

ISSN 0260-5805

**THE BRITISH  
HERPETOLOGICAL SOCIETY  
BULLETIN**



**No. 38  
Winter 1991**

## BRITISH HERPETOLOGICAL SOCIETY

*c/o Zoological Society of London  
Regent's Park, London NW1 4RY*

*Correspondence, membership applications, subscription renewals and purchase orders for the Herpetological Journal and British Herpetological Society Bulletin should be sent to the above address.*

The British Herpetological Society was founded in 1947 with the broad aim of catering for all aspects of interest in reptiles and amphibians. Initiated by a small number of enthusiastic and well-known naturalists, including the first President and author of the standard textbook on British herpetofauna Dr. Malcolm Smith, the Society expanded rapidly and today enjoys national status with many international connections.

Activities of members range over a number of interrelated fields. In many cases the prime interest is in maintaining, breeding and observing various species in captivity and the Society acts as a forum for the interchange of experiences in this area. Others are concerned with the observation of animals in the wild state. There are active sub-committees which help to cater for these various tastes, notably the Captive Breeding Committee and the Conservation Committee. The former encourages the development of effective breeding techniques for captive specimens, thus providing animals for observation and study in vivaria, and for conservation purposes, while simultaneously reducing the need to take fresh stock from wild and possibly declining populations. The Conservation Committee is actively engaged in field study, conservation management and political lobbying with a view to improving the status and future prospects for our native British species. It is the accepted authority on reptile and amphibian conservation in the U.K. and has an advisory role to the Nature Conservancy Council (the statutory Government body). There are also professional scientists within the ranks of the Society engaged in increasing our understanding of all aspects of reptile and amphibian biology.

### Meetings

About ten meetings covering a broad sphere of interests are held each year.

### Subscriptions

Will be printed in the next issue of the Bulletin.

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*The Society does not, as a body, hold itself responsible for statements made or opinions expressed in the Bulletin; nor does the Editorial necessarily express the official opinion of the Society.*

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The Bulletin is edited and produced by  
**John Pickett and Simon Townson**

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Contributions and correspondence arising from the Bulletin should be sent to:  
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### FRONT COVER

Giant Ground Gecko, *Chondrodactylus angulifer*, male with white spots. (photography by Stephen Spawls)

## SOCIETY MEETINGS FOR 1992

Council has decided to change Meeting arrangements from single-speaker events on weekday evenings to part- or full-day sessions, held less often but always at weekends and with several speakers on each occasion. The intention is that there will be at least as many talks as in previous years (and hopefully more) but at greater convenience to Members. Please let us know, at the end of the year, any views you develop as to the merits or demerits of this new system.

Below is an outline programme for 1992, with details of just the first few sessions. Details of the later ones will be published in future Bulletins as well in advance of the events as can be arranged. Look out for them!

- FEBRUARY 1st**      Joint Leicester Polytechnic/BHS Recorders' Meeting, at Leicester Polytechnic. Topics will include Reintroductions of Amphibians & Reptiles in Britain (details circulated with Autumn Bulletin).
- FEBRUARY 29th:**    Reptile and Amphibian Day at London Zoo.  
This is a joint meeting between the Young Herpetologists Club (Junior branch of BHS) and the Explorers Club the Junior section of the London Zoo.
- Adult BHS members are welcome to attend, but must be accompanied by children! Assistance in running this event from adult members welcomed.
- For tickets (which must be obtained in advance) and more details please send a S.A.E. to the B.H.S. Education Officer – address on back cover.
- MARCH 21st:**      Annual General Meeting, including talks in afternoon. Details are on separate sheet.
- APRIL 5th:**        Leapers & Creepers Day. Joint BHS/Surrey Amphibian & Reptile Group Open Day, Nower Wood Nature reserve (on B2033, Headley-Leatherhead Rd, map ref: TQ 194546). A day of talks, pond-dipping, guided walks and other herpetological activities for all the family. 9.30am-5.00pm.
- LATE MAY/  
EARLY JUNE**        Joint Conservation Committee and Education Committee Open Meeting, probably in Hampshire or Dorset.
- SEPTEMBER:**        Captive Breeding Committee Meeting.
- LATE AUTUMN:**    (1) Research Committee Meeting on "Conservation Biology", to be held at the Open University at Milton Keynes.
- (2) Autumn General Meeting, with talks on a range of topics.

## WATCH OUT FOR THE Y.H.C.!

A recent Metamorphosis has produced the Young Herpetologists Club. Y.H.C. . . . The Junior section of the B.H.S., formerly known as the Junior Herpetologists or 'J-Herps'. With a more professional image, and vastly improved Y.H.C. Newsletter, we are out to get every young person with an interest in Amphibians and Reptiles. Enclosed with your Bulletin is a Y.H.C. membership form. I'm sure you know someone who will benefit from membership – an ideal Birthday or Christmas present! Encourage the future's Herpetologist's! Watch out for us in the Media, we want the world to know Y.H.C. is the place to be!

For more details contact the Education Officer.

## THE SOCIETY NEEDS A CO-SECRETARY

As most Members will know, Monica Green has for many years provided a service to the Society of quite outstanding calibre. We are lucky to have such a dedicated Secretary, and to know that she will continue in that role for the foreseeable future. However, the workload for this job is increasing dramatically as the Society membership grows and as we seem to be attracting evermore publicity in the media with consequent floods of letters and telephone enquiries.

A second Secretary, to work closely with Monica and assist with these essential tasks, is now badly needed. The person will become a full member of Council, and any volunteers should please contact the Chairman as soon as possible for further details.

By phone: during weekdays on 0273-606755 extension 2690 or evenings/weekends on 02703-305634.

Or by letter to the address in the back of the Bulletin.

Trevor Beebee  
December 1991

## II CONGRESO LUSO-ESPANOL Y VI CONGRESO ESPANOL DE HERPETOLOGIA

### First Announcement

The Second Portuguese and Spanish Meeting and the Sixth Spanish Meeting on Herpetology will be held in the nice city of Granada (Southern Spain) from 24th-27th September 1992, under the auspices of the Spanish Herpetological Society (A.H.E.). It will include plenary lectures, posters and working groups concerning amphibians and reptiles, mainly of the western Mediterranean area.

On the last day, a full-day excursion will be arranged to the Sierra Nevada Natural Reserve. We may go by four-wheel drive cars, climbing to more than 3,000 meters above sea level.

We will welcome everyone working on or interested in Iberian and Mediterranean herptiles. The deadline for the first application is 30 March, 1992. Please send:

- Name
- Address
- Institution
- Type of presentation (oral and/or poster)
- Title(s)

and mail to:

Dr. J.M. Pleguezuelos (ORGANIZING COMMITTEE)  
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## ERRATUM TO BULLETIN No. 37 (AUTUMN 1991)

Erratum to Bulletin No. 37 (Autumn 1991)

*The Reptiles of Papua New Guinea*, by Mark O'Shea, p.27: the dried weight venom yield from 1-1.5m specimens of *Micropechis ikaheka* was found to be 100-120 mg rather than the 200-240 mg quoted.

## A REPORT ON HERPETOLOGICAL INVESTIGATIONS ON THE ISLAND OF SAMOTHRAKI, NORTH AEGEAN SEA - GREECE

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### INTRODUCTION

A journey to Greece in the summer of 1990 enabled me to make observations on the amphibian/reptilian fauna in several areas: islands of Thassos, Samothraki and Levkas as well as the North Greek mainland mostly in the Pindos Mountains and Prespa lake region. An article on the mainland findings is in preparation but here I would like to mention two significant finds: *Elaphe l. longissima* at Prespa and *Lacerta agilis bosnica* from Pissoderi (1650 metres) near to Florina. This latter find was new to my records and the single specimen of *E.l.longissima* was only the third example of this snake that I have observed in Greece. On Levkas very little was seen. The island has had very little rain in recent years and was extremely dry. Only 1 *Algyroides moreoticus* was noted and an unidentified Colubrid snake seen disappearing into a dry stone wall. On Thassos the following were found; *Rana graeca*, *Mauremys caspica rivulata*, *Ophisaurus apodus thracicus*, *Lacerta viridis*, *Coluber jugularis caspius* and *Malpolon monspessulanus insignitus*. Andrew Laister (personal communication) has provided me with a list of his findings from Thassos which includes *Vipera ammodytes meridionalis*, the first record of viperine snakes from this island. This report deals with my research on Samothraki. The island was visited from July 4th to July 12th during which time I was able to make detailed notes on the occurrence and activity of the elusive lizard *Podarcis muralis*.

### SAMOTHRAKI - PHYSIOGRAPHY

Since this island has received so little attention from herpetologists and is one of the most interesting in Greece I shall give a detailed description of it in the hope that this may be of assistance to future researchers.

Samothraki boasts the highest mountains in the Aegean and is dominated by the masif of Phengari with a summit of 1584 metres and lesser peaks of 1475 and 1455 metres. The island is roughly circular and is notable for its diverse topography, vegetation types and the fact that small rivers and streams flow throughout the year. The lowlands and plains in the west is an important olive-growing region. Along the S. and S.E. coasts the mountains descend precipitously to the sea with streams plunging down the cliffs. In the east is an area known as Ano Meria. This is richly fertile with several small hamlets, fields, orchards, walnut plantations and natural woodland. Along the north coast extend the plains and foothills of Phengari across which flow a number of small rivers which are thickly wooded along the water courses. There are also bodies of still water and in the spring these must be quite extensive. Although there are cultivated fields this area is heavily grazed by goats resulting in stony expanses with light phrygana vegetation. The lower mountain slopes and foothills contain dense and impenetrable evergreen scrub and there are remnants of ancient forests with some massive stands of oak. There is also limited oak woodland on the upper slopes of Mt. Koufoyllo but the higher peaks of Phengari are largely rocky and barren.

### WEATHER CONDITIONS

The weather was quite variable and even unsettled at times. The high mountains attract cloud cover even in summer whenever the moister air is forced to rise against the steep slopes. On four days cloud was persistent with a few light showers. Consequently temperatures fluctuated a good deal with maxima on some days below 27°C. On July 12th only 25°C was recorded. Otherwise the mercury mostly exceeded 30°C with maxima of 36°, 35° and 32° on the 4th., 5th and 6th July respectively. Early morning, sunrise, temperatures were around 20-22° but lower on some days, viz. 18.6° on July 10th.

## FOREWORD

References to the herpetofauna of Samothraki can be found in Werner (1938), Wettstein (1953) and Ondrias (1968). These refer to collections mostly made in the 1930s and 1940s and there is no detail as to under what conditions the animals were found, for the most part. We can say, therefore, that the herpetofauna of Samothraki was inadequately documented until 1988 when David Buttle visited the island and made some important observations (Buttle 1989). My visit in 1990 was a follow up to Buttle's trip. Most of the work done was on the north of the island. Other areas, along the south and up into the lower mountains, produced few observations. The mountain peaks could not be reached but I managed an excursion by foot up Mt. Konfoyllo to around the 1000 metre contour. The road system consists of a coastal route which is incomplete due to the steep mountain cliffs mentioned above. Other roads run a short way inland to the villages. The main mountain region can only be penetrated by ill-defined paths and local help is needed to find these.

## SPECIES ACCOUNT

### RANIDAE

#### *Rana r. ridibunda* (Pallas)

This was found in all streams and ponds visited. Most common in the latter whereas in running water more solitary. The colour varied from olive/brown with dark blotches (shaded locations) to bright green in sunlit ones. Active calling after dark on the 6th and 7th July at 22.00 with a temperature of 23.5°. Tadpoles seen in muddy pools in the Ano Meria region were presumed to be of this species.

### EMYDIDAE

#### *Mauremys caspica rivulata* (Gmelin)

The Stripe-necked Terrapin was found at several sites between Therma and Akro Kipos in stagnant pools and ponds behind the shore line. None in running water. Some of the pools were quite polluted. Observed either on banks or in the water itself from just after dawn to late evening. Some quite sizeable colonies from large adults to juveniles.

### TESTUDINIDAE

#### *Testudo graeca ibera* (Pallas)

Two specimens found in a grassy field near to Pyrgos Fonias were seen to be feeding on dry grasses and plants, 08.00, 23°C. Evidently ancient specimens, very dark in colour with the carapace almost black. The single thigh spur was unusually prominent. Single caudal plate, end of carapace not flared. A few tortoise ticks, *Hyaloma aegyptium*, were adhering to the thighs but infestation was light. Buttle (1989) found 6 specimens.

### LACERTIDAE

#### *Lacerta viridis* (Laurenti) ? subsp.

The most common lizard on the island with dense population concentrations. Frequently found near streams in wooded areas but also in drier areas, both woodland, field perimeters, hedges and scrub. Active throughout the day in cooler, shaded environments. Also seen on road edges at dusk venturing onto tarmac surfaces. Colouration most variable, notably in females. Bright green males had a typical 'trilineata' jizz but with blue throats and necks. I found no evidence of *L.trilineata* (Buttle 1989) and doubt that this species occurs on the island. However I stand to be corrected on this point.

#### *Podarcis erhardii* (Bdriaga) ? subsp.

Only one example seen on a tree trunk close to the stream at Pyrgos Fonias, 18.00, 30°C where sympatric with *P.muralis*. Further investigation failed to discover more specimens. Buttle (1989) observed this species near Hora in stony scrub. It is extremely unlikely that the Samothraki form belongs to *riveti* which is found in western Macedonia and Epirus. Evidently most rare on Samothraki.

#### *Podarcis muralis* (Laurenti) ? subsp.

Apart from two examples found between 800 and 900 metres on Mt. Koufoyllo this lizard was only seen in shaded woodland near streams between Therma and Pyrgos Fonias – 3 sites in close proximity. Investigation in the Ano Meria region which provided suitable habitat

was negative and there was no evidence of it in dry woodland, rocky areas and scrub. Thus it would seem to have most particular habitat requirements. Apart from a few juveniles seen amongst dead leaves and debris it was always spotted on tree trunks several feet above ground level and never far from the water courses. Deep shade was preferred with some indirect sunlight and most were found around mid morning, late afternoon and early evening with temperatures  $\pm 30^{\circ}\text{C}$ . Apart from being reticent and secretive it was also solitary being seen in ones or twos at any one spot. This is in contrast to its habitats on the mainland where it can often be found in sizeable colonies and is gregarious. Most examples were easy to approach once they had been sighted and did not demonstrate the fussy, aggressive active behaviour normally attributed to this species. Population density was thin and *P. muralis* had to be sought with great persistence. Even so the number of individuals observed totalled only 9 males, 1 female and about 8 juveniles. The high proportion of males to females was of interest and could well, if this is an accurate assessment, be the reason for its scarcity. *P. muralis* is possibly a species in decline. I do not attribute the scanty observations to the season. On the mainland this lizard is fully active in the summer occupying a variety of habitats. It is worth noting that Buttle found only one specimen beside a stream near to Palcopoli. Whether this lizard is commoner at higher elevations I doubt: on Mt. Koufolyio, as stated above, I saw only two examples, one of which was on an open rock face which should have yielded plenty of material if the animal was at all common. In life *P. muralis* was coloured olive or occasionally brown with a greenish tint in sunlight. The dorsum was marked with black reticulations or broken black bars either side of the vertebral position which was plain. There was never any sign of a mid-dorsal dark stripe. The flank zone was darker grey/black with spots of the background colouration. Throat and venter marked prominently with red or orange. Neck and head with fine black lines. To what form these wall lizards belong needs resolving. They do not resemble *P. muralis* from the north Greek mainland, nor from other parts of the country visited by me (Pindos Mountains, Olympos and the Peloponnese). With the possible exception of Thassos, Samothraki is the only island known to contain *P. muralis* and we might well have here a completely distinct subspecies that needs naming.

## COLUBRIDAE

### *Coluber jugularis caspius* Gmelin

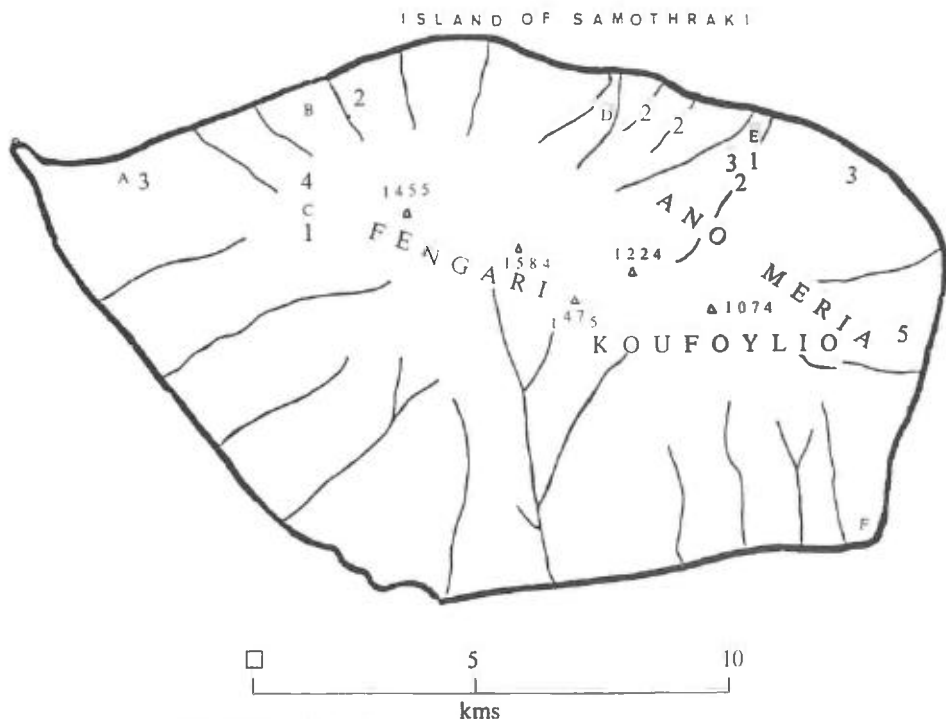
One medium sized adult crossed the tarmac road near Pyrgos Fonias (10.30  $28^{\circ}\text{C}$ ) while on a cycle ride and was caught as it tried to escape up a bank covered with prickly scrub. Cultivated fields were on either side of the road. This was typical *caspius* with some red on the top of the head and the neck. Sex female. Total length 1335 mm. Body length 990 mm. Ventrals 205. Subcaudals 104. This species was not found by Buttle.

### *Natrix natrix* (Linnaeus)

Three examples identified. One a small juvenile (patterned as *persa*) was seen swimming in a stream at Pyrgos Fonias in the mid afternoon,  $35^{\circ}\text{C}$  and shortly afterwards in the same stream was caught a melanistic specimen. The belly was checkered white and black. The labials were white and black and the eye was black. Total length 718 mm. Body 590 mm. Ventrals 174. Subcaudals 58. Of the 7 supralabials the 3rd and 4th bordered the orbit. There was a single preocular and 2 postoculars. Another melanistic example of about the same size was seen at 08.45 basking beside a pool behind the shoreline a few kilometers away. This could not be caught. Unfortunately no more were seen so it was not possible to determine if melanism in adults is the general trend on this island. Wettstein (1953 p.803) mentions a 'very large' specimen from Kamariotissa which was of the *persa* form. No mention is made of melanism. It would appear that melanism is a tendency demonstrated by some individuals. Much more material is needed to show how far this goes. *Natrix natrix* was found by Buttle in 1988.

### *Malpolon monspessulanus insignitus* (Geoffroy)

A single adult was glimpsed as it disappeared into rocks and undergrowth near to Pyrgos Fonias, 08.30,  $26^{\circ}\text{C}$ . Buttle (pers.comm.) found a 1.5 metres example under a piece of cardboard on the stony beach in the N.W. of the island.



Localities for selected species;

1. *P. erhardii*
2. *P. muralis*
3. *Natrix natrix*
4. *E. longissima*
5. *E. quatuorlineata* (approximate)

Place names:

- A Kamariotissa  
B Palcopolis  
C Hora  
D Therma  
E Pyrgos Fonias  
F Akro Kipos

Streams and water courses

### SUMMARY

A list of the herpetofauna of Samothraki is given in Table 2. In this list I have tried to include all amphibia and reptilia to which I can find certain references. Only two amphibians are known, *R. ridibunda* and *B. viridis*. I looked persistently for Brown Frogs but to no avail although conditions were suitable. The streams that run across to the north coast rise at fairly low altitude but the water is cool enough to support the life style of, say, *R. graeca*. Higher mountain streams might well contain Brown Frogs but these were not visited. The co-existence of two wall lizards that do not normally come together on islands is noteworthy: *P. erhardii* and *P. muralis*. Both seem uncommon or even rare and probably represent populations in decline. The snake-eyed Lizard, *Ophisops elegans*, is absent from Samothraki. This fact, and the occurrence of *P. erhardii*, demonstrates that this island did not receive faunal elements from Asia Minor. Regarding the snakes all species are what one might anticipate for this coastal island. An exception is *E. longissima* (Buttle 1989) which otherwise is not known from islands in the Aegean region. The presence of *E. quatuorlineata sauromates* (Wettstein 1953 p.800) is based on a sight identification but can be taken to be sufficient documentation to allow its inclusion, as with Buttle's siting of *E. longissima*. Viperine snakes have not been found.



TABLE 1 Species known to inhabit Samothraki

| SPECIES                        | BUTTLE | CLARK | OLDER SOURCES |
|--------------------------------|--------|-------|---------------|
| <i>Rana ridibunda</i>          | +      | +     | +             |
| <i>Bufo viridis</i>            | +      | —     | —             |
| <i>Testudo graeca</i>          | +      | +     | +             |
| <i>Mauremys caspica</i>        | +      | +     | —             |
| <i>Hemidactylus turcicus</i>   | +      | —     | —             |
| <i>Lacerta trilineata</i> (?)  | +      | —     | —             |
| <i>Lacerta viridis</i>         | +      | +     | +             |
| <i>Podarcis erhardii</i>       | +      | +     | +             |
| <i>Podarcis muralis</i>        | +      | +     | +             |
|                                |        |       |               |
| <i>Coronella austriaca</i>     | —      | —     | +             |
| <i>Coluber jugularis</i>       | —      | +     | +             |
| <i>Elaphe longissima</i>       | +      | —     | —             |
| <i>Elaphe quatuorlineata</i>   | —      | —     | +             |
| <i>Malpolon monspessulanus</i> | +      | +     | +             |
| <i>Natrix natrix</i>           | —      | +     | +             |

N.B. 1) subspecific status omitted

2) + = present. — = not recorded.

#### REFERENCES

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- Werner, F. (1938) Die amphibien und reptilien Griechenlands. *Zoologica Stuttgart* 94, pp. 1-117.
- Wettstein, O. (1953) Herpetologia aegaea. *Sitz-Ber-Usterr.Akad.d.Wiss., math.-naturw. Kl., Wien* 162, pp. 651-833.

N.B. The following was also used to help check localities although not referred to specifically:

- Arnold, E.N., Burton, J.A. and Oviden, D.W. (1978) *A field guide to the reptiles and amphibians of Britain and Europe*. London & Glasgow; Collins.

## A SHORT NOTE ON THE HERPETOFAUNA OF GOZO

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Having worked on the herpetofauna of the Maltese Islands for the last four years we note that in the contribution by F.D. Bowles (1988) there were certain inaccuracies and misconceptions, which we should like to rectify by means of this short note.

### AMPHIBIANS AND REPTILES OF THE MALTESE ISLANDS

**Amphibians.** In the Maltese Islands there is only one species of amphibian, the Painted Frog *Discoglossus pictus pictus* which does occur in Gozo. *Bufo viridis* which Bowles mentioned to occur in Malta is not actually present on any island of the Maltese group. Fossil remains of *B. viridis* have been found at Ghar Dalam Cave (Bate, 1935) as well as remains assigned to *Bufo vulgaris* or *Bufo bufo* (Zammit Maempel, 1985). Despott (1913) had introduced specimens of *Bufo viridis* (together with *Bufo vulgaris*, *Bufo calamita*, *Hyla arborea* and *Rana* spp.) into the island but none of these seem to have established breeding populations or have been recorded since.

**Reptiles.** In the Maltese Islands there are the following Squamata:

*Chalcides ocellatus tiligugu* (Gmelin) – Ocellated Skink

*Hemidactylus turcicus turcicus* (Linnaeus) – Turkish Gecko

*Tarentola mauritanica* (Linnaeus) – Moorish Gecko

*Chamaeleo chamaeleon* (Linnaeus) – Mediterranean Chameleon

*Podarcis filfolensis maltensis* (Mertens) – Maltese Wall Lizard

All of these have been recorded on Gozo.

On the island of Malta there are also four species of Ophidia:

*Coluber viridiflavus carbonarius* Bonaparte (Black Whip Snake) listed in the Red Data Book for the Maltese Islands as locally vulnerable (Lanfranco and Schembri, 1989).

*Coluber florulentus algirus* (Jan) (Algerian Whip Snake) which is locally vulnerable and has a restricted distribution (Lanfranco and Schembri, 1989).

*Elaphe situla leopardina* (Bonaparte) (Leopard Snake) which has a restricted Mediterranean distribution and is locally vulnerable (Lanfranco and Schembri, 1989).

*Telescopus fallax fallax* (Fleischmann) (Cat Snake) which is locally vulnerable and has a restricted distribution (Lanfranco and Schembri, 1989).

Out of these four snakes only *Coluber viridiflavus carbonarius* has been recorded from Gozo where it can be commonly seen late in the afternoon among vegetation and crossing footpaths.

On the island of Malta *Elaphe situla leopardina* seems to be the most common snake (although quantitative studies need to be carried out in this regard) while *Coluber florulentus algirus* and *Telescopus fallax fallax* are very rare and seem to be restricted to the southeastern parts of the island (Lanfranco, 1955).

From Maltese waters there are records of five sea turtle species – *Dermochelys coriacea* (Leatherback Turtle), *Caretta caretta* (Loggerhead Turtle), *Chelonia mydas* (Green Turtle), *Lepidochelys kemp*i (Kemp's Ridley) and *Eretmochelys imbricata* (Hawksbill Turtle), the latter three recorded only from single specimens (Gramentz, 1989). *Caretta caretta* is the most common of the five turtles and is frequently caught and sold by fishermen, even in Gozo, since they are still not legally protected in the Maltese Islands. Despott (1915) records that during Spring large numbers of Loggerhead Turtles appear to lay eggs "on our unfrequented sandy beaches, especially at Gozo". These sandy beaches are no longer unfrequented and sea turtles no longer breed on Gozo.

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## MEMBERS' ADVERTISEMENTS

- \* Free to responsible owner (B.H.S. members only): captive bred female *Python molurus*, long term captive *Varanus exanthematicus*. Any carriage fee must be paid. John Daniels, 9 Brinkburn Road, Hazel Grove, Stockport, Cheshire, SK7 4NR.
- \* Research on reproduction of *Python regius* in captivity: information wanted. Greg Greer is undertaking a survey on all aspects of breeding *P. regius* in captivity. If you can help, write to: Greg C. Greer, Chauttahoossee Nature Center, 9135 Wilko Road, Roswell, Georgia 30075, U.S.A. Tel: (404) 992-2055 or (404) 952 3737.
- \* Adult pair of Boa Constrictors for sale. Contact Simon Townson. 081-531 1378.
- \* For Sale: trio of Hogs Island Boas. Carol Kemp. 081-531 9478.

## AMPHIBIANS AND REPTILES OF THE JOINT SERVICES SCIENTIFIC EXPEDITION TO THE UPPER RASPACULO, BELIZE, 1991

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### INTRODUCTION

An account is given of the reptiles and amphibians observed during an expedition to the river basin of the Upper Raspaculo, Belize (formerly British Honduras). The expedition was a joint operation between the British Services and the Natural History Museum, London, and was organised with the principal aim of conducting the first field study of the area and providing a written record of its biological resources for the Belizean Government, underwriting the value of its protection. As far as the scientific program was concerned, the main objectives were to compile a biodiversity inventory and conduct more detailed studies on the forest, its flora, fauna and soils. A full account of the expedition and its findings will be produced as a special report; the herpetological contribution is reproduced here as a condensed version.

The expedition took place between January and February 1991, which in Belize corresponds to the end of the wet season/beginning of dry season. Rainfall in the area varies from 2032 mm to 2450 mm per year, and during the course of the expedition temperatures ranged from 52°F (night-time low) to 80°F (day-time high). In the context of Belizean vegetation, the forest is classified as "semi-evergreen seasonal forest" (Wright *et al* 1959). Common forest trees in the area were Quamwood (*Schizolobium parahybum*), Prickly yellow (*Zanthoxylum* sp.), Ironwood (*Dialium guianense*) and Cramantree (*Guarea* cf. *excelsa*). Also present were large Mahogany (*Swietenia macrophylla*), an indication of the area's remoteness from logging operations. Conspicuous in the understorey were small palms (*Bactris* sp., *Chamaedorea* ssp. and *Geonoma* sp.), aroids and lianes. Riparian vegetation was dominated by various secondary growth tree species such as Bribri (*Inga edulis*), Trumpet (*Cecropia obtusifolia*), Salmwood (*Cordia alliodora*) and Cottonwood (*Ceiba pentandra*), with tall herbaceous plants such as *Heliconia* spp.

The herpetofauna of Belize was first documented by Schwartz in 1941, and further investigations have revealed a number of additional species (Neill and Allen, 1959a, 1959b, 1960), with the publication of a comprehensive checklist and keys for their identification in 1975 (Henderson and Hoervers). A number of other species have since been recorded (Henderson, 1976; Iverson, 1976; Lee, 1976; Henderson, Hoervers and Wilson, 1977). The herpetology of surrounding countries has also received considerable attention. The reptiles of Chiapas, southern Mexico were treated by Alvarez del Toro (1983); the distribution of the herpetofauna of the Yucatán Peninsula was reviewed by Lee (1980); a number of regional accounts have been made of the Guatemalan herpetofauna including a major checklist by Stuart (1963); and more recently the herpetofauna of Honduras has been summarised by Wilson and Meyer (1985). The upper reaches of the Raspaculo River and forested interior of Belize north of the Maya Mountain divide however, is an area which has remained for the most part largely unexplored.

Campbell and Vannini (1989) described the distribution of amphibians and reptiles in Belize and Guatemala in terms of eight faunal areas (based on Stuart, 1964), in which all of Belize is encompassed together with the northern portion of Guatemala and the lower Polochic and Motagua valleys in a division referred to as the "Petén area" (consisting in part of El Petén, Guatemala). The Maya Mountain range of Belize with its peaks of higher elevation may perhaps form a separate biological sub-area, but in general the herpetofauna of Belize and Guatemala have much in common, together totalling 326 species. Some 135 species are known from Belize, its islands and adjacent marine waters, of which almost one half are known to occur in rainforest and jungle, with some 20 or more species restricted more or less completely to primary rainforest typical of that in the Upper Raspaculo.



Plate 1. *Bufo valliceps*



Plate 2. *Iguana iguana rhinolopha*

A significant number of reptiles and amphibians were recorded during the course of the expedition. Unless otherwise stated the species were all observed in the vicinity of the camp at an altitude of 445 metres. Specimens collected for verification are denoted by JSSEUR and a sequential number, and have been deposited in the collection of the Natural History Museum, London.

#### CLASS AMPHIBIA

Family Caeciliidae

*Gymnopsis syntrema* (Peters). JSSEUR 38.

Remarks: Semi-fossorial; rainforest. One specimen found representing a new departmental record for the species.

Family Plethodoniidae

*Bolitoglossa m. mexicanus* Duméril. Bibron and Duméril Vernacular names: *Galliwasp* (this name also applies to a number of lizards in Belize).

Remarks: Terrestrial and arboreal; rainforest. One specimen recorded.

Family Bufonidae

*Bufo marinus* (Linnaeus)

Vernacular names: *Spring chicken*, known in Carib as “hua”.

Remarks: Terrestrial; riparian habitats and rainforest. Common.

*Bufo valliceps* Wiegmann

Remarks: Terrestrial; rainforest. Common.

Family Leptodactylidae

Three different forms of the genus *Eleutherodactylus* were recorded; JSSEUR 22 and 26 may be variations of the same, unknown form, and have consequently not been given full species names.

*Eleutherodactylus cf. rugulosus* (Cope). JSSEUR 16.

Remarks: Terrestrial in leaf litter and semi-aquatic; rainforest. A fairly abundant species both in the forest and near streams. Olive green to brown above with prominent supernumery tubercles on plantar surface; posterior surface of hind legs dark with yellow-gold spots and black reticulations; iris gold-brown with network pattern of fine black reticulations; call a short but unbroken soft warble.

*Eleutherodactylus sp.* JSSEUR 22.

Remarks: Terrestrial in leaf litter and semi-aquatic; rainforest. The most abundant form (also at alt. 720 metres). Head proportionately larger than in aforementioned species and supernumery tubercles much less distinct. Uniformly pale brick-red above with dark brown cheeks; some specimens with a small dark spot either side of cloacal opening; hind legs faintly barred; upper half of eye pale bronze with fine dark reticulations; call a series of usually four sharp croaks rising gradually in pitch.

*Eleutherodactylus sp.* JSSEUR 26.

Remarks: Terrestrial in leaf litter and semi-aquatic; rainforest. This form was recorded only on a few occasions (also at alt. 720 metres) and in many ways resembled JSSEUR 22. Colouration pale grey-brown above with dark symmetrically-arranged linear blotches extending on to underside; two small blotches either side of cloacal opening; posterior surface of hind legs dark with peppering of lighter dots. Upper half of eye bright orange-red; lower half black.

Family Hylidae

*Smilisca baudini* (Duméril and Bibron). JSSEUR 2.

Remarks: Arboreal in understorey growth on the banks of a seasonal stream; rainforest. Common.

Family Ranidae

*Rana berlandieri* Baird. JSSEUR 14.

Vernacular names: Probably *Spring chicken*.

Remarks: Terrestrial; small seasonal pool in rainforest. One specimen recorded.

*Rana palmipes* Spix

Vernacular names: *Spring chicken*.

Remarks: Terrestrial; riparian jungle and riverbanks. Common.

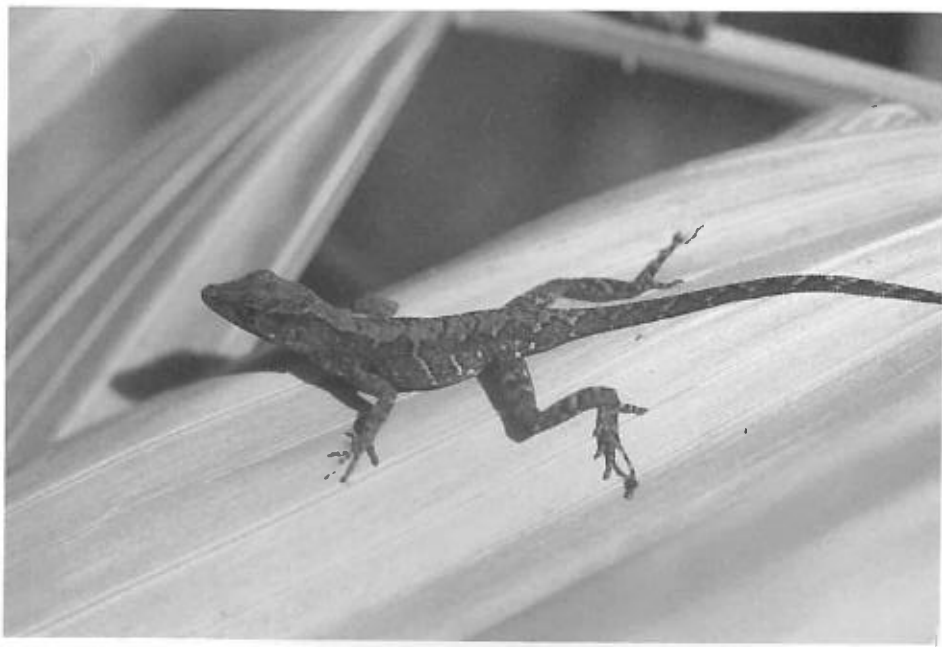


Plate 3. *Anolis humilis uniformis*



Plate 4. *Anolis biporcatus*

## CLASS REPTILIA

### Family Crocodylidae

#### *Crocodylus moreleti* Duméril and Bibron

Vernacular names: *Alligator*; known in Carib as “*agarei*”.

Remarks: Aquatic; deep, slow-moving stretches of the main river. Seven specimens recorded (in a 55 km stretch of the Raspaculo and Macal River).

### Family Kinosternidae

#### *Kinosternon scorpioides* (Linnaeus)

Remarks: Aquatic in rather fast-flowing stretches of the main river; rainforest. Three specimens recorded.

### Family Iguanidae

#### *Anolis biporcatus* (Wiegmann); JSSEUR 27.

Remarks: Arboreal in canopies of large trees; rainforest. Three specimens recorded.

#### *Anolis humilis uniformis* Cope. JSSEUR 7.

Remarks: Terrestrial and arboreal; rainforest. Common.

#### *Basiliscus vittatus* Wiegmann

Vernacular names: *Maklakka*, *Cock lizard*, *Cock maklala*.

Remarks: Arboreal; riparian jungle. Common.

#### *Corytophanes cristatus* (Merrem)

Vernacular names: “*Old man*”; the names for *Basiliscus* probably apply here also.

Remarks: Arboreal; rainforest. One specimen recorded.

#### *Iguana iguana rhinolopha* Schmidt

Vernacular names: *Bamboo chicken*, *iguana*.

Remarks: Mostly arboreal in large trees and vines; an abundant lizard in riparian habitats.

### Family Scincidae

#### *Scincella cherriei* (Cope)

Vernacular names: *Galliwasp*.

Remarks: Terrestrial and semi-fossorial in leaf litter; rainforest. Common.

### Family Teiidae

#### *Ameiva festiva* (Lichtenstein and Von Martens)

Remarks: Terrestrial; rainforest. Common.

### Family Boidae

#### *Boa constrictor imperator* Daudin.

Vernacular names: *Wowla*, *Wowler*, *Owla*, *Boa*; also known to Caribs as “*wanasai*”.

Remarks: Terrestrial and arboreal; riparian jungle. Three specimens recorded.

Male: 1.92 metres; weight: 3.5 kgs.

Female 1: 2.15 metres; weight: 9.0 kgs.

Female 2: 2.35 metres; weight: 7.5 kgs.

### Family Colubridae

#### *Coniophanes f. fissidens* (Günther)

Remarks: Terrestrial amongst leaf litter; rainforest. Three specimens recorded.

#### *Imantodes cenchoa leucomelas* Neill

Vernacular names: *Cat-eyed snake*.

Remarks: Arboreal; rainforest. One specimen recorded.

#### *Lampropeltis triangulum polyzona* Cope

Vernacular names: Probably “*coral*” or “*coralillo*”.

Remarks: Terrestrial; rainforest. One specimen recorded.

#### *Masticophis m. mentovarius* (Duméril, Bibron and Duméril)

Remarks: Terrestrial, rainforest (Alt. 650 metres). One specimen recorded.

#### *Mastigodryas melanolomous* (Cope)

Remarks: Terrestrial amongst leaf litter; rainforest and riparian jungle. Common.

#### *Scaphiodontophis annulatus* (Duméril, Bibron and Duméril)

Vernacular names: “*Double snake*”, possibly *coral* or *coralillo*.

Remarks: Terrestrial; rainforest (alt. 500 metres). One specimen recorded.





Plate 5. *Boa constrictor imperator*



Plate 6. *Stennorhina freminvillei*

*Stenorrhina freminvillei* Duméril, Bibron and Duméril.

Remarks: Terrestrial; rainforest. One specimen recorded.

*Tantilla canula brevis* (Günther)

Remarks: Terrestrial and semi-fossorial; rainforest. Two specimens recorded.

Family Elapidae

*Micrurus diastema sapperi* Roze. JSSEUR 4.

Vernacular names: *Coral* or *Coralillo*.

Remarks: Terrestrial and semi-fossorial in leaf litter; rainforest. Two specimens recorded.

*Micrurus hippocrepis* (Peters).

Vernacular names: *Coral* or *coralillo*.

Remarks: Terrestrial and semi-fossorial in leaf litter; rainforest. One specimen recorded.

*Micrurus nigrocinctus divaricatus* (Hallowell). JSSEUR 8.

Vernacular name: *Coral* or *coralillo*.

Remarks: Terrestrial and semi-fossorial in leaf litter; rainforest. Nine specimens recorded.

## DISCUSSION

During the course of the expedition a total of 31 species were recorded, representing some 40% of the herpetofauna in Belize known to include rainforest and jungle in their range of habitats, and some 20% of those which more or less occur only in this relatively undisturbed type of forest. It is interesting that at least 3 species of snake (*Masticophis*, *Mastigodryas* and *Scaphiodontophis*) were recorded which are more commonly associated with drier forest habitats i.e. pine parkland, cocotal and scrub forest. Snakes constitute the greatest percentage of the herpetofauna recorded (38.7%), followed by lizards (22.6%), and this pattern is known to be true of the faunal area as a whole (Campbell and Vannini, 1989). The presence of all three species of Coral snake (genus *Micrurus*), which was the most dominant terrestrial group of snakes, is indicative of the degree of speciation and richness of the herpetofauna in this area. A little known caecilian was also found which represents a new departmental record for the species and the only animal of its kind to occur in Belize. The size of some of the reptiles observed, notably *Crocodylus moreleti*, *Iguana iguana* and *Boa constrictor* is significant, as in few other areas would these animals be able to survive persecution by man and attain their full, natural adult size. It is likely that the large populations of *Iguana iguana* in particular are also important in sustaining a diverse range of predatory animals, particularly large birds of prey.

The inventory is also characterised by the absence of some species which in adjacent areas, i.e. the Cockscombe Basin, are said to be relatively common. Despite meticulous searching for the four species of pit-viper in Belize known to inhabit rainforest and jungle (*Bothrops atrox*, *Bothriechis schlegelii*, *Porthidium nasutum* and *Porthidium nummifer*), none were found. It is likely that a considerable number of other species inhabit the area but were not recorded due to the inaccessible nature of their habitat, i.e. *Laemactus longipes* in the forest canopy, or because they remained hidden by their camouflage and were simply overlooked. The activity patterns and seasonal incidence of species may to some extent differ in the area and this would also have had some bearing on the results; in particular the low mean night-time temperatures could not be regarded as conducive to high activity amongst nocturnal reptiles, and in the wet season it is reasonable to expect that amphibian species would be more in evidence.

## ACKNOWLEDGEMENTS

The help of Dr E N Arnold Dr B T Clarke of the Reptile Section, Natural History Museum, London, is gratefully acknowledged.

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## THE HERPETOLOGY AND HERPETOFAUNA OF NAMIBIA

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"Notwithstanding the dryness of the soil and the atmosphere between the Orange River and the seventeenth or eighteenth degrees of south latitude, reptiles are rather numerous . . . indeed, some parts of Damara-land are so infested by them as to be almost uninhabitable."

Charles John Anderson, "Lake Ngami", 1956

Namibia, which became independent on the 21st March 1990, lies on the extreme south-west corner of Africa (hence its previous name, South-West Africa), north of South Africa, west of Botswana and south of Angola. The country can be conveniently split into four regions. They are: the Kalahari (semi-desert scrub, not true desert) occupying the eastern third of the country; the highlands – an area of relatively high, rocky land running from south to north, up the centre of the country, from the great Karas mountains through the Aus range (where Windhoek, the capital, is sited) to the Waterberg and Brandberg (the highest mountain, 2579 m altitude); the Namib Desert – a true desert, lying along the coastline, with less than 50 mm of rain a year and rainfall reliability less than 20%; and the Northern savanna, an area of relatively (more than 500 mm/year) high rainfall. In the northern savanna are two features of interest, a huge evaporate pan, Etosha, around which a big National park is sited, and the Caprivi Strip, a finger of land extending far east of the north-east corner, across to the Linyanti and Chobe river. The Caprivi strip is much more well watered than the rest of Namibia and contains the country's only genuine wetlands (Jones, 1990). The Caprivi was given by the British to the German colonists in 1889 in order to give them access to the Zambezi river. Two major rivers cross the Caprivi strip, the Kavango and Cuando, and the Zambezi/Linyanti rivers border the eastern edge of the strip. The Cunene river forms the western side of the border with Angola. In the south, one permanent river, the Fish, bisects the high land and enters the Orange river.

Sited on a cold coastline, cooled by the Benguela current, Namibia is a dry land. Most of the country has less than 400 mm rainfall annually. There is no forest, although in the north and the Caprivi there is some savanna woodland. It is a country of harsh, wind and heat worn landscapes. The settlement of Noordoewer, in the south, has an average daily maximum temperature of over 40 degrees centigrade during the height of summer. There are few people, just over one million, in a country of 820 000 square kilometres (compare Nigeria, with an area of 924 000 km<sup>2</sup> and 90 million people!). The country's economy is based on mining (large reserves of diamonds and uranium), stock farming and fishing, the cold sea providing abundant catches (data from Van der Merwe, 1983).

### THE HERPETOFAUNA

Despite the dryness of the land, Namibia has a relatively diverse herpetofauna. The region (particularly if one includes in the region the 250 km northern extension of the Namib desert into Angola, to the Mossamedes/San Nicolau area) has a very high number of endemic species, mostly associated with the Namib desert. An interesting comparison can be made with the herpetofauna of Egypt, which lies at a similar latitude to the north of the equator and is slightly larger in area: the number of species present are as follows (Namibian reptile data from Branch (1988a), Namibian frog data from Channing and Van Dijk (1976) and Griffin (1990), Egyptian data from Marx (1968).

|                                       | NAMIBIA | EGYPT |
|---------------------------------------|---------|-------|
| Land Tortoises (Testudinidae)         | 6       | 1     |
| Soft-shelled Terrapins (Trionychidae) | 1       | 1     |
| Side-necked Terrapins (Pelomedusidea) | 4       | 0     |
| Snakes (Serpentes)                    | 76      | 34    |
| Worm Lizards (Amphisbaenia)           | 8       | 0     |

|                           |     |    |
|---------------------------|-----|----|
| Lizards (Sauria)          | 111 | 46 |
| Crocodyles (Crocodylidae) | 1   | 0  |
| Frogs (Anura)             | 50  | 6  |
| Total                     | 257 | 88 |

The number of Namibian species is somewhat boosted by species known only from the Caprivi strip, sticking out like a finger east of Namibia proper, into the Chobe/Zambezi river system. For example, all three species of *Pelusios* (Hinged Terrapins) found in Namibia only occur in the Caprivi, some seven or eight snake species (including the Congo Burrowing Adder, *Atractaspis congica* and Rufous beaked-snake, *Rhamphiophis oxyrhynchus*), three Dwarf Gecko species (*Lygodactylus*) and three or four frog species (including the Foam-nest Tree Frog *Chiromantis xerampelina* and Red Toad *Schismaderma carens*) reach the Caprivi but no further west. Nevertheless, for a dry land, Namibia has a very rich reptile fauna.

The structure of the Namibian herpetofauna is best considered in terms of its zoogeographic affinities, with most species falling into the following major groups:

**Pan-African Savanna species:** widespread throughout the African savanna south of the Sahara. There are a number of snakes in this group (examples: *Python sebae*, *Lamprophis fuliginosus*, *Rhamphiophis oxyrhynchus*, *Dasypeltis scabra*, *Dispholidus typus*) and nine frogs (examples: *Ptychadena mascareniensis*, and *Kassina senegalensis*.) but few lizards (only *Varanus niloticus* and *Chamaleo dilepis*; this latter species does not reach West Africa proper).

**South-east African Species:** occurring generally from Somalia/Sudan/Ethiopia/Kenya down the eastern seaboard, across to Namibia and Angola. Associated with savanna and/or semi-desert. There are about 17 snakes, 15 lizards and 13 frogs in this group, including such species as *Thelotornis capensis*, *Pseudaspis cana*, *Hemirrhagerrhis nototaenia*, *Gerrhosaurus flavigularis*, *Agama atricollis*, *Pachydactylus bibronii*, *Bufo carens*, *Phrynomerus bifasciatus* and *Ptychadena mossambica*.

**Southern African Endemics,** not confined to Namibia, found on both east and west sides of the sub-continent. There are 10 or 11 snakes in this group, about 13 lizards and three frogs. Typical species: *Aspidelaps scutatus*, *Psammophylax rhombeatus*, *Agama atra*, *Bradypodion ventrale*, *Strongylopus grayii*, *Breviceps adpersus*.

**Southern African Endemics,** confined to the western (drier) side of the sub-continent. Quite a large group, with some 14 snakes and nearly 30 lizards (of which 10 are geckoes), but only a couple of frogs; examples are: *Naja nivea*, *Dipsina multimaculata*, *Telescopus beetzi*, *Mabuya sulcata*, *Pachydactylus weberi*, *Pachydactylus serval*, *Phrynomerus annectans*.

**Namibian Endemics:** Confined to Namibia and/or the Namib desert, including the section of the Namib desert that enters southern Angola as far as Mossamedes. Branch (1988a) did not consider those occurring north of the Namibian border as endemics, but I feel this is an artificial division, as the Namib fauna is reasonably heterogeneous, and most species found in the northern Namib enter Angola. There are seven or so snakes but nearly 40 lizards in this group (including 18 geckoes). Some species are associated purely with the desert, others with the rocky mountains to the west of the desert. Typical species are: *Python anchietae*, *Mehelya vernayi*, *Pythonodipsas carinata*, *Bitis peringueyi*, *Sepsina albertii*, *Aporosaura anchietae*, 4 species of *Cordylus* (*C. campbelli*, *C. jordani*, *C. pustulatus* and *C. namaquensis*), *Meroles micropholidus*, *Narudasia festiva*, *Pachydactylus bicolor* and all six known species of *Rhoptropus*. This group could be split into two sub-groups, species associated primarily with the dry rocky mountains and species associated with the gravel plains or dunes of the Namib and pro-Namib (a transition zone between the Namib desert and the higher land to the east).

Species associated purely with the Kalahari but not the Namib: This is a small group, including the snake *Amblyodipsas ventrimaculata*, the gecko *Colopus wahlbergii* and the skink *Typhlosaurus garipeensis*.



Plate 1: The Horned Adder, *Bitis caudalis*, found throughout Namibia. (photograph by Stephen Spawls).

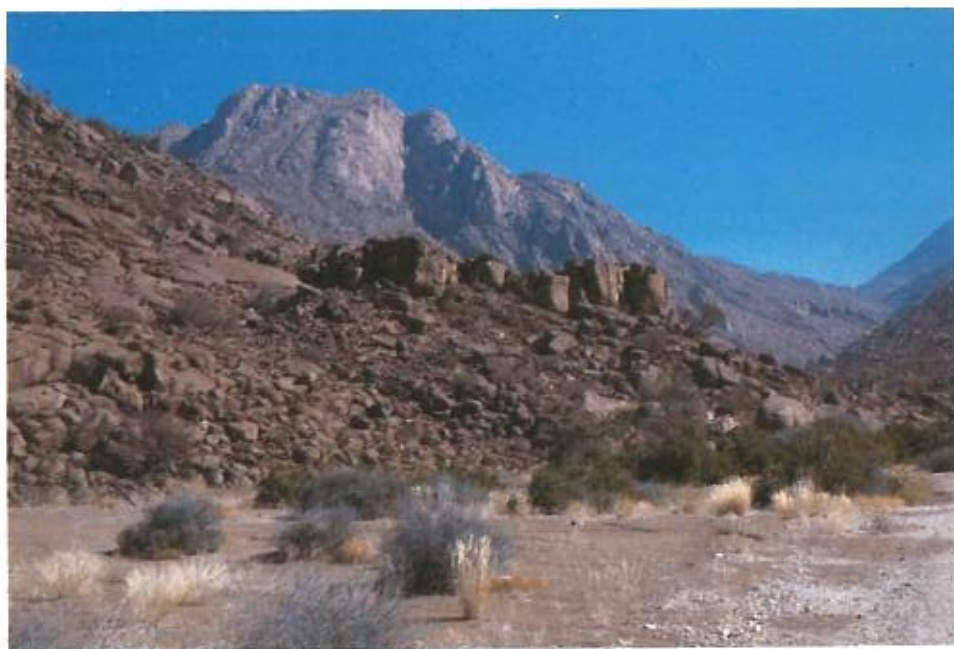


Plate 2: In the Brandberg, Namibia's highest mountain. *Rhoptropus* geckoes were active on the boulders during the day. (photograph by Stephen Spawls).



There are a few species, occurring mostly in the Caprivi strip, which do not fit easily into any of these categories, for example the snake *Limnophis bicolor* (associated with the south-central African watershed), the burrowing adder *Atractaspis congica* (central African forests) and two species of *Lygodactylus*, both associated with the Zambezi basin.

It is worth discussing the herpetofauna of the Namib desert proper, because for a desert it is remarkably rich. Joger (1985) indicates that the Namib and associated rocky hills is one of the principal radiation centres of nocturnal geckoes (Gekkoninae), more than 20 species occurring in the region (for comparison, only eight in the Arabian desert of Egypt). Some of these geckoes are astonishingly weird and beautiful animals, including species such as the virtually transparent Web-footed Gecko, *Palmatogeoeko rangei*, and the Kaoko Web-footed Gecko, *Kaokogeoeko vanzyli*, confined to the gravel plains of the Kaokoveld in the north-west. Some twelve or so species of Lacertid lizard also occur in the Namib. Among them is the strange Shovel-snouted Lizard, *Aporosaura anchietae*, which lives on the dune slipfaces (sites of much life in the Namib) and has fringes on its toes. This lizard can withstand body temperatures of 44 degrees C and when overheated cools itself by an amusing thermal dance, whereby it lifts its legs and tail into the air (interestingly, this same behaviour is shown by another desert dwelling lizard from the opposite corner of the continent, *Acanthodactylus boskianus*, a species from Egypt, which also has fringes on its toes (Flower 1933)). In addition, in the triangle of desert and dwarf shrub savannah in the south-east of the country, between Luderitz Bay, Keetmanshoop and Karasburg, no less than six species of true African vipers (*Bitis*) occur; nowhere else in Africa is this diversity found. In fact, the number of *Bitis* species found in Namibia may be seven. There are two major dune seas in the Namib, one extending south of Walvis bay and the other north of the Huab river, separated by a huge gravel plain. Work by Mike Griffin, at the Ministry of Wildlife, Conservation and Tourism in Windhoek indicates that the specimens of *Bitis peringueyi* from the northern sector of the Namib are genetically different from those from the southern sector. The curious plated lizard *Angolosaurus skoogi* is only found in the northern sand dunes.

The reason for this huge diversity of reptile life in the Namib is that, despite the lack of rainfall, the desert is by no means waterless, for it receives a large amount of fog-water precipitation. Wind moving across the sea from the south-west (from which direction most of Namibia's coastal wind comes) picks up much moisture. As it approaches the Namibian coastline, the sea surface temperature gradually falls, from 21 to 12 degrees C (this is caused by upwelling of Antarctic waters of the Benguela current). At the same time, an inversion layer (a layer of cool air overlying warm coastal air) prevents the air stream rising and becoming turbulent, or forming clouds. Hence as the warm air stream is cooled by the sea, huge fog banks are formed, and these can be often seen offshore as one drives towards the Namibian coast. On approximately 100 days of the year, onshore winds at night push the fog banks inland onto the Namib, and as they rise over the desert they are cooled past the dew point, and fog condenses out onto the desert. Most fog water falls between elevations of 300 and 600 m above sea level. In this area there are many plants, in particular lichens, which simply lie on the rocky ground and depend on this fog water. Dependent on the plants (and fog-water !) are herbivorous animals, and dependent on the herbivores are the carnivores. Thus the fog-water explains why the Namib dunes contain so much more life than comparable areas of the Sahara. The Namib is a desert of astonishing beauty. As well as the remarkable landscape, with its Seif and barchan dunes (often coated with garnets !), and jagged rocky hills, the plant life is unlike anywhere else on earth. It includes the strange Welwitschia, a plant that may live to be more than a thousand years old and only has two leaves, that grow continuously. On rocky hills one sees the strange Phantom or Moringa trees, distinctive because of their ghostly white bark.

#### CONTEMPORARY HERPETOLOGICAL WORK IN NAMIBIA

Herpetological research in Namibia is or has recently been conducted by four major institutions; they are the State Museum, at Windhoek, the Namib Desert Research Station at Gobabeb, south-east of Swakopmund on the coast, the Ministry of Wildlife, Conservation and Tourism

(formerly the Directorate of Nature Conservation and Recreational resorts. Headquarters in Windhoek but offices and scientists in all six major Namibian national parks and game reserves), and the Transvaal Museum, in Pretoria. A handful of foreign and South African scientists also research on Namibian herptiles (to be detailed shortly), and although at present there is no snake park or reptile house in Namibia exhibiting the fauna, one will shortly open in Windhoek. There are also 3 crocodile farms in the country.

The State Museum in Windhoek houses a collection of some 7,500 preserved Namibian reptiles (about half are lizards) and 850 amphibians under the curatorship of R.E. (Eryn) Griffin. Herpetologists who have been based there include the late Dr. W. Steyn, who published on various aspects of herpetology, often in conjunction with other authors, (mostly in Cimbebasia), e.g. Steyn, (1963), Steyn and Els, (1963), Steyn and Mitchell, (1967). The Austrian herpetologist Hartwig Berger-Dell'mour recently spent a short sojourn at the Museum, and produced several papers, especially on the Lacertid genus *Pedioplanis* (Berger-Dell'mour and Mayer, 1989, Mayer and Berger-Dell'mour, 1988). The Museum produces the journal *Cimbebasia*, which appears on an irregular basis; issues usually contain 200-odd pages and often have herpetological papers in them. Examples are Professor Geoff McLachlan's revision of the taxonomy of *Agama hispida* (McLachlan 1981), Steyn and Haacke's description of the new Web-footed Gecko *Kaokogecko* (from the Kaokoveld of north-west Namibia) (Steyn and Hacke, 1966) and Helmut Finkeldey's notes on *Python anchietae* (Finkeldey 1963). Early issues contained several papers by Dr. C.K. Brian (e.g. Brain 1962), one of southern Africa's most remarkable zoologists. Dr. Sam Telford, from Cape Town, has just been appointed to the post of herpetologist at the State Museum, and is commencing a project on the barking gecko, *Ptenopus*.

The Namib Desert Research Station, 100 km south-east of Walvis Bay, is sited astride the 3 main biotypes of the Namib; they are the red dunes, the gravel plains and the riverine bush of the Kuiseb river. The research station was the brainchild of Dr. Charlie Koch, an Austrian entomologist who came to Namibia in 1949 with a University of California/Transvaal Museum expedition. Koch was a foremost authority on the strange *Tenebrionid* beetles that flourish in the Namib. Originally set up as a field station of the Transvaal Museum, in 1963, the research station became the headquarters of the Desert Ecological Research Unit (DERU), a South-African based organisation. It remains to be seen what administrative changes will take place in this post-independence era. Scientists based at the Research Station have produced many important works, in various scientific journals (in particular the *Annals of the Transvaal Museum*), but the station also produces its own journal, *Scientific Papers of the Namib Desert Research Station* (whilst under the auspices of DERU, *Bulletins of the Desert Ecological Research Unit*). Herpetological works appearing under this imprint includes Wulf Haacke's description of two new lizard species (Haacke 1964) and ongoing work on the strange Plated lizard, *Angolosaurus skoogi*, of the northern dune sea (Hamilton and Coetzee, 1969, Seeley, 1987(a), (for further work on this lizard, see also Seeley, Mitchell, Roberts and McLain, 1988)).

Scientists operating from the station have produced some 40 odd papers on the herpetofauna of the Namib. Herpetologists of note who have visited the Namib and/or the Research Station and published on their work there include Edward Ross, (really an entomologist, at the California Academy of Sciences, but a keen herpetologist as well !) (Ross; 1972), Yehudah Werner of the Hebrew University of Jerusalem (Werner, 1977), Karl Switak (1981) and Leonard Hoffman, who worked on Horned Adders, *Bitis caudalis* (Hoffman 1988). Helmut Finkeldey, a herpetologist, was for some years based at the Research Station. The present director of the research station, Dr Mary Seely, as well as researching on *Angolosaurus*, has produced a delightful book on the Namib, essential reading for anyone who would like to understand the delicate ecology of this fascinating desert (Seely 1987(b)).

Resident herpetologist at the Ministry of Wildlife, Conservation and Tourism (formerly the Directorate of Nature Conservation) is Mike Griffin, officially the Small Animal Biologist. Originally from California, Mike has been resident in Namibia for 16 years, and has produced an interesting (if somewhat speculative) checklist of amphibians, reptiles and mammals of Etosha (Griffin, 1989, but author stated simply as "Small Animal biologist" !), he has also recently





Plate 3: Dwarf Python, *Python anchietae*, collected in Namibia. (photographed by Laura Spawls).



Plate 4: Kalahari Ground Gecko, *Colopus wahlbergi*, associated with the Kalahari in Namibia. (photograph by Stephen Spawls).

summarised herpetological work being carried out in Namibia (Griffin 1990). His present studies concern the conservation status of various species of the Namibian herpetofauna, and the production of a Red Data Book. At present, the only Red Data book in existence for African Reptiles and amphibians is that prepared for South Africa by Geoff McLachlan (1978), updated by Branch (1988b). Mike Griffin is also working on some 3,000 odd snakes that were collected from the Eastern National Water Carrier, a somewhat controversial canal, mostly open, that transports water from Grootfontein in northern Namibia, 260 km south to Omatoko. A preliminary report on this collection has been published (Griffin, Panagis and Berriman, 1989). The canal has attracted much heated debate (e.g. see Comrie-Greig, 1986), with ecologists pointing out that it serves as a deadly trap for a huge range of vertebrates, with little means of escape.

In Etosha National Park, in northern Namibia, Andy Phillips, from the Centre for Reproduction of Endangered Species in San Diego, is working with the Ministry of Wildlife, radio-tracking *Varanus albigularis*, the Southern Monitor, which together with Toy Bodbijs' Gaboon Viper radio tracking project in Zululand, are the first two reptile radio-telemetry projects in Africa. The Directorate of Nature Conservation (as it was) produced a quality scientific journal, Madoqua (the generic name of the Dik-dik !); four issues appeared each year. Madoqua regularly published herpetological papers, e.g. Penrith's (1971) paper on *Trionyx*, the Nile Soft-Shelled Turtle that just reaches Namibia, Wulf Haacke's (1981) paper on *Mehelya* in southern Africa, Jurgens' (1979) work on the *Rhoptropus* geckoes. A worrying aspect of the Ministry's work is the control of herpetofaunal poaching. Namibia's remarkable endemic reptiles, although fully protected by legislation against commercial exploitation, are greatly in demand among overseas hobbyists, in particular its rare endemic python, its beautiful geckoes and little vipers. South African based collectors visit the region, collect and remove Namibian animals and sell them both within South Africa and overseas. It is hoped that increased fines and new stricter border controls will discourage this illegal trade.

During the last 3 decades, the most important herpetological research in Namibia has been carried out by Wulf Haacke. Born in Windhoek, but now assistant director of the Transvaal Museum, Wulf has been publishing on the herpetofauna of Namibia since the early 1960's. Under V.F.M. Fitzsimons, who joined the staff in 1924, the Transvaal Museum began to build up a major preserved collection of Namibian reptiles and amphibians. When Wulf started at the museum he continued to expand the collection. The Transvaal museum now houses the most comprehensive collection of the Namibian herpetofauna in the world. Wulf's own work includes five classic papers on the ground-dwelling and burrowing geckoes of the region (Haacke 1975a, 1976 (a,b,c,d), several works on the biogeography of the area (Haacke 1982, 1984), descriptions of new species of lizards and snakes (Haacke 1965, 1975(b) and he has recently found a new species of *Lycophidion* from the area, presently being described by Don Broadley at the Natural History Museum in Bulawayo, Zimbabwe. Although based in Pretoria, Wulf travels to Namibia frequently, where he takes remarkable photographs as well as doing field work. Anyone wishing to research on the Namibian herpetofauna would be well advised to talk with him and look at the Transvaal museum collection before they start.

Visiting herpetologists who have done or are now doing research include Dr Aaron Bauer from Villanova University, Michigan, who (with Bill Branch from the Port Elizabeth Museum, South Africa) is working on the herpetofauna of the Kamanjab area, north-west Namibia. They have turned up a remarkable 25 species of snake while collecting during the winter, making a total of 39 snake species from that area. Alan Channing, a biochemist from the University of the western Cape, is shortly to produce a monograph on the Namibian frogs. A student at the University of Namibia, N. Heidman, is currently working on behavioural ecology of ground agamas in the Windhoek area.

### HISTORICAL HERPETOLOGY IN NAMIBIA

Early herpetological work in Namibia has been detailed by Mertens in his classic (1955) paper, under the section "Historical remarks" (Historische Bemerkungen, pp 7-8) and most papers referred to in this section are detailed in his reference list. This work can be summarised

into three phases, firstly, random collections made by early adventurers into what was hard hostile land, secondly collecting by the German colonists who arrived after the annexation of the area (1883-1885), documented by German museum workers, thirdly work by South African scientists after that country was given a mandate to rule Namibia by the League of Nations in 1915.

Among the early adventurers were Johann Wahlberg, a Swede, who collected extensively in southern Africa, and was eventually killed by an elephant at Lake Ngami in Botswana in 1856. Several lizards were named after Wahlberg, one by Wilhelm Peters, herpetologist at the Berlin Museum, who between 1862 and 1882 (detailed in Mertens 1955) produced a series of papers on the herpetofauna of Namibia. Peters named the gecko genus *Rhoptropus*, later immortalised by V.F.M. Fitzsimons, normally a most careful zoologist, who consistently misspelled the name as *Rhotropus* !

After Peters' death in 1883, herpetological research on Namibia was centred at the Senckenburg Museum in Frankfurt, under Oskar Boettger, whose thorough work included a series of papers produced between 1886 and 1898 (detailed in Mertens 1955). Another German museum housing herpetological collections from this era in Namibia was the Natural History Museum at Wiesbaden (Lampe 1901, 1902, 1911, and Andersson, 1908, including description of the new Gecko genus *Palmatogekko*, detailed in Mertens 1955). Unfortunately, most of this collection was destroyed by Allied bombing during the second world war. A herpetologist who worked at both Senckenburg and Berlin was Richard Sternfeld, who between 1908 and 1911 produced several papers on the Namibian herpetofauna (among other regions in Africa, notably the then German colonies of Kamerum (Cameroon) and Togo). However, his 1910 paper on the snakes and 1991 work on other reptiles and amphibians were much criticised by Werner (1915), because Sternfeld added to the known list of the Namibian herpetofauna a number of species that he thought might occur there (most of which did not !). This practice bedevils herpetologists, and is still not uncommon, especially in Africa.

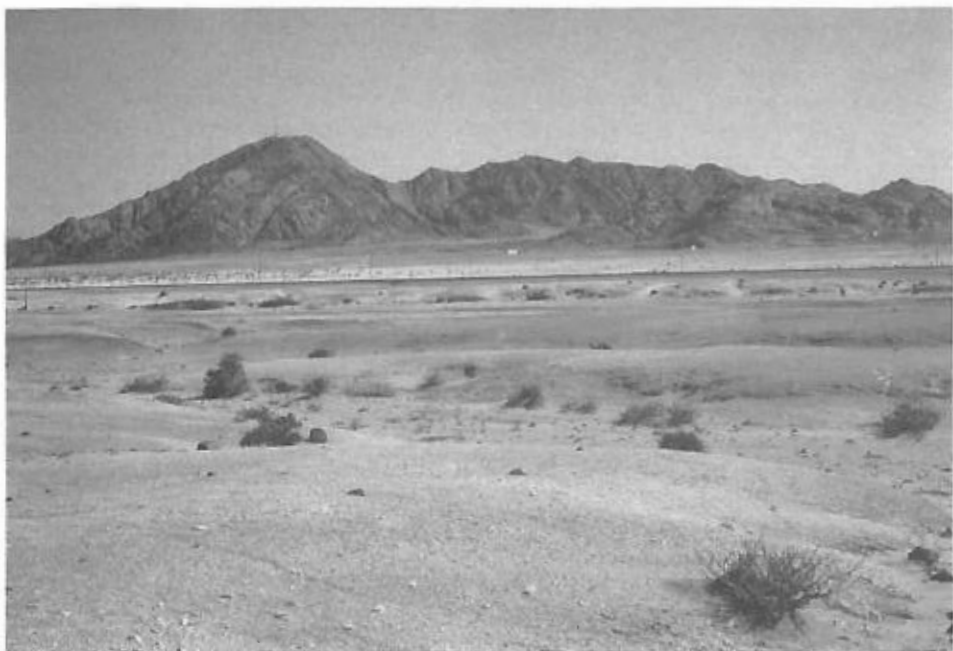
Franz Werner detailed, among other works, the Namibian herpetofaunal collection by Michaelsen in the Frankfurt museum (1915), and between 1920 and 1926, Kurt Falk produced some very readable and popular articles on the Namibian herpetofauna (detailed in Mertens). After the first world war, most work was done by South African scientists, in particular, by John Hewitt at the Albany Museum in Grahamstown, Natal, and V.F.M. Fitzsimons, from the Transvaal Museum. However, three British herpetologists deserve an honourable mention in Namibia's herpetofaunal history; they are George Boulenger, of the British Museum, who among other things produced a short report on Namibian tortoises (Boulenger 1886), H.W. Parker (also of the British Museum) who documented Dr Karl Jordans' herpetological collection from Namibia and Angola (Parker 1936), and Arthur Loveridge, of the National Museum, Kenya, and the Museum of Comparative Zoology, Harvard, whose series of comprehensive revisions of African herpetofauna, published between 1935 and 1951, did much to sort out taxonomic problems posed by some of Namibia's herpetofauna.

#### MODERN HERPETOLOGICAL LITERATURE AVAILABLE ON NAMIBIA

There are a handful of popular works that cover Namibia, as part of the herpetofauna of the southern African sub-continent. The reptiles of the region are covered in Bill Branch's field guide (Branch 1988a). This book is intended for the keen amateur as well as the serious herpetologist. It has a good photographic record of most species, and I found it useful in Namibia for identifying lizards. It is compact enough to be useful in the field, too. The snakes of Namibia are covered in Don Broadley's revision of "Fitzsimons Snakes" (Broadley 1983: revised 1990), and their range within Namibia can easily be seen from the large clear distribution maps in this work. The only significant bound work on the lizards of the region is Fitzsimons' (1943) monograph, "The Lizards of South Africa" which despite its name also covers Namibia, Botswana, Swaziland, Lesotho and Zimbabwe. A series of popular articles on the lizards of southern Africa (including Namibia) were published by John Visser, in the Afrikaans farming weekly "Landbou Weekblad" (Visser 1984; published in 38 consecutive issues: nos 319-356),



**Plate 5:** The Common Barking Gecko, *Ptenopus garrulus*, whose characteristic call is associated with sunset in the Namib desert. (photograph by Stephen Spawls).



**Plate 6:** Rock and Sand, the Namib desert near Rossing. (photograph by Laura Spawls).

although written in Afrikaans these articles contain some interesting range maps. The Chelonians are covered by 2 works dealing with the region as a whole, that is Comrie-Greig and Burdett's (1976) paper on patterns in the distribution of terrestrial tortoises, with range maps covering the entire sub-continent, and Boycott and Bourquins (1988) book, "The South African Tortoise Book". This handy work is beautifully produced and has no less than 56 excellent colour plates. However, its major shortcoming where Namibia is concerned is that the distribution maps for each species cut off at about 22 degrees south, thus excluding the northern 40% of Namibia.

Passmore and Carruther's useful book, "South African Frogs" (1979) does not cover Namibia; the range maps are restricted to the republic of South Africa. The only book with any Namibian frog data in it is Vincent Wager's "Frogs of South Africa" (1986), this re-issue of his original 1965 work gives ranges for most species reaching Southern Africa, although the endemic Namibian frog *Phrynomerus affinis* is conspicuously absent! The most important paper on the frog fauna of southern Africa, including Namibia, is John Poynton's 1964 work; "The Amphibia of Southern Africa".

As far as I am aware, the only popular book dealing exclusively with any aspect of the Namibian herpetofauna is Buys and Buys "Snakes of South-West Africa" (no date), also available in Afrikaans and German. It is a 64 page guide to the snakes of the region, somewhat lightweight in approach. It contains some remarkable photographs (including one of a Puff Adder striking with a closed mouth, and some gruesome snakebite injuries!), but many pictures are unnecessarily duplicated (there are nine pictures of a Puff Adder), and few of the Namibian endemics, such as the small Vipers; the odd *Pythonodipsas* or *Python anchietae* are illustrated. It has no range maps.

The definitive paper on the Namibian herpetofauna, as mentioned, is Mertens' 1955 monograph "Die Amphibien und Reptilien Sudwestafrikas", 172 pages of baseline data, illustrated by 24 plates. This paper has sometimes been criticised, on the grounds that Mertens' data was very insular, he only considered specimens that he had collected and/or seen, from a handful of Museums (notably Senckenberg, Berlin, Hamburg and the Museum of Comparative Zoology) – he did not take note of the Transvaal Museum specimens. Nevertheless, this paper (and a revised update which appeared in 1971) represents the single most comprehensive work in the herpetofauna (including the amphibia) of the region. The 24 plates are remarkable, both in quality and informative content; particularly so when one considers the general standard of herpetological photography in the 1950's; Mertens' living subjects (plates 2-18) are obviously live, alert, and fill the frame, his picture of *Rana* (now *Tomopterna*) *delalandii* on plate 2 is a gem.

Other substantial recent works on the herpetofauna include Fitzsimons' (1938) report on a Transvaal Museum expedition to the area, and Channing and Van Dijk's (1976) monograph on the amphibia (to be updated soon). Recent scientific work on the Namibian herpetofauna has been published in a variety of journals, much in the annals of the Transvaal museum, but also in *Herpetologica*, *Copeia*, *Herpetozoa*, *Journal of the Herpetological Association of Africa*, and the *South African Journal of Science*, among others. As far as I am aware, there is no comprehensive bibliography of Namibian Herpetofauna, but if one could be produced, Wulf Haacke would be the man to do it.

#### NOTES FOR THE INTENDING HERPETOLOGICAL VISITOR TO NAMIBIA

Namibia is a dry, healthy country, which is just opening up to the visitor. The people, I found, were friendly and hospitable, and the black Namibians, in particular, were very eager to talk to visitors from Europe. The herpetofauna is stunning and visible, especially in the rocky hills and the desert; in the Brandberg I saw 10 species of lizard inside two hours, and this in winter. There are also some other remarkable tourist attractions, in particular Etosha National Park (the best National Park I have ever been in for viewing large carnivores); the Skeleton Coast park and the Namib-Naukluft park (THE park to see the Namib desert); the curious rock engravings at Twyfelfontein; the rock paintings of the Erongo mountains and

the Brandberg (especially the enigmatic "White Lady"); Spitzkoppe, an isolated cluster of jagged volcanic peaks; the wierd Waterberg plateau, a national park on a mountain top, with only one way in; the Fish River Canyon, Namibia's answer to the Grand Canyon; the strange Germanic coastal towns of Swakopmund and Luderitz Bay; the worlds' tallest dunes (at Sossusvlei) and the biggest meteorite (at Hoba).

For the herpetological visitor, the best time for seeing fauna is October/November, when the rains are starting. For those unused to heat, however, this can be a trying time to travel, and in fact the herpetofauna (especially the lizards) is visible virtually throughout the year. The usual precautions for desert work should be taken.

Zambian Airways fly to Windhoek from London, and Namib Air fly to Frankfurt. Information for the budget traveller is contained in the Namibia chapter of Geoff Crowthers "Africa on a Shoe string" (1989). There are a number of tour operators in Windhoek, and the big car rental gencies are there. (For addresses, a useful publication is "Africa's Gem", produced by the Namibian tourist board, address below). It is worth hiring a car, as unlimited mileage deals are available, public transport is poor and distances vast, although hitching on the major roads is practical. Hotels are somewhat expensive but the National parks and recreational resorts offer a range of self-catering accommodation, often at camps with attached restaurants, at extremely modest rates. These usually need to be booked in advance. Information on hotels and National Park accommodation can be obtained from the Namibian Tourist Board, Private Bag 13297, Windhoek 900. Herpetologists wishing to observe and photograph need no permits, those wishing to collect and/or research should contact Mike Griffin, at the Ministry of Wildlife, Conservation and Tourism, P.O. Box 13306, Windhoek. Bear in mind that any commercial collecting is unlikely to be permitted! There are also various areas of Namibia that are closed to visitors, in particular the diamond fields in the south. But for the herpetologist and/or naturalist Namibia is a delight, you will see a large number of species, in particular lizards, under excellent viewing conditions. In addition, with the exception of certain spectacular species, very little ecological work has been done on the Namibian herpetofauna. The field notes in the most modern texts all too often are simply rehashed versions of notes from monographs produced 50 or more years ago. Much work still has to be done on the ecology, even of the larger species. Bill Branch is at the minute in the process of describing a new tortoise species from the dry mountains of southern Namibia. The visiting herpetologist, even on a short trip, may well be able to make observations which are new, or note range extensions. So go there !

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Plate 7: Welwitschia Flats, Namib desert, near Swakopmund. (photograph by Laura Spawls).

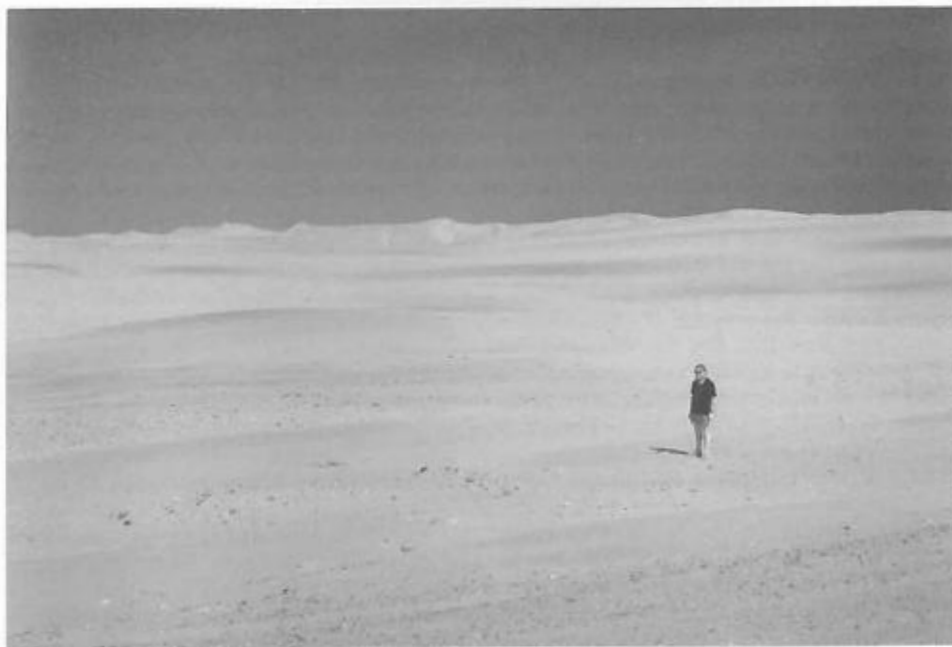


Plate 8: The author in the southern Namib dune sea, near Walvis Bay. (photograph by Laura Spawls).

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## BELL UNHINGES AN ENIGMA

OLIVER A. GARDEN

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### INTRODUCTION

Bell's Hinged tortoise, *Kinixys belliana*, remains as much of an enigma today as when first discovered by Thomas Bell over one hundred years ago (Adler, 1989). It belongs to the only genus of the Order Chelonia that has a hinge in the carapace, rather than in the plastron.

### THOMAS BELL: NATURAL HISTORIAN OF UNIQUE QUALITIES

Bell, born on 11th October 1792 at Poole, Dorset, entered medical college at Guy's and St. Thomas's hospitals, London, in 1813, and The Royal College of Surgeons of England in 1815. He followed a distinguished career, practising dental surgery at Guy's Hospital between 1817 and 1861, and concurrently holding the Chair of Zoology at King's College, London, beginning in 1836. It is in the field of herpetology that Bell is most remembered by zoologists, producing a "Monograph of the Testudinata", a magnificent work in which he described many of the species of the Order Testudinata. (This Order has since been renamed the Chelonia). This work, never completed because of the bankruptcy of the publishing company, contained 40 folio size, hand-coloured plates. One of the species he so described was *Kinixys belliana*.

### BIOLOGY OF BELL'S HINGED TORTOISE

The taxonomy of *K. belliana* has been widely debated in recent years, but it is generally accepted that three subspecies exist, namely *K. b. nogueyi*, *K. b. zombensis* and *K. b. belliana* (Swingland and Klemens, 1989). These are distinguished from one another by differences in the pattern of the carapace and plastron, and differences in the outline of the marginal scutes.

*K. belliana* is found throughout the continent of Africa and in Madagascar. The sub-species *nogueyi* ranges from Senegal to northern Cameroon, where it meets the sub-species *belliana*, which extends through north-eastern Zaire to western Kenya, Ethiopia and north-western Somalia. The subspecies *zombensis* is found along the East African coastal plain from Tanzania to Zululand, and has been introduced into north-western Madagascar (Swingland and Klemens, 1989) (Fig. 1).

Bell's Hinged Tortoise inhabits moist savanna woodland and thicket, becoming active with the onset of the rains and aestivating during the dry season. When conditions become dry, it takes shelter in animal burrows and holes in termitaria, and, interestingly, has also been observed to bury itself under soil at the base of trees. The animal feeds in the early morning and evening, avoiding the mid-day sun by taking cover under herbage.

Nesting and oviposition occur during the wet season. Clutches are small, typically numbering from one to three eggs, with a maximum of ten. The eggs hatch after about a year, producing hatchlings which measure some 40mm from one end of the carapace to the other.

*K. belliana* eats a wide range of vegetation and fruit, especially succulents and fungi. In addition, millipedes are voraciously taken, and snails of the genus *Achatina* are eaten after the shells have been broken. This species also scavenges on the corpses of amphibians and other small animals.

Of the various threats to its survival, perhaps the greatest are presented by man and the Ground Hornbill (*Bucorvus cafer*): man eats the tortoise throughout most of its range, and the Ground Hornbill is able to knock a hole through the thick bone of the carapace with its strong bill.

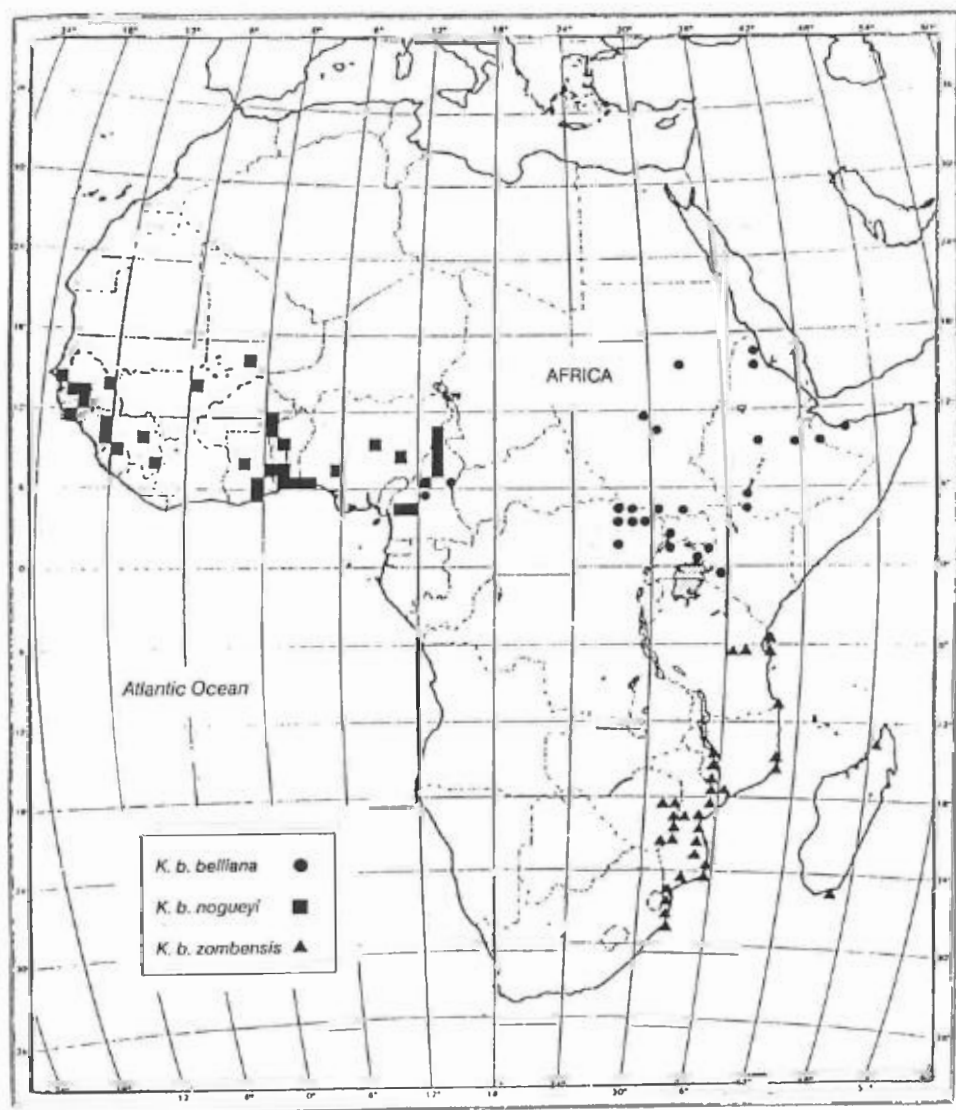


Fig. 1 Distribution of *K. belliana*

## THE UNIQUE DORSAL HINGE

Perhaps the most interesting feature of Bell's Hinged Tortoise – unique to the genus *Kinixys* – is its dorsal hinge (Pritchard, 1979). Many other tortoises, terrapins and turtles have a hinge in the plastron, giving the caudal part of the plastron a degree of dorso-ventral mobility. Such mobility allows sufficient pelvic space for the oviposition of hard, calcified eggs, while retaining the ability to effect full “closure” of the shell – thought to have an important protective function if the tortoise is threatened by other animals.

The hinge of *K. belliana*, however, is located in the carapace. The name “hinge” is perhaps a misnomer when applied to this species, since it gives one the impression of a continuous joint extending from one side of the carapace to the other: the hinge in fact comprises two flexible inter-scutal joints (and their bony counterparts) on the lateral aspects of the carapace, interrupted dorsally by the more familiar unjointed pattern of scutes. The flexible nature of the dorsal scutes between the lateral joints would accommodate the slight movement that would have to occur in the upper part of the carapace when the lateral walls move up or down (Fig. 2).

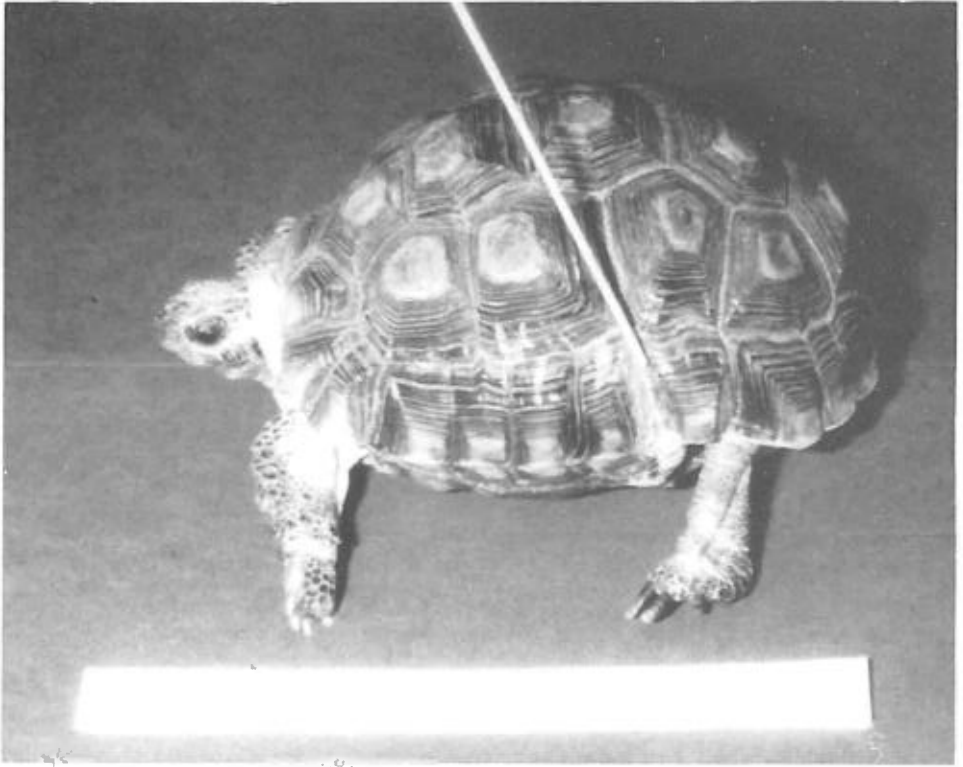


Plate 1. *K. belliana* showing the dorsal hinge

The hinge is situated between the fourth and fifth pleural bones, and the seventh and eighth peripheral bones; a position corresponding to the junction of the second and third costal scutes, and seventh and eighth marginal scutes. It allows the caudal part of the carapace to be lowered if the tortoise is threatened, affording protection to the hindfeet and perineal region, and is also thought to assist in ventilation and oviposition.

## SOME VETERINARY ASPECTS OF *K. BELLIANA*

It is important for veterinary surgeons to be aware of the genus *Kinixys*, since it is increasingly likely to be presented for veterinary attention as its popularity grows. This is a consequence of the potentially free access of *Kinixys* spp. into this country, in contrast to the restrictions placed on the importation of the Mediterranean species by the EEC Regulation 3626/82, as amended (Cooper and Cooper, 1987). It is possible that the gap created by the restriction on importation of the latter species may be filled by an influx, and increase in popularity, of the former, a trend which has already been seen with North American Box Turtles (*Terrapene* spp.).

The unexpected presentation of a tortoise with a dorsal hinge may lead to erroneous diagnoses of shell fractures or dystrophies, underlying the importance of promoting awareness of this genus among veterinary surgeons. However, it is interesting to note that young specimens of *K. belliana* do not possess a hinge, but that it develops with age, beginning peripherally and extending dorsally between the scutes.

One of the most valuable ways of assessing the body condition of a Mediterranean tortoise (*Testudo* sp.) is to calculate the Jackson's ratio, a ratio of body mass (g): carapace length (mm), devised by the late Dr. Oliphant Jackson MRCVS (Jackson, 1980): "fit" examples fall between certain maximum and minimum values. *K. belliana* - like several other non-Mediterranean species - does not conform to this relationship, probably because its shell is disproportionately long in relation to its bodyweight.

In common with certain other genera, *Kinixys* does not hibernate, and should not therefore be confined to a dark enclosed space in the winter months.

### CONCLUSIONS

*K. belliana* is an interesting species with several unusual features, especially its unique hinge. The present restrictions on the importation of Mediterranean species of tortoises, and the possible increase in popularity of *Kinixys*, underline the importance of promoting awareness of this genus among veterinarians and herpetologists alike.

### ACKNOWLEDGEMENT

I would like to thank Mr. John E. Cooper FRCVS and Mr. Mac Johnston MRCVS for reading and commenting on the manuscript prior to publication. The work leading to this paper was carried out while I was working in the Animal Health Laboratory at The Royal College of Surgeons of England. I would also like to express my gratitude to Mr. Ian Lyle for information on Thomas Bell and Mr. Frank Sambrook for photographing a specimen of Bell's hinged tortoise.

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*The following Article has been reprinted from "The Observer" 5.1.92*

## **TORTOISE WAR COMES TO A SLOW BOIL AS FANCIERS STICK THEIR NECKS OUT**

**MICHAEL DURHAM**

Nature, red in tooth and claw, usually makes an exception of the humble tortoise. But war has broken out among the tortoises, terrapins and turtles. It is not the animals themselves, but Britain's tiny band of tortoise lovers who are at each other's throats.

The normally tranquil world of chelonia – tortoise, turtle and terrapin keeping – is in turmoil because of a dispute which has so far involved bitter allegations of unprofessional conduct, four libel writs, resignations, dark hints of forged documents and, supposedly, even the suicide of a leading tortoise expert. The three rival clubs which advise Britain's 10,000 tortoise lovers are now bracing themselves for a court case which has split the pet world. The outcome, however, could be some way off: lawyers, like tortoises, are not the swiftest movers.

The dispute began two years ago when a small Dutch animal lovers' magazine, *De Schildpas* (The Tortoise, circulation 400) published an article – in Dutch – which referred in unflattering terms to Andy Highfield, a prominent British tortoise expert and founder of the 1,800-member Tortoise Trust.

Mr Highfield, a conservationist and animal photographer, perceived a libel. Although few British tortoise lovers could have read the article, he set about tracing the source of the slur. The finger, he believed, pointed at leading members of the British Chelonia Group, a rival club with 1,500 members.

Writs for libel were issued against three leading British Chelonia Group members. But far from retreating within its shell, the BCG has decided to fight back. To the dismay of some of its supporters, it has since spent more than £11,000 to defend the case.

And the war has escalated. Forbidden by the Charity Commission to spend further funds on behalf of individual members, the BCG issued an appeal for legal costs. The author of the appeal, Dr Martin Lawton, a prominent vet, may have been ill-advised. He, too, has received a libel writ from Mr Highfield.

Meanwhile, tragedy struck. The tortoise world was shocked by the suicide of one of its leading academic experts, Dr Oliphant Jackson, the BCG's chairman, who shot himself shortly after the dispute began.

And as if libel, professional backbiting and suicide were not enough, there are hints of further skulduggery. The BCG is believed to be pinning part of its defence on allegations that key documents in the case were forged on BCG headed notepaper. Tortoise lovers, some of whom have been driven to resign from membership of the BCG, are dismayed.

'I'm in it for the tortoises,' said one enthusiast who remains a member of both the BCG and the Tortoise Trust. 'This whole thing is a huge waste of time, money and energy. Why line solicitors' pockets when the money could be used for the welfare of animals?'

The tortoise groups have never stayed in hibernation for long. Relations between the BCG and the Tortoise Trust have been frosty ever since the Trust was started as a splinter group in 1986.

Four years ago, tortoise wars erupted again when Diana Pursall, the then BCG chairman, resigned in a dispute over shell rot and tortoise runny nose syndrome. She formed a third group, the British Association of Tortoise Keepers, which is also competing for members.

The latest issue of tortoise welfare to divide their keepers is whether or not they are prone to tortoise Aids. According to Mr Highfield, the theory could account for thousands of deaths in America; others claim the deaths are more likely to be due to environmental factors.

Mr Highfield said last night he did not want to inflame the row further. 'Various matters are in dispute and action is still pending. It's a small world and people tend to get very worked up,' he said.

Dutch-born Henni Fenwick, one of the BCG leaders who has received a writ, yesterday warned *The Observer*: 'You are not to use my name in this story.'

The British Association of Tortoise Keepers, meanwhile, is keeping its hard hat on. 'We've done our best to keep out of it,' said Brian Pursall. 'We think some of the people involved are more interested in the politics of it all than what they are trying to achieve.'

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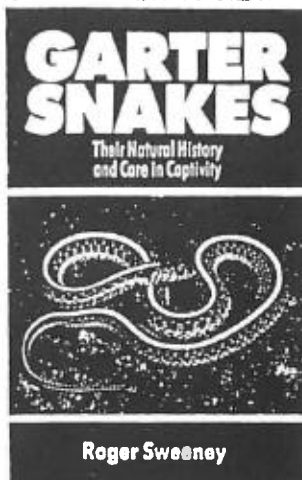
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## LETTERS TO THE EDITORS

Dear Sirs,

### A Personal View of Herptile Conservation and Captive Breeding in Japan

Due to the language barrier, Herpetology in Japan is very much an unknown factor. Many of the key references are in Japanese with only the latin names given. There is an english translation titled 'Current herpetology in East Asia' published by the Herpetological Society of Japan that outlines various research projects carried out by Japanese and Chinese herpetologists. The sheer amount of academic research into morphology, physiology, systematics, reproductive strategies, ecology and ethology is most impressive but I could find no references about conservation through captive breeding. During my recent visit to Japan I tried to find out as much as I could about attitudes towards conservation and captive breeding of native Japanese herptiles.

In comparison to Great Britain, Japan has many more herptile species and the sheer numbers of amphibians and reptiles killed on the roads each year does not appear to be cause for concern. Conservation work appears to be largely 'grass root' projects. For example schoolchildren protecting *Caretta caretta* eggs. There is a current research project into the ecology of the Giant Japanese Salamander (*Andrias japonicus*). This amphibian has been given 'national treasure' status and is protected by Japanese law. Its habitat is under threat due to creation of dams to control the flooding that destroys arable land. Also the creation of concrete banks and water slides for recreation adds to the problem. The aim of the research project is to create an artificial breeding habitat for this species. Apart from these examples I came to the conclusion that conservation does not have such a high priority as it does in Great Britain.

Captive breeding is only carried out by academics for research purposes. However the Asa Zoological Park in Hiroshima has been successfully breeding the Giant Japanese Salamander since September 1979 after eight years of effort. It remains the only place in the world where this animal is bred in captivity. The zoo now has more than 1,600 individuals and is encouraging other zoos and aquariums to do likewise.

I also became aware of two possible pressures on the distribution of Japanese herptiles. Firstly the increasing popularity of golf means that there are many proposals to develop golf courses. Secondly if rice is imported from the United States, marginal rice production in the mountains will stop. In both cases loss of habitat will occur and herptile food chains will vanish.

In conclusion, Japanese attitudes towards conservation and captive breeding are very different to ours. I do not think they can afford to be so complacent. Japan is a densely populated country and as land use changes and herptile habitats disappear they will need to act to conserve their native reptiles and amphibians.

I would like to thank Dr R. Goris, Prof. Oka, Dr Matsui and Mr Tayashi of the Herpetological Society of Japan for their help and information.

Yours faithfully,

Jan Clemons, 34, Montalt Road, Cheylesmore, Coventry CV3 5LU



Dear Sirs,

**Study on endoparasites in snakes = help wanted**

I am a post-graduate student at the Royal Veterinary College and I am presently trying to organise a study on the subject of endoparasites in snakes, during March/April 1992. The nature of this study will be to perform faecal egg counts at the Institute of Zoology on captive-bred, long term captive and recently wild-caught boas and pythons. I hope to perform faecal analysis on boas and pythons from several herpetological centres (including London and Howletts Zoos), and knowing that the BHS must have contacts with relevant herpetologists I was wondering whether any of your members or associates would be willing to participate in this study by supplying snake faecal material.

At this stage I am simply trying to locate potential snakes and willing owners. I would therefore be grateful if you would pass this letter on to the relevant individual(s), and that they would contact me at the Royal Veterinary College.

Your assistance on this matter is greatly appreciated.

Yours sincerely,

Mr. S.J. Divers.  
Royal Veterinary College,  
Hawkshead Lane,  
North Mymms,  
Hatfield,  
HERTS AL9 7TA

Dear Sirs,

**Parthenogenic Garter Snakes?**

We write to you on the advice of Colin McCarthy of the Department of Zoology at the Natural History Museum to see if any of your members can suggest the reasons for a strange occurrence we have observed with our (North American?) Garter Snake.

It was bought some five or six years ago as one of a pair, but the other one died within a few weeks of purchase, well before the first moult.

At the time of it's first moult it measured approximately nine inches in length, and was therefore less than two years old, which we understand is the age at which they reach sexual maturity.

Over the years we have owned the snake it has occasionally passed small waxlike objects. The last time it did this, some four weeks ago, it also passed a dead baby snake.

As this snake has had no contact with a male snake in five years and as we understand that this breed is not parthenogenic, could any of your members offer an explanation?

We still have the baby, currently in our deep freeze, should it be of any interest.

Yours faithfully,

Peter Broadley,  
Elvin Garth, Normanby Rise,  
Claxby, Market Rasen,  
Lincolnshire LN8 3YZ.

Dear Sirs,

### Disappearance of Britain's Tree Frog (*Hyla arborea*) Colonies

A letter of mine was published in the Winter (1990-91) Bulletin on "The preferred habitat of *Hyla arborea*" (the European Treefrog). Unfortunately this was a copy of a letter originally sent in 1985-86 but lost before publication; the article was published after I finally found and sent a replacement. The confusion needs to be cleared up as many readers now seem under the misapprehension that both colonies still exist. The Kidbrooke, S.E. London site was collected out when a new road opened up the site. In 1986 only 3 males and 17 females were seen. In 1987 no males, 9 females. This dwindled to one female in 1989. None at all were seen in 1990. Since the males make their presence clear by their loud calls, it can be safely said that no males have existed on the site since 1987 when all breeding naturally ceased.

On the long established New Forest Colony a similar picture has emerged. People neighbouring the site have accosted persons removing frogs but to no avail. In 1986 I and a friend counted only 2 males. In the following year my friend, who lived nearby, reported no calling males. Other investigators have seen or heard none in past few years. One calling male was found many miles from the original site by another pond In May 1988. A wildlife photographer, on being shown the frog to photograph, said he preferred to take the frog away to a controlled environment. Permission was refused. The same night the frog disappeared. 2 weeks later a photographer advertised for a female European Treefrog to make up a pair. So the unfortunate saga goes on.

As I knew of at least one person who removed frogs from the Kidbrooke site, I tried to get them returned, but to no avail as the offender knew the law was on his side. A similar thing has happened at least twice in the case of the New Forest colony. Although this species is disappearing fast in many parts of its range in Europe, it receives no legal protection in this country – in fact quite the opposite – as it is not a native British species. The New Forest colony dates from the latter part of the last century. This colony appears to have expired about 1987 with human and legal assistance.

The ending of these colonies I find disappointing. Though not native, there must be a case for general and scientific interest; this fact has become clear to me from the considerable number of letters I have received following the last (Winter '90-91) and previous articles (many of which were from European herpetologists). I wonder what the reaction would have been if instead of amphibians we were talking about a bird species which, though rare and threatened in much of N.W. Europe, started breeding in a part of Britain! Could it so easily have been collected out with hardly a murmur raised in defence?

I would welcome news from any readers on sightings in the New Forest area or elsewhere. Information would, because of the collection problem, be kept strictly confidential.

Yours faithfully,

Charles A. Snell.  
76 Birdbrook Road,  
London SE3 9QP  
Tel: 081-856 9852

P.S. Members who have back copies of "Bulletin" might like to refer back to No. 14 (Dec. 85) to my article, "*Hyla arborea*: worth protecting or not?" where I argued that without protection both established tree frog colonies could be lost: sadly, prophetic words.

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