



KANSAS
HERPETOLOGICAL
SOCIETY
NEWSLETTER



NUMBER 38

AUGUST 1980

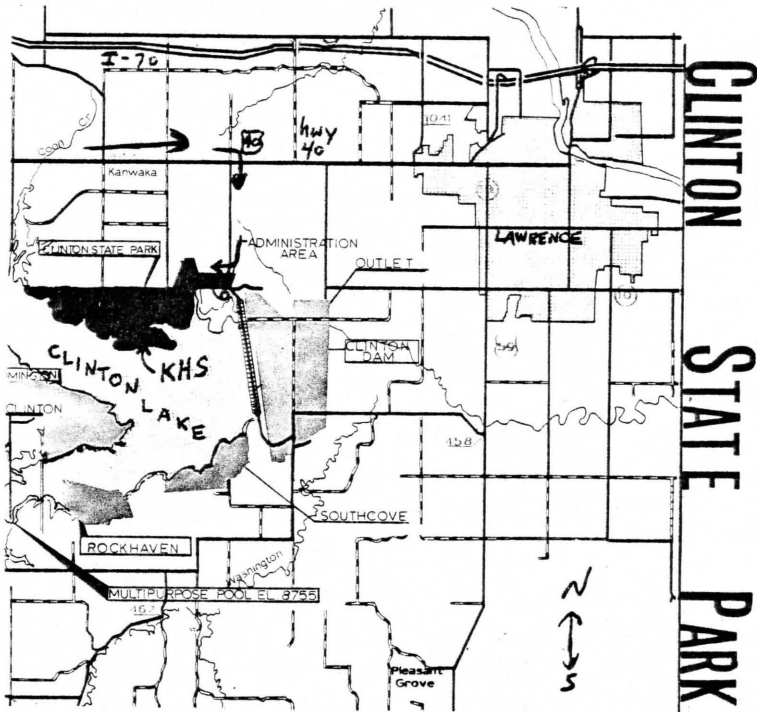
SEPTEMBER MEETING AT ATCHISON COUNTY LAKE: SEPTEMBER 26-28

The Autumn meeting of the Kansas Herpetological Society will be held on the fourth weekend of September at Atchison County Lake. This area of the state (the extreme northeastern part) has not received much attention, and, there is a good possibility of discovering new county records. There is also a chance of discovering the western fox snake (Elaphe v. vulpina) for the first time in Kansas. It has been found in several counties in Missouri which are located just across the Missouri River from Atchison and Doniphan counties in Kansas. Therefore it is very possible that this snake lives in our state.

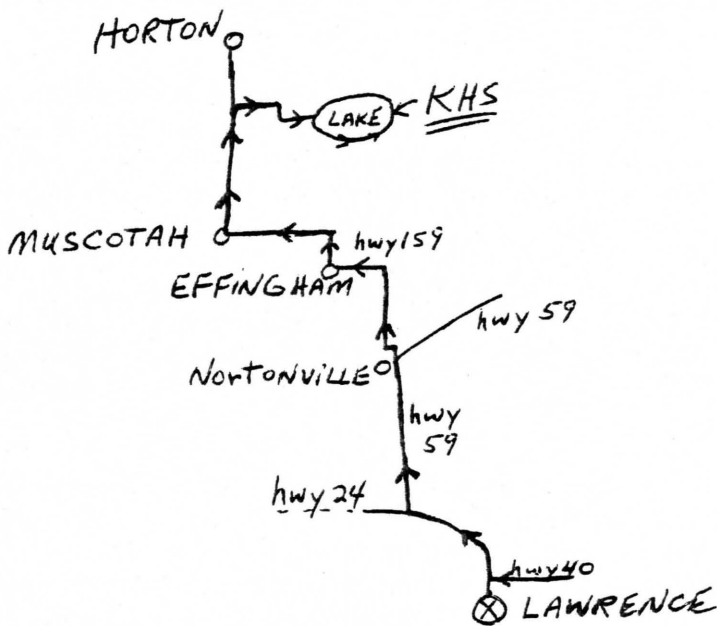
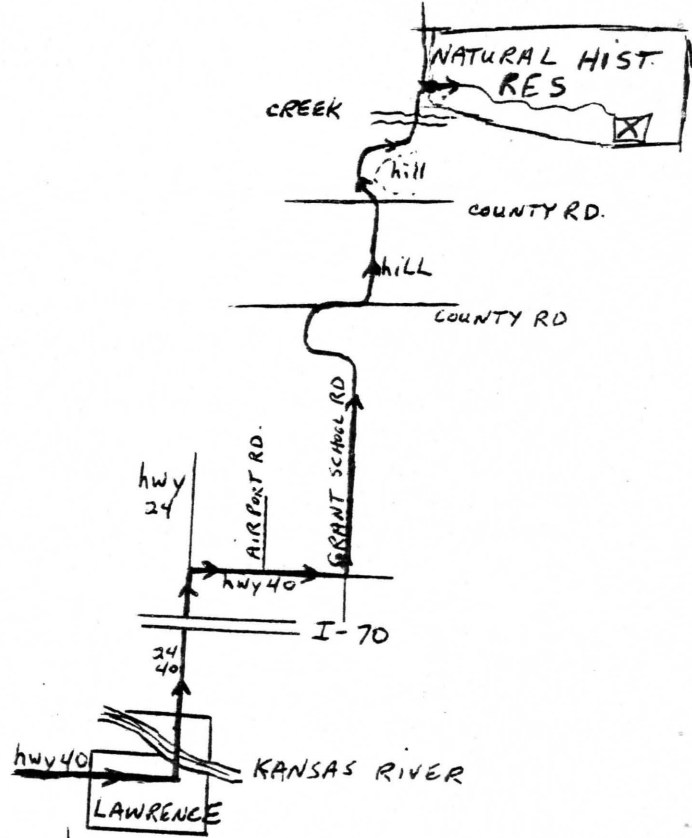
There are several added activities that will make this field trip a memorable one. Dr. Henry S. Fitch, who has done extensive work on the natural history of this part of the state, will take us on a guided walk through the beautiful fields and forests of the Natural History Reservation of the University of Kansas in Douglas County. Dr. Fitch has done much in the area of reptile ecology, and, has been trapping, marking, and releasing snakes for over thirty years. We will be able to see these techniques, and, in addition, gain a general understanding of the ecological balance of this area. The Natural History Reservation is the only known location where the patternless copperhead (Agkistrodon contortrix) has been found. A very small number of copperheads in this area lack the brown bands that are characteristic of this species. Hence, this color type is known as a "patternless" copperhead. Dr. Fitch has an adult male of this color variety, so KHS members and friends will have the opportunity of seeing one.

Since most KHS members will be approaching Lawrence from the southwest, we will camp at Clinton Lake, which is located just seven miles west of Lawrence on US highway 40 on Friday, September 26. We will camp here overnight, then, leave the next morning, arriving at the Natural History Reservation at 8:00 AM Saturday. Clinton Lake has just been opened to the public this year, and, it has many miles of south and southwest-facing limestone bluffs which offer ideal hibernation sites for the large snake population in the area. Several of the most common snakes include: the prairie ringneck (Diadophis punctatus arnyi), the Osage copperhead (Agkistrodon contortrix phaeogaster), and the black rat snake (Elaphe o. obsoleta). There are also populations of timber rattlesnakes (Crotalus horridus) and red milk snakes (Lampropeltis triangulum sypila).

After the tour of the Natural History Reservation, we will travel north on US highway 59, then onto US highway 159 to the turnoff for Atchison County Lake, located southeast of the town of Horton. Most of the eastern side of the lake has extensive marshes and wet, grassy fields which should support a great variety of reptiles and amphibians. So, be sure not to miss this field trip weekend. You and your friends are invited to as many of the activities you can make.



KHS AT CAMPGROUND #1.



ATCHISON CO. LAKE

GUEST EDITORIAL: KHS FIELD TRIP PHILOSOPHY

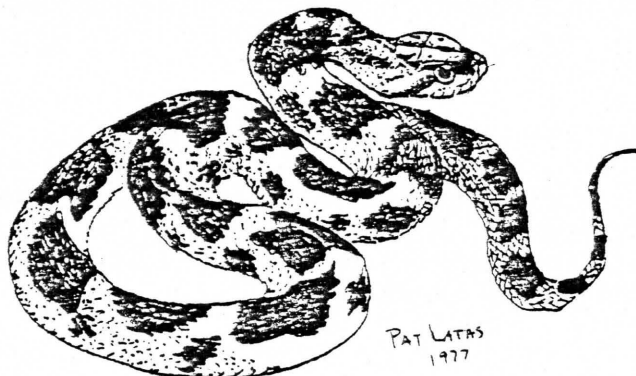
The Kansas Herpetological Society, now five years old, sports a membership of some two hundred members, most of whom reside within the boundaries of the state. However, participation on the bimonthly field trips has been disconcertingly low, a fact lamented at the recent meeting of the KHS executive council. Poor attendance at the July field trip to Chetopa was undoubtedly influenced by the hot, dry conditions prevailing during the month. However, even under the most ideal conditions, seldom do more than ten percent of our members attend the scheduled outings. Conflicting schedules and the high cost of travel make attendance difficult for some, but, it was the consensus that possible misconceptions about the purpose and value of field trips was also a contributory factor.

The value of field trips might be categorized into three major areas: pure science, education, and fellowship. Pure science emphasizes enhancement of the knowledge of herptile biology. KHS field trip collections, for example, have contributed significantly to the understanding of herp distribution patterns in Kansas. Rarely are new county records not discovered on field trips. The location of these trips are often chosen in regions which are poorly known.

A major individual benefit of field trip attendance concerns educational and learning experiences. There is no better way to learn to recognize and appreciate plants and animals than to observe them in a field setting. Ophidiophobics could find no better way to overcome their fear of snakes! The marked diversity of background and training of KHS members creates ideal learning situations in which all have some contributions to make. Persons who are novices are strongly encouraged, and, special efforts should be made to help quell the feelings of intimidation which are naturally felt in the company of trained specialists.

A final advantage of field trip participation lies in the opportunity to make and renew friendships with people who share common interests. Persons having a humble appreciation for the diversity and complexity of nature are, I believe, among the finest people one can associate with. And spending a weekend in the field can cement friendships which last for a lifetime.

---Jeff Burkhart, Saint Mary of the Plains College, Dodge City, KS.



LOW ATTENDANCE AT JULY KHS FIELD TRIP

The hot and dry Kansas weather during late June and July was probably partly responsible for the light turn out at the KHS Chetopa meeting the week end of 18-20 July. There had been no rain in the Chetopa area since early June and the temperatures were ranging from 100-110°F. almost every day. It was not a very good time of the year to find amphibians and reptiles. The people who did, however, brave the weather and traveled to the southeastern part of our state were rewarded with a few interesting finds.

Jeff Burkhart left Dodge City early Friday morning for the long trip across Kansas. His traveling companions, Lance Good and Rodney Dufault, had never been to the Chetopa area, and, were looking forward to seeing some unique herps. As they traveled east along the Kansas-Oklahoma state line, Jeff and his crew observed several Texas horned lizards (Phrynosoma cornutum) and lesser earless lizards (Holbrookia maculata). While looking for herps southwest of Caldwell, Jeff discovered Larry Miller. After a rest stop at a local cafe, they headed east to Cowley County State Lake for a quick dip. They observed two western painted turtles (Chrysemys picta belli) in the clear, cool waters of the lake.

When the group drove through Coffeyville the temperature was 107°F. When they arrived at Chetopa it was even hotter! After setting up camp, their exploration of the area revealed several bullfrogs (Rana catesbeiana) and plains leopard frogs (Rana blairi). Later that evening, the group went road collecting. Nothing was found on the roads in the area.

The next morning they went to Galena and Schermerhorn Park, hoping to see the unique amphibian fauna of the area. The four first went to the cave at the north end of the park. The habitat around the cave entrance had changed a lot since the KHS meeting there last year. As reported in KHS newsletter No. 36 "Hitchhike Herping in December," someone had burned much of the habitat and the trees near the mouth of the cave had been cut down. The group found several salamander larvae in a shallow pool in the twilight zone of the cave. They then entered the main part of the cave through the narrow opening; and, once inside, found both cave salamanders (Eurycea lucifuga) and dark-sided salamanders (E. longicauda melanopleura). The cave was so damp and cool that the four thought about spending the rest of the weekend there.

They did, however, decide to venture back into the outside world and explore Shoal Creek for a short period of time. The water was cool and quite clear. No herps were collected, but, seining and skin diving revealed a number of interesting fish and invertebrates. They left Galena about mid-afternoon and traveled back to the campsite at Chetopa.

After some food and relaxation, the four were getting ready to head west when the fifth person drove into the park. Hank Guarisco had just arrived from Lawrence. After stopping at the air-conditioned cafe, the group decided to spend the night at Cowley County State Lake. The hundred-mile drive to the lake was hot, to say the least. Just before arriving at the lake, they stopped at the site of the first discovery of helium on earth (south of Dexter).

Jeff and Lance were the first in the cool water and Hank had just entered when it happened. A man showed up to notify the group that there was no swimming, and they could be fined \$100 for their actions. He said there were signs saying "NO SWIMMING" and wanted to know why the swimmers had not read the rules. After a while, a search for the sign revealed a small, carved "no swimming" sign, among several other "NO" signs. Sleeping next to the lake was very enjoyable and relaxing. Since it was so dry, there were no mosquitoes to contend with. Next morning, a search of the dry hillside uncovered one eastern collared lizard (Crotaphytus c. collaris) sunning itself on a rock.

The field trip had been a hot one, but it was fun, and some interesting animals were found. In addition to the species mentioned above, the following were also seen: a water snake (Nerodia sp.), a map turtle (Graptemys sp.), an ornate box turtle (Terrapene o. ornata), Blanchard's cricket frogs (Acris crepitans blanchardi), and, spotted chorus frogs (Pseudacris clarki).

RECORD SIZE GREAT PLAINS TOAD COLLECTED IN SUMNER COUNTY

A new state size record for the great plains toad (Bufo cognatus) was collected by KHS member Jeff Ehlers the morning of 23 June 1980. Jeff found the large toad in his yard in Caldwell (Sumner County), Kansas. The animal measures 102 mm, which is one millimeter longer than the previous size record. The maximum size record for this species throughout its range is 114 mm.

"KANSANS FOR SAFE PEST CONTROL" ORGANIZED AFTER MEETING IN SALINA

Representatives from a dozen different Kansas towns, the Kansas Board of Agriculture, the Kansas Department of Health and Environment, and, several environmental groups met on the afternoon of 26 July 1980 at the Land Institute in Salina. The idea of the meeting was to discuss past pesticide use problems in Kansas, storage and disposal of highly toxic pesticides and containers, the Kansas pesticide law, and, what might be done to help victims of unwanted pesticide drift.

J. Howard Duncan from the Kansas Department of Health and Environment told the group about his agency's role in protecting public health. Duncan gave those attending a booklet dealing with pesticides and pesticide poisoning.

Jon Flint, one of four men that attended from the Board of Agriculture, told the group about the Kansas Pesticide Law. He said that the law required the pesticide not to drift onto a non-target area, such as a public road or private land. Flint informed us that he intended to enforce this law, and, asked anyone who receives damage from pesticide spraying to call him (913-296-2263) as soon as possible after the damage. A copy of the current pesticide law was distributed to the group. Jon Flint has been with the Board of Agriculture for seven years, and, was an ecological specialist for the board before becoming the pesticide law administrator a few months ago. He was one of several men involved in the investigation of the 1976 pesticide disaster that took place in southern Kansas. Wild and domestic animals were killed, citizens were poisoned,

and plants were damaged by the misuse of pesticides at that time.

Freeman Biery and Bill Greenwood, also members of the Board of Agriculture, spoke to the group. They told us a little about the history of pesticide use in the state, the "noxious weed" program, and, their duties on the board.

Almost everyone attending had questions and comments to express at the meeting. Most of the citizens attending had, at one time or another, suffered damage from a careless sprayer. A few of the people said they would like to see aerial spraying of some pesticides banned in Kansas, while others wanted a total ban on pesticide spraying in Kansas. The majority of the group felt that spraying could be conducted in a safe manner in many cases. Better education and training should be required for all spraying companies working in Kansas. The group also felt that those few sprayers who have already caused significant damage by their careless techniques should not be allowed to continue spraying in this state.

Representatives from the Kansas Agricultural Aviation Association (KAAA) had asked to attend the meeting. Although they were invited to do so, no one from KAAA was present at this gathering.

A citizen's group is now being formed to help keep the public informed on pesticide issues, educate those involved in spraying and agriculture in the number of possible alternatives to pesticides, and, to work on possible future change in the law. This group will be called, "KANSANS FOR SAFE PEST CONTROL". Anyone interested in learning more about the newly formed group should contact Terry Shafer, RR# 3, Lawrence, Kansas 66044. She is planning to publish the first newsletter informing people about the group's plans, and, asking the general public for their suggestions concerning the pesticide situation.

Our experience with pesticides over the last few decades has changed our attitude toward these chemicals. Pesticides were first considered to be an almost magical solution to the ancient problem of pest management. Over the years we have seen a growing number of problems concerning their use. This has led us to view pesticides with a cautious eye. We have seen many pests become immuned to the lethal effects of our chemicals. As an example, there is a strain of the common housefly found in Topeka which is immuned to the five most commonly used insecticides. Since pesticides work on basic biochemical processes common to most life forms to produce their lethal effects, the application of such substances will invariably kill a number of beneficial organisms - organisms which help keep certain pests in check. However, in spite of their drawbacks, pesticides have a useful place in pest management, if used properly and in a cautious manner.

The meeting at Salina was organized by Terry Shafer of Lawrence, Sue Lukens, a member of the Kansas Organic Producers from Beloit, and, Larry Miller of Caldwell. The twelve Kansas towns represented at the meeting were: Lawrence, Wichita, Greensburg, Brookville, Lincoln, Salina, Lecompton, Hope, Topeka, Sabetha, Gypsum, and, Caldwell. Wes and Dana Jackson of the Land Institute in Salina graciously provided the meeting place.

----Larry Miller, 524 North Osage St., Caldwell, KS 67022 316-845-2680
----Terry Shafer, RR# 3, Lawrence, KS 66044 913-842-1348

OBSERVATIONS OF THE RED-SPOTTED TOAD IN BARBER COUNTY KANSAS

The red-spotted toad (Bufo punctatus) is currently known to occur in a small area of southwestern Kansas along the Oklahoma border. Collins (1974) showed this animal occurring from Barber County to the west along the Kansas-Oklahoma border. Conant (1975) shows this toad to be found in the southwestern part of the United States, the southwestern corner of Kansas being the northeastern boundary of its range.

I made a number of collecting trips to Barber County between the months of March and October, during the years of 1976-1979. These trips were made during a wide variety of weather conditions and several of them were both day and night adventures involving other herpetologists, some of my former science students, and, my parents. Every trip yielded at least a few interesting finds, but never a specimen of Bufo punctatus.

The high cost of fuel and a busy schedule limited my travels during early spring of 1980. My first trip through Barber County was the afternoon of 23 May. I was on my way to the May KHS meeting at Coldwater Lake, when I noticed a lot of standing water in the roadside ditches as I traveled through my favorite collecting area. I stopped several times to look for herps, but, never found anything uncommon. Two days later, while attending the Coldwater meeting, Eddie Stegall played a tape of red-spotted toads calling. Eddie had made the tape the evening before, as he traveled through Barber County. This made me decide to go back to Barber County that evening, on my way back to Caldwell.

I arrived in Barber County about 9:00 PM that evening. It was a warm evening with almost no wind. The humidity was quite high, and, I heard several cricket frogs (Acris crepitans) calling each time I stopped to listen. After checking several areas that looked good, I turned around and started back toward the east. It was about 10:00 PM and I was starting to hear Woodhouse's toad (Bufo w. woodhousei) calling from areas of standing water near the road, but still no B. punctatus.

A few minutes past ten, I topped a hill about seven miles west of the point where the road that leads west from Hardtner crosses the Salt Fork of the Arkansas River. At that point I heard my first red-spotted toad calling in the wild. Several toads were calling from shallow standing water along the north side of the road at the bottom of the hill. I stopped my pickup at the top of the hill, and, slowly made my way to the bottom. The toads did not stop calling as I approached to within a few meters of their calling site. First, I recorded their calling for a few minutes. Next, I used my light to locate one of the toads. The animal continued to call even as I watched him from a distance of about three meters. I then collected one specimen, and, left the recorder going while I returned to my truck to get my camera. Several other toads continued to call as I left.

Back at the truck, I took a few minutes to record some data about the location and weather conditions. The toads were calling from the bottom of a hill, and, I estimated that there were about 15 to 20 toads calling from the same area. It was a clear night with a bright moon. There was almost no wind, and, the temperature was about 27°C. There was some lightning to the south, but, it was so far away that thunder could not be heard. The depth of the water was between 3-20 cms, and,

the water temperature was above 27°C.

When I finished recording the data, I took both of my cameras back to the calling site. I then took about a dozen color slides and a dozen black and white photographs of different toads that were calling. I used a flash, and, often moved to within 10-20 cms of the toad while I was photographing, but this did not seem to bother them. They continued to call all around me. Three cars that came within five meters of the toads as I was recording and taking pictures did not disturb them.

When I finished the photography, I observed the toads for about thirty minutes. Three were calling from a ridge about 30 cms from edge of the water on the south side of the pool. About a dozen were calling from the edge of the pool in some short grass. I saw only one toad that was calling from the water. It was in water that was about 3 cms in depth. At about 11:00 PM, I moved to a point about 200 meters to the east of the pool where the toads were calling. I could then hear a few more calling to the south and several calling to the north. Many Bufo w. woodhousei were calling in all directions at this time. However, they were all quite some distance from where the red-spotted toads were calling. I stayed in the area until just past midnight. At least twenty toads were calling when I left.

I checked several other areas after leaving, but, I heard only Woodhouse's toads. No other red-spotted toads were heard that night. I did find many Woodhouse's toads, spadefoot toads (Scaphiopus sp.), and leopard frogs (Rana blairi) on the road as I drove back to Caldwell.

The evening of 28 May, Bob Dixon of Caldwell and I drove back to the same area hoping to find the red-spotted toads once again. The temperature and humidity were similar to the previous occasion, but it became stormy. No toads were calling that evening.

My parents, Clyde and Zeda Miller of Wellington, and I traveled to the area the evening of 1 June. We arrived a little before 9:00 PM. The temperature was 28°C, and there was a strong wind from the south. The humidity was high, but we didn't hear any toads calling when we arrived. At about 10:00, just after sundown, we heard red-spotted toads calling to the south of the road in a pasture. I took a light and camera to the area where the toads were calling, and, found them calling from the bank of a shallow stream. I observed about three toads and heard four others. The stream was about a meter in width, and only 5-10 cms deep. The toads were located on the edges of the stream that were not covered with grass. At 11:00 PM about ten toads were calling from the area along the stream bank. The temperature was 25°C at that time, and, the wind had decreased to a light breeze from the south. The toads were still calling when we left to return to Caldwell. Once again, no toads were heard calling from any other areas.

I spent several evenings during the first part of June 1980 searching for specimens of B. punctatus in selected areas of Harper and Sumner Counties in Kansas, but, had no luck. I did find what seemed to be good habitat, and the search will continue. The specimen I collected on 25 May 1980 has been deposited in the KU Museum of Natural History's collection.

Collins, J.T.

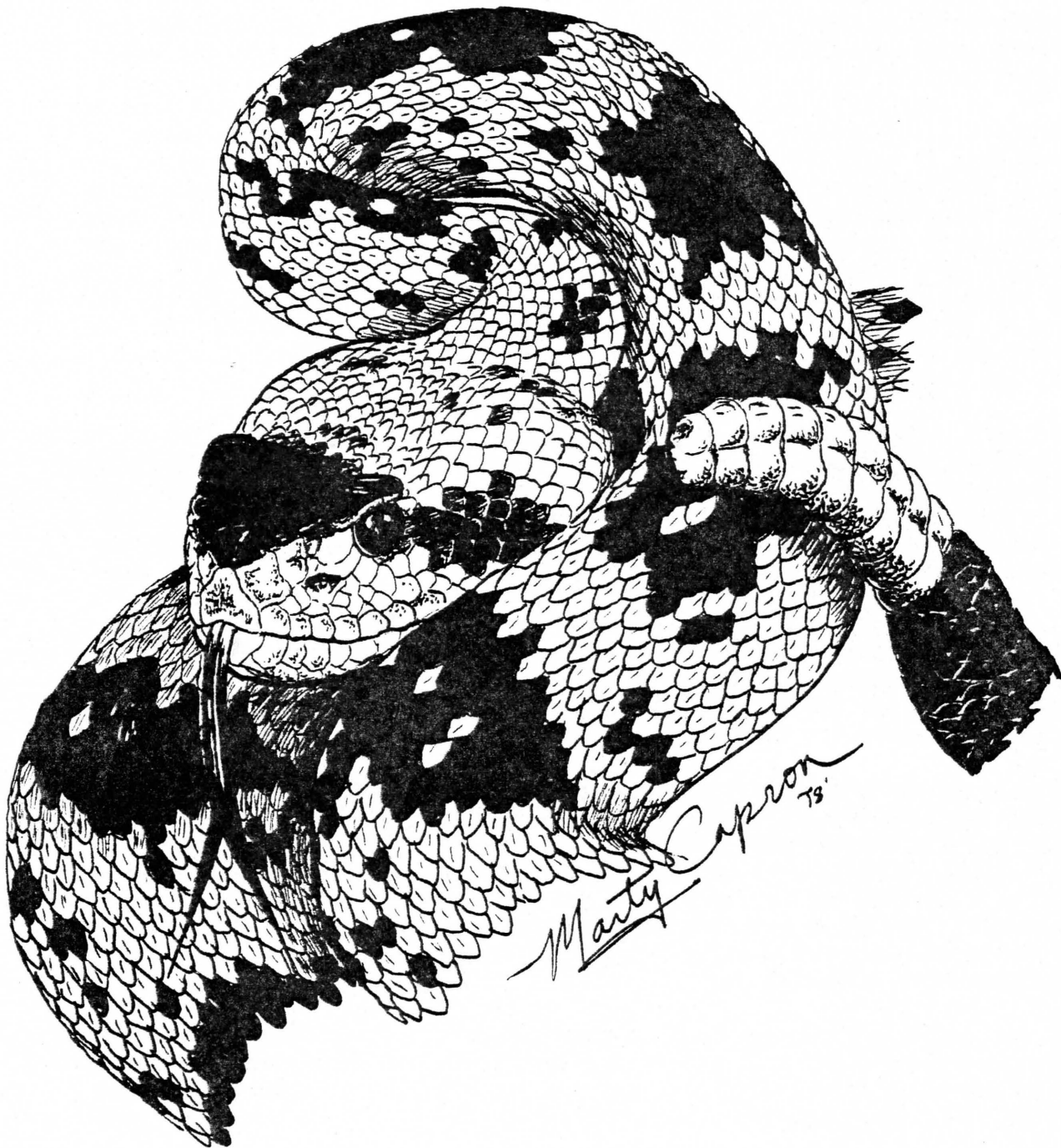
1974. Amphibians and reptiles in Kansas. Univ.KS Mus.Nat.Hist.Pub.Ed.Ser.1:1-283.

Conant, R.

1975. A field guide to reptiles and amphibians of eastern and central North America. Houghton Mifflin Co., Boston, xviii-429.

---Larry Miller, 524 North Osage St., Caldwell, KS 67022

* * * * *



TREATMENT OF AN IMPACTED EGG IN A GRAY-BANDED KINGSNAKE

The snake involved was a twenty-one month old female captive-hatched (F_1) cross between a male alterna phase and a female Blair's phase gray-banded kingsnake (Lampropeltis mexicana alterna). Gravidity had resulted from a series of matings with an unrelated Blair's phase male. The afflicted snake was a first-time breeder at the time of the egg impaction.

I noticed that the female had deposited the first egg of the clutch at about 1715 hours Mountain Standard Time (5:15 PM) on June 19, 1979. Another egg followed within the hour, but the third egg did not emerge until one and one half hours later. By 2315 hours (11:15 PM), the fourth egg had not yet been deposited, and the female had appeared agitated for some time. At 0630 hours (6:30 AM) of June 20, I awoke to find that the fourth through seventh eggs had been deposited in a random fashion throughout the egg-laying medium (damp sphagnum moss in a gallon jar) instead of in a single adherent mass as is usually the case. The female still held at least one egg about 8 or 9 centimeters anterior to her cloaca. At 1700 hours I found the eighth egg in the jar - I may have overlooked it early in the morning - and the female still held what was obviously a single egg about 6 to 8 cms anterior to the cloaca. Gentle palpating failed to move the egg one iota, and the female remained agitated. By the morning of June 21, I noticed that the egg had become slightly skewed within the female's body. One end of the egg angled ventrally, and the other rested, or pressed, against the snake's spinal column.

In 1976, when I was less experienced in such matters, I had failed to notice the impaction of two eggs in a large Arizona mountain kingsnake (L. pyromelana) which had just laid four eggs. I could not fail to notice, however, that the snake regurgitated all of its meals and soaked itself in the water bowl almost constantly for the next five weeks. It then deposited two eggs, regained its appetite, and ceased its constant soaking. It bred successfully for the next three years.

In the hopes that soaking would help me with my current problem, I soaked the gray-banded kingsnake for several days in 3 cms of water in a gallon jar. I then removed her for a day, and then soaked her again for several days - to no avail. The egg would not budge by itself or with gentle palpating.

I was beginning to worry about the large size and skewed angle of the egg. It seemed that the oviduct might have looped, twisted, or even torn, in which case the egg could never move. The snake's spine was also kinking from the pressure that one end of the egg was exerting upon it whenever the snake moved. Therefore, I decided that surgery might be necessary to remove the egg. An acquaintance of mine has a gray-banded kingsnake which suffers from an impacted egg or two every year. He does nothing about it. The snake resorbs them and always breeds the following year.

I was unable to find any local veterinarians with significant reptile experience, but through local parrot breeders I found a veterinarian, Dr. Irvin Ingram of the Shea Animal Hospital, who was experienced in removing impacted eggs from birds. He contacted a veterinarian in San Diego who knew something

about reptiles, and, who also knew researchers at UCLA who had had experience with snake anesthesia and surgery. With their advice supplementing his experience with birds, I felt fairly confident in the outcome of any necessary surgical procedure.

Dr. Ingram examined the snake and decided that cloacal injection of a lubricant, such as mineral oil, followed by straightening or other manipulation of the presumably looped oviduct via insertion of a probe through the cloaca, was not workable unless the egg was very close (within 2 to 4 cms) to the cloaca. At the same time, he was reluctant to resort to surgery without first having attempted a non-surgical procedure. So, he decided to try inducing labor through intramuscular injections of oxytocin. Since the female had undergone intense labor contractions, I felt that this procedure would not succeed, but I also felt that it would not cause any harm.

During the late afternoon of June 26, two doses of oxytocin were injected an half an hour apart. Unfortunately, my notes on this aspect of the snake's treatment are incomplete. I cannot recall the concentration of the oxytocin solution used, nor the exact dosage administered. Either 1/4 ml was injected twice, or the total dose of both injections was 1/4 ml. In any event, the hormone had no apparent effect upon the snake.

About 45 minutes after the second oxytocin injection, a general anesthetic, Ketaset (ketamine hydrochloride) was administered. An intramuscular injection of 8.4 mg was followed by another injection of 10 mg fifteen minutes later. This dosage was based upon a recommended dose of 20 to 40 mg of ketamine per kilogram of body weight. The snake soon became relaxed, but not comatose. It responded to manipulation with weak body movements, and was capable of some voluntary movement.

The anterior portion of the snake's body was then inserted into a plastic tube having a diameter slightly larger than that of the snake's cross-sectional diameter. Only the posterior portion of the body (from the egg to the tail) was left outside the tube. The tube was then placed on a table and rotated so that the snake's venter faced upward. Then, a few drops of local anesthetic were injected at two or three points in the snake's belly in the vicinity of the egg. While an assistant restrained those portions of the snake's body which lay outside the tube, Dr. Ingram scrubbed the prospective incision site with a bacteriostatic soap. (I had also washed the entire snake with soap and water prior to surgery). The doctor then made an incision through the body wall at mid-belly along the length of the egg to expose the oviduct. In the oviduct, he then made an incision just large enough to allow extraction of the egg. Bleeding was minimal, as it usually is in small reptiles. The oviduct appeared neither deformed nor necrotic, so the incision was closed with dissolving sutures. He then sutured the body wall, using about one suture per cut ventral scale. About twelve sutures were required.

Post-surgical infections are not common in reptiles, but to be safe, Dr. Ingram applied an antibacterial sulfa-based ointment to the surgical wound, and I kept the snake in an autoclaved cloth bag for the next four days. During this

time I did not handle the snake any more than was necessary to determine that it had recovered from the effects of the anesthetic. I next transferred the snake to a clean plastic shoe box lined with paper towels and containing a water bowl. I applied antibacterial ointment to the wound once daily for the next several days.

One week after surgery, I began feeding the snake small meals (furry mice) about twice weekly. Whenever the snake defecated, I immediately washed the container, and the snake if necessary, and applied antibacterial ointment to its wound. Three weeks after surgery, the snake became opaque (blue) and prepared to shed its skin. Just prior to the shed, I cut and removed all the stitches from the body wall, then applied antibacterial ointment to the suture site once daily for the next few days. I then returned the snake to its usual cage and began feeding it normally large meals: several weaned mice, or one or two subadult to adult mice per meal every four to five days.

The impacted egg weighed 16.7 grams upon removal from the snake, while the average weight of the other eight eggs was 12.52 grams apiece at the time of deposition. Either because it had been injured by its prolonged stay in the female's body, or, because it became smeared with blood during its removal, the egg rapidly molded and eventually rotted.

The snake has mated this year, and was found to be gravid during May.

--- Randall N. Johnson, 8342 E. Keim Dr., Scottsdale, AZ 85253

* * * * *



A NON-DESTRUCTIVE TECHNIQUE USED IN TURTLE DIETARY STUDIES

One very important aspect of an animal's natural history is the place it occupies in the food web. Does it feed upon vegetation (herbivore) or upon other animals (carnivore)? Is it a scavenger? Does the diet include many different items, or, only one or two? The answers to these and other questions enable us to obtain a better ecological understanding of the species in question. Although it is sometimes possible to observe an animal feeding in the field, the secretive habits of most reptiles and amphibians have forced investigators to choose other methods.

One very useful method is an examination of the stomach contents of selected individuals. In most cases, however, this operation has involved killing the animals. Aside from philosophical considerations, there is a scientific reason to try to avoid sacrificing animals when obtaining ecological data. Scientific observations should be conducted in a manner which introduces the least amount of perturbation into the system under investigation. In certain cases, such as a dietary study of an endangered species, the unsuitability of sacrificing these animals is intuitively obvious. The information obtained from such a food study may, however, be essential in the development of an appropriate management program. Fortunately, alternative methods of obtaining this vital information are available for many species.

When dealing with snakes, for example, it is a relatively simple procedure to manually force up any ingested food from the stomach. I have observed Dr. Henry S. Fitch do this in the field. When the identity of the food item was determined, it was manually forced back into the stomach. Although it is sometimes regurgitated, the prey item often remains in the stomach where it is eventually digested. We can see that this system enables us to obtain the desired information while a minimal adverse effect results.

A similar method has been developed for examining the stomach contents of turtles. Basically, the procedure involves flushing out the stomach with a continuous stream of water. While the turtle is held upside down, a plastic tube is inserted into the mouth and passed into the stomach. The attached syringe draws water through another tube. In this way, the contents of the stomach are displaced by the water. This method removes virtually all of the stomach contents of turtles up to 25 cms carapace length. The first material to be removed usually consists of small whole animals, such as insects and crustaceans. Next, the plant material comes out in one solid mass. Finally, the appearance of a mucous-coated mass is a reliable indication that the stomach has been completely emptied. For large turtles, the technique may be applicable if a larger stream of water is used. Stomach flushing appears to be a relatively safe procedure that can be efficiently employed in obtaining dietary information for many species of turtles.

Legler, J.M.

1977. Stomach flushing: a technique for chelonian dietary studies. Herpetologica 33(3):281-284.

---Hank Guarisco, Museum of Natural History, University of Kansas, Lawrence, KS 66045

* * * * *

KANSAS LEGISLATURE PASSES LAW FUNDING STATE'S NONGAME WILDLIFE PROGRAM

Through the combined efforts of many organizations and individuals HB 2772 has been passed and signed into law. This establishes a mechanism whereby Kansas income taxpayers may donate money to a Kansas nongame wildlife program. It provides for a check-off which taxpayers may use to donate a portion of their refund or an amount in addition to their tax liability for the program. Moneys so donated are to be deposited in a fund which is to be used by the Fish and Game Commission for preserving nongame wildlife.

In 1975, the Kansas Legislature passed the Nongame and Endangered Species Conservation Act but provided no moneys to carry out the responsibilities that were mandated. The lack of funds has seriously retarded the program, however, much planning has been accomplished. Nongame wildlife is included in the Agency's comprehensive plan. Also a nongame section and Threatened and Endangered Wildlife section is included in the Agency's strategic plan for managing the Kansas wildlife resource. A cooperative agreement for cooperative funding of endangered wildlife projects has been completed with the U.S. Fish and Wildlife Service. Wildlifers, outdoors people and individuals have been organized, and are forming a Citizens Advisory Committee to work with the Fish and Game Commission in the development of an expanded nongame program.

Colorado first developed this method for funding a nongame wildlife program. Now in its third year, it has permitted Colorado to develop one of the best such programs in the nation. Oregon, Utah, Minnesota and Kansas have now adopted a similar funding source.

We are very pleased, excited and enthusiastic about the future of this legislation as it will benefit all wildlife and their habitats.

My personal heartfelt thanks along with those of the Fish and Game Commission are extended to all who worked and succeeded in the passage of this legislation.

--- Marvin Schwilling, Kansas Fish & Game Commission, Project Leader Nongame and Endangered Wildlife

* * * * *

The following is a copy of House Bill NO. 2772: an act providing for individual income tax check-off for the Kansas nongame wildlife improvement program:

"Be it enacted by the Legislature of the State of Kansas:

Section 1. Each Kansas state individual income tax return form for tax years commencing after December 31, 1979, shall contain a designation as follows:

Kansas nongame wildlife improvement program. Check if you wish to donate, in addition to your tax liability, \$1, \$5, \$10 or \$____, or designate \$1, \$5, \$10 or \$____ of your tax refund for this program. If joint return, check if spouse wishes to donate or designate \$1, \$5, \$10 or \$____.

Section 2. The director of taxation of the department of revenue shall determine annually the total amount designated for use in the Kansas nongame wildlife improvement program pursuant to section 1 and shall report such amount to the state treasurer who shall credit the entire amount thereof to the nongame wildlife improvement fund which fund is hereby established in the state treasury. In the case where donations are made pursuant to section 1, the director shall remit the entire amount thereof to the state treasurer who shall credit the same to said fund. All moneys deposited in said fund shall be used solely for the purpose of preserving, protecting perpetuating and enhancing nongame wildlife in this state. All expenditures from such fund shall be made in accordance with appropriation acts upon warrants of the director of accounts and reports issued pursuant to vouchers approved by the director of the Kansas fish and game commission or the director's designee. As used in this act, "nongame wildlife" means any species of wildlife not legally classified as a game species or furbearer by statute or by rule and regulation adopted pursuant to statute.

Section 3. This act shall take effect and be in force from and after its publication in the statute book."

* * * *



IN THROUGH THE OUTBACK

I was having my doubts, flying along on a DC-10, nervously sipping my sixth rum and cola and trying to forget the night I had just past in a low budget Los Angeles motel. Below me was the South Pacific! Thus far it'd been a typical trip for me, plagued by various pitfalls: a police search of our L.A. motel at 3:30AM, a hurricane in Honolulu, the usual stuff. But as the wheels of our jet met the runway, I felt secure and relieved. My friend Jeff Delp and I were in Samoa. We were going to camp there on the island, that is, until Jeff's bags were accidentally sent on to New Zealand! So, we forced ourselves to endure the comfort (and expense) of the Rainmaker Hotel - the only such establishment on the island. The entire building was occupied, inside and out, by hundreds of geckos belonging to two species: Gehyra oceanica and Lepidodactylus lugubris. For five days we explored the island, retrieving our lost gear the second evening, and finally able to do some camping. I noted three species of skinks on the island, none of which I knew the slightest about. I also found a number of marine toads (Bufo marinus) on the island. And in the course of all that, we absorbed a lot of the Samoan culture and South Pacific atmosphere - too much infact! I blundered barefoot onto a poisonous Stonefish while skin diving, and received a sunburn that swelled my eyes shut and swelled and split my lips until they bled. We were grateful to the sympathetic Samoans who brought us buckets of ice, a case of beer, a quart of wine, and, a jar of cold cream to relieve our pain. It was an absolutely wonderful five days there on the islands, and, they were capped off by sighting a Sperm whale from our plane as we departed.

After a rather unusual and scalding encounter with a stewardess on the flight to Sydney, we landed on the "Upside-down continent." (I wish to make it clear at this point that our friends "down under" contend that we are infact the ones who are upside down!) It was interesting that nearly all forms of Australian currency portray some form of indigenous wildlife, notably, monitors and pythons on one dollar bills and frilled lizards on two-cent pieces. We spent little time in Sydney, contending with a metropolis a bit larger than Los Angeles! Despite a broken camera, we hopped a bus for Melbourne and pushed on. By six AM on the fifteenth of January, we were at KHS member, Anthony Sokol's house. Anthony showed me his private collection: a pair of water dragons (Physignathus lesueurii), a pair of blue tongue skinks (Tiliqua nigrolutea), and some fascinating green tree frogs (Litoria caerulea) nearly five inches long.

We went to a nearby wildlife sanctuary to become acquainted with some of the peculiar native forms of animal life in semi-wild conditions. We saw such things as the platypus, koalas, bandicoots and numerous other critters. But the next day, Anthony took us out into the "Bush." (This word refers to any area of undeveloped land.) The bush, in this case, was a mountainous area, something like a cross between Olympic rain forest and the Swiss Alps - not exactly what I'd expected at first. However, herps began showing up in abundance. We found a DOR Australian copperhead (Austrelaps superba). Beside a brook we found an Alpine treefrog (Litoria verreauxii) and two smooth frogs (Geocrinia victoriana). Rounding a curve in the road, we saw a shrike thrush flying off with what appeared to be a worm. The bird dropped the "worm," which turned out to be a juvenile tiger snake (Notechis scutatus). A couple of miles down the road as we searched a meadow,

I literally stumbled upon a four-foot example of the same species. After some hectic moments, Anthony and I succeeded in getting the snake under control. I even posed for a rather shaky picture, holding the venomous snake by its tail - the safest end! Later we caught skinks of two species, the water skink (Sphenomorphus sp.) and a ground skink (Leiopisma sp.). A highlight of the day - if you can beat a four foot tiger snake - was finding two Baw Baw frogs (Philoria frosti); a frog similar to our narrowmouth toads (Gastrophryne sp.), endemic to a single mountain, Mt. BawBaw. Other sights for the day included: Swamp Wallabies, a common wombat, great sulphur-crested cockatoos and scarlet rosellas.

The time changes and schedules had me entirely off balance, but, by the 18th we were on a bus heading for the interior - the out back. Alice Springs is a long way from anywhere, 980 miles from where we were! It was to be a long bus ride. Along the way, we passed through the underground opal mining town of Coober Pedy and had a flat at Mabel Creek; but, most of the dirt road to Alice was lonely and without many stops. From the bus we saw a flock of emus, some kangaroos, a dingo, feral camels, and "brumbies," as wild horses are known there. But the last six hours of the trip through the desert night were the best. Only four of us occupied the bus by now, and, I sat near the front watching the road. A large, poisonous king brown snake (Pseudechis australis) was the first find, having gained the full cooperation of our driver. An unidentified gecko appeared next, quickly followed by a small death adder (Acanthophis antarcticus). Twenty-five kilometers down the road we came upon a yard-long example of a Children's python (Liasis childreni). We were exhausted upon reaching Alice Springs at 10:00 PM, and settled into a deep sleep. In and around Alice we found unidentified skinks. We chartered a plane to fly us to Ayer's Rock some four hundred miles to the southwest. On the morning of January 22, my twenty-first birthday, we took off for the great monolith. We made camp quickly and set off to the base of the rock. Numerous skinks scurried over the hot sand, but, one movement caught my eye. A small Moloch (Moloch horridus) rested beneath a bush. It was an amazing creature, uncannily similar to our horned lizards (Phrynosoma sp.), yet strikingly different. Several hundred yards onward we found a juvenile bearded dragon (Amphibolurus barbatus). The rock, 348 meters high, three miles long, two miles wide, was incredible. As the sun rose higher, our thermometer approached 105° F. A dingo ran away from a waterhole at the base of the rock, and upon investigation, we found the waterhole crowded with tadpoles of some sort. Right in the center of one of the greatest deserts in the world was a puddle full of anuran larvae! By the time we were half way around the Rock, it was 1:00 PM, and 118°F. We climbed up the shoulder of the dome-shaped rock a little way, but decided not to go all the way up. Coming down the rock was a white South African lawyer who, in both manner and looks, duplicated James Bond. There was a bar on the other side of the rock, so we got into his rented car and retreated for a cold, world-famous Aussie Beer. The bartender displayed a large jar full of "Ever-clear" grain alcohol in which several snakes, giant centipedes and huge scorpions were preserved. "That devil there, he bit a bloke right here in this pub just last weekend! Had to fly 'im to Port Augusta to save 'im!" he said, pointing to a 2 1/2-foot king brown snake.

We set out to scale the Rock at 4:00 PM, and the going was rough. The surface temperature now read 122°F, and, I thought for a moment that my 21st birthday was

to be my last! We conquered it's full height by 5:30 and started down. Small geckos were now scurrying about the surface as the sun began to fade, but, I could not identify them.

That night, back at the bar, we celebrated my birthday in an all-night roaring brawl in the company of 15 Aussie ranch hands, the South African, two Germans, two Swiss, and two Danes! So, in international company, we celebrated being there - in the middle of nowhere - together that one night. At dawn we radioed our charter flight, informing them that we were driving back with our lawyer friend instead. The morning drive (some 350 miles back to Alice) was fantastic. A huge emu crashed out of the bush beside our car and kept an even pace with us for a hundred yards or so as my camera clicked wildly. I had dozed off into a hangover stupor when Jeff and the South African yelled out simultaneously, "Goanna!", the Aussie slang for monitor lizard. Beside the road sat a five foot Perentie goanna (Varanus giganteus) feeding upon a road-killed rabbit. I snapped two quick shots and jumped out in pursuit. A mad dash found both lizard and I squaring off on opposite sides of a burrow. It was a stalemate, he knew I could jump him before he reached the hole, but as he raised up, puffed out his throat and nervously lashed his tail about, I realized that if I got him, he'd get me! The intimidation worked, and I yielded to him. On down the road, I attempted to chase down two sand goanna (Varanus gouldi), monitors some three feet in length. They were extremely swift, and reached their burrows long before I did.

When we reached Alice our time was running short. The South African had a private plane to whisk him on his way, telling us to be sure to stop by the next time we were in Pretoria. I assured him I would. I had to leave Alice the next day. Jeff would continue to the Great Barrier Reef, and, then to Fiji. I had to return to Sydney, then to the cold, frozen U.S. It had been an amazing, wonderful trip indeed. So, the next time you've got three or four thousand bucks lying around, don't buy a new car, take a month off and go down under instead.

----- Marty Capron, Oxford, KS

