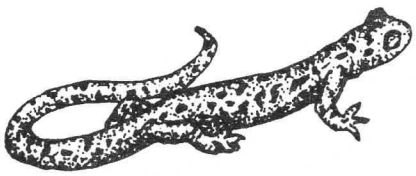
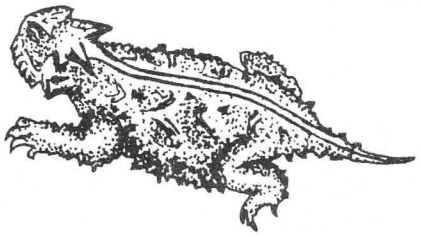


KANSAS HERPETOLOGICAL SOCIETY NEWSLETTER



Number 20 August 1977

KHS OTTAWA COUNTY MEETING PROFITABLE

A majority of the thirteen KHS members attending the 1977 July field trip arrived at Ottawa County State Lake by 6:00 pm on Friday, 8 July. This was the second KHS-sponsored field trip of the year, and prospects were good for collecting some new county records of amphibians and reptiles. On previous KHS field trips during July, the Society members had obtained many important distributional records for Kansas, and this trip to the eastern part of the Smoky Hills Province provided a promising region in which to collect. The KHS campsite was set up at a remote end of the County lake, well away from the weekend crowd of swimmers.

After a late afternoon meal, members scattered by car or on foot in various directions to search for herps. That evening, the following species were found in and around the lake: Eastern Ornate Box Turtle (Terrapene o. ornata), Plains Leopard Frog (Rana pipiens complex), Bullfrog (Rana catesbeiana), and Blanchard's Cricket Frog (Acris crepitans blanchardi). The various field parties regrouped at the KHS campsite for some relaxation with cards, coolers and conversation.

Saturday morning (9 July) was bright and clear, and well-fed KHS herpers took off to explore Rock City near Minneapolis, Kansas. Enroute to their destination, they accumulated a DOR Plains Yellow Mud Turtle (Kinosternon f. flavescens) and 35 AOR Great Plains Toads (Bufo cognatus). The latter were busy playing "target" for on-coming cars and trucks. At Rock City, the group marveled at the strange and unusual formations which, incidentally, provided homes for Rocky Mountain Toads (Bufo w. woodhousei) and Great Plains Skinks (Eumeces obsoletus). After a tour of the formations, the KHS members started back to the lake. After a much needed food stop in Minneapolis, they arrived at the lake and met fellow KHS member Stan Roth and his family. The Roth's had been camped there most of the previous week while Stan and his wife, Jan, conducted faunal and floral surveys for the State Biological Survey of Kansas. J. T. Collins arrived from Lawrence about 9:00 am while the assembled members were out doing their thing. At lunch, two non-KHS members from Hutchinson arrived, and KHS Secretary-Treasurer Marge Perry promptly signed them up to the cause. The new members, J. D. Jennings and Elvis Pryor, joined right in with the conversation and relaxation.

With lunch leisurely devoured during an Executive Council Meeting, the KHS patrol hit the field for some daytime collecting. At the end of the day's collecting, the group had added five more species to their list. The evening was beautiful, but extensive road-cruising yielded only a half-dozen smashed turtles. Back at camp, everybody was preparing for rest when Stan Roth arrived with his tape recorder and turned on some owl calls. This turned on the owls, and everyone was treated to a fascinating night observing owls at close range. Stan and KHS president-elect Larry Miller were able to photograph two nervous screech owls at close range.

Sunday morning (10 July) came early at 5:30 am for those members sleeping in the open -- the threat of rain caused them to scurry for any available shelter, but Jan Perry refused to unlock her station wagon and let them in with her. Kansas storms being unpredictable, it did not rain. Breakfast at the Carver Inn in Minneapolis filled the stomachs, and nearly everyone headed for home. All told, the KHS July field trip yielded seven county records out of a total of 14 species of amphibians and reptiles observed or collected. It was a trip enjoyed by all.

--KELLY IRWIN, 2218 West 2nd Street, Topeka, Kansas.

KHS TO HUNT COTTONMOUTHS

The September field trip of the Kansas Herpetological Society will be held from 9 to 11 September at Montgomery County State Lake. The 105 acre State Lake is located four miles south and one mile east of Independence in southeastern Kansas, and features camping, picnic tables, drinking water and concession stand. The total park area is over 300 acres.

Evidence is accumulating that the western cottonmouth (*Agkistrodon piscivorus leucostoma*) may occur over wide areas of Montgomery County, particularly along the Verdigris River and its tributaries. All KHS members and friends are urged to join this trip and help determine the status of this venomous snake in Kansas. Information gathered regarding the presence of the western cottonmouth in southeast Kansas is of great importance to Kansas citizens--your help is needed. Plan to attend.

The KHS Executive Council will meet at noon on Saturday. A reminder--bring flashlights, gloves, high boots, snake tongs (if possible) and mosquito repellent.

KHS HOLBROOK CONTEST ESTABLISHED

The KHS has received a gratis copy of the SSAR Holbrook facsimile reprint in recognition of its financial support to the SSAR in reprinting this most important work on North American amphibians and reptiles.

Since the KHS does not maintain a Society library, the KHS Executive Council decided at the Ottawa County meeting on 9 July 1977 to initiate a contest to award the Holbrook facsimile to the winning KHS member. Contest rules are:

1) All participants must be KHS members.
2) No elected KHS officers for 1977 or 1978 may participate.
3) No member of the judging committee may participate.
4) A winner will be selected from among those KHS members publishing the most original paper on Kansas amphibians and/or reptiles appearing in the KHS Newsletter. The contest is restricted to articles appearing in KHS Newsletters 22 (December 1977) through 27 (October 1978).
5) The Holbrook facsimile will be awarded to the winner at the 5th annual KHS meeting in November 1978.
6) A second prize of selected Holbrook color plates will be awarded to the second place entrant.
7) A third place entrant will receive a free KHS membership for calendar year 1979.

The KHS Executive Council has appointed Janice Perry, Larry Miller, and Joseph Collins to serve as the judging committee for this contest.

WORLD'S OLDEST SNAKE DIES

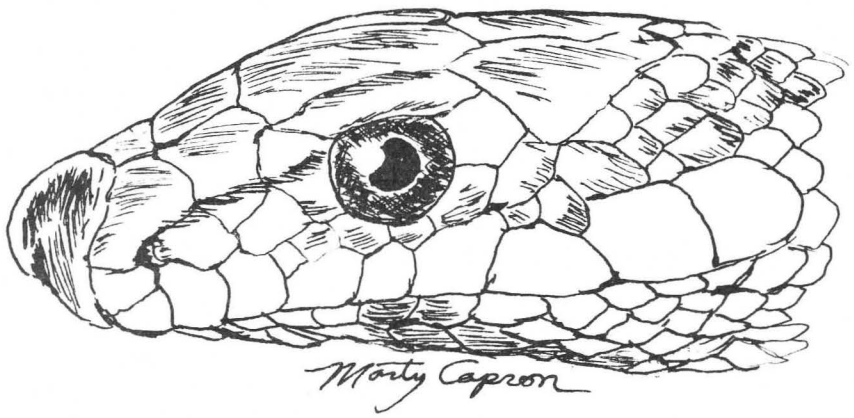
The world's oldest-known snake, a South American boa constrictor, died at the Philadelphia Zoo on April 15, 1977. She was euthanized because of medical problems associated with advanced age. The boa constrictor, named "Popeye," attained the maximum known longevity record for any snake of 40 years, 3 months, and 14 days.

Popeye was first acquired by Mrs. Eugenia S. Shorrock of Reading, Massachusetts on December 31, 1936. The snake arrived at the Philadelphia Zoo on December 3, 1970. Curator of Reptiles J. Kevin Bowler said, "Only five other snakes are known to have exceeded 30 years in captivity. Captive longevities may indicate to some extent the maximum life spans possible."

Because of her age, Popeye was never exhibited at the Philadelphia

Zoo. She was considered a resident in retirement. Popeye measured 180 cm (6 feet) long.

Reprinted from "News from the Philadelphia Zoo"



THE KANSAS HERPETOLOGICAL SOCIETY: A BRIEF HISTORY

The Kansas Herpetological Society was formed on 18 May 1974 at the Museum of Natural History on the University of Kansas campus in Lawrence. Interested herpetologists gathered at this meeting to ratify a proposed constitution for the operation of the proposed Society. The proposed constitution was the product of an ad hoc committee consisting of Mary Dawson, Al Kamb, Richard Plumlee, Stanley Roth, Robert Sprackland, and Eric M. Rundquist (presiding). Items such as election of officers, the vote on the proposed constitution, and the goals of the Society were discussed at this formative meeting. With the passage of the KHS constitution by the more than 30 interested individuals present, the Kansas Herpetological Society was launched and, since that day, has been very active in herpetology, both statewide and nationally.

This brief history attempts to document the KHS past, show its current directions, and guess at its future. The KHS has undertaken numerous and varied projects, as the following examples will demonstrate.

During May 1975 the KHS conducted a survey of the amphibians and reptiles of the Kingman County Game Management Area in cooperation with the Kansas Forestry, Fish and Game Commission. This project involved taking a census of burned and unburned portions of the GMA to determine differences in the composition of the herpetofauna. While only partially successful, the survey did result in the discovery of the sixth known specimen of the southern prairie skink (Eumeces septentrionalis obtusirostris) in Kansas. In February 1976 the KHS published and distributed (free to members) a pocket-size checklist, prepared by Eric M. Rundquist, which has proven so popular that a revised second printing will be issued very soon. During April 1977, the Society supported and participated in an organized nature sit-in on

the Chikaskia River in south-central Kansas. Over 100 persons attended this program, organized by KHS members Larry Miller, Gene Trott and Marty Capron.

In the area of Society publications, the KHS has been most active. Janice Perry has built the Kansas Herpetological Society Newsletter into a solid respectable publication, one of the best state herpetological society publications in the United States. With the help of her Associate Editor David Grow, Janice has implemented new features in nearly every issue of the KHS Newsletter. Regular features include a report of the immediate past meeting or field trip, announcement of the next program, current literature, an annual directory of KHS members, feature articles, and, more recently, photographs of interesting amphibians and reptiles. In addition, the "Hopping Hemipenis of Horror" award has been given annually by the KHS to the organization, institution or individual most deserving it. Winning candidates have been rattlesnake round-ups, roadside snake shows and commercial exploiters of animals and their by-products. With regard to rattlesnake round-ups, the KHS has taken a firm stand in condemning these activities.

On a national scale, the Society cooperated with the Society for the Study of Amphibians and Reptiles in the publishing of James B. Murphy's "Treatment and care of captive reptiles" in October 1975. In August 1976, the KHS Executive Council voted to contribute money to assist the SSAR in producing a facsimile reprint of Holbrook's monumental "North American Herpetology," originally published in 1842 and unobtainable. The KHS was one of only two state herpetological societies to assist the SSAR in this project.

Since its inception over 3½ years ago, the Kansas Herpetological Society has been represented and guided by an active and resourceful membership with a wide range of talents and interests. From these have come the officers of the Society. During 1974, the elected officers of the KHS were: President - Eric M. Rundquist, President-Elect - George R. Pisani, Treasurer - Mary E. Dawson, and Secretary - Richard Lattis. During 1975, Eric stepped down to become Past-President, George assumed the Presidency, and Jan Caldwell became President-Elect. Mary was re-elected Treasurer, but Dick Lattis accepted a position with New York's Bronx Zoo, and his vacancy was filled by Terry D. Schwaner as KHS Secretary. In 1976, Robert F. Clarke became President-Elect, and Delfi Messinger was elected Treasurer. They were joined by returning officers Jan Caldwell (President), George Pisani (Past-President) and Terry Schwaner (Secretary). Each of the officerships outlined above sits on the KHS Executive Council, the governing body of the Society. In November 1976, the KHS members voted to amend the KHS constitution to combine the offices of Secretary and Treasurer, and to make the KHS Newsletter editor a member of the Council. Larry Miller was voted

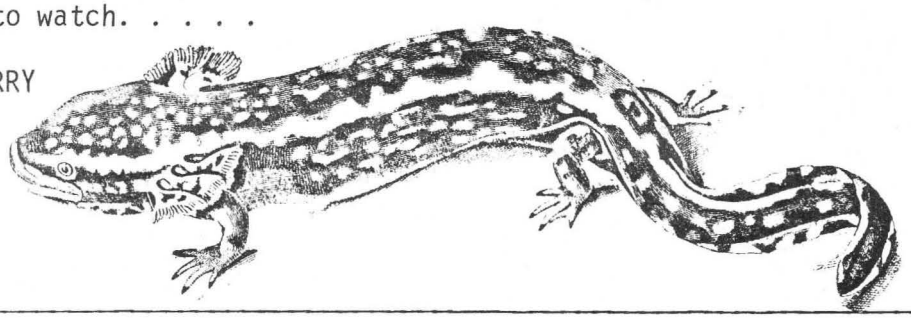
President-Elect for 1977, and will lead the KHS during 1978.

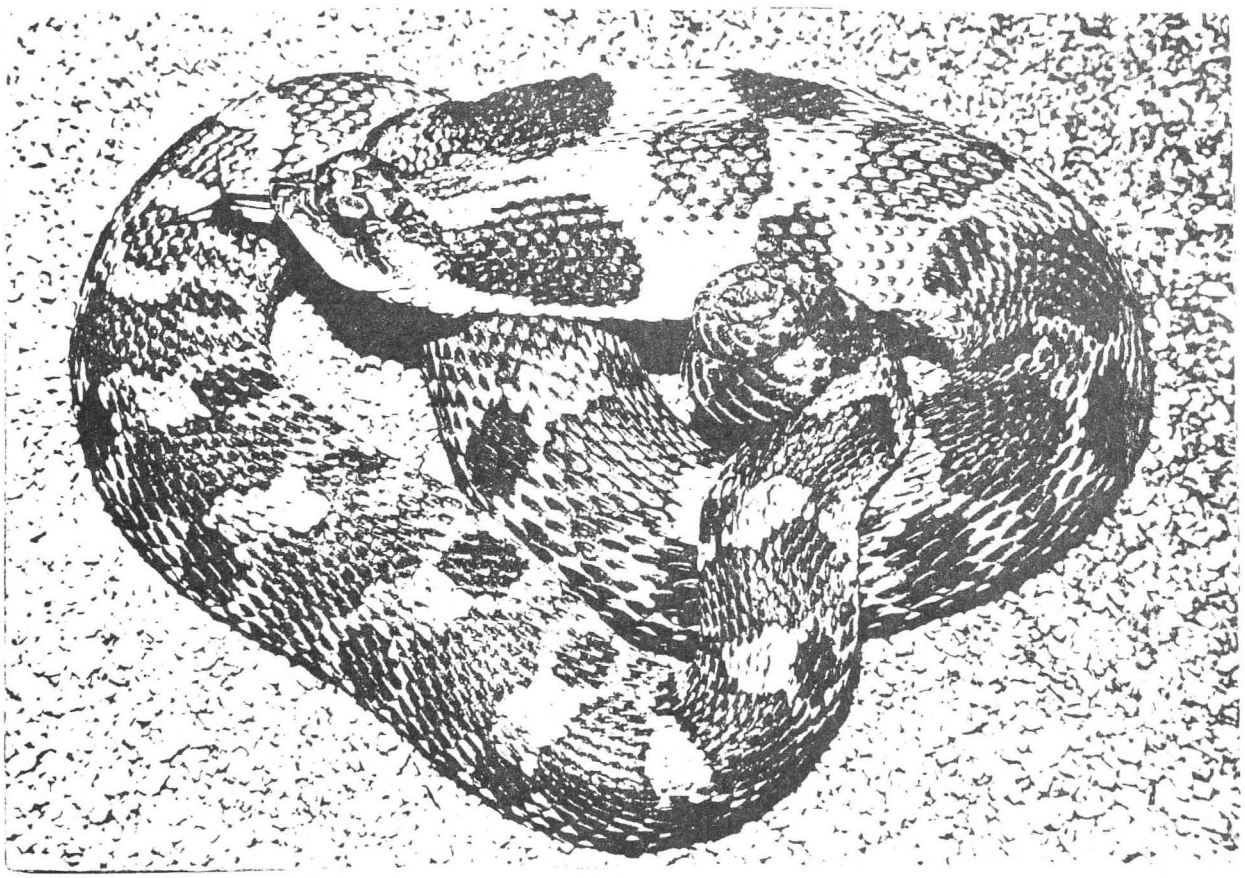
The first three years have shown that the Kansas Herpetological Society is a highly successful state society, both in terms of number of members and financial solvency, and in services provided to its membership. From a membership of 40 individuals in 1974, the KHS has grown to nearly 140 members as of mid-year 1977. During 1974, the KHS membership consisted mostly of Kansas residents, but as of 1977 its membership has spread throughout the United States, and even includes four members in other countries--Australia, Belgium and Venezuela. Financial solvency for the KHS has been the result of vigorous membership campaigns, and wise and diversified income-producing projects and publications. When compared with some of the other state and regional herpetological societies, it is amazing that the KHS can produce six issues of the Newsletter per year, hold three field trips per year, hold two regular meetings per year, and an annual meeting, plus produce a checklist and cooperate with a national society in publishing additional pamphlets and facsimile reprints, and do all this on annual individual dues of $3.00.

KHS winter meetings have been popular with the membership. These meetings provide an important activity for members during the most inhospitable time of the year, and give many individuals an opportunity to speak about their current research or field projects. Among past distinguished speakers at KHS meetings are: Robert F. Clarke, Joseph T. Collins, Henry S. Fitch, Arnold Froese, David Grow, Kelly Irwin, Randy Johnson, Harvey Lillywhite, Luis Malaret, Larry Miller, George Pisani, Dwight Platt and George Toland.

Thus, the Kansas Herpetological Society has attempted to serve its membership in a wide variety of ways. In the future, the KHS hopes to become more active. With this issue of the KHS Newsletter, the editor presents a new feature -- our first facsimile reprint of an old, out-of-print article on Kansas herpetofauna. But, can the KHS survive? New members are needed, and new officers must be found who will operate the Society at the level it has achieved while searching for the ways and means to improve its existing programs. Who will step forward to do the work, where are we headed? Will we remain a strong state society? Or fade into nothing and disband? Are we upwardly mobile like the old Ohio Herpetological Society which eventually became the SSAR? Will our Newsletter become a professional journal? The Kansas Herpetological Society is reaching a peak -- the next year or two will be most crucial to its future. A new Society for the Study of . . .? It will certainly be most interesting to watch. . . . .

---JANICE PERRY





An Eastern Hognose snake (Heterodon platyrhinos) displaying its bluffing posture (Photograph by Joseph T. Collins).

CURRENT LITERATURE

This current literature section has been compiled by J. T. Collins, and contains titles of books and articles on amphibians and reptiles of possible interest to KHS members. Generally, titles listed here are those written by KHS members, those which contain direct reference to Kansas herpetofauna, or those of significance regarding North American amphibians and reptiles.

Collins, J. T. and R. E. Kurtz.
1977. A bibliography of the amphibians and reptiles of Kentucky (1820-1976). Meseraull Printing, Lawrence, Kansas. 21 pp.

Conant, R.
1977. The Florida water snake (Reptilia, Serpentes, Colubridae) established at Brownsville, Texas, with comments on other herpetological introductions in the area. Journ. Herp., 11(2): 217-220.

Dyrkacz, S.
1977. The natural history of the eastern milk snake (Reptilia, Serpentes, Colubridae) in a disturbed environment. Journ. Herp., 11(2): 155-159.

Gillingham, J. C., C. C. Carpenter, B. J. Brecke and J. B. Murphy.
1977. Courtship and copulatory behavior of the Mexican milk snake, Lampropeltis triangulum sinaloae (Colubridae). Southwest. Nat., 22(2): 187-194.

Henderson, R. W. and L. G. Hoevers.
1977. The seasonal incidence of snakes at a locality in northern Belize. Copeia, 1977(2): 349-355.

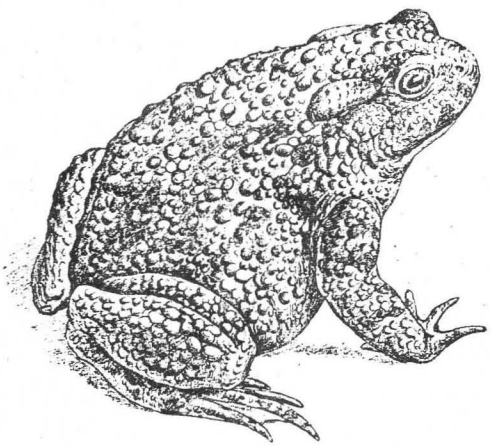
Parker, H. W. and A. G. C. Grandison.
1977. Snakes- a natural history. Cornell University Press, Ithaca, New York 14850. 108pp + color plates. Available for $3.95 (soft-cover) from Cornell.

Smith, A. K.
1977. Attraction of bullfrogs (Amphibia, Anura, Ranidae) to distress calls of immature frogs. Journ. Herp., 11(2): 234-235. (Note: A. K. Smith data is based on observations of Kansas bullfrogs).

Smith, H. M., R. B. Smith and H. L. Sawin.
1977. A summary of snake classification (Reptilia, Serpentes). Journ. Herp., 11(2): 115-121.

Tucker, J. K., R. S. Funk and J. T. Collins.
1977. Distributional notes on Kirtland's water snake, Clonophis kirtlandi (Kennicott). SSAR Herp Review, 8(2): 40-41.

Walsten, D. M.
1977. Living jewels of the tropics. Field Mus. Nat. Hist. Bull., 48(7): 7-9.



NEW KHS SERIES

The reprinted article to the right on this page is the first in a new KHS facsimile reprint series. This series will feature old, out-of-print, hard-to-obtain, short articles on Kansas amphibians and/or reptiles. They will appear irregularly as space and availability permit.

The KHS editors welcome suggestions for future facsimile reprinted articles. Please let us know what you think of this series. We hope these small reprints will prove interesting and useful to the KHS membership.

Reprinted from Science, 74(1926): 547-548. 1931.

AN ADDITION TO THE HERPETOLOGICAL FAUNA OF KANSAS

A SINGLE specimen of *Bufo punctatus* Baird and Girard was secured in the vicinity of Elkhart, Morton County, Kansas, by W. H. Burt and a party of students from the Museum of Birds and Mammals, University of Kansas, between June 25 and July 5, 1927.

I believe this to be the first record of this species in Kansas. The systematic papers on Kansas herpetology, including the recent "List of Reptiles and Batrachians of Morton County, Kansas,"[1] make no mention of it.

p. 548

Published records of the range of *Bufo punctatus* report it from western Texas to southern California and Lower California.[2] It has also been reported from Utah[3] and extreme southwestern Colorado. Ortenburger[5] reports a single specimen from Comanche County, Oklahoma, which seems to have been the northernmost record east of the Continental Divide. So it would appear that the known range of *Bufo punctatus* east of the Rocky Mountains has been extended about a hundred miles to the north.

Bufo debilis, a near relative, has been recently discovered in the same locality,[6] which makes the occurrence of this species less extraordinary than it would have been otherwise.

The measurements of the Kansas specimen (*Kansas Univ. Mus. Nat. Hist.*, No. 9100) are given below. They are quite average for specimens of *punctatus* from Texas and New Mexico.

Total length	51 mm
Length of head	11 mm
Width of head	21 mm
Length of hind leg	40 mm
Length of foot	30 mm
Least interorbital width	7 mm
Width of parotoid gland	6.5 mm
Length of parotoid gland	5.5 mm

J. ERIC HILL

MUSEUM OF BIRDS AND MAMMALS,
UNIVERSITY OF KANSAS

[1] E. H. Taylor, *Univ. Kansas Sci. Bull.*, XIX, 6: 63–65, 1929.

[2] L. Stejneger and T. Barbour, "Check List of North American Amphibians and Reptiles," *Harvard Press*, 1923.

[3] V. M. Tanner, *Copeia* 166: 25, 1928.

[4] M. M. Ellis and J. Henderson, *Univ. Colorado Studies*, 1915.

[5] A. I. Ortenburger, *Proc. Oklahoma Acad. Sci.*, 6: 92, 1926.

[6] E. H. Taylor, *loc. cit.*

A Leopard frog (Rana pipiens complex) from southern Missouri (Photograph by J. T. Collins).

GROSS CONVERSION EFFICIENCY AND GROWTH IN THREE SPECIES OF KINGSNAKES (LAMPROPELTIS)

Gross conversion efficiency is the ratio of weight gain in an animal to the weight of food consumed by the animal. Most studies of conversion efficiency have centered around organisms of practical interest to man, such as domestic food animals. More recently, conversion efficiency has also been studied by those physiologists and ecologists who are interested in the energy budgets of organisms and the flow of energy through ecosystems. This paper reports on growth and gross conversion efficiency in four individual kingsnakes (Lampropeltis). Data from these snakes are compared with other snake data found in the literature.

The snakes used in this study were immature specimens of three species: the Yuma kingsnake (Lampropeltis getulus yumensis) the Gray-banded kingsnake (Lampropeltis mexicana alterna) and the Arizona Mountain Kingsnake (Lampropeltis pyromelana woodini and Lampropeltis pyromelana pyromelana). Due to difficulties in obtaining specimens, only one individual of each of the above varieties was used. The age and sex of each snake can be found in Table 3.

Specimens were housed individually in a variety of commercial and home-made terraria. The substrate in all cages was "Supersoil" brand potting soil. Flat rocks and bark in each cage provided shelters. Substrate temperatures varied from 27.5° C - 30° C, but were usually just under 30° C. Heat was provided by incandescent lamps in the top of each cage. Cages were sprinkled liberally with water once daily; also water was always available in bowls placed in each cage.

The gross conversion efficiency study period for each snake began immediately after ecdysis (shedding) during February 1977 and ended after ecdysis closest to 1 May 1977. Snakes were weighed to the nearest 0.1 gr. within 24 hours of each shed during this period. Shed skins were not weighed. An attempt was made to feed each snake 10 to 15 percent of its body weight in mice every two to four days during non-shedding periods (Table 1). Mice were weighed to the nearest 0.1 gr. Because of the preliminary nature of these data, caloric determinations are not yet available; live weights of mice and snakes were used to calculate gross conversion efficiency (%) using the following formula:

$$\frac{\text{Weight gain of snake during study}}{\text{Weight of mice ingested}} \times 100$$

This figure was determined for each snake for each shed-to-shed period that occurred during the entire study period (Table 1).

Each snake's total length (Table 3) was measured at irregular intervals between October 1976 and May 1977; no length data coinciding exactly with the beginning and ending of the conversion

efficiency experiment are available. However, feeding schedules and food quantities consumed per unit time during the pre- and post-experimental periods were identical to those listed in Table 1 for the experimental period.

The data for each snake are presented in Table 1 in a sequential manner that explains the calculation of the presented values. Data such as mean weight of individual meals and feeding frequency are presented because of their possible effect on conversion efficiency, perhaps via their effects on digestive and assimilation efficiency (which were not determined in this study). More data will be required to show any such relationships.

The snakes reported here exhibited gross conversion efficiencies ranging as high as 47%, which may be high compared to many mammals. Efficiencies as high as 31.5% have been reported for pigs raised on high-quality feeds (Vanshoubroek, 1967, as cited by Vinegar et al. (1970) also calculated efficiencies of 9.6% for cattle and sheep using data cited by Brody (1945). Conversion efficiencies of carnivorous mammals, if available, would be more interesting to compare with the efficiencies presented in Tables 1 and 2.

While the gross conversion efficiencies of the snakes reported here may be high compared to some mammals, they are quite comparable to those of snakes studied by other researchers (Table 2). At least some lizards also convert their food quite efficiently: data given by Avery (1971) for one of the European wall lizards, Lacerta vivipera (feeding on meal-worms), yield a figure of 42.5% when calculated as conversion efficiencies based on dry weights of lizards and food.

Vinegar et al. (1970) discussed the possible reasons for the high conversion efficiencies of reptiles as compared to mammals. He and his colleagues felt that the low metabolic rates of reptiles permitted them to convert more food into body weight than was possible for mammals (and, one would suppose, for birds), whose higher metabolic rates cause them to use more of their food for heat production.

The relative digestive and assimilation efficiencies of mammals and reptiles may also be important factors in determining the conversion efficiencies of these two vertebrate groups. The data of Vinegar et al., who studied the Blood Python (Python curtus), yielded values of 94.8% and 91.7%, respectively, when calculated as digestive and assimilation efficiencies. Many lizards, both herbivorous and insectivorous, also have high digestive and assimilation efficiencies (see Johnson, 1975, for a review). Mammals generally exhibit lower efficiencies (Engelmann, 1966; Kilgore, 1972) but most data are for herbivorous or omnivorous mammals and therefore are not directly comparable to snake data.

A reptile possessing both a high conversion efficiency and a good appetite will grow rapidly. Some of the snakes in the present study increased their body weights by several hundred percent over several months (Table 3). My experiences with other kingsnakes, particularly individuals of Lampropeltis getulus, indicate that they can reach mature size (approximately 91+ cm) in 9 to 11 months and are sexually mature

upon reaching this size. Wagner and Slemmer (1976) and Frank Retes (unpublished data) have observed similar growth rates in Elaphe (ratsnakes) and Lampropeltis.

TABLE 1. Feeding, growth, and gross conversion efficiency data for each individual snake.

		INDIVIDUAL & SPECIES'			
		getulus	mexicana	pyromelana pyromelana	pyromelana woodini
First shed-to-shed period	Total # of days	24	27	19	34
	# of days shedding	5	8	6	8
	# of potential feeding days (a-b)	19	19	13	26
	# of meals eaten	7	9	3	8
	Feeding frequency (c/d)	2.7	2.1	4.3	3.2
	Total food weight eaten (grams)*	65.5	31.7	23.5	43.3
	Mean weight of each meal (f/d)	9.4	3.5	7.8	5.4
	Starting weight of snake (grams)	83.4	22.5	62.8	45.1
	Finish weight of snake	113.5	33.8	70.1	62.3
	Weight gain (i-h)	30.1	11.3	7.4+	17.1
	Mean weight of snake during study period (h+i)/2	98.4	28.1	66.5	53.7
	Mean weight of each meal as % of snake body weight (g/k) X 100	9.5	12.5	11.8	10.1
	Gross conversion efficiency, % (j/f) X 100	45.9	35.6	31.3	39.6
Second shed-to-shed period	Total # of days	26	28	36	
	# of days shedding	6	6	7	
	# of potential feeding days (a-b)	20	22	29	
	# of meals eaten	6	6	5	
	Feeding frequency (c/d)	3.3	2.4	5.8	
	Total food weight eaten (grams)*	76.9	46.9	43.5	
	Mean weight of each meal (f/d)	12.8	5.2	8.7	no
	Starting weight of snake (grams)	113.5	33.8	70.1	data
	Finish weight of snake	145.1	50.0	84.5	
	Weight gain (i-h)	31.6	16.2	14.4	
	Mean weight of snake during study period (h+i)/2	129.3	41.9	77.3	
	Mean weight of each meal as % of snake body weight (g/k) X 100	9.9	12.4	11.2	
	Gross conversion efficiency, % (j/f) X 100	41.1	34.5	33.0	
Third shed-to-shed period	Total # of days	22	28	32	
	# of days shedding	5	6	7	
	# of potential feeding days (a-b)	17	22	25	
	# of meals eaten	6	8	4	
	Feeding frequency (c/d)	2.8	2.8	6.2	
	Total food weight eaten (grams)*	94.3	58.1	37.8	
	Mean weight of each meal (f/d)	15.7	7.3	9.5	no
	Starting weight of snake (grams)	145.1	50.0	84.5	data
	Finish weight of snake	189.6	71.4	92.2	
	Weight gain (i-h)	44.5	21.4	7.7	
	Mean weight of snake during study period (h+i)/2	167.3	60.7	88.3	
	Mean weight of each meal as % of snake body weight (g/k) X 100	9.4	12.0	10.7	
	Gross conversion efficiency, % (j/f) X 100	47.7	36.8	20.3	
	MEAN CONVERSION EFFICIENCY	44.7	35.6	28.2	39.6

*All weights listed are live weights.

+Figures not rounded off until all calculations had been completed

'See Table 3 for sex and age of each snake.

TABLE 2. Gross conversion efficiencies of snakes.

SPECIES	CONVERSION EFFICIENCY, %	AGE (years)	REFERENCE
Natrix sipedon	28	0 - 1	Brown (1958)
" "	34	1 - 2	" "
" "	20	5 - 6	" "
Eunectes murinus	17	adult	Barton & Allen (1961)
Python sebae	13	7 - 9	" "
Python molurus	56	2 - 3	Pope (1965)
Spalerosophis cliffordi	21*, 22+	0 - 1	Dmi'el (1967)
" "	26, 33	1 - 3	" "
" "	11, 23	4 - 8	" "
" "	7, 12	9 -13	" "
Python curtus	52, 45, 29'	0 - 2	Vinegar, et al. (1970)
Elaphe quadrivittata	27.2	0 - 2	Ford (1974)
Lampropeltis getulus	44.7	0 - 1	present study
Lampropeltis mexicana	35.6	0 - 1	" "
Lampropeltis pyromelana	39.6	0 - 1	" "
Lampropeltis Pyromelana	28.2	2?-3?	" "

*males only.
+females only.
'data for each of three individuals.

TABLE 3. Growth of four individual kingsnakes.

Species	starting length (cm) tail included	final length (cm)	starting weight (grams)	final weight (grams)	elapsed time (days)
Lampropeltis getulus yumensis (female)	ca. 45	ca. 77	ca. 33	145	140
Lampropeltis mexicana alterna (male)	ca. 38	ca. 53	ca. 14.7	50	92
Lampropeltis pyromelana pyromelana (female)	ca. 52	ca. 74	ca. 35	107	222
Lampropeltis pyromelana woodini (male)	ca. 31	ca. 58	ca. 10	62.3	137

LITERATURE CITED

AVERY, R. A. 1971. Estimates of food consumption by the lizard Lacerta vivipera Jacquin. Journ. Animal Ecol. 40:351-365.

BARTON, A. J. and W. B. ALLEN, JR. 1961. Observations on the feeding, shedding and growth rates of captive snakes (Boidae). Zoologica 46:83-87.

BRODY, S. 1945. Bioenergetics and growth. Reinhold Publ. Co., New York.

BROWN, E. E. 1958. Feeding habits of the northern water snake, Natrix sipedon sipedon Linnaeus. Zoologica 43:55.71.

DMI'EL, R. 1967. Studies on reproduction, growth and feeding in the snake Spalerosophis cliffordi (Colubridae). Copeia 1967:332-346.

ENGELMANN, M. D. 1966. Energetics, terrestrial field studies, and animal productivity. p. 73-115 in J. B. Cragg (ed.), Advances in Ecological Research. Vol. 3. Academic Press, New York.

FORD, N. B. 1974. Growth and food consumption in the Yellow Rat Snake, Elaphe obsoleta quadrivittata. Herpetologica 30:102-104.

JOHNSON, R. N. 1975. Digestive efficiency of the omnivorous lizard Klauberina riversiana. M.A. thesis, Dept. Zool., Univ. Kansas.

KILGORE, D. L. 1972. Energy flow in a hibernator: energy dynamics of the yellow-bellied marmot (Marmota flaviventris). Ph.D. dissertation, Dept. Zool., University of Kansas.

POPE, C. H. 1965. The giant snakes. Alfred A. Knopf, New York.

VANSCHOUBROEK, F., R. DE WILDE and P. LAMPO. 1967. Cited in: VINEGAR, A., V. H. HUTCHISON and H. G. DOWLING. 1970. Metabolism, energetics, and thermoregulation during brooding of snakes of the genus Python. Zoologica 55:19-50.

VINEGAR, A., V. H. HUTCHISON and H. G. DOWLING. 1970. Metabolism, energetics, and thermoregulation during brooding of snakes of the genus Python. Zoologica 55:19-50.

WAGNER, E. and G. SLEMMER. 1976. Some parameters for breeding reptiles in captivity. in Proceedings of the 1976 reptile symposium, Frederick, Maryland.

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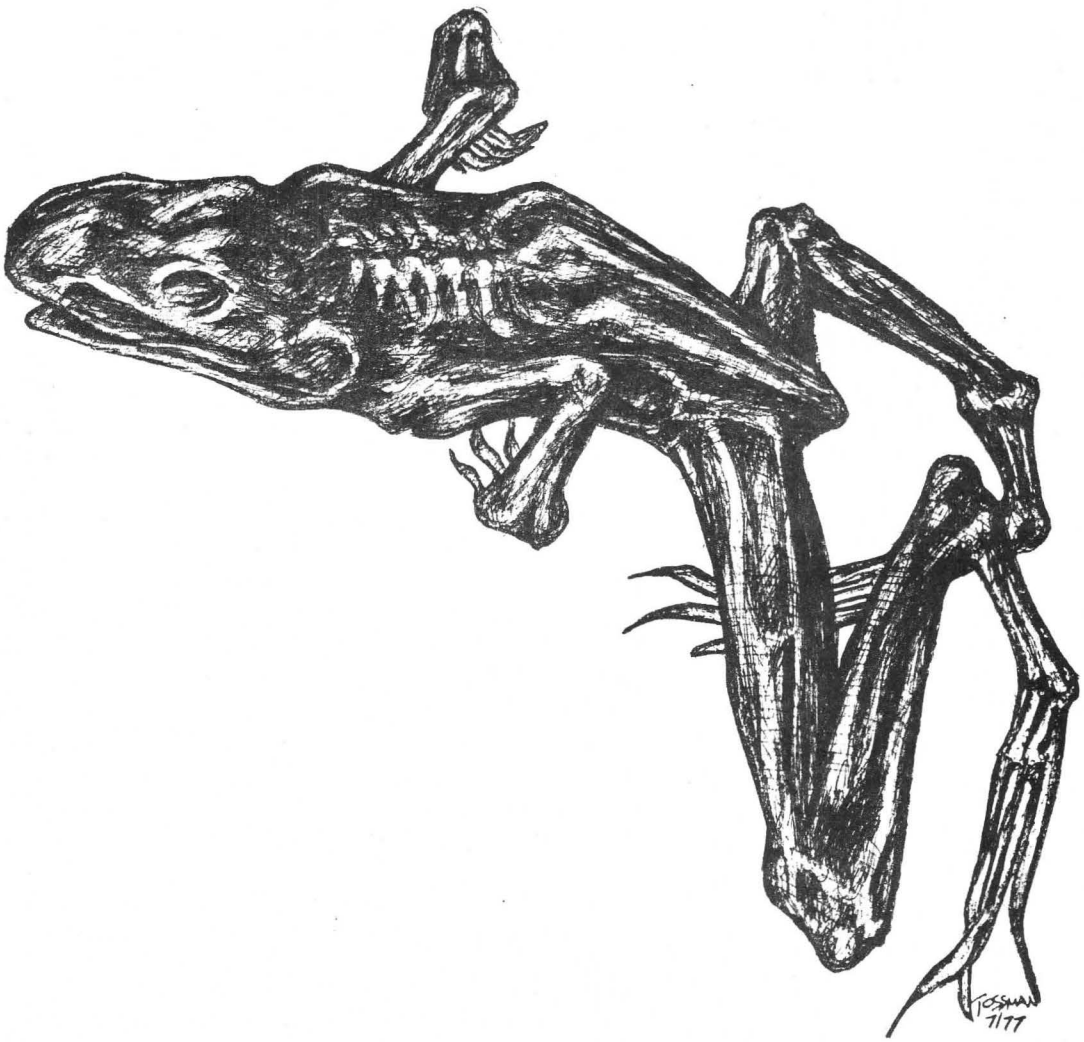

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