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THE BRITISH HERPETOLOGICAL SOCIETY

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FRONT COVER
Adult Sunbeam Snake, *Xenopeltis unicolor.* See "The Successful Breeding of the Sunbeam Snake at Chester Zoo, by Isolde McGeorge. p.1. Photo by Stephen Von Peltz.

THE SUCCESSFUL BREEDING OF THE SUNBEAM SNAKE *XENOPELTIS UNICOLOR* REINWARDT, 1826 AT CHESTER ZOO

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ABSTRACT

Relatively little information has previously been published regarding the Sunbeam Snake *Xenopeltis unicolor* in a captive environment. This is an account of the reproductive husbandry of *X. unicolor* spanning a six year period from 1988-1994.

INTRODUCTION

The family Xenopeltidae is represented by only one species, the Sunbeam Snake, also known as the Rainbow Snake and Iridescent Earth Snake. The name *Xenopeltis unicolor* originates from a combination of Greek and Latin, the former referring to the generic epithet *Xeno* with *pelta* meaning 'strange skin' and the latter referring to the specific name *unicolor*, being 'of one colour', whether it be black, dark brown or tan. The highly polished scales, when reflected in the light, give the snake a glossy purple-blue iridescence. The Sunbeam Snake is commonly found throughout South-East Asia from Burma to Southern China, extending to the Indonesian Islands. It is a shy, secretive animal of nocturnal habit. It is well adapted to its fossorial existence with its cylindrical body, flat, shovel-shaped head, strongly rounded jaws and small eyes.

There is relatively little published information on the Sunbeam Snake but herpetological notes have been provided by Hindley (1987), Tiwari (1992), Cox (1993) and Beardsley (1994).

This is the first full account of the successful maintenance and breeding of this species in a zoo.

Housing and Maintenance

On 22 December, 1985 a wild-caught male *X. unicolor*, approximately 1.0m in length, arrived in the collection. He was housed off-show in an enclosure measuring 91.5 x 30.5 x 38 cm with a front sliding glass door which allowed natural, although subdued, daylight to filter through. This tank was kept in a space-heated environment where the temperature remained fairly constant throughout the spring and summer, fluctuating in any one 24 hour period from the mean daily temperature by no more than -2°C at night. A standard 25W incandescent luminaire was used as a source of light and supplementary heat. A temperature of 28-30°C was achieved between the light bulb and the coldest spot in the enclosure. In the autumn and winter, the temperature gradient dropped down slightly to 24-26°C. A high humidity is not considered to be a critical maintenance requirement and the enclosure was maintained at *ca* 50% RH. A plastic open-topped container filled with moist sphagnum moss was placed at one end of the enclosure for the male to burrow into. Water was provided in a shallow dish, 17cm diameter x 2cm deep. However, drinking was observed on only one occasion in the early evening. There

appear to be no other published observations on the drinking habits of this secretive species. The male fed readily on freshly-killed adult mice which were offered once weekly.

Mating

On 21 December, 1988 a wild-caught female *X. unicolor* was presented to the collection by another zoological institution. The female was held in isolation and routinely checked for internal and external parasitic infection, but none were diagnosed. She was maintained separately under the same conditions as the male. After eight weeks (during which time she accepted freshly killed adult mice offered each week) she was introduced to the male. She was slightly shorter in length and girth than the male and his dorsal surface was a strong chocolate brown versus her reddish tan coloration. Both snakes had the characteristic highly-polished white ventral scales.

On 15 February, 1989 the male (which had spent a solitary existence for the previous three years) responded immediately to the stimulus of the female presented before him. The male, when routinely handled, often moved in a jerky springy action, sometimes flinging his head from side to side. His reaction to the female showed a similar motion but was greatly accentuated. Thereafter, handling the male at any time would provoke a mating response. Handling evidently duplicates in some way the sexual stimulation provided by the female (although there remains the possibility that handling triggers a sexual response through stimulating a memory of an earlier encounter with a female).

As well as jerking, his whole body would shudder and a lot of intermittent body contact was initially observed between them. They then retired into the sphagnum moss hide-box and it is assumed that copulation took place out of sight. Periodically the snakes were separated and reintroduced to promote sexual activity. An additional sphagnum moss container was provided but both snakes preferred to share one box.

Oviposition

In February, 1990 the female refused food and was rarely seen out of the hide-box. On 13 April a hard, round yellow egg was discarded by the female which was identified as an infertile or 'slug' egg. The egg measured *ca* 2.7 x 1.4cm. The male was immediately removed and on 20 April – the day after the female shed her skin – she laid twelve white oval-shaped eggs in the centre of the sphagnum moss box, each weighing between 10 and 13g. Four days after oviposition, the female resumed feeding.

Eggs and Incubation

There was a considerable variation in the physical dimensions of the eggs. The smallest of the eggs measured 3.8 x 2.5cm and the largest egg measured 4.3 x 2.9cm. All of the eggs were placed in a well-ventilated plastic box measuring 44.5 x 28 x 12.5cm with a transparent lid so their progress could be monitored without disturbance to the eggs. The box, after sterilisation with 'Pevidine' (a proprietary brand of iodine-based antibacterial solution), was half-filled with medium grade vermiculite mixed in a 1:1 ratio by weight with tepid water. The box was pre-incubated without the eggs to bring it up to the required temperature (see below). Each egg was then placed in an indentation made in the vermiculite to allow proper air circulation around each of the eggs. A hygrometer was placed in the centre of the box to check humidity levels. Humidity remained fairly constant throughout the incubation period at 95-100% RH. When humidity dropped to 95%, additional water at incubation temperature was added to the four corners of the box, remote from the eggs; but this was only necessary once, near the end of the incubation period.

To minimise the risk of loss through interference, only one egg was selected to be weighed throughout incubation to see how much weight was gained or lost. This egg was weighed at 19.00 hours once per week and on the same day, or as close to this schedule as was practicable.

The box was then placed on a shelf in a space-heated room where the temperature fluctuated between 28-30°C and the room was lit artificially by a 2m long white fluorescent tube of domestic specification. General experience indicates that light is not a controlling factor in egg development, although one assumes that natural light would normally be largely excluded.

Hatching

On 5 July, after seventy-six days incubation, one egg was split and the neonate emerged later that day. Two more youngsters emerged on 6 July, by which time all the eggs were pipping. Four emerged on the 7 July, four on the 8 July and the last one was on the 9 July. The total success rate in terms of hatching was therefore 100%. The neonates, on emerging, immediately buried themselves into the substrate.

On hatching, the young have a distinct pink colour which gradually fades over the following weeks. By six weeks, the neck collar has undergone a full ontogenetic change to the adults' natural coloration.

All of the neonates were weighed and measured, the average length being 23cm and average weight 8.5g. There was very little embryonic residue left in the discarded eggshells which weighed between 1 and 3g each. The neonates were housed individually in small plastic boxes with a dry newspaper substrate for the young to burrow under and a heavy drinking pot to prevent spillage during the young snakes' burrowing activities.

Post Oviposition

The female was kept isolated from the male from the time the eggs were laid in April until October, 1990. By the time she had fed sufficiently and, upon superficial observation, had regained all of the body weight she had lost during the gestation period.

Further Matings

Apart from the male's initial excitement at the presence of the female in his territory, no copulation was observed on subsequent introductions. The familiar regime of introduction and withdrawal of the female to the male was followed as before. It was not until January, 1992 that the female refused to feed again and was visibly gaining in girth. The female was removed from the enclosure and on 5 April she laid thirteen eggs in the sphagnum moss box. Two days after oviposition, the female resumed feeding. This second batch of eggs was incubated with the same general protocol as used for the previous clutch. Although an attempt was made to maintain the same temperature regime, due to a higher than previous external ambient temperature, there occurred a corresponding elevation in incubator temperature. As a result temperatures ranged between 29-31°C. The smallest egg measured 3.5 x 2.3cm and the largest egg measured 4.6 x 2.1cm and weighed between 12.5 and 15g.

On 7 June, after only 63 days incubation, the first youngster started to emerge. Nine more were out by the 9 June and all 13 were successfully hatched by 10 June. By the end of October the female had gained sufficient weight to be returned to the male's enclosure. Again, apart from his initial behavioural response to the return of the female, no copulation was observed.

Plate 1 - Captive hatchling of *Xenopeltis unicolor*
Photo Stephen Von Peltz

Plate 2 – Hatchling *Xenopeltis unicolor.*
Photo Stephen Von Peltz

In February, 1994, the female refused food and was removed from the enclosure. She remained in good condition, gained weight rapidly and looked much heavier than in her earlier gestation periods. On 12 April she laid 16 eggs in the sphagnum moss box and accepted a meal that same evening. Eight of the eggs were aggregated in strongly adhered groups of three, three and two. Separation was not attempted for fear of damaging the shells.

The smallest egg measured 2.0 x 1.3cm and the largest 3.0 x 1.1cm. The weights ranged between 6.5 and 12g. On this occasion, because of a shortage of incubator space, the eggs were placed in the same substrate but split into two groups in plastic boxes, approximately half the size of the original incubating box. The temperature was kept at 29-30°C. Within two weeks, half of the eggs were spoiled by the presence of fungal growth on the eggshell. These eggs were removed and on 10 June, after only 60 days incubation, the first Sunbeam snake hatched. Three more emerged on the 11 June, two on the 13 June and the 14 June, and the last one on the 15 June. The discarded eggshells weighed between 3 and 5g. Inside, a large amount of residue, including the remains of the neonate yolk sac, was found. All of the neonates were much smaller, thinner and consequently lighter in weight than their predecessors, averaging only 6.2g. This occurrence is attributed to variation in incubation conditions and temperature regime.

In conclusion, it appears from these results that *Xenopeltis unicolor* is a species which may exhibit a biennial reproductive cycle.

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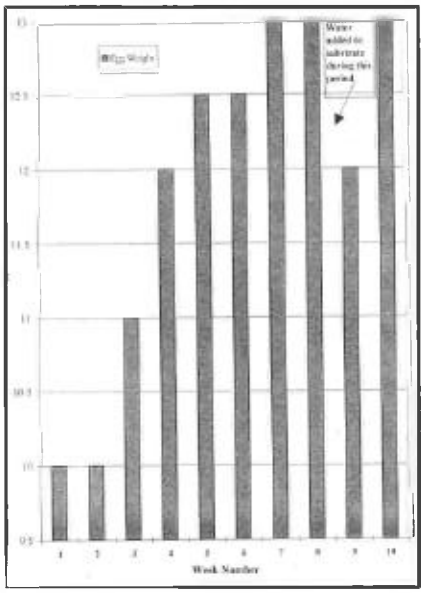

Fig. 1: Egg weight of *Xenopeltis unicolor* during incubation

SOME MORPHOLOGICAL CHARACTERS OF *TRITURUS ALPESTRIS* (LAURENTI, 1768) AT HIGH ALTITUDE (MT. POHORJE, SLOVENIA) (CAUDATA: SALAMANDRIDAE)

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INTRODUCTION

Triturus alpestris (Laurenti, 1768) is widespread (e.g. Arnold & Burton 1980, Nöllert & Nöllert 1992) and well known in Europe and has been studied by many herpetologists especially in Central and in northern Europe, e.g. Glandt (1978), Glandt (1985), Joly & Miaud (1989), Miaud (1991), Gutleb (1991a), Gutleb (1992), Joly & Miaud (1993), Kletečki (1995), Faber (1996).

Sexual dimorphism in size of most species of newts is not great (e.g. Duellman & Trueb 1994). Customarily females are slightly greater than males, but the sexes are about the same size in many species. However in *Triturus alpestris* females appear to be evidently larger than males (e.g. Arnold & Burton 1980, Nöllert & Nöllert 1992).

The aims of this article are to present some morphometric characters and to test sexual size differences of the *T. alpestris* population from Mt. Pohorje. The results are compared with those found in the literature.

STUDY AREA AND METHODS

The research was conducted near the skiing centre of Areh on Mt. Pohorje in northeastern Slovenia (46°30'N 15°29'E). The study pond is located at 1160 m above sea level in the prealpine phytogeographical zone (Marinček 1987). It is 67 m long, 0.1 ha in size and is surrounded by boreal forest. The water level fluctuates, up to 50 cm, with the pond completely drying up in some summers. The bottom of the pond is covered with a mud layer of up to 40 cm. The vegetation includes as dominant species *Equisetum sp.* and *Potamogeton sp.*

The research was carried out in June and July 1995 and June to August 1996 during the newts' breeding season. The specimens were caught by dip-netting. 94 males and 38 females were measured. No specimen was killed or injured during the study.

To characterise the specimens' morphometry six variables have been considered: total length (tip of snout to tip of tail – L, snout-vent length (tip of snout to posterior margin of cloacal lips) – Lsv, tail length (posterior margin of cloacal lips to tip of tail) – Lcd, length of head (mouth length) – Lc (measured from the snout to the corner of the mouth), head width (largest width) – Ltc and distance between fore- and hind-limbs – D. All characters were recorded to the nearest 0.1 mm using dial calipers, except total length which was measured to the nearest millimeter. Abbreviations of characters are from Kalezić et al. (1990). All measurements were made by the author to avoid inter observer variability on the live specimens.

ANOVA test was used for statistic comparison (Sokal & Rohlof 1995). Pearson correlation coefficient was used to discover the correlation between the samples.

RESULTS AND DISCUSSIONS

Morphometric characteristics of *T. alpestris* males and females are presented in Table 1.

The total body length of the *Triturus alpestris* males is less than the total length of the females; the difference is statistically significant ($F = 187.84$, $P > 0.02$). Statistically significant (ANOVA, $P < 0.05$) is also all other parameters which are present in table 1.

Correlations between all characters in *Triturus alpestris* males is significant (all: $P < 0.005$). However in *Triturus alpestris* females only the following pairs of correlations are significant: length of head – head width, distance between fore- and hind-limbs – tail, distance between fore- and hind-limbs – total length, tail – body length, tail – total length, and body length – total length (all: $P < 0.02$).

Results from this study suggest that *T. alpestris* is morphometrically sexual dimorphic, even though seasonal secondary sexual characters were excluded from the analysis. After Krebs & Davies (1993) differences in size between sexes is presumably advantageous in reducing intersexual competition for resources. According to this, characters such as head length (Lc) and head width (Ltc) would expectedly be sexually dimorphic in *Triturus sp.* In this study this holds true also for *T. alpestris*. The same pattern was also observed by Kalezić et al. (1992). However Kalezić et al. (1992) point out that the food resource competition was unlikely to be a main factor in explaining sexual size difference in newts. Schabetsberger & Jersabek (1995) discovered that both sexes in *Triturus alpestris* showed a similar pattern of temporal changes in food choice during their aquatic phase. However some significant differences exist. However, after Duellman & Trueb (1994), in general, larger body size in females has been thought to be related to egg-carrying capacity.

The *Triturus alpestris* female/male size relations (table 2) of six morphometric characters are in general similar to the results from Kalezić et al (1992). Not only ratio but also morphometric characters of *Triturus alpestris* from other areas, e.g. Austria (Gutleb 1991b) are similar to those on Pohorje.

If we compare ratio of the total length (quotient of mean values of females and males) it is obvious that variation within groups from different geographic distribution does not exist (table 3).

This suggests the *Triturus alpestris* is not responding to local variations in selective factors.

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Table 1.

Some morphometrical characters of *Triturus alpestris*. N – sample size, f – female, m – male

	Mean		SD		Min		Max		N	
	f	m	f	m	f	m	f	m	f	m
L	90.7	79.5	4.40	3.82	84.0	69.0	101.0	88.0	38	94
Lsv	51.4	45.7	2.9	2.10	46.0	39.1	56.0	51.0	38	79
Lcd	39.2	33.6	3.09	2.58	31.0	26.0	45.0	40.0	38	79
Ltc	9.0	8.6	0.61	0.54	7.5	6.9	10.0	9.6	23	79
Lc	8.6	8.2	0.64	0.66	7.6	6.7	10.1	9.6	23	79
D	25.7	23.5	3.03	2.62	19.1	16.4	31.8	30.3	38	94

Table 2.

The *Triturus alpestris* female/male size relations of 6 morphometric characters to population sample (quotients of mean values) from Mt. Pohorje. For character symbols see text.

L	Lsv	Lcd	Ltc	Lc	D
1.14	1.12	1.17	1.04	1.05	1.09

Table 3.

Ratio of the total length (quotient of mean values of females and males) in *Triturus alpestris* from different localities. Only data obtained from population samples of 10 and more specimens of each sex were included. * - data from Kalezić et al. (1992)

Location	Ratio	Source
Hungary	1.13-1.18	*Dely 1960
Romania	1.18	*Fuhn 1960
Germany	1.18	*Feldmann 1981
Greece	1.12-1.20	*Breuil & Parent 1987
Italy	1.09	*Giacoma et al. 1988
Austria	1.20	Gutleb 1991b
Yugoslavia	1.10-1.11	Kalezić et al. 1992
Slovenia - Mt. Menina	1.11	orig.
Slovenia - Mt. Velika Planina	1.16	orig.
Slovenia - Mt. Matajur	1.20	orig.
Slovenia - Mt. Pohorje	1.14	this study

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AL HAMDAB DAM: A CHECKLIST OF AMPHIBIANS AND REPTILES, PRIOR TO CONSTRUCTION

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INTRODUCTION

Although no checklist of Sundanese amphibians and reptiles has been published, several species have been recorded (e.g. Flowers, 1990 : Loveridge, 1947 : Venkatraman and Badawi, 1969; Belail, 1979; Osman and Tag Elsir, 1988) and/or studied (e.g. Cloudsley-Thompson, 1965, 1967, 1970; Mahmoud and El Naeim, 1986). The disappearance of the card indexes of reptile species in the Sudan Natural History Museum and the deterioration of the preserved material therein necessitate the updating of locality records. In this connection we had an opportunity to collect amphibians and reptiles from the area of the proposed Al Hamdab dam.

MATERIAL AND METHODS

The study area extends from Merowie Island (construction site) to Ras el Gezira (Mograt Island), River Nile State, Sudan (Fig 1). A detailed account of its geomorphology, plant and animal ecology was given by Mahmoud et al (1966). Manual and/or pitfall trap collections and observations were made primarily in 9 locations: Ras El Gezira (1), Kabna (2), Shiri Island (3), Al Ashamin (4), El Nekheila (5), El Ganagra (6), Kirbekan (7), Hamdab East (8) and Hamdab West (9) (Fig 1). Locations are given in numerals for the sake of brevity. Specimens, except for 40 *Uromastix aegyptius* deposited in the vivaria of the Sudan Natural History Museum, were released as close as possible to the site of collection. Herptile species collected and/or observed during this study were identified to the species level following Anderson, 1898; Anderson, 1935; Loveridge, 1947 and Schmidt, 1919. The study was performed during December (1995)/January (1996) and February/March (1996).

Herptile fauna

Class Amphibia:
Order Apoda
Family Bufonidae, *Bufo regularis* (locations: 1 to 9). Habitat: Found along river banks and cultivated sites.

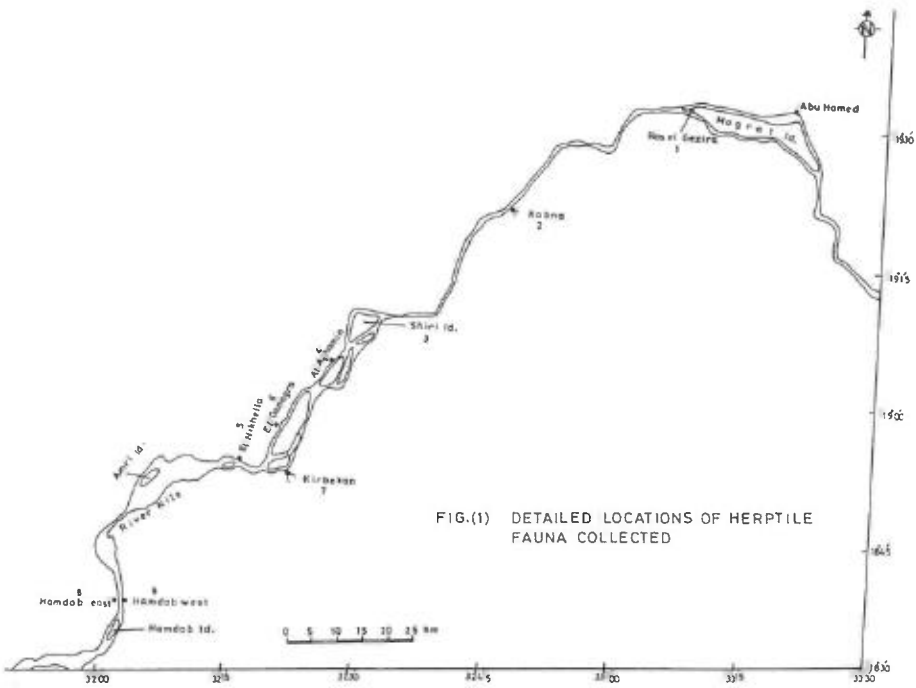
Class Reptilia:
Order Chelonia
Family Trionychidae, *Trionyx triunguis* (locations: 1,9). Habitat: They remain concealed beneath water, probably emerging at night. They were collected by seine net.

Order Squamata

Family Gekkonidae, *Tarentola annularis* (locations: 1 to 9). Habitat: Very common in houses as well as on trees, rocks and ruins.

Family Gekkonidae, *Stenodactylus stenodactylus* (location: 7). Habitat: Several specimens were found beneath stones.
Family Gekkonidae, *Pristurus flavipunctatus* (Location: 7). Habitat one specimen was found on an acacia tree.
Family Gekkonidae, *Hemidactylus brookii* (Location: 6, 7). Habitat: Crevices of trees and buildings. Few specimens were collected.
Family Agamidae, *Agama spinosa* (Locations: 5, 6, 7). Habitat: Very common on rocky outcrops and open spaces.
Family Agamidae, *Uromastyx aegyptius* (Locations: 2, 3, 4, 5, 7, 9). Habitat: Usually found beneath stones (sometimes in association with scorpions) or basking during early morning or late afternoon.
Family Scincidae, *Chalcides ocellatus* (Locations: 1, 2, 3, 7, 8, 9). Habitat: Very common in cultivated areas.
Family Scincidae, *Scincopus (= Scincus) fasciatus* (Locations: 1, 2, 4, 8, 9). Habitat: Cultivated areas.
Family Scincidae, *Mabuya quinquetaeniata* (Locations: 1, 2, 8). Habitat: Cultivated areas.
Family Varanidae, *Varanus niloticus* (Locations (1, 9): Habitat: Few specimens were seen along river banks.
Family Viperidae, *Causus rhombeatus* (Locations: 1, 6): Habitat: Beneath stones.
Family Viperidae, *Cerastes cornutus* (Locations: 1, 6): Habitat: Sandy regions.
Family Elapidae. *Naja nigricollis* (Location: 1): Habitat: Riverine cultivation.

Fig (1)
Detailed Locations of Herptile Fauna Collected



Order Crocodilia

Family Crocodylidae, *Crocodylus niloticus* (Locations: 1, 9). Habitat: Seen basking on small islands.

The present investigation showed that:

1. One amphibian species *(B. regularis)* is present in the area.
2. The number of reptilian taxa in the area (3 orders, 8 families and 12 species) is far greater than that of amphibians.
3. Gekkonidae are represented by 4 species. It is interesting that the people in the study area appreciate the role of *T. annularis* in the control of mosquitoes and other insects. The superstitions about it recorded by Cottam and Cottam (1923) are invalid at least in the study area.
4. While agamids are found on the desert fringes, skinks are dominant around human settlement and cultivated sites.
5. The two vipers reported here were considered to be highly poisonous (Venkatraman and Badawi, 1969). The few specimens encountered in this study were killed during collection.
6. *T. triunguis, V. niloticus* and *C. niloticus* are becoming endangered due to countless irrigation water pumps that have altered the calm riverine habitat and the illegal hunting of *V. niloticus* and *C. niloticus* for their highly valued skins.
7. *Varanus griseus* was described by local people at Al Ashamin and El Nekheila in such a way that there was no doubt about their classification.
8. The possibility of finding *Stenodactylus petrii, Ptyodactylus hasselquistii* (Gekkonidae), *Acanthodactylus ascutellatus* (Lacertidae) *Leptotyhlops cairi* (Leptotyhlopidae), *Psammophis aegyptius* and *P. sclocaris* (Cloubridae) recorded by Mathiasson (1964) around the second cataract or more taxa should not be neglected.

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A NOTE ON THE SEX RATIO OF THE EGYPTIAN TORTOISE, *TESTUDO KLEINMANNI*

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INTRODUCTION

Testudo kleinmanni is a small *Testudoid* that inhabits the most arid environment of any tortoise species. The males have an average carapace length of only 95 mm while the larger female can attain a carapace length of 127 mm (Highfield and Martin. 1995). It is an endangered species ranging from Libya to the Negev in Israel. In recent years T. *kleinmanni* have been readily available in the animal trade. Most of the tortoises in captivity originated from Egypt or Libya. The current Egyptian tortoises originate from Libya but are exported out of Egypt, where *T. kleinmanni* are believed to be almost extinct. This Libya-Egypt transit route is a recent phenomenon resulting from the open border relations between Egypt and Libya (Baha El Din, 1994). The availability of a large number of Egyptian tortoises could provide an opportunity to investigate certain aspects of the biology of this understudied endangered species. Upon observing *T. kleinmanni* at various localities in Egypt, a significant difference was noticed in the proportion of male to females offered for sale.

Plate 1
The appalling conditions in which *Testudo kleinmanni* are transported from Libya to Egypt (Sayyida Aisha) – Photo: Omar Attum

In June 1994, several hundred *T. kleinmanni* were witnessed for sale by animal traders in Cairo at the Sayyida Aisha animal market. A random sample of 124 tortoises were examined. Of these, 85 were males and 39 were females. This was only a small fraction of the captive *T. kleinmanni* witnessed for sale (Attum, 1996). In June 1995, 25 tortoises were examined at assorted shops in the Egyptian-Libyan border city of Salum. Salum is the port of entry between Libya and Egypt. 15 males and 10 females comprised the total number of tortoises witnessed for sale there. In total 149 Egyptian tortoises were examined comprising 100 males and 49 females; the resulting total male to female ratio was 2.04/1.

Geffen and Mendelssohn show that male *T. kleinmanni* have a larger home range size than females. The maximum daily travelled distance of male *T. kleinmanni* was greater than the female's maximum daily travelled distance (Geffen and Mendelssohn, 1988). Males are also known to be more active during the mating season as they pursue females to mate with (Geffen amd Mendelssohn, 1988). This increased activity and larger home range of the males could perhaps make them more susceptible to being caught by animal collectors. On the other hand, this could likewise expose them to predation pressure.

United States law requires that tortoises larger than 4 inches (101.6 mm) are imported. This size discrimination prevents many males from being exported to the United States because of their smaller overall size. The United States is one of the leading importers of reptiles from Egypt (pers. comm. w/Egyptian animal traders). In Egypt, larger tortoises are more desirable and worth more. To the Egyptian consumer the relatively larger female *T. kleinmanni* are an alternative to the larger and more expensive Mediterranean Spur-thighed Tortoise, *Testudo graeca*. These anthropogenic factors may lead to the higher male/female ratio of animals held by traders.

Table 1
Male/Female Ratio of *Testudo kleinmanni*

	Males	Females	Males/Females
Syyida Aisha animal market (Cairo)	85	39	2.18
Salum	15	10	1.5
Total	100	49	2.04

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A NOTE ON THE UNKENREFLEX AND SIMILAR DEFENSIVE POSTURES IN *RANA TEMPORARIA* (ANURA, AMPHIBIA)

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Many species of amphibians are protected by antipredator adaptations, such as cryptic or aposematic colouration, noxious skin secretions and antipredator vocalizations (Altig 1972, Brodie 1978, 1981, Brodie et al. 1979, Formanowicz and Brodie 1979). They often adopt a defensive posture when threatened or handled (Dickerson 1908, Hinsche 1926, 1928, Noble 1955, Smith 1964, Duellman and Trueb 1994). *Bufo bufo*, for example, when meeting a snake, will inflate its body, raise itself off the ground and even gulp, as well as producing bufotoxin. Many frogs show antipredator adaptations to a less dramatic degree.

The classic "unkenreflex" takes its name from the European Bombinas ("Unken" in German) of the family Discoglossidae, and is a response to perceived threat. It is mostly restricted to species with ventral warning colouration. The lifting of all four legs and arching of the back in order to draw attention to the bright ventral colours is very characteristic. The typical unkenreflex is characterized not only by this distinctive posture and immobility but also by a closure of the eyes, a slowing down of respiratory movements and an increase in skin secretion (Hinsche 1926, Noble 1955). Captive-bred *Bombina variegata* demonstrate the unkenreflex from soon after metamorphosis and retain it throughout life, despite having been bred in captivity for many generations, and being completely used to the presence of humans (J.W. Wilkinson, pers, obs.). Other species of the genus (eg. *B. orientalis, B. bombina*) will demonstrate this behaviour only after they have been separated from human influence for some while or are extremely provoked.

The term "unkenreflex" has been used more generically to describe a range of defensive postures in various species. Duellman and Trueb (1994) cite Brodie's (1978, Brodie et al. 1979) work, where he uses the term to describe the defense postures of salamanders, which differ slightly to the posture adopted by Bombinas, the emphasis frequently being placed on the bright ventral surface of the tail (which Bombinas lack). This type of unkenreflex has been observed for example in the newt *Taricha granulosa* (Johnson and Brodie 1975, Halliday and Adler 1986) and a variety of other North American urodeles, as well as the European *Triturus cristatus* and *T. helveticus* (Denton 1990). Production of the posture in salamanders may follow tail undulation or thrashing, which directs the attention of a predator away from the head. A complete, or "high-intensity" unkenreflex in these species has the effect of inhibiting the attack reflexes of predatory birds (Halliday and Adler, 1986).

Hinsche (1926) has shown that the same reflex is present in the drab-coloured Midwife Toad (*Alytes*, also of the family Discoglossidae) and further states that various species of *Rana* and *Bufo* exhibit more or less of the reaction (also see Villa, 1969, Altig 1972,

Formanowicz and Brodie 1979), which perhaps could be termed a "partial unkenreflex". S. Grenard (pers. comm.) states that he has seen the "unken-" or "defensive posture" ("... a head-down posture to deflect attention away from the area of the head...") in many anuran amphibians (Bufonidae, Leptodactylidae and Hylidae) save for *Pipa, Xenopus* and some other strictly aquatic forms. G. Cline (pers. comm.) observed the behaviour in the treefrog, *Hyla versicolor*. In the same species, however, Brodie (1981) describes the posture on encountering a small predator (*Blarina brevicauda*, Soricidae) as "flexing the head forward and extending the hind legs, usually tilting and orientating the side of the body towards the shrew".

When escape is not possible, the Ranidae often shrink to the ground with the head low when threatened, but there is only very little literature on the unkenreflex or similar defensive postures in this family. It is not mentioned for *Rana temporaria* in Smith (1964), who in fact records merely that "... the frog seeks escape in flight" when in danger. It seems, however, that the phenomenon is found more widely than is generally known. The behaviour seems fairly common in the American Bullfrog (*Rana catesbeiana*) (J.N. Stuart, pers. comm.). If cornered, it will sometimes thrust out its arms and flatten its body. The back is not curved as in *Bombina* but otherwise the reaction has a considerable resemblance to the unkenreflex (S. Grenard, pers. comm.). The Northern American Leopard Frog (*Rana pipiens*), when unable to escape, also responds by covering its eyes with the "hands". D. Hoag (pers. comm.) describes that almost every Leopard Frog of more than 200 he picked up to remove from a pit would "cower, hands over its head, the position varying individually". The posture has also been observed in *Rana chiricahuensis* on a few occasions (J.N. Stuart, pers. comm.), in *Rana holtzi* (Teynié 1991) and (especially) in European *Rana* of the Green Frog complex (P.-A. Crochet, pers. comm.).

The first author observed *Rana temporaria* engaging in a defensive posture that seems to be more than simply shrinking away from apparent danger and yet not quite a true unkenreflex (Figs. 1 and 2). Burny and Parent (1984) and Garcia-Paris and Esteban (1989) have also recorded a form of unkenreflex in this species. They present photographs showing a posture very similar to those given here. H. Strijbosch (pers. comm.) confirms the existence (in the Netherlands) of an antipredator behaviour similar to the unkenreflex for *Rana temporaria*, but points out that it is a very rare phenomenon in this species, as he has seen it "only some 4 or 5 times in his 25 years of working on amphibians". The pose is characterized by the raising of the hands to both sides of the head, covering the eyes. This is especially significant, as P.-A. Crochet (pers. comm.) states, the defensive posture in *Rana* differs from the "unkenreflex" in respect that the hands are usually not raised at or above eye-level. (Note that the figured frog is looking through between the first and second digit and exposes the bright colouration of the underside of its limbs).

The animal was captured in a pitfall trap set for small mammals in the surroundings of Schönbach (Lower Austria) on April 21st, 1989. It took up this posture when placed in the grass and photographed and kept this pose when turned onto its back. At that time, the ambient temperature was very low (0-5°C), which may account for the production of this behaviour. J.N. Stuart (pers. comm.) mentions that his "impression was that they perform it more commonly when cold...", and it may be that in the absence of sufficient body warmth (frogs being poikilothermic), the more usual means of predation advoidance (escape) was unavailable to the frog at that time. Burny and Parent (1984) have also suggested that low temperatures are a factor in provoking the unkenreflex in *R. temporaria*, and that the species produces the posture just before and after hibernation. This is in contrast to at least one of the specimens found by Garcia-Paris and Esteban (1989), which was observed following the reproductive period (during June).

Plate 1 and 2: The unkenreflex in *Rana temporaria.* (Photos by W. Haberl)

CONCLUSIONS

A number of anurans other than *Bombina* engage in antipredator postures similar to the unkenreflex to a varying degree. However, since this is usually not a "true unkenreflex" which includes a marked curvature of the spine to facilitate exposure of the ventral surface, it is probably preferable to use the term "partial unkenreflex". While the behaviour seems to be fairly common in North American Ranids, it has only rarely been observed in the European *Rana temporaria*, although the behaviour observed here seems to be closer to a true unkenreflex than is generally recorded (with the notable exceptions of Burny and Parent 1984 and Garcia-Paris and Esteban 1989). At low temperatures the reflex in *Bombina* can be incomplete and resemble that of *Rana*, which suggests that the postures have the same neural pathways and neuromuscular basis in both species (S. Grenard, pers. comm.). The non-specialized, "partial" unkenreflex of *R. temporaria*, however, has probably not developed further because of the absence of vivid, contrasting ventral colouration, and because of the species' normal recourse to flight when confronted. The species also lacks the vertebral articulations found in *Bombina* (Garcia-Paris and Esteban 1989) which facilitate the "full" unkenreflex in this genus. We can therefore tentatively postulate that the partial unkenreflex observed in *Rana temporaria* serves, when flight is unavailable for temperature or other reasons, as a means of momentarily startling a potential predator, at the same time perhaps causing disorientation by the covering of the eyes. Further observations in the field will be necessary to confirm or refute this assertion.

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A SECOND RECORD OF THE SMALL-EYED FILE-SNAKE, *MEHELYA STENOPTALMA* (MOCQUARD, 1887) (REPTILIA: SERPENTES: COLUBRIDAE) IN UGANDA

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ABSTRACT

A second record of *Mehelya stenoptalma* in Uganda, in the lowland rainforest in the Semuliki River National Park is simultaneously a report on the largest known specimen (total length 76.1 cm) until now. Some of its morphological features as well as the etymology of the species name is presented and discussed here.

INTRODUCTION

In August 1994, a short research trip to the recently founded Semuliki Walley National Park (extreme west of Uganda) was undertaken by the authors. The aim of the one-week stay in the Park was to make basic herpetological research there. The area is very interesting from the faunistical point of view, because of its geographical position east of the Ruwenzori Mts., at the eastern margin of the Congo basin. Eastern- and Central-African faunistic elements meet there and form therefore unique cenoses. The reptile fauna of this region is extremely rich.

RESULTS

On the night of the 24 August 1996, an adult female specimen of *Mehelya stenoptalma* was found freshly killed at night, just next to the headquarters of the Semuliki Walley National Park at Ntandi, on the floor of the secondary rainforest. The specimen is now deposited at the "Zoologisches Forschungsinstitut und Museum A. Koenig, Bonn, FRG" under the collection number SFMK 63073. This snake is recorded for the second time in Uganda – except for Pitman (1974), who considered it a "rare forest species" and mentioned one specimen from Mingani (Kibale Forest), no literature record of this snake from Ugandan territory has been published yet.

Mehelya stenoptalma is an ophiophagous, terrestrial, and probably partly burrowing rainforest snake, which is widely distributed in Cameroon, Ghana, Guinea Bissau, Congo, Togo, Zaire and Western Uganda, but relatively rare within the whole range (Boulenger 1893, Loveridge1939, Pitman 1974, De Witte 1962), Thanks to its secretive lifestyle and rareness, its biology is generally poorly known.

Some data taken from the collected specimen are presented here. Total length: 76.1 cm, tail length: 9.3 cm. It is the longest known specimen, as the previously longest one, originating from the type of series of Mocquard, was only 70 cm long. The head is clearly distinct from neck, depressed, rostrum rounded, with small eyes and large, round nostrils. Rostral is more than twice as broad as long, barely visible from above. 7 upper

Plate 1. *Mehelya stenoptakma* from Ntandi, Semuliki National Park, eastern Uganda

Plate 2. Secondary forest near Ntandi, Semuliki National Park, eastern Uganda – habitat of *Mehelya stenoptakma*

labials, 3rd and 4th entering the orbit, 8 lower labials, 1 preocular, 1 postocular, 1+2 temporals; supraocular and parietal shields are large, loreal tiny. Length of the frontal is equal to its width. Body scales are smooth, hexagonal, all of about the same size, except for the slightly enlarged vertebral row of scales, which are weakly bicarinate. There are 15 midbody scale rows, 214 and 45/46+1 (paired) subcaudals; the anal shield is entire. The colour is uniformly glossy blackish above, each dorsal scale with a whitish edge, cream to white below. The ventrals have laterally a grey spot on each side, of the same size as neighbouring dorsal scales. Lower labials are speckled with blackish. Terminal third of tail is blackish above and below. The presented morphological features are in accordance with the data published by Boulenger (1893), Loveridge (1939), Mocquard (1887) and Pitman (1974).

ETYMOLOGICAL NOTE

The grammatical gender of the genus- and species-name must be in accordance, due to the International Rules of Zoological Nomenclature. The snake genus *Mehelya* Csiki, 1903, named in honour of the famous hungarian zoologist L. MEHELY, is of feminine gender. Mocquard described this species in 1887 as *Heterolepis stenoptalmus*, the type originating from Assini, Gold Coast. The species name is derived from Greek and means "small eyed". If the species name of the Small-Eyed File-Snake is formed as an adjective, it must be spelled as "*stenoptalma*" instead of "*stenoptalmus*", when belonging to the genus *Mehelya*.

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A STORY FROM THE PAST: A HERPETOLOGICAL JOURNEY IN POST-WAR GERMANY BY ALFRED LEUTSCHER

Alfred Leutscher was a founder member of the British Herpetological Society, active in its early years. His name and work will be familiar to many members. He often contributed articles to aquarist magazines. We reprint here an article of his from the now long vanished "Water Life" magazine of April, 1947. It reminds us of a Europe very different from that in which we live today.

LIBERATING REPTILES AND AMPHIBIA

by Alfred Leutscher, B.Sc.

In a thousand-mile journey, taking nearly a year to cover, an animal-lover is sure to find opportunities for pursuing his hobby, even under stress of war. My travels in uniform, from Normandy to the extreme south-east corner of the British Zone, brought me in contact with many fellow hobbyists, and no small number of well-remembered pets, some in their natural homes.

It was close to the ruins of Caen, shortly on disembarking, that I encountered my first pet, a common toad of exceptional portliness, which crossed my path one late evening and, with biscuit-tin as temporary home, joined our convoy for many miles. At each halt a display of how to eat unlimited worms, given to an admiring audience, won "Old Bill" (a female, I suspect, from her size) the position of Battery mascot, which she held until her untimely death. Straying one morning, she suddenly disappeared under the tracks of a passing tank.

Our next pet, appropriately called "Froggie" an Edible Frog of exceptional size, measuring over a foot when fully stretched, came from near Lille. With his pals, he had kept a tired camp awake, and in a violent temper, the whole night, with the bedlam he created from a nearby pond. The problems of the orderly sergeant, who next morning was despatched to the watery home to "still the enemy", were solved by a local partisan, a frog-catcher in his spare time. He appeared with his twelve-foot pole, supporting a wide, circular net, which he lowered into the water, and left to settle. The catch was to be made that evening.

Returning at dusk to the pond, which had stilled at our approach, I watched my friend prepare his bait, a bunch of white feathers dangling from a willow wand. Soon, heads began to pop up, and amorous males, with vocal sacs distended, broke night, can be heard a mile away. The feather lure was sent dancing over the water and cunningly moved towards the submerged net, with the whole pond in full chase. At a given signal I hauled on the net, and thirty captives were landed, "Froggie" among them. He lived with us for many days in a water-filled petrol tin, learning at last to take food from my hand. The rest, expertly killed, their hind legs cut off and skinned, were for market. I purchased a few and later, those of us who sampled this dainty dish, fried in butter, were agreeably surprised.

Winter saw us in the V raids of Antwerp, where, in quieter moments, I cemented friendship with my host's son, an ardent aquarist and "frogman." The hobby, he told me, was as popular to many Belgians as the national sports of archery and pigeon racing. His collection included tree-frogs from the Ardennes, which lived in a fernery, a usual recess to an Antwerp living-room, and a tropical community tank, close to the ever-lit stove.

In the Spring of 1945 we moved across the Scheldt, and into Holland. In the familiar surrounding of sand-dunes, which form a natural sea-barrier to the Dutch coast, I rediscovered the sand-lizard. The nine-inch long males, resplendent in courtship dress, were a pleasure to watch; a welcome diversion from more serious work of mine-clearance.

In the coniferous belt behind the dunes, planted to restrict the movement of shifting sand, the Natterjack toad was found, very active by day as it ran over the sand tracks of our lorries, more like a mouse than a toad. After a cold spell, I discovered many sand burrows under the firs, in which these toads were safely sheltered from the biting wind.

A short leave to Amsterdam in early summer and a reunion with some relatives resulted in a visit to the Artis, or Zoo. Reptile and Amphibian stock was poor. Poison snakes, as in London, had been destroyed, larger reptiles could no longer be fed, and some, I understood, had helped to sustain a starving population during the previous winter. I left "Froggie" as an offering.

Crossing the Rhine into Germany shortly after, I knew that, whatever my reactions toward the people, I should meet sincere and keen enthusiasts in a mutual hobby. In fish breeding, at least, Germany has led the way in Europe. In a Hamburg suburb a German employee, attached to our unit, showed me his collection – five species of newt, a pair of Fire-bellied Toads, the curious Olm, both Alpine and Spotted Salamanders, and a young Alligator. These, like his family, had lived underground for the most part of the previous year. He told me of Hamburg's many clubs, keen members and public shows, and when I mentioned "water life" said he had heard of our paper. I scoured the ruined city for animal shops, but could find only one, where rabbits, now a vital food commodity, had replaced a once flourishing fish and reptile trade.

The conspicuous yellow and black markings of Salamanders are referred to as warning coloration, and natural enemies learn to avoid them. The milky fluid secreted from glands in the skin is highly unpleasant and poisonous to some animals. In experiments performed with a grass snake, hedgehog and dog I found the Salamander safe from attack. Although viewed with suspicion it is quite safe to handle, but contact with the eyes and mouth should be avoided. We found both spotted and striped forms of *S. salamandra* together with gilled tadpole stages. The adults are not so aquatic as other tailed amphibians, entering water merely to produce their living young. *S. atra,* a smaller and black species, is found in Alpine districts. The limited number of young produced have lungs from birth.

Late summer, in the Hanover district, the Sand Lizard again appeared, a hundred miles from the sea, and it was a common sight for human and lizard to sunbathe together in a sandy woodland, where we lazed and swam. In the lake I found my first Alpine newt. The name seemed misleading, as we were only fifty feet up, but later, in higher districts, I was to see many more.

Towards the close of 1945 my duties took me on educational work to the University town of Göttingen, where the newly formed army college was opened. As biology instructor, I had the fullest scope to pursue my hobby, and after a bitter winter, the spring of 1946 opened on the last chapter of my journey.

Wandering through the fairyland of the Hartz mountains I accompanied the local collector on many a delightful jaunt. His work in supplying the hospitals and biological departments of the University, and Zoos at home and abroad meant a detailed knowledge of all likely haunts, and in turn we visited hidden pools, streams, thickets and heaths to collect grass-snakes, newts, frogs, toads and salamanders.

Tiny Bell-toads, the males with eggs slung on their backs, called in bell-like tones, inviting us to seek them in the dark woods, on warm evenings, with our torches. Edible frogs chorused from innumerable pools, falling each time to the feather lure, and once a Fire-bellied toad turned up beneath the bracken.

For a while the demonstration-bench in my laboratory was the show-piece of the College, but all too soon had to be dismantled, and its inmates liberated. A small selection made the one-way journey to England with me, where they have now settled down, I hope, to a long life in their new quarters.

CORRECTION TO SPRING 1997, BULLETIN, No. 59

1. In the article on **The Work of the DAPTF,** p. 35 in the second paragraph, there is a line or so missing. In the *Bulletin* it reads:

The findings of these studies, such as those at Rainbow Bay, South Carolina, USA (Pechmann et al. 1991), or from Switzerland (Grossenbacher, 1995) frequently show that, in the long-term, amphibian populations has to be held in mind during investigations of amphibian declines.

It should read:

The findings of these studies, such as those at Rainbow Bay, South Carolina, USA (Pechmann et al. 1991), or from Switzerland (Grossenbacher, 1995) frequently show that, in the long-term, amphibian populations naturally show large population fluctuations. This aspect of amphibian population dynamics has to be held in mind during investigations of amphibian declines.

2. In the section **Looking to the Future**, in the tenth line the sentence that starts:

The casual factors of some well-documented declines.....

Should read:

The casual factors of some well-documented declines, such as the decline of five anuran species in the Yosemite region of California (Drost & Fellers, 1996) still lack conclusive explanation.

INTERNATIONAL SYMPOSIUM ON THE LACERTIDS OF THE MEDITERRANEAN BASIN

The 3rd International Symposium on the Lacertids of the Mediterranean Basin will be held on 25-29 May, 1998 in Cres (the island of Cres), Croatia. All information (application form, instructions for abstract preparation, etc) can be obtained from The Organizing committee, The 3rd International Symposium on the Lacertids of the Mediterranean Basin, "HYLA" - Croatian Herpetological Society, c/o Hrvatski Prirodoslovni Muzej, Demetrova 1, HR - 10000 Zagreb, Croatia, tel. +3855 1 424 973, fax. +385 1 424 998, E-mail: hyla@hpm.hr or from the Web page http://croatica.botanic.hr/~ztadic/hyla/lacerta/main.htm".

ANNOUNCEMENT – CONTEMPORARY HERPETOLOGY, A NEW ELECTRONIC JOURNAL

On January 1, 1998, Contemporary Herpetology (CH), a peer-reviewed electronic journal devoted to herpetology, will go on-line (URL: http://vmsweb.selu.edu/~pcsd4805/) with the following articles:

A key to the anuran larvae of the United States and Canada
Ronald Altig and Roy W. McDiarmid.
Taxonomic status of the Wyoming toad
Hobart M. Smith, David Chiszar, and Joseph T. Collins.

We are currently soliciting papers, which can be submitted to managing editor Travis Taggart (ttaggart@selu.edu) via e-mail. CH will publish articles covering all aspects of herpetology, including ecology, ethology, systematics, conservation biology, and physiology. CH will also publish monographs, points-of-view, and faunistic surveys of poorly-known areas. CH will not publish herpetocultural or anecdotal papers. Internet technology provides publication capabilities that were either impossible or expensive in previous media, including full-motion video, full-color digital photography, computer simulations, and audio playback. For questions about CH, contact the editor Joe Slowinski (jslowins@cas.calacademy.org; 415-750-7041).

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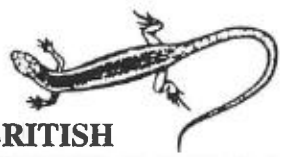

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