of the lake, we returned to the west side again, where Kelly Irwin secured the only new Woodson County record, an Eastern Collared Lizard, Crotaphytus collaris collaris. By this time, we were all feeling thirsty and hungry so we headed south to

stop and refuel at Rosy's Acres, in north Wilson County. Everything went fine at Rosy's, except that Joe, Kelly and Larry were forced to endure an extended waiting period for their sandwiches.

Leaving Rosy's at 1:30 p.m., the group followed John Fraser into Elk County, where 6 new records were obtained. These were:

Speckled Kingsnake, Lampropeltis getulus holbrooki
Red-sided Garter Snake, Thamnophis sirtalis parietalis
Great Plains Rat Snake, Elaphe guttata emoryi
Lined Snake, Tropidoclonion lineatum

Spotted Chorus Frog, Pseudacris clarkii
Plains Narrow-mouthed Frog, Gastrophryne olivacea

In addition to these species, the following were observed in Elk County:

Flat-headed Snake, Tantilla gracilis
Prairie Ringneck Snake, Diadophis punctatus arnyi
Eastern Coachwhip, Masticophis flagellum flagellum
Black Rat Snake, Elaphe obsoleta

Great Plains Skink, Eumeces obsoletus
Prairie Lined Racerunner, Cnemidophorus sexlineatus viridis

Eastern Ornate Box Turtle, Terrapene ornata ornata
Three Toed Box Turtle, Terrapene carolina triunguis

American Toad, Bufo americanus

When we quit lifting rocks in Elk County, it was 4:30 p.m. Everyone went back to Toronto Reservoir, where we all disbanded for home. Although during both days the skies were completely cloudy and rain appeared imminent, the weather graciously held and we were all thankful for that. It was a short, but very interesting two days.

--John Fraser, Scoutmaster
Fredonia, Kansas

1983 JOINT ANNUAL SSAR/HL MEETING

Salt Lake City, Utah, is to be the site of this years joint meeting of the Society for the Study of Amphibians and Reptiles and the Herpetologists' League. The meeting will be from 7-12 August, if Salt Lake City has not been washed away by flood waters. Plans for the

meeting include a Distinguished Herpetologists' Lecture by Dr. Roger Conant, a Regional Herpetological Societies session, and a symposium in honor of Dr. Hobart and Rosella Smith, entitled "Biogeography of the Herpetofauna of Mexico: Perspectives and Approaches."

Registration is \$32 for real people, \$20 for students. Lodging on the University of Utah campus is \$10-\$17 per night. For further details or registration forms, contact:

Dr. John M. Legler
Department of Biology
University of Utah
Salt Lake City, Utah 84112
Phone (801) 581-6609

CHIKASKIA RIVER WILDLIFE STUDY

At noon on Friday, 13 May 1983, the apprehensive organizers of the 7th annual Chikaskia River Wildlife Study set out to locate a site for the camp. Taking into consideration the weather leading up to the weekend, a location high above the river was chosen, with an abundance of trees for protection from the wind and a buffer for the rain that was sure to come.

However, a few miscalculations were made at the time.

Friday night gave us more than an inch of rain, Saturday brought us winds gusting up to 35 miles per hour from the north and temperatures in the lower 40s, most of which we were not prepared for.

Several times during the weekend you could find people seeking the safety and comfort of their homes, only to return to the camp and those who remained when the weather had calmed some.

Those who (for whatever reason) stuck it out Saturday night were richly rewarded Sunday morning when, half-way through the third cup of much needed coffee, the sun appeared and warmed both wildlife and those who came to see it.

The hardy little group of forty-plus were quite successful in locating and identifying a large number of amphibians and reptiles, and observing an ample amount of other wildlife.

The following is a list of amphibians and reptiles collected in Sumner County, Kansas, during the 7th Annual Chikaskia River Wildlife Study, May 13-15:

Smallmouth Salamander, Ambystoma texanum
Tiger Salamander, Ambystoma tigrinum

Plains Spadefoot, Scaphiopus bombifrons
Great Plains Toad, Bufo cognatus
Woodhouse's Toad, Bufo woodhousii
Banchard's Cricket Frog, Acris crepitans blanchardi
Spotted Chorus Frog, Pseudacris clarki
Plains Leopard Frog, Rana blairi

Bullfrog, Rana catesbeiana

Ornate Box Turtle, Terrapene ornata ornata

Ouachita Map Turtle, Graptemys pseudogeographica ouachitensis

Lesser Earless Lizard, Holbrookia maculata

Eastern Fence Lizard, Sceloporus undulatus

Prairie Skink, Eumeces septentrionalis

Prairie-lined Racerunner, Cnemidophorus sexlineatus viridis

Prairie Ringneck Snake, Diadophis punctatus arnyi

Plains Blackhead Snake, Tantilla nigriceps nigriceps

Coachwhip, Masticophis flagellum

Ground Snake, Sonora semiannulata

Texas Brown Snake, Storeria dekayi texana

We wish to thank Mr. and Mrs. Freeman Dillard, Marla, and Vikki for their hospitality and the use of their land.

Tentative plans are in the making for the 8th Annual Chikaskia River Wildlife Study the second weekend in May, 1984.

--Gene Trott

RR#1, Box 11

South Haven, Kansas 67140

SSAR ANNOUNCES NEW TURTLE BOOK

The SSAR has a special, pre-publication offer available for an outstanding new book, Turtles of Venezuela, due to be published early this fall.

In about 350 pages, with 34 maps and 48 full-page color plates, this book covers half of the species of turtles found on the South American continent. This includes 11 side-necks, 6 tortoises, pond, and land turtles, and 5 sea turtles. Written by the renown Peter C.H. Pritchard and Pedro Trebbau, the book has excellent watercolors by Giorgio Voltolina. The text includes descriptions of two new forms of turtles, a discussion of the zoogeography of South American turtles, keys in both English and Spanish, and information on size and growth, distribution, habitat, feeding, reproduction, economic importance, common names, etc. There are a total of 26 watercolors and 160 photographs included.

Until 1 September 1983, this volume will be available to SSAR members for only \$35 (clothbound). After this date, the price will be \$45. It may be ordered from:

Dr. Douglas H. Taylor
Department of Zoology
Miami University
Oxford, Ohio 45056

Make checks payable to "SSAR". The price includes postage.

KHS BRINGS YOU NEWS OF THE WORLD AND BEYOND

Diligence Pays Off For Frog-Hunting Explorers

The dozen hearty explorers trudged through swampy ditches in search of their elusive game.

They were combing the land for slippery amphibians--as many as they could find.

At the Natural History Museum's "Friday Frog Frolic," a group of children and a few adults braved Friday's wet weather to go to various sites around Lawrence on a nighttime hunt for frogs, salamanders and toads.

Eric Rundquist, who leads some of the museum's programs, and David Hillis, a Baltimore graduate student, taught the group, who were mostly eight to 15-year-olds--and mostly males--how to identify different species by their calls and their appearance.

As a bus carried the group to rural areas, Rundquist and Hillis described various kinds of frogs and imitated calls.

Some of the children repeated the imitations, while others asked whether they could keep the animals they captured.

"If I could find one of these, I could freak out my poor mother," one participant said.

Another said that he had been fish-hunting, but never frog-hunting.

Although the weather was still a little chilly for the frogs to be calling much, the group was able to find as many as five different species of frogs, along with some other amphibious creatures.

The animals seemingly did not want to surface as the flashlight-wielding stalkers waded through the wet grass, listening for calls.

But since the bus drove along the country roads, Hillis was able to stop the bus, get out, and catch a few.

"One of the most effective means for herpetologists to gather amphibians is to drive up and down roads slowly," he said.

As he held the tiny animals in his hand, he explained their characteristics, such as the spadefoot frog's unique feet, and let the group touch them.

When he brought a toad around, one young boy was wary at the prospect of warts, but others explained that that was simply an old wife's tale.

"Hey, no feminist jokes," another boy said.

Hillis also showed them other species of frogs and a salamander.

Despite the inclement weather and silent frogs, the various species found made the trip a success, Rundquist said.

He said that many times herpetologists--people who study reptiles and amphibians--traveled several hundred miles and found only a few species, or several of one kind of species. He said that to find five species in such a short time and limited area was unusual.

--The University Daily Kansan, 25 April 1983

Pet Python Kills Missouri Man

WINCHESTER, MO. (AP) -- A West St. Louis County man was crushed to death in his bedroom by his pet python Wednesday, authorities said.

Ballwin Police Chief Donald "Red" Loehr said the body of Robert J. Vierling, 42, was found Wednesday morning by his wife, Christine. She at first believed he had suffered a heart attack, but an autopsy showed he had been crushed to death. The snake was found loose in the bedroom of the couple's Winchester home.

Mrs. Vierling said her husband had complete trust in the 16-foot, 100-pound Burmese python and often played with it on the bed.

The snake was taken to the St. Louis Zoo for safekeeping.

Zoo Director Charles H. Hoessle said pythons have been known to crush humans, but such attacks are rare.

"When it does happen," Hoessle said, "it usually makes the news coast to coast."

Vierling's neighbors, who described the victim as "an animal lover," said the car salesman often let the snake roam loose in his back yard during warm weather, but he was careful not to let it escape.

"He'd just turn it loose and let it crawl around," said Jim Ellis. Other neighbors said Vierling often showed neighborhood children how the snake ate rabbits.

--Lawrence Journal-World, 28 April 1983

Alumnus Engages in Battle of Wit

Debunking myths is not a popular gambit. Witness the nervous reactions of the judge and prosecuting attorney assigned to the "Santa Claus sanity suit" in Miracle on 34th Street. Witness, too, how a twist of fate rather than logic or rhetoric saved the day for Santa. Well, if

logic and rhetoric won't do and fate doesn't intercede, about all a man can do is turn to humor.

"Alligator in sewer movie is a flimflam and is nothing but a croc," is a sample of the humor with which John T. Flaherty is battling Hollywood and other myth-makers. Their story has it that Florida tourists brought home baby alligators that they tired of and flushed down the toilet into the sewer system, where they grew to immense size. John, chief of design in the NYC Bureau of Sewers, tells it like this: There is not enough space, there is not enough food and the torrents of water that run through the sewers during a heavy rain would drown even an alligator.

At least six times a year, John must reply to correspondence concerning the "Subterranean saurians." And he's been at it for almost 30 years. No wonder the New York Times article about John (May 19, 1982) called the alligator allegations "the most durable urban myth."

On a daily basis, John's work involves the design of the sewer system and the capital or expense budget expenditure estimates of the system. Six-inch pipes, monster sewers, brick sewers constructed in the nineteenth century, sewers being constructed today...John's Worth Street office is filled with blueprints of all 6,500 miles of sewer lines. He often tours the underground chambers and says, "A well-functioning sewer is a rather pleasant atmosphere--nice and cool in summertime, warm in the wintertime."

Pleasant though the sewers may be, alligators have not taken up residence. "Suffice it to say that, in the 28 years I have been in the sewer game, neither I nor any of the thousands of men who have worked in the sewer system has ever seen one, and a 10-foot, 800-pound alligator would be hard to miss." To the man who inquired whether sewer-dwelling alligators become "much lighter in pigment and in some cases turn almost white," John added, "Following the thought that you advance in your letter to its ultimate conclusion, perhaps the pigmentation affect has been so radical that they have been rendered invisible."

Aside from alligators, there are dangers in the sewers. To John, the biggest personal danger is that the atmosphere steams his glasses. The biggest annoyance is disposable diapers, which are improperly disposed of and so clog things up. Maybe that's how the rumor about baby alligators started.

--Manhattan, Winter, 1983
(submitted by Hank Guarisco, Lawrence, Kansas)

Rare Viper Stolen from Zoo Bites Youth

WASHINGTON(AP)--A youth who was bitten by a deadly Gaboon viper that had been stolen from the National Zoo remained in critical condition today and may suffer permanent damage, doctors said.

Louis Morton, 16, was making progress after being treated with anti-venom serum, doctors at Children's Hospital said Tuesday night. However, doctors said he probably would suffer permanent damage to the muscle and skin around his right shoulder and arm.

"We don't know how long we'll have to administer the serum," said Dr. Murray Pollock. "There's a scarcity of medical literature on it, and that's why we've been calling around the world."

The physician said there were fewer than 10 recorded cases of bites by the Gaboon viper, one of the two or three most poisonous snake species in the world. He said the last known case in the United States occurred in 1942.

The Gaboon viper's venom, which is injected through 1.5-inch fangs, can kill an untreated victim within minutes.

All of the zoo's supply of anti-venom serum was used to treat the youth, and additional serum was flown in from Philadelphia, Baltimore and New York.

Individuals and zoos across the country had offered to contribute serum and Children's Hospital anticipated no shortage, Pollock said.

The youth was carrying two four-foot-long Gaboon vipers in a plastic bag when he was bitten on the shoulder, authorities said.

He had taken the bag onto a transit bus near the zoo late Monday night, according to police. Morton, who lives in southeast Washington, rode about three miles and then got off the bus in the downtown area, slinging the bag over his shoulder, according to transit spokeswoman Marilyn Dicus.

Soon thereafter, he returned to the bus and told the driver he had been bitten by a snake, Ms. Dicus said. The driver called police on her two-way radio, and the youth was rushed to the hospital.

The vipers were returned safely to the zoo early Tuesday morning, said Laurie Bingaman, who works in the zoo's reptile house.

Police said they do not know what prompted the theft. They said no charges had been filed pending further investigation.

--Lawrence Journal-World, 6 April 1983

(Submitted by B. Wood, Lawrence, Kansas)

CONSERVATION OF THE FIJI CRESTED IGUANA (BRACHYLOPHUS VITIENSIS)

Until recently, the Fijian or banded iguana (Brachylophus fasciatus) was believed to be the only kind of iguana in all Polynesia. But in 1979, Dr. John Gibbons of the University of the South Pacific, Suva, while studying the banded iguana on the Fijian island of Yadua Tabu, discovered a new species, unknown to science, the Fijian crested iguana (Brachylophus vitiensis). WWF/IUCN are cooperating with the National Trust for Fiji to ensure its survival.

The Fijian crested iguana is bulkier than the banded iguana, with a crest of spines along its back and white bands on a light green body. The green can change to black if the animal is aggressive and frightened. The tiny uninhabited volcanic island of Yadua Tabu, about

80 ha. in extent, seems to be the crested iguana's only home, and it is estimated that there are about 300 living in the coastal bush.

At first, it looked as though the crested iguana had been discovered only to face rapid extinction, for goats have been introduced to the island in recent times and are rapidly destroying the vegetation where the iguana lives and feeds. By a democratic process, however, a happy solution has been found that will get rid of the goats, benefit the people of the neighboring island, and ensure a future for the crested iguana.

When the National Trust for Fiji learned of the threat to this unique reptile, it submitted a proposal to WWF/IUCN for the establishment of a reserve on the island. But the island is the communal property of the people of Nakorolevu village on the neighboring island of Yadua, and their consent was needed before any conservation measures could be taken. So the Fijian Government sent a negotiating team, including two ministers, to meet the elders of Nakodrolevu and accompany them on a visit to the crested iguanas among the rocks and forest vegetation, and sailed back to Yadua to finalize an agreement for its protection. The elders called a council meeting to explain the proposals and the villagers accepted them without objection. Next day, 7 August 1980, an agreement was signed on board the government ship, creating a wildlife reserve on Yadua Taba. It is the first wildlife reserve in Fiji.

The agreement stated that WWF had undertaken to make a grant available to the National Trust for Fiji to secure the future of the crested iguana. The National Trust agreed to capture all goats possible on Yadua Taba, so that the owners could remove them to Yadua; to provide fencing to enclose them there; and to shoot all goats on the island that could not be caught. The National Trust also agreed to pay the people of Nakorolevu \$1,500 a year so long as the island is maintained as a nature reserve, and issue permits to allow qualified persons to visit the island for study. The people of Nakorolevu in turn agreed not to allow any goat or other animal to be placed on the island; not to allow anyone to visit the island apart from the people of Nakorolevu or bona fide visitors with permits; to use the island for agriculture only; not to kill any iguana or other fauna on the island or burn vegetation; and to act as effective wardens of the island.

The two elders who visited the island with the government team were appointed the first honorary wardens. The villagers will also receive a punt with outboard motor, so that the island can be visited regularly. The crested iguana is considered to be an endangered species and is being placed on the list of species in which trade is banned under CITES (The Convention on International Trade in Endangered Species of Wild Fauna and Flora).

--World Wildlife Fund Yearbook, 1980-1981, pages 153-155.
(submitted by Hank Guarisco, Lawrence, Kansas)

RECENT LITERATURE OF INTEREST

Sex in Snapping Turtles...

Willhoft, Daniel C., Elizabeth Hotaling, and Patricia Franks. 1983. Effects of temperature on sex determination in embryos of the Snapping Turtle, Chelydra serpentina. Journal of Herpetology 17(1):38-42.

Experiments have now proven that the temperature at which turtle eggs are incubated controls sex determination in some species. The authors of this paper wanted to see how these laboratory findings related to the situation in nature. What happens to turtle eggs in a nest?

To investigate this problem, the authors incubated some eggs in the laboratory under controlled conditions. In the field, they put thermometers in the nests of some Snapping Turtles to record the actual temperatures there. Some of the nests were in the sun, some in the shade.

Females are produced in this species at warm (30 degrees C) and cold (20 degrees C) temperatures, males are produced at intermediate temperatures (22-28 degrees C). They found in the laboratory that only 4 hours per day of exposure to 30 degree C temperatures will result in the development of females. In nature, the eggs near the top of the nest tended to be warmer, so that females were produced from these upper eggs, and males from the lower ones. Some nests produced either all males or all females, depending on location.

Dog Food Stinks but Marine Toads Smell

Rossi, John V. 1983. The use of olfactory cues by Bufo marinus. Journal of Herpetology 17(1):72-73.

We all know that frogs and toads will attempt to eat anything that moves, such as insects, rolling stones, and dog food. Dog food? It seems that Marine Toads (Bufo marinus) are able to locate some food items, like dog food set out for pets, by smell.

To test this ability, an extract of dog food was prepared and poured on the ground at a spot frequented by the giant toads. Observation of the toads tongue flicks demonstrated that they were using olfactory cues to locate food items. The author mentions that this has also been shown for the Western Toad, Bufo boreas.

The Bigger They Call...

Ramer, John D., Thomas A. Janssen, and Charles J. Hurst. 1983. Size-related variation in the advertisement call of Rana clamitans (Anura: Ranidae), and its effect on conspecific males. Copeia 1983(1):141-155

Frogs call for reasons other than just to attract mates. Their vocalizations can also be territorial signals. Other workers have shown that the ears of some species of frogs are "tuned" to certain frequencies of sound, thus enabling the frogs to respond to particular calls.

The authors of this paper wanted to see if the acoustical quality of the call of the Green Frog, Rana clamitans, varied among male frogs, and if so, what were the responses to these differences by other frogs.

Frogs were tape recorded in the field and then marked for later identification if recaptured. The recorded vocalizations were analyzed electronically in the laboratory. From the tapes, the researchers randomly selected the call of one large and one small male, and played these calls back to frogs in the wild. The subject's behavior and frequency of calling were noted.

The results of this study showed that call frequency in Green Frogs is related to their body size. It was also found that the qualities of a call enable the frog which hears it "to assess the size and potential threat" of the calling frog. Small males responded with stronger agonistic vocalizations to the calls of small frogs, while larger frogs responded more to the calls of large frogs, so territorial frogs vary their aggressive behavior depending on the call characteristics of the intruding frog.

This study is further evidence that frog social organization is more complex than it was once thought to be.

Fangs for the Memories

McKinstry, Donald M. 1983. Morphologic evidence of toxic saliva in colubrid snakes: a checklist of world genera. Herpetological Review 14(1):12-15.

We have undoubtedly all heard or read reports of toxic snakebite from "non-poisonous" colubrids, including even Garter Snakes and Hognose Snakes. This report gives a checklist of the genera of colubrid snakes grouped according to tooth form and the presence of Duvernoy's gland, with general geographic distribution and references for each name.

Duvernoy's gland is a branched tubular salivary gland which empties into the mouth near the upper rear teeth (posterior maxillary teeth). The actions of the secretions from this gland (serous cells rich in protein and sometimes also mucous cells rich in carbohydrates) are still

relatively unknown, but apparently have resulted in inflammation or even hemorrhage in humans.

The rear maxillary teeth are either grooved (opisthoglyphous) or ungrooved (aglyphous). Opisthoglyphous snakes are also called "rear fanged" snakes.

According to this paper, the opisthoglyphous snakes include Ground Snakes (Sonora), Crowned and Black-headed Snakes (Tantilla) and a Peruvian snake named Tachymenis. This last genus merits attention since a specimen of it once bit your Loyal KHS Editor, resulting in a swollen hand for him.

Among the aglyphous snakes with enlarged rear teeth are the Ring-neck Snakes (Diadophis), Hognose Snakes (Heterodon) and Brown Snakes (Storeria), all of which have Duvernoy's gland. Aglyphous snakes with unmodified rear maxillary teeth and Duvernoy's gland include Water Snakes (Nerodia), Garter Snakes (Thamnophis), and the Racers (Coluber).

Its Not How Dark You Make It...

Radcliffe, Charles W. and David Chiszar. 1983. Clear plastic hiding boxes as a husbandry device for nervous snakes. *Herpetological Review* 14(1):18.

Some snakes display such strong defensive behavior or escape behavior in captivity that they cannot be kept without using hiding boxes. The authors speculated that two different sensory components affected the snake's choice of a hiding place. The two components were visual (the snake was seeking a dark place) and thigmotactic (the snake was seeking an enclosed place). They tried offering the snakes clear plastic boxes with one corner taped for slight shading, and found that their cobras (Naja mossambica pallida) responded by ceasing defensive and escape behavior, yet could still be observed through the clear plastic of the hiding box.

--Irving Street
Lawrence, Kansas 66044

THOUGHTS OF A MIDWESTERN NATURALIST

For me it was a special occasion. It was springtime in Oklahoma. My wife, Teri, and I had prepared our cameras and spent several weekends scouting likely areas to find lizards when they emerged from hibernation. Part of the reason I had moved to this region was to observe collared lizards, but between school and the fact that the

university I was attending was about sixty miles east of the nearest colony, I hadn't had much chance to observe them before. During the past two summers, I had photographed adults, but I still hadn't seen many young lizards; now the opportunity had presented itself. Despite a warm first week of April, the weekend was cold, and it snowed! It was two more weeks before we were in the prairie, cameras in hand, looking for reptiles.

While Kansas prairies abound in greens and browns, Oklahoma prairies seem to be characterized by the rusty-red rocks and soil which form the central redbed plains. Geologically, these formations consist of red Permian shales and sandstones which date back about 220-270 million years. The resulting dust tints everything--plants, animals, and photographers-- with a dull orange hue.

Having grown up in New Jersey, I was not quite prepared for the success that searching for reptiles in Oklahoma would bring. Under that first red rock we overturned were, amazingly, TWO young collared lizards! Fortunately, the cool weather had kept the lizards in a semi-depressed state, and getting near enough to photograph them was no problem. They had none of the gaudy adult coloration, but rather were tiger-striped in brown and tan, with a few orange spots along the sides. Of course, they had the double black collar, broken at the nape, which gives the species its name. They were also well tinted by the orange dust, almost invisible when sitting on a rock or in the sand. Before the day was over, many more specimens were seen and photographed, but the high point for us was those first collared lizards.

Since that day, we've been in many fields, looking for all sorts of small wildlife, with some wonderful results. At first, we were taken aback by the presence of scorpions in such great numbers. They seem to thrive in virtually every habitat, from shales to office buildings. These scorpions, only about two inches long, are usually found in the soil under rocks, though they occasionally adhere to the undersurface of the rocks themselves. Exposure to light prompts them into immediate motion, requiring the photographer to be careful to avoid being stung while simultaneously trying to replace the rock (it is, after all, a home) without crushing the resident. We were fortunate to find an adult with about eight tiny young attached to its back. Scorpions provide this parental care until the young can fend for themselves.

To date, I have considered myself primarily a systematic herpetologist, being interested in the evolution of species and their relationships to one another. However, I've also been interested in ecology, and my adventures in the Oklahoma microcosms combine these interests with the goal of learning more about the evolution of communities. Once in the field, there is ample opportunity to live through the lessons that textbooks can only dryly convey. For example, while exploring a gully community in the springtime, it quickly became apparent that young insects were numerous, but adults of most species were lacking. With the lone exception of a beautiful, metallic-emerald beetle, all of the insects we surveyed were young crickets or locusts, and small ants. All of the lizards seen that day except for a diminutive skink (including five collared lizards) were little more than hatchlings. Now, after emerging from hibernation, most of the available insects were of the right size for these lizards, the adult insects in some cases being larger than the lizards themselves. Most organisms produce more young than can possibly survive, and there seems to be a

fairly consistent increase in progeny as the number of potential predators increases. Locusts are preyed upon by lizards, birds and small mammals. For the species to survive at all, there must be more young than can be consumed. Similarly, collared lizards are preyed upon by birds, mammals and snakes. The little brown skinks, which are readily eaten by collared lizards, were not observed in the same microhabitat as the latter, preferring grassy knolls and open fields to rocky outcroppings. Here was a place to see the ideas conveyed in textbooks: if the skinks moved nearer the collared lizards, there would likely be fewer skinks. If adult insects emerged when young lizards did, there would be little food small enough for the reptiles, and they might not survive.

The limitations of physiology became very apparent in the field. For example, how do creatures that generate little, if any, body heat keep warm enough to move on cool days? Thermodynamics tells us that small bodies heat up quicker and cool off faster than larger bodies. On that first April day, the air temperature was about 75 degrees, and the soil under rocks we sampled was about 70-71 degrees. The skinks which had been basking on the rocks were quite active, while the collared lizards were all found nearly torpid under rocks. Their susceptibility to predation was limited only by their concealment. The scorpions, also dependent upon temperature for body heat, were quickly moved to action when hit by sunlight. Both scorpion and skink are of similar body size, yet the former, in a dark, cooler environment was as active as the latter. How, then, did the scorpions have the energy to scramble away from our invasion of their privacy?

There is a need to walk away with questions on occasions such as this. The usual answers are sometimes too neat, so divorced from a real situation that they mean little. Even very great answers may come from looking at an old problem anew, or from a different perspective. Once the medical texts of the Roman physician Galen (ca.130-200 A.D.) were accepted by doctors. In fact they were used for nearly 1400 years, despite discrepancies between the texts and actual human patients. Interest in comparing human and simian skeletons led the Renaissance physician Vesalius (1514-1564) to note some 200 differences between the two, and that the ape matched Galen's descriptions. The Roman, not having access to human bodies, did his anatomies based on apes, and it took Vesalius, quite incidentally, to discover the error! The result was a new text with quality illustrations by Vesalius, and a new inquiry into medicine and the human body. Similarly, new perspectives concerning birds, large lizards and dinosaur bones has led to the formation of the "hot-blooded" dinosaur concept which, eventually, may change the way we look at a great deal of biology.

Who is to say? There is, after all, nothing new under the sun.

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Last issue's herp husbandry helper covered external, or ectoparasites. This time around we will go over the most medically important parasites: endo- or internal parasites. Herp parasites break down into two major groups, protozoans (single-celled organisms) and worms. Both types tend to be debilitating to their hosts and frequently are killers, particularly in the stressful environment of captivity. Diagnosis, treatment, and prevention will be discussed herein.

Protozoal parasites may be divided into two groups: blood parasites and those of the gastrointestinal tract. Blood parasites are most commonly found in lizards and snakes and are particularly common in tropical and subtropical taxa. The pathogenicity (ability to cause disease) of these beasts in herps is largely unknown and unstudied. For the sake of convenience, I will assume that they are undesirable critters to have roaming around your pet's circulatory system. The presence of both these kinds of organisms is determined through microscopic examination of stained blood smears by a vet. Blood samples may be taken in the following manner: frogs, puncture of subsurface digital veins; salamanders, puncture of subcaudal vein (this can be tricky in that many salamanders are capable of tail autotomy); turtles, toenail clipping or puncture or subcaudal vein puncture; crocodilians, subcaudal vein puncture; lizards, toenail clipping; snakes, subcaudal vein puncture. Blood samples may also be obtained by heart puncture. This is the most effective way of getting adequate blood samples and if done correctly is rarely damaging to the specimen, but sticking a needle into the heart of one's pet usually has the same effect on keepers as dragging fingernails over a chalkboard does for normal people.

Alright, after examination, the vet tells you, yep, your frog or lizard is just full of malarial parasites (hemosporines). Now what do we do, you ask? Your vet gives you a puzzled look, a bill for services rendered, shrugs his shoulders, and walks back to his office for more important tasks, such as the caesarian section on Ms. Frump's pet poodle.

To be honest, there is very little you can do. In the case of hemosporines, administration of standard human malarial suppressants (chloroquine, amodaquin, and both in conjunction with primaquin) may be effective. These are powerful drugs and may easily kill your charge. A heat source capable of raising your animal's body temperature to 35 degrees C should be available. This will serve the same function as a fever in warm-blooded animals. For heat-tolerant reptiles, you may try raising their temperature to 35 degrees C for 24 hours in a low-humidity environment. Bear in mind, however, that once your animal has an established malarial infection, it will always have it. It is not transmissible to other specimens, as an intermediate vector is required for transmission and malarial organisms tend to be species-specific. If your animal does have malaria or hemogregarines, the best thing you can do is to provide a better-than-adequate environment and diet for it and as little disturbance as possible.

One of the most medically important groups of parasites (to herps, at least) are protozoans of the gastrointestinal tract. The most pathogenic of these are amoebas, eimerians (coccidia), and trichomonad flagellates. Infection by any of these in herps is rapidly fatal if

untreated and accurate diagnosis and quick treatment are imperative.

1. AMOEBAS. In reptiles, characterized by general listlessness in the specimen, refusal to feed, moderate weight loss, perhaps regurgitation, and foul-smelling, fairly loose, highly mucoid (whitish) stools. Unusual stools are one of the first and best indicators of disease in herps. Since your charges generally do not whine, howl, or otherwise vocalize, do not develop fevers as such, and do not indicate pain in a way that is generally recognizable to you, you should be intimately aware of the nature of their fecal material. Handle it, smell it, poke it, prod it, examine it closely with all the sensory faculties available to you.

The presence of amoebas is positively demonstrated by fecal examination by a vet or trained medical technician.

Once a positive diagnosis is made, the specimen and its cagemates should be immediately isolated. Amoebiasis is highly contagious and will decimate a collection in short order. Fecal samples should be taken from any other specimens in your collection that may have had contact with the infected animal. Be alert for symptoms in other specimens in the coming weeks.

TREATMENT: Both Flagyl (metronidazole) and Emtryl have been used with a high degree of success. Dosage for the former is 275 mg/kg body weight and for the latter is 106 mg/kg for one treatment. Drugs should be given by gastric intubation (stomach tube) or via injection into a food item. Flagyl has been removed as a human drug by the FDA and thus may be hard to find. Emtryl, in my experience, is just as effective.

Secondary drugs of choice may be EnteroVioform (iodochlorhydroxin) or Lomotil (diphenoxylate hydrochloride). Dosage is 0.3 g/kg for the former and 1.25 mg/kg for the latter, both given once orally. Follow-up fecal examinations should be made 2-3 weeks post-treatment.

One last note: Entamoeba invadens, the primary cause of reptilian amoebiasis, does not tolerate high temperatures and is killed by temperatures of 35-37 degrees C. If you have determined the presence of this organism in one of your specimens, prevention in the others in your collection may be effected by keeping them at 35 degrees C for 24 hours in a low-humidity environment (Murphy and Armstrong, 1978).

2. EIMERIANS (COCCIDIA). Diagnosed by rapid weight loss in specimens and blood-tinged, somewhat loose stools. Presence of the organism is demonstrated by fecal examination.

TREATMENT: 1 oz/gal Sulmet (sodium sulfamethazine) in drinking water dish for 10 days. Trisulfa at 2 oz/gal given in the same manner is also effective. Fecal examination should be done 10-14 days post-treatment.

Cages should be completely disinfected with a quaternary ammonia disinfectant and all substrate discarded. Cage props should also be disinfected.

Like malaria and herpes, eimerians are forever, present in the epithelial lining of your herp's gut. Your specimen may or may not

be infective post-treatment (coccidiosis is fairly transmissible). The treatment you have given is done to allow your specimen time to develop resistance to the organism following the initial outbreak. Regular fecal exams should be done on all specimens with a past history of this disease and they should be treated symptomatically as the disease manifests itself. Some persons advocate regular prophylaxis with a coccidiostat. However, since the sulfa compounds used to treat the illness are fairly nephrotoxic (kidney destructive), this regime is not recommended.

3. TRICHOMONADS. Extremely rapid weight loss, normal appetite, very watery, fairly compact stools (this is particularly evident if your animals are kept on paper substrate) with traces of blood, regurgitation.

TREATMENT: Flagyl or Emtryl, administered as previously described for amoebas are the drugs of choice. Sulmet or Trisulfa, administered as for coccidiosis, is highly effective.

Animals should be immediately isolated and treatment initiated for cagemates. This is a highly contagious and pathogenic disease. Cages, substrates, and props should be immediately disinfected with a quaternary ammonia solution.

Trichomoniasis is a source of considerable debate between and among veterinarians and husbandrymen. The latter tend to accept it as a true disease and the jury is still out among the former. My personal experience shows me that animals who are shown to carry trichomonads do tend to die quickly. I am also aware of the fact that sulfa compounds in themselves do not kill flagellates. However, animals treated with these drugs do not have trichomonads post-treatment.

Trichomonads can be demonstrated positively via direct fecal smear examination. There are two problems associated with this determination.

1. Many flagellates, particularly trichomonads, lyse (dissolve) quickly when exposed to environments other than their normal intestinal environment. Lysis occurs 1-3 hours after exposure. So, if you want to positively determine the presence of trichomonads in your animal, you must arrange with your vet to examine a fecal sample no later than 2 hours after it has been collected. Unless you work in a zoo, this is rarely possible.

2. There are many types of flagellated organisms that are a normal part of herp gut fauna. They are all very similar. Only trichomonads have been associated with disease. Positive identification of trichomonad flagellates is difficult for those without direct experience with them. Trichomonads exhibit the following characteristics: they are highly motile, 1.25 to 1.50 times larger than other flagellates, tend to be ovoid rather than elongate, and may show peculiar undulations of the body wall when observed over time.

It is important to make the proper identification of trichomoniasis before treatment is initiated, as the drugs suggested for treatment are toxic to both the host and parasite and their unnecessary use is to be avoided.

Now that you have a basic grounding in herp protozoal parasitology, let's move on to the more discrete, slimier denizens of your pet's body. I am talking, of course, about worms, wonderful worms. A herp keeper, when not battling respiratory infections in his or her specimens and trying to get them to breed when ill, is usually wrestling with worms of one sort or another and I do not mean earthworms as food. Oh, no. We're talking nematodes (roundworms), trematodes (flukes), cestodes (tapeworms), pentastomes (tongue worms) and acanthocephalans (thorny-headed worms). Amphibians and reptiles are two major intermediate and final hosts for a bewildering array of ghostly white (usually), blood-sucking or nutrient-robbing organisms collectively known as worms, although they rarely look like the little creatures we tortuously impale on hooks and gleefully toss in the direction of fish in a pond. For the sake of convenience, most of the initial discussion and suggestions will concern reptilian worms. Do not despair, amphibian lovers, I'll get around to you, too.

1. NEMATODES. Roundworms are probably the most medically important group of worms for herps. These include strongyles, hookworms, pinworms (oxyurids), whipworms (trichurids), and Capillaria. All are debilitating to various degrees and some, particularly hookworms and Capillaria, are highly pathogenic. The presence of nematodes is determined primarily by fecal examination. With healthy animals, regular fecal exams should be done biannually. For animals having a history of nematode parasitemia, exams should be done every three months for at least one year until 3 consecutive negative reports are received, then revert to a biannual schedule. Parasitized specimens rarely exhibit overt symptoms of disease but there are exceptions. Hookworm infection is generally associated with dark stools heavily tinged with blood and moderate weight loss or inability to gain weight. Animals with heavy worm loads will not infrequently regurgitate food items. They may occasionally vomit masses of worms or expell them with feces.

TREATMENT: The following is a listing of various medications and suggested doses: A. Telmin or TBZ (thiabendazole), 100 mg/kg given once orally. This is a widely used antihelminthic. Unlike most antihelminthics, Telmin acts as an irritant to the parasite and causes it to disengage from preferred tissue sites and be expelled with fecal material. It has a very low toxicity to hosts and is the drug of choice by many vets. However, because it does not actually kill the worms, repeat treatments may be necessary. It is highly effective against strongyles but may not be effective against physalopterans. B. Ripercol (tetramisol or levamisol), 10 mg/kg injected subcutaneously intramuscularly, or intraperitoneally, or 7 mg/kg orally given once. This drug is effective against all nematodes but is relatively toxic to the host. It should not be used on amphibians. Ripercol is the drug of choice for many in treating parasitized turtles as it can be injected. Anyone who has tried to shove any medication down a turtle's throat can testify to the difficulty of this act. A word of caution: chelonian (turtle) physiology is similar to that of mammals. Most of the dosages given here are higher than what would

be given to mammals or birds because of the generally slower basal metabolism of reptiles. With turtles, however, too little is better than too much as far as medications are concerned. Since Ripercol is fairly toxic, be particularly alert for signs of overdose after giving it to turtles. Signs of overdose in treated animals are difficulty in breathing and foaming at the mouth followed by convulsions. There is no known antidote so treatment for overdose is symptomatic and supportive. Overdosed animals frequently show signs of central nervous system damage after recovery. C. Nemex, 12 mg/kg delivered orally once. Nemex is highly effective against hookworm and Capillaria infections and is effective against all other nematodes. It, too, is fairly toxic and care should be taken in delivering the right dosages.

There are a variety of antihelminthics available for use today. See Murphy and Armstrong (1978) and Murphy (1975) for other suggested treatments. I highly recommend both of these publications except for one suggested treatment, and that is Atgard IV. Atgard IV is widely used for dogs, cats, and other mammalian livestock. It is chemically similar to chlorinated hydrocarbons from which we have gotten such marvelous poisons as DDT, chlordane, lindane, and dioxin. I am a little leery about its use on reptiles and absolutely oppose its use with amphibians.

A couple of last notes about nematodes: A. Chuckwalla lizards (Sauromalus) are typically loaded with strongyle-like nematodes. Fecal samples from these animals widen the eyes of and bring gasps from med techs because of the vast numbers of worms present in the samples. There is good evidence that these worms perform the same function in chuckwallas and other herbivorous lizards as protozoans do in termites in the breakdown of cellulose in the lower gut (Nagy, 1977; Iverson, 1979). It is probably best not to treat these lizards for worms as the animal will eventually die of starvation since it cannot assimilate its necessary nutrients without the presence of these worms. B. By and large, herp parasites cannot be transmitted to humans and or vice versa. Many keepers, inexperienced in the ways of worms, spend a good deal of time worrying about picking up their charges' diseases and some develop extraordinary levels of personal hygiene (two showers a day, constant hand cleaning, regular visual examination of their own fecal material, etc.). This is generally an unnecessary bother. The nematode exception to this is Capillaria. Capillaria worms, unlike most parasites, show little host-specificity and their life cycle is direct (requires no intermediate host for transmission). A horse is as good as a lizard to Capillaria. Capillaria are nasty beasts and will kill people (Schmidt and Roberts, 1981). Be careful about handling your animals if they test positive for Capillaria. Symptomology in humans is similar to hepatitis and may include violent diarrhea, abdominal distension and pain. Demonstration of the organism in people is the same as for herps, i.e. fecal examination.

2. CESTODES (TAPEWORMS). Tapeworms delight and fascinate parasitologists. Their complex life histories and forms are true zoological wonders (the tapeworms, I mean, not the parasitologists). However, they are rare in herps and generally

are not pathogenic. They are not transmissible to humans unless you make a habit of eating your captives raw. If your snake or frog dies and you feel compelled to eat it in the interest of recycling, be sure to cook it well. Don't laugh. I know people who have eaten their snakes. Herpetologists are a strange lot.

As I said, tapeworms are generally not a problem in herps and the presence of adults in herp specimens is rare. I find this interesting in that herps (particularly frogs and snakes) are prime intermediate vectors for many kinds of tapeworms. The major problems that they cause in herps are mechanical, either by the sheer mass and volume of the parasite blocking the gut and interfering with nutrient uptake or by larval forms migrating out of the gut and through the body wall, which may lead to peritonitis. The latter problem is not uncommon in snakes infected with tapes and seems to be particularly prevalent in the Green Tree Python (Chondropython viridis). As a matter of fact, Chondropython is the only snake in my experience which has been infected with two types of tapeworms. Treatment for encysted tapes in the body wall entails surgical excision of the cyst and complete removal of the tapeworm larva. Several of these surgeries may be necessary over an extended period. But, you say, my snake, lizard, or crocodilian has a tape in its tummy. What do I do?

Presence of the parasite is determined through fecal examination or excision of cysts. Specimens may occasionally expell tape sections in their feces. These sections look like semi-transparent grains of rice.

Yomesan (niclosamide) and Scolaban (bunamidine hydrochloride) are the drugs of choice. Dosage for the former is 159 mg/kg and for the latter is 25-50 mg/kg, both given once orally. Both drugs are toxic and their use should be judicious. In addition, Scolaban should not be given to reptiles with known heart conditions. Follow-up fecal exams should be done 3-4 weeks post-treatment. Additional treatments are not unusual in that tapeworms are hardy creatures and one treatment is frequently not enough to kill the whole beast.

3. TREMATODES (FLUKES). Flukes are an uncommon problem in reptiles. This is good since there is no known really effective treatment. Flukes are most commonly observed in the mouths of natricine snakes (water snakes, garter snakes, etc.). These should be removed manually with forceps.

Your regular fecal check-up has shown that some sort of trematode has taken up residence in your critter's body. If this is so, then the parasite is most probably living in your pet's liver. How do you kill the worm without killing the liver? You probably won't but you have to try something because that fluke (or flukes) will eventually kill your specimen. Organic trivalent antimonial compounds are used most commonly for human schistosome flukes. If your trematode is schistosome-like, then you should probably use one of these drugs. However, they are extremely toxic and should be given in small doses over 2-6 weeks. For Fasciola-like flukes, rafoxanide has been used effectively. In addition, Telmin has been suggested as a treatment but its effectiveness against trematodes is questionable.

4. LESSER LIGHTS OF THE WORM WORLD (TONGUE WORMS AND THORNY-HEADED WORMS). Pentastomes (tongue worms) and acanthocephalans (thorny-headed worms) are two of the more interesting herp parasites. Pentastomes are not really worms but possibly degenerate arachnids (spider or mite-like). In my opinion, all arachnids are degenerate. Many people have said the same thing about herpetologists, I suppose. Acanthocephalans are interesting because of their rarity and the bizarre arrangement of multiple rows of hooks adorning their heads.

The presence of pentastomes is usually determined by examination of the mouth cavity of your snake. They may occasionally be expelled orally. The worms may be removed manually by forceps or, if a lung infection is evident, Caracide (disethylcarbamazine) has been suggested as a treatment (Kauffeld, 1969).

Pentastomes are particularly common in rattlesnakes, and snakes seem to be the major reservoir for this pest. Pentastomes are highly transmissible to humans. Be careful with your charges if a tongue worm infection is suspected. They are definitely no fun in people and treatment is painful, difficult, and usually not highly effective.

Acanthocephalans are found primarily in fish, anurans, and lizards (West Indian iguanas of the genus Cyclura seem to be particularly susceptible). They are highly pathogenic and treatment must be initiated immediately following positive identification in your animal.

Diagnosis is from loose, diarrheic stools tinged with blood. Positive identification is made via fecal examination.

TREATMENT: Nemex at 12 mg/kg administered once orally has been found to be effective as has the administration of Telmin and Ripercol. Follow-up fecal exams should be done 10-14 days post-treatment.

Alright. I promised you amphibian freaks out there a few words of wisdom about your particular type of pet's parasites. Amphibians are susceptible to all the illnesses we have covered so far, with the exception of pentastomes. All the medications suggested for treatment of reptiles are effective in amphibians. However, administration of and toxicity of the drugs to amphibians are significant problems to overcome. By nature, a frog, toad, or salamander is extremely sensitive to any foreign substance in its body. What is toxic to a reptile is significantly more so to an amphibian.

The drug of choice for amphibian protozoal parasites is Sulmet. The other drugs are highly toxic to amphibians and will probably kill your specimen as surely as the parasite. It is your choice. If you do use Sulmet, be judicious in its use because of its nephrotoxic properties and the simple structure of amphibian kidneys.

The drug of choice for most amphibian worm infections is Telmin because of its particular properties and low toxicity. Nemex has also been used with some success. Worm infections by cestodes or trematodes are difficult to treat because they are virtually impossible to diagnose. This is because amphibians are usually intermediate hosts for

larval forms of these worms, and as such are not releasing eggs into fecal material. The drugs suggested are effective only on adult parasites.

Administration of drugs is a problem. Prying a frog's mouth open to give a dose of medicine usually leads to broken frog jaws. This is not good. Holding that frog in your hot, sweaty hands while trying to pry its mouth open frequently will kill your frog by stress. This, of course, is assuming that your frog is big enough to hold in your hand.

The best way to give treatments to your amphibian is by food item. With Telmin, this is done by dusting crickets, moths, worms, flies, etc. with the drug. Liquid drugs can be injected into the food item and dangled before your pet.

Treatment of amphibian illness at this time is largely symptomatic, supportive, and holistic. As time goes on, we will get better at it, but for the most part, amphibian enthusiasts must learn to grit their teeth, cross their fingers, and hope for the best.

NEXT ISSUE: Molds, Mildews, and Plagues

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THE BOX TURTLE'S GRAVEYARD

The setting is idyllic, the cold clear waters of an Ozarkian spring bubbling forth from a cleft in the rocks. A luxuriant growth of moss carpets the forest floor, punctuated by the first dainty fronds of ferns beginning to unfurl. It is early April and the surrounding oak-hickory forest has just begun to bud out. Distantly, Spring Peepers are tuning up for their bell-like procreative chorus. Tracks in the damp earth around the spring give evidence of passing Gray Foxes and with warming temperatures, Copperheads will frequent these haunts. It is a picture post-card perfect scene, except for one macabre detail...the empty shells and skeletons of sixty or more Box Turtles scattered about.

Nature holds many great mysteries, seemingly unsolvable enigmas that range from the Loch Ness monster to old standbys like Bigfoot. They taunt us with intangible bits of information and evidence, begging for explanations yet thriving on a lack thereof. People have devoted entire lives trying to unravel such mysteries, millions of dollars are spent in the course of these efforts and their very existences trouble the minds of thousands the world over. So it is not without some apprehension that I reveal what may be the first published account yet of another grand enigma--the Box Turtle's Graveyard.

I had heard of this spot second-hand from a zoologist friend who had come across the place, nestled snugly in the rolling Missouri hills, one day while collecting snakes. He sketched out a map as he spoke, his voice running with excitement over this biological peculiarity like a treasure hunter recounting the discovery of the Lost Dutchman Mine. He drew an "X", pressing hard upon the pencil. "There...is the Box Turtle's Graveyard."

Had I not known the man better, I would have thought his tale was the product of too much Stanley & Livingston reading and an over-active imagination. But this was no dusty Darwinian gold panner I was speaking to. He was (and is) the curator of a well-known zoo, a former conservation officer and a college-trained biologist.

I set out to search for this almost mythical spring not knowing for sure that I could even find it, if it did exist. The map was rough at best, the twisting Ozark roads deceptively similar and a low distant rumble of thunder rolled in ahead of an April storm. Finally I pulled off the road and struck off into the woods following the trickle of a tiny, crystalline brook.

I had walked probably a quarter of a mile, pausing to gather up the errant feather of a Blue Jay that lay incongruous upon the glowing green mosses, when I came to the spring. It was just as it had been described to me, a tiny clearing in the forest where the waters came up, a thick blanket of moss spongy beneath my step, the rocks encrusted with pale grey-green lichens. And everywhere, the skeletal remains of dozens of Box Turtles.

I moved about the area carefully, stepping lightly, stooping to inspect the empty carapaces and tiny bones. All appeared to be deceased adults, their shells four to five inches long. Of some only the bleached white shells remained while on others the colored chitinous layers still adhered, revealing those of a later demise. The reptiles did not appear to have perished at once. Tiny brown ants ran frantically about on the decaying tissues of one terrapin's legs while the individual plates of yet other turtle shells lay strewn about like

pieces of some strange, geometric puzzle, the blocks of dismantled igloos.

Then I came to a live turtle, sitting quietly amongst the bones of deceased relatives. It retreated within its shell at my approach, drawing head and legs inside and sealing itself within by means of the hinged plastron. I found two other living individuals who tolerated my intrusions with exquisite reptilian patience, apparently in good health but as inactive as their dead and gone compeers.

I sank down upon a rock and took some notes, trying to rationalize the bizarre congregation. There was no natural trap here to doom the reptiles as I had seen before in sink holes and abandoned wells. The water was fresh and sweet. Though insufficient to sustain any fish, it teemed with insect larvae, and I found a lone salamander beneath a rock. It was apparent, too, that the creatures had arrived here and perished over a considerable number of years, owing to the various stages of decay as well as the still-living individuals.

Perhaps, I thought, they had come here suffering from some unknown turtle ailment, seeking relief. Perhaps these waters contained some sort of medicinal mineral that the reptiles sought out, too late for most. But to assume that such a creature is capable of the realization of the curative properties of a certain spring is a little ambiguous.

I considered the possibility of some poisonous form of fungi growing hereabouts upon which passing turtles had chanced to feed and then perished of. But I found no mushrooms in the immediate area of special note.

The low grumblings of thunder now broke into an earth shaking clap that shattered my thoughts and heralded the first big drops of rain. I got up and surveyed the graveyard one last time, the dim amber eyes of the three living turtles peering suspiciously out of their fortifications at me. An unnerving, eerie sort of feeling curbed my urge to take one of the empty shells with me as I usually did upon finding such remains in the woods. I did not wish to be seen as the malefactor of such a heinous crime as grave robbing in the eyes of turtles still alive there. Or perhaps it was just the solemn, respectful atmosphere of the place, so akin to that of our own cemeteries.

I made it back to my car moments before the deluge and continued on home to Kansas. And though the mystery of the Box Turtle's Graveyard kept my mind groping for explanations I never searched any further for clues. Some things, after all, just are. Should I ever find out why so many turtles had come there to die, the romance of the story would be lost forever.

The map to the sacred resting place of the Box Turtles vanished into the cluttered debris on the floorboards of my old Chevy, never to be seen again and the mystery, in my mind, seemed to be complete. I am tempted to test my memory and once again search out the Box Turtle's Graveyard, just to see how many more have come to pass away amongst the bones of cousins and kin. But to try and explain the phenomena would seem almost sacrilegious to me now. Enigmas seem always to shed their mystery ungracefully and appear explained as awkward and ungainly natural functions. A clinical knowledge of light diffraction does nothing to enhance a rainbow. I will let the turtles rest with their deaths unexplained, as the ancient reptiles rest.

As I reflect now upon the phenomena, I feel an odd, sad, peacefulness. There is something touching in this fatal congregating that I finally recognized as my attributing a common human fear to the motives of the turtles--the fear and tragic inevitability of dying alone.

--Martin Capron
Oxford, Kansas

LETTERS TO THE EDITOR

Esteemed Editor,

Today's mail brought the KHS Newsletter No. 51. What an excellent change in format and content! Congratulations and thank you for a first-class publication that far surpasses several others that I receive regularly.

I was particularly excited to receive this Newsletter, as it is the first to reach me since March of 1982. Among the reasons for this were three changes of address combined with the U.S. Post Office's failure to deliver this information to you each time. At last the matter has been straightened out...

Most Sincerely,
Janet Labrecque
Riverwoods, Illinois

EDITOR'S REPLY: Many people apparently are having difficulty getting their newsletters. This will not do. If you or some KHS member you know of is not receiving the KHS Newsletter, please write us immediately so your efficient newsletter staff may rectify this grave injustice.

Esteemed Editor,

Just a note on a couple of matters I'm sure you'll be thrilled to hear of. First off, my compliments and a tip of the ol' beer mug to you for the out-standing quality of the last issue of the KHS Newsletter. It's a beaut!

Second, I regret to inform you that yet another crushing blow has been dealt us by the press in the on-going issue of Misnaken Identities

[see KHS Newsletter No. 51, pp. 6-8]. On this particular punch, however, I feel compelled to retaliate. Outside Magazine, May 1983, page 75. John Shaw, author. "Photos In the Field." A very good photo of an Eastern Hognose snake is captioned, and I quote, "The distance between the eastern hognose snake and the camera (bottom) was about nine inches. The hognose is poisonous but rarely attacks."

I believe this to be nothing short of incredibly irresponsible and just plain stupid. While it has been rumored that hognose snakes do possess a very mild, primitive sort of venom...to my knowledge no one has ever documented this scientifically. A statement of this nature in a well-read magazine of this type could cause tragic confusion for both readers and hognose snakes alike.

Well, just thought you might like to know of this debauchery, and I figured I could count on you (and other KHS members) to exert a little muscle on the editors responsible.

Many thanx,
Marty Capron
Oxford, Kansas

LETTERS POLICY:

The KHS Newsletter will publish letters to the editor from time to time on issues of concern to the membership or which say nice things about the newsletter staff. We reserve the right to do minor editing. Please send letters to:

John Simmons, KHS Newsletter
Museum of Natural History
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Lawrence, Kansas 66045

A FINAL WORD FROM THE EDITOR

Thanks for assistance with the production and mailing of the KHS Newsletter to Hank Guarisco, Erik Rundquist, Linda Ford, and Joseph T. Collins.

THE KANSAS HERPETOLOGICAL SOCIETY

The Kansas Herpetological Society is a non-profit organization designed to encourage education and dissemination of scientific information through the facilities of the Society; to encourage conservation of wildlife in general and of amphibians and reptiles in Kansas in particular, and to achieve closer cooperation and understanding between amateur and professional herpetologists, so that they may work together in the common cause of furthering herpetology.

Membership

All interested persons are invited to become members in the Society. Membership dues per calendar year are \$4.00 (U.S., regular), \$8.00 (outside North America, regular) and \$15.00 (Contributing) payable to: KHS Secretary-Treasurer, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045.

All members are entitled to participate in Society functions and have voting privileges. They receive copies of Society publications, which include **KHS Newsletters**, as well as infrequent publications of interest and publications that the Society has co-supported.

Editorial Policy

The **Kansas Herpetological Society Newsletter**, issued quarterly, publishes manuscripts and notes of interest dealing with the biology of amphibians and reptiles. Manuscripts should be submitted to the Editor no later than the first of the month of issuance. All manuscripts should be typed or legibly written and become the sole possession of the Society and will not be returned unless special arrangements are made.

Pen and ink illustrations and photographs are also welcomed. These should be sized accordingly, as no reductions can be made. Illustrations and photographs will be returned to the owner only upon request.

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