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THE BRITISH HERPETOLOGICAL SOCIETY

BULLETIN

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THE BRITISH HERPETOLOGICAL SOCIETY

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The British Herpetological Society was founded in 1947 by a group of well-known naturalists, with the broad aim of catering for all interests in reptiles and amphibians. Four particular areas of activity have developed within the Society:

The Captive Breeding Committee is actively involved in promoting the captive breeding and responsible husbandry of reptiles and amphibians. It also advises on aspects of national and international legislation affecting the keeping, breeding, farming and substainable utilisation of reptiles and amphibians. Special meetings are held and publications produced to fulfil these aims.

The Conservation Committee is actively engaged in field study, conservation management and political lobbying with a view to improving the status and future prospects of our native British species. It is the accepted authority on reptile and amphibian conservation in the UK, works in close collaboration with the Herpetological Conservation Trust and has an advisory role to Nature Conservancy Councils (the statutory government bodies). A number of nature reserves are owned or leased, and all Society Members are encouraged to become involved in habitat management.

The Education Committee promotes all aspects of the Society through the Media, schools, lectures, field trips and displays. It also runs the junior section of the Society - THE YOUNG HERPETOLOGISTS CLUB (YHC). YHC Members receive their own newsletter.

The Research Committee includes professional scientists within the ranks of the Society, organises scientific meetings on amphibian and reptile biology and promotes *The Herpetological Journal*, the Society's scientific publication.

Meetings
A number of meetings and events take place throughout the year, covering a wide range of interests.

Publications
The BHS Bulletin, Herpetological Journal and *YHC Newsletter* are all produced quarterly, and *The Natterjack* Newsletter is produced monthly. There are in addition a number of specialised publications available to Members and produced by the various Committees, such as notes on the care of species in captivity, books and conservation leaflets.

Subscriptions
All adult subscriptions become due on the first day of January each year. Payment by Banker's Order is much preferred.

Ordinary Members	£20	(Receive Bulletin only)
Full Members	£25	(Receive Bulletin and Journal)
Family Members	£30/£37.50	(Without/with Journal) Family members with children also receive the YHC Newsletter
Student Members	£18	(Receive Bulletin and Journal)
Institutional rates	£36	(Receive Bulletin and Journal)
YHC (Age 9-18):		
Basic Membership	£6	
Bulletin Membership	£12	(Receive YHC Newsletter)
Group Membership	-	For Schools, Youth Groups etc. Contact Membership Secretary (Address on inside of back cover for details)

Correspondence, Membership applications, subscription renewals and purchase orders for publications should be addressed to the Secretary (address as at page top) PLEASE INCLUDE A STAMP-ADDRESSED ENVELOPE WHEN WRITING TO THE SOCIETY.

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.

The Bulletin is edited and produced by
John Pickett and John Spence.
Contributions and correspondence arising from the Bulletin should be sent to:
John Spence, 23 Chase Side Avenue, Enfield, Middlesex EN2 6JN

FRONT COVER
Indian Trinket Snake, *(Elaphe helena)*. On this adult male the black dorsal stripe can be clearly seen. See "Notes of the Biology, Keeping and Breeding of *Elaphe helena lelena* (Daudin, 1802)" by Paul M. Kornacker, P.22.

BRITISH HERPETOLOGICAL SOCIETY MEETINGS FOR 1997

Meetings are usually held at Birkbeck College, Malet Street, London WC1, unless otherwise stated

March 15th	Annual General Meeting. Programme: 10.30 am – Coffee; 11.00 am – A.G.M; 11.45 am – Quiz; 12.30 pm - 2.00 pm – Lunch (buffet with wine); 2.00 pm – Trevor Beebee – "Life at a range edge: the biology and conservation of natterjack toads in Britain; 2.45 pm – Tea; 3.15 pm – Mark Wilkinson – "Is it a worm? is it a snake? No, it's a caecilian. 4.00 pm – Close.

50th ANNIVERSARY MEETINGS

Aug. 2nd/3rd	N.W. Group – 50th Anniversary Reptile and Amphibian Fair at Martin Mere (details to follow).
September	The Scottish Branch will organise a 50th Anniversary in September (details to follow).
October 25th	Huddersfield Technical College – 50th Anniversary Day and Lectures (details to follow).
November 9th	Bristol University will host a 50th Anniversary Day with Lectures – provisionally on 9th November (details to follow).
Oct/Nov.	Captive Breeding Committee – Annual Stock Sale – New Denham (details to follow).

BRITISH HERPETOLOGISTS

For volume 2 of the series entitled "Contributions to the History of Herpetology" (Volume 1 published by SSAR in 1989, 202 p.), I need biographical materials about the following British herpetologists:

Beddome, Richard Henry (1830-1911): need portrait
Blandford, William Thomas (1832-1905): need biography
Catesby, Mark (1683-1749): need portrait and signature
Cott, Hugh Bamford (1900-1987): need portrait and biography
Fayrer, Joseph (1824-1907): need biography
Flower, Stanley Smyth (1871-1946): need biography
Fox, Harold Munro (1889): portrait, signature, and biography
Gadow, Hans Friedrich (1855-1928): need biography
Huxley, Thomas Henry (1825-1895): need biography
Ionides, Constantine John Philip (1900-1968): need portrait and biography
Jerdon, Thomas Claverhill (1811-1872): need signature and biography
O'Shaughnessy, Arthur W. E. (1844-1881): need portait and biography
Owen, Richard (1804-1892): need biography
Procter, Joan Beauchamp (1897-1931): need biography
Ray, John (1627-1705): need signature and biography
Theobald, William (1829-1908): need portrait and biography
Topsell, Edward (1572-1625 or 1638): need portrait and biography
Tyson, Edward (1650-1708): need portrait and signature
Watson, David Meredith Seares (1886-1973): need biography

Needed materials are indicated above. Any materials or leads to materials would be appreciated (and acknowledged in the book). Current addresses of family member descendents are also solicited. **Prof. Kraig Adler, Cornell University, Division of Biological Sciences, Seeley G. Mudd Hall, Ithaca, New York 14853-2702, USA.** *(telephone: 607-254-4392, fax: 607-254-4308, e-mail: kka4@cornell.edu).*

CONSERVING GREAT CRESTED NEWTS

JAN CLEMONS, BHSCC CHAIRMAN

INTRODUCTION

British populations of this species are of international importance as this country contains some of the largest populations within Europe. In several European countries they are considered as endangered. As Britain has a relatively large number of Great Crested Newt sites, effective conservation measures need to be taken as soon as possible, whilst the species is still generally widespread.

STATUS IN GREAT BRITAIN AND REASONS FOR DECLINE

The number of Great Crested Newt populations in the UK is unknown. More than 3000 have been identified out of an estimated 18,000 populations, but the total has certainly declined in recent years, owing to the loss or deterioration of suitable breeding ponds and degradation of surrounding terrestrial habitat. Studies in the 1980's indicated a national rate of colony loss of 1.4%-2% per year. On this basis at least 72-360 populations are lost annually but the actual number may be a lot higher. English Nature has estimated that nationally 182,000 ponds have been lost since the 1940's and of the 291,000 remaining, at least 23% are in poor condition.

The reasons for decline include urban development, lowering of water tables and a range of modern farming practices. Lack of management of farm ponds which no longer serve their original function is a significant cause of loss. Colonisation by fish, either naturally or deliberately can, in time, eliminate Great Crested Newt populations. Pollution and the toxic effects of agrochemicals may also threaten newt populations. As more of the Great Crested Newt's habitat is lost and the distance between remaining populations increases, so the movement of animals between populations diminishes. This means that natural fluctuations in population size are less likely to be buffered by immigration and emigration, and chance local extinctions are less likely to be followed by recolonization.

Many Great Crested Newt populations may already have become isolated by the rapid changes in the countryside in recent years and we cannot assume that the present situation is sustainable in the long term. At the very least, there should be no further net loss of Great Crested Newt populations. A net increase in the number and connectedness of populations should be an objective in any future conservation programme for this species.

These declines could be halted by pond restoration and pond creation programmes by urging the government to promote agri-environmental schemes and incentives, and secondly, by gaining funding for specific schemes from the National Lottery Charities Board or charitable Trusts.

PROTECTION MEASURES

The Great Crested Newt is listed on Annexes II and IV of the EC Species & Habitats Directive and Appendix II of the Bern Convention and protected under Schedule 5 of the Wildlife and Countryside Act 1981 and Schedule 2 of the 1994 Conservation (Natural

Habitats, etc) Regulations (1994). This legislation makes it an offence to kill, injure or take the species or to damage or destroy their habitat.

Under the terms of the EC Habitats directive Special Areas of Conservation (SACs) must be designated for the Crested Newt, which will be selected from the most important Sites of Special Scientific Interest (SSSIs) for the species. SAC protection will only be afforded to a few exceptional populations on the basis of population density and geographical rarity, however. As a protected species, the Crested Newt and its habitat must be taken into account by planning authorities when considering planning applications under the DoE Planning Policy Guidance: Nature Conservation (PPG9). Such strong guidance further strengthens the status of the Crested Newt, especially in a local context.

Despite this degree of protection, there are several current cases where Great Crested Newt colonies are threatened by legal development. Often this is due to inadequate environmental assessment at the planning stage. While such cases attract attention, there may be other instances where damage is done as a consequence of actions that require no planning permission, largely through ignorance either of the presence of newts or their protected status.

SITE THREATS

a) Mitigation

If a Great Crested Newt site is threatened, the first priority is site safeguard and *in-situ* conservation but this requires prior knowledge of the locations of Great Crested Newt colonies. Often the presence of the species is not known before the planning processes are beyond the point of no return. In which case, the next priority will need to be the negotiation of suitable mitigation. Adequate habitat should be retained or provided within the development as a condition of the planning application and sufficient time must be made available for habitat enhancement or creation and to rescue the animals. Suitability and accessibility of the terrestrial habitat, buffer zones and wildlife corridors, such as hedgerows and ditches, will need to be considered.

b) Translocation

Rescues of Great Crested Newts from threatened sites, followed by translocation elsewhere, is the last resort and must be fully documented and monitored for several years. Methodologies that enable us to establish the sustainability of the translocated populations should be employed in order to assess the success or failure of the translocation. Management of the receptor site, with suitable modifications if needed, is an important requirement for any translocation programme.

On the other hand it could be argued that introductions from local donor populations, that can spare eggs or individuals, to newly created or restored ponds, could re-establish the species or increase its range in some areas. Such conservation translocation programmes could help to achieve the 'no net loss of sites' target for the Crested Newt. Certain precautions would need to be taken so that no disease or invasive water plants are inadvertently transferred.

RESPONDING TO THE PROBLEM

What action can be done to offset the decline of the Great Crested Newt in Britain and maintain the species' range and distribution? The Government have produced an outline action plan for the Great Crested Newt which is a step in the right direction, but how this

will be actually achieved and funded is not certain. To take this a step further, any Crested Newt action plan will need to involve working partnerships between the voluntary and statutory conservation organisations at both a national and local level. Local Amphibian and Reptile groups or recorders could get involved with local Biodiversity Action Plans and Local Agenda 21 projects, for example in the national recovery of the Great Crested Newt, which will be best achieved through many local programmes. Local databases containing information on known breeding sites on a county basis, sensitivity maps, conservation plans could be built. This would ensure that the actual and likely distribution of Great Crested Newts is known to the planning authorities. Local surveys could be carried out where information is inadequate and pond creation and habitat restoration schemes could be implemented to offset local losses. Survey programmes should, firstly, aim to survey 30% of the estimated sites within five years and secondly, be targeted towards those areas where the species is poorly surveyed. These programmes need to be put into place as soon as possible. Designation of the most important sites as SSSI or SINC (Sites important for Nature Conservation) in each local authority region should be undertaken, together with positive management programmes for each site.

Why should we be worried about conserving Great Crested Newts when they are so relatively widespread? The signs indicate that this may not always be the case and it is possible that in the future the Crested Newt could join the Natterjack Toad, Sand Lizard and Smooth Snake on the UK endangered species list. By taking action now, we can make sure that the Great Crested Newt will not only be found in a relatively few places in Britain but will continue to be well known the length and breadth of the country.

ACKNOWLEDGEMENTS

I am grateful for the advice and helpful comments from the following BHSCC members and advisors on this paper: J. Buckley, Clive Cummins, T Gent, Richard Griffiths and Mary Swan.

BRITISH HERPETOLOGICAL SOCIETY POLICY ON THE CONSERVATION OF THE GREAT CRESTED NEWT *(Triturus cristatus)* IN GREAT BRITAIN

1. The British Herpetological Society (BHS) considers the Great Crested Newt to be a vulnerable and declining species and will support and promote the conservation of the species.

2. The BHS supports the UK and European legislation and contends that it should be more effectively enforced.

3. The BHS asserts that further loss of Great Crested Newt populations should be prevented and every opportunity should be taken to increase the number of breeding sites.

4. Where breeding sites are threatened, BHS advocates that existing populations be accommodated and conserved *in situ*.

5. Where site destruction is unavoidable mitigation measures to maintain the status of the Great Crested Newt in the immediate locality should be undertaken. The outcomes of these measures must be monitored in order that techniques can be improved and/or revised in the light of experience.

BHS ACTION

1. To contribute to an agreed set of guidelines and establish working partnerships with other organisations involved in Great Crested Newt conservation work.

2. To participate in the development of a national recovery programme, that can be applied locally, to restore the species' range and distribution.

3. To participate in a site protection/management programme to ensure a representative set of sites within the species' geographical range is fully protected and conserved.

4. To encourage BHS members to participate in the activities of Local Amphibian and Reptile Groups, to survey ponds for Great Crested Newts and to report their findings.

5. To contribute to a national herpetofauna dataset of validated records and assist in their analysis.

HERPETOLOGICAL OBSERVATIONS IN THE CHAGOS ARCHIPELAGO, BRITISH INDIAN OCEAN TERRITORY

LINDA K. BARNETT* and CRAIG EMMS

Ecosystems Analysis and Management Group, Department of Biological Sciences, University of Warwick
*(*author to whom correspondence should be addressed)*

INTRODUCTION

Description of the Chagos Archipelago

The Chagos Archipelago has been British territory since 1814. It was made a dependency, the British Indian Ocean Territory (BIOT) of the United Kingdom in 1965 (Edis, 1993; Foreign & Commonwealth Office, 1993; Pearce, 1994).

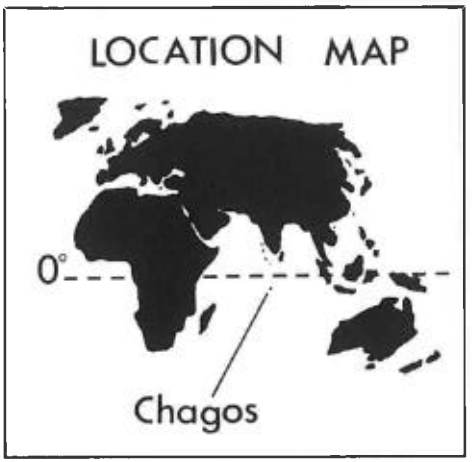
The Chagos Archipelago is the largest and most isolated coral atoll complex in the world (Pearce, 1994). It is centred at 6 degrees south, 72 degrees east, about 3,380 kilometres east of Mombassa and west of Singapore, 1,930 kilometres east of Mauritius, and 1,770 kilometres east of Mahe (the main island of the Seychelles). The nearest land to the Chagos is Addu Atoll, the southernmost part of the Maldives group, lying 600 kilometres to the north. The whole territory covers 54,400 square kilometres of the Indian Ocean, of which the archipelago covers about 37,500 square kilometres. There are five island atolls – Diego Garcia, Egmont, the Great Chagos Bank, Peros Banhos and Salomon. There are also several submerged atolls and vast banks and shoals. The limestone bank on which the Chagos Archipelago is situated is also one of the world's largest, being on a par with the Mascarene and Bahaman banks (Foreign & Commonwealth Office, 1993).

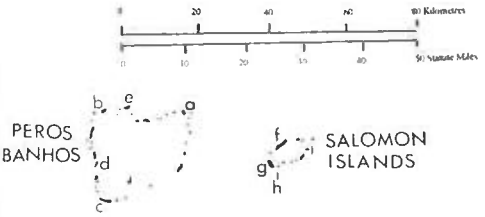
Diego Garcia, the most southerly of the islanded atolls, consists of a V-shaped sand cay which almost encloses a large, deep lagoon. There are three smaller islands in the mouth of the lagoon. The total land area is about 44 square kilometres, and there is an American military base on the main island, which houses British and United States military, and civilian-contractor personnel. The Egmont Atoll is the smallest islanded atoll and contains six islands. The Great Chagos Bank contains eight islands that are quite widely separated from one another relative to the other atolls. The main island groups are the Peros Banhos Atoll, which has 29 islands and a land area of 10.4 square kilometres, and the Salomon Atoll, with 11 islands and a land area of 5.2 square kilometres (Foreign & Commonwealth Office 1993).

The islands have a typical tropical maritime climate. The average temperature on Diego Garcia is 27ºC with the average maximum and minimum being 29ºC and 25ºC respectively. Rainfall is between 2,290 and 2,540 millimetres per annum (Edis, 1993; Foreign & Commonwealth Office, 1993).

The islands were exploited for copra from the late eighteenth century onwards, with much of the native vegetation being removed to make way for Coco Palm plantations. Many of the islands were inhabited during this period by the plantation workers. After emancipation from slavery in the nineteenth century, some of the workers (most of them came from Mauritius) decided to stay on the islands and become contract employees in

THE CHAGOS ARCHIPELAGO





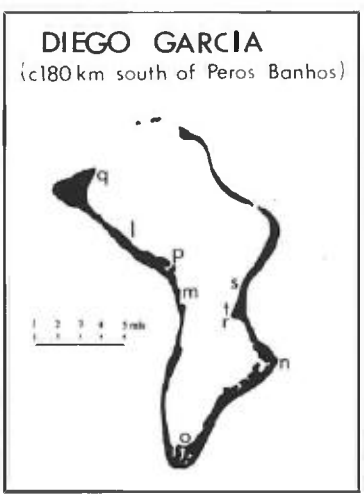
Key to maps

Peros Banhos:
a = Isle Yeye
b = Isle Diamant
c = Isle du Coin
d = Isle Petite Soeur
e = Moresby Islands

Salomon:
f = Isle Anglaise
g = Isle Boddam
h = Isle Poule
i = Isle Takamaka

Great Chagos Bank:
j = Middle Brother
k = Danger Island

Diego Garcia:
l = Wharf
m = Incinerator/landfill
n = Horsburgh Point
o = Turtle Cove
p = Point Marianne
q = Downtown
r = East Point
s = Meteorological Station
t = Plantation



the plantations which were owned by a private company. In 1966 it was agreed to make BIOT available for the defence purposes of Britain and the United States. The plantations were allowed to run down in 1967 as their commercial future could not be ensured, and the islanders were offered the choice of returning to Mauritius or the Seychelles. The majority of them, some 1,200 people, elected to settle in Mauritius. The final exodus of workers took place in 1973 (Foreign & Commonwealth Office, 1993). Since then the islands have been uninhabited, apart from the military base on Diego Garcia, though extended visits by yachtsmen to both the Salomon and Peros Banhos atolls are becoming increasingly common (Edis, 1993; Foreign & Commonwealth Office, 1993; Hutson, 1981).

RECENT SCIENTIFIC EXPEDITIONS

Three major scientific expeditions visited the Chagos Archipelago in the 1970s (Hutson, 1981). The first, a joint services diving expedition, took place in 1972/73 and concentrated on the Egmont Atoll. The second joint services expedition took place in 1975 and concentrated on the Great Chagos Bank (Bellamy, 1979). The third joint services expedition took place in 1978/79 and visited all of the atolls (Dutton, 1980). Only the last expedition studied the herpetology of the Archipelago and then only as a small component of its itinerary.

The 'Friends of the Chagos' 1996 International Scientific Expedition

A six week visit to the Chagos Archipelago took place in February and March 1996. An international scientific research programme was developed for this visit, covering two broad lines of investigation:

- To provide a scientific foundation for a conservation management plan of the Archipelago. This included research on diversity, biogeographic position, biological productivity and condition of the flora and fauna.

- The use of Chagos in the global environmental network and the emerging coral reef monitoring network.

24 of the 58 islands on the Chagos were visited by the authors of this paper during the 1996 expedition and surveyed intensively for insects, as well as amphibians and reptiles on a more casual basis. The other expedition members included Dr Jeanne A. Mortimer who conducted a dedicated survey of the Archipelago for sea turtles. The results of her work will be published in due course.

SPECIES ACCOUNT

The Chagos Archipelago has had a total of seven species of amphibian and reptile recorded in he past. During the 1996 'Friends of the Chagos' International Scientific Expedition one species of amphibian and four species of reptile were observed.

AMPHIBIA

Bufo sp.: Stoddart (1971) states that no amphibians were known on the island of Diego Garcia or on any of the other islands in the Chagos Archipelago. There is also no mention of amphibians being located on the Chagos by Dutton (1980) during the Chagos research expedition of 1978/79. The earliest record of an amphibian is made by Edis (1993), who states that 'at least one species of toad' is found on Diego Garcia. Presumably this species has been recently introduced to Diego Garcia, though there is no

direct evidence to substantiate this claim. The nearest record of a toad species to the Chagos Archipelago is *Bufo melanostictus* which is common on Addu Atoll and Male in the Maldives (Stoddart, 1971). During the 1996 expedition, toads were found to be common on Diego Garcia. They were recorded as tadpoles in freshwater ditches at the wharf (3/3/1996) and also at the incinerator/landfill site (27/2/1996 & 2/3/1996), and as adults from many areas of the island (Horsburgh Point: 27/2/1996; 29/2/1996. Turtle Cove: 29/2/1996. Point Marianne: 4/3/1996. Downtown: 5/3/1996). They were especially noticeable in the early evening as they crossed the main road that runs almost the length of the island. Several specimens of tadpoles and adults were collected and preserved. These specimens were identified to the generic level by the staff of the Zoological Section of the British Museum (Natural History) in London, and are now lodged in their collection.

REPTILIA

Chelonia

Chelonia mydas: The earliest record of the Green Turtle for the Chagos Archipelago appears to be by Bourne (1886b) at Diego Garcia. Stoddart (1971) does not mention having seen *C. mydas* in Diego Garcia during 1967, and Dutton (1980) did not see this species during 1978/79 even though he walked the perimeter of many islands in the Salomon and Peros Banhos atolls in search of turtle nests Edis (1993) states that this species comes ashore to breed during the south-east trade winds (June to September). The authors of this paper made the following casual observations of *C. mydas:* one subadult was observed at Turtle Cove, Diego Garcia on 29/2/1996, in association with *Eretmochelys imbricata* subadults. Tracks and completed nests of this species were located on the islands of the Salomon, Peros Banhos and Great Chagos Bank atolls. The Green Turtle is found in tropical and subtropical seas and is a very large, hard-shelled turtle. During their first year, Green Turtles feed on jellyfish and other floating organisms. When older, they become predominantly herbivorous, grazing on sea-grasses in shallow waters (Branch, 1988). The only sea-grass bed in the Chagos is a small area located inside the lagoon of Diego Garcia.

Eretmochelys imbricata: The earliest record of the Hawksbill Turtle for the Chagos Archipelago is by Bourne (1886b) who states that three or four were taken each week at Diego Garcia (presumably for food). *E. imbricata* was reported as having been seen in the lagoon of Diego Garcia in July 1967 (Stoddart, 1971), but records of this species in the other atolls of the archipelago were not forthcoming until a turtle survey was undertaken by the joint services expedition between 15 November 1978 and 24 January 1979 (Dutton, 1980). During this survey many islands in the Salomon and Peros Banhos atolls were searched by walking their perimeters, counting completed nests and noting their locations. In the Salomon Atoll all eleven islands were surveyed and eleven nests were located, with more than half of these on Isle Anglaise. In the Peros Banhos Atoll eighty-eight nests were located on eleven of the seventeen islands visited. Nearly a third of these were on Isle Yeye. The islands on the eastern rim of the atoll had most signs of turtle activity. According to Dutton this is consistent with the lack of human activity there, in contrast to the islands in the south and west. Edis (1993) states that this species comes ashore to breed during the north-west monsoon (December to March). The authors of this paper made the following casual observations of *E. imbricata*: Surfacing subadults/adults were observed in the lagoon of the Salomon Atoll between 9/2/1996 and 17/2/1996, and also between 8/3/1996 and 10/3/1996; Surfacing subadults/adults were observed in the lagoon of the Peros Banhos Atoll between 19/2/1996 and 25/2/1996. Tracks and completed nests were located on most of the islands visited in these atolls. Hawksbill Turtle hatchlings were observed leaving a nest on Isle Diamant, Peros Banhos

Atoll on 19/2/1996. On Diego Garcia, subadults of this species were numerous in the tidal channel of Turtle Cove between 27/2/1996 and 5/3/1996 (over 40 specimens were captured, weighed, measured and tagged by Dr Jeanne Mortimer, with the assistance of the authors and a few volunteers drawn from the military personnel on the island). The Hawksbill Turtle is circumtropical on coral reefs and is a relatively small sea turtle. Young juveniles eat floating vegetation, but adults are mainly carnivorous, feeding on hard-bodied, bottom-living marine invertebrates, including corals and urchins (Branch, 1988).

Pelusios subniger: This terrapin is presumably introduced to the Chagos, though there is no direct evidence for this (Stoddart, 1971). Two specimens were collected by J. Stanley Gardiner in 1905 'in one swamp near East Point' on Diego Garcia. They are lodged in the collection of the British Museum (Natural History) in London (Gardiner & Cooper, 1907). This species was not found on Diego Garcia during 1967 (Stoddart, 1971), or by the 1978/79 Chagos research expedition (Dutton, 1980), although a determined search was made for it by Richmond Dutton. Stoddart (1971) states that, according to local inhabitants, *P. subniger* has not been seen in Diego Garcia since at least 1945. He then adds the following note: 'According to J. Frazier, who visited Diego Garcia in 1970, and Jean-Michel Vinson, the meteorological station staff on the atoll reported that *P. subniger*, or *Geomyda trijuga*, or both of these reptiles were still extant though difficult to find during the dry season'. During the 1996 expedition several barochois on Diego Garcia were searched for the presence of this species without result. It is a widespread terrapin of East Africa and Madagascar, and is also present on the Seychelles (Branch, 1988; Stoddart, 1971) and possibly Mauritius (Branch, 1988). Two races are recognised. The typical race *P. s. subniger*, occurs on the African mainland and Madagascar, and is replaced on the Indian Ocean islands by *P. s. parietalis*. In Africa the habitat of this species is pans and temporary waterbodies, where it feeds on small frogs and invertebrates. During the summer *P. subniger* often aestivates on land during droughts (Branch, 1988).

Geomyda trijuga thermalis: This terrapin is presumably introduced to the Chagos, though there is no direct evidence for this (Stoddart, 1971). G.C. Bourne collected a specimen of this species in 1886 from Diego Garcia. He referred to it only as 'a mud-tortoise……abundant in some of the marshy pools' (Bourne, 1886). This specimen is in the collection of the British Museum (Natural History) and was identified by G. A. Boulenger (Boulenger, 1909). *G. trijuga* was not found on Diego Garcia during 1967 (Stoddart, 1971) or by the 1978/79 Chagos research expedition in Diego Garcia (Dutton, 1980) although a determined search was made for it by Dutton. According to local inhabitants the species has not been seen in Diego Garcia since at least 1945, and it is likely that the species had become extinct by the time of Gardiner's visit in 1905 (Stoddart, 1971). However, attention should be paid to the report of J. Frazier and Jean-Michel Vinson in the previous species account that *G. trijuga* may still have been extant on Diego Garcia in 1970 (Stoddart, 1971). During the 1996 expedition several barochois on Diego Garcia were searched for the presence of this species without result. This terrapin is native to Sri Lanka, India and Burma. It is also present in the Maldives at many localities (Stoddart, 1971).

Squamata

Hemidactylus frenatus: Boulenger (1909) records this house gecko from the Diego Garcia and Salomon atolls. Gardiner also collected *H. frenatus* from the Diego Garcia, Salomon and Peros Banhos atolls (Gardiner & Cooper, 1907). G. R. Zum of the Smithsonian Institution in Washington identified Fehlmann's collection of ninety-one specimens from Diego Garcia in 1967 as *H. frenatus* (Stoddart, 1971). Dutton (1980)

recorded *H. frenatus* on Middle Brother (Great Chagos Bank Atoll), Isle Anglaise and Boddam (Salomon Atoll), Isle's du Coin and Petite Soeur (Peros Banhos Atoll) and Diego Garcia. During the 1996 expedition this gecko was observed on Isle's Boddam (9, 10, and 18/2/1996) and Poule (10/2/1996) in the Salomon Atoll; Isle's Diamant (19/2/1996), Yeye (24/2/1996) and Moresby Islands (22/2/1996) in the Peros Banhos Atoll; Danger Island (15/3/1996) in the Great Chagos Bank Atoll, and on the island of Diego Garcia at two locations (at the 'Plantation' on 27/2/1996 and Downtown on 6/3/1996). A single specimen of this species (from Isle Boddam) was identified by Dr Colin McCarthy of the British Museum (Natural History) and is now lodged in their collection. Specimens were observed to be active by both day and night, but nowhere could they have been described as common. Dutton (1980) states that this species was loudly vocal, but although the authors of this paper heard many sounds on the islands at night, there was none that they could absolutely guarantee as having been generated by this species of gecko. In 1996 this species was observed to frequent the stems of native trees such as Takamaka *Calophyllum inophyllum* and the introduced Coco Palm *Cocos nucifera*, rotting logs on the ground, and buildings (abandoned or still in use). Dutton (1980) also includes dense, low ground cover such as *Ipomea* and *Canavalia* in the habitats of this species. A few of the specimens observed during 1996 were recorded as preying on large ants (*Camponotus* sp.) which were extremely common in places on some of the islands visited (Barnett & Emms, 1996). Dutton (1980) also noted large ants as prey items, as well as other small insects, chiefly moths, mosquitoes and spiders. One individual was observed by Dutton to prey upon a small scorpion (*Isometrus maculatus*). Natural predators of the gecko included the large hunting spiders that abound in the herbage (Dutton, 1980). This is a widespread species of house gecko that is also recorded from the Maldives (Stoddart, 1971).

Lepidodactylus lugubris: Boulenger (1909) records J. Stanley Gardiner's collection of this house gecko from Diego Garcia in 1905. Gardiner also collected *L. lugubris* on the Salomon and Peros Banhos atolls (Gardiner & Cooper, 1907). Fehlmann (Stoddart, 19761) and Dutton (1980) both failed to locate this species during 1967 and 1978/79 respectively. During the 1996 expedition this gecko was observed on Isle Takamaka (14/2/1996) in the Salomon Atoll; Isle du Coin (22/2/1996) in the Peros Banhos Atoll and on the island of Diego Garcia at two locations (at the 'Plantation' on 29/2/1996 and Downtown between 27/2/1996 and 5/3/1996). A single specimen of this species (from Isle Takamaka) was identified by Dr Colin McCarthy of the British Museum (Natural History) and is now lodged in their collection. Specimens were observed to be active only at night (although one individual was observed in the dark interior of an abandoned building during the day) and this may explain why neither Fehlmann nor Dutton located the species. The gecko was observed hunting on the leaves of *Scaevola sericea* along the edge of the beach, and on *S. sericea* and Coco Palm *C. nucifera* leaves in the interior of islands. On Diego Garcia *L. lugubris* was extremely common around lights within the Downtown area, so much so that each light appeared to have its own gecko. This species was also observed to be highly vocal at night. Prey items that were observed to have been taken by the species include several species of smaller moth (*Endothricha mesenterialis* and *Eilema* sp.) around light traps set up on Isle Takamaka (Barnett & Emms, 1996). This is a Malesian species of house gecko (Stoddart, 1971).

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REFERENCES

Barnett, L. K. & Emms, C. (1996) *Insects and Lepidoptera of the Chagos Archipelago.* A report funded by the British Foreign and Commonwealth Office and the World Wide Fund for Nature (UK).

Bellamy, D. (1979) *Half of Paradise.* Cassell. London.

Boulenger, G. A. (1909) A List of the the Freshwater Fishes, Batrachians, and Reptiles Obtained by Mr J. Stanley Gardiner's Expedition to the Indian Ocean. *Transactions of the Linnean Society of London II*, 12: (Percy Sladen Expedition Reports, 1), 296-297.

Bourne, G. C. (1886a) General Observations on the Fauna of Diego Garcia, Chagos Group. *Proceedings of the Zoological Society of London*, 333.

Bourne, G. C. (1886b) On the Island of Deigo Garcia of the Chagos Group. *Proceedings of the Royal Geographical Society* n.s. 8: 392.

Branch, B. (1988) *Field Guide to the Snakes and Other Reptiles of Southern Africa.* New Holland. London.

Dutton, R. A. (1980) The Herpetology of the Chagos Archipelago. *British Journal of Herpetology*, Vol. 6: 133-134.

Edis, R. (1993) *Peak of Limuria: The Story of Diego Garcia.* Bellew. London.

Foreign & Commonwealth Office. (1993) *British Indian Ocean Territory: The Chagos Archipelago.* HMSO.

Gardiner, J. S. & Cooper, C. F. (1907) Description of the Expedition. *Transactions of the Linnean Society of London* II, 12: (Percy Sladen Expedition Reports, 1), 48.

Hutson, A. M. (1981) A Preliminary List of Insects of Diego Garcia Atoll, Chagos Archipelago. *Atoll Research Bulletin* No. 243. Smithsonian Institution, Washington.

Pearce, F. (1994) Britain's Abandoned Empire. *New Scientist.* April 1994: 26-31.

Stoddart, D. R. (1971) Terrestrial Fauna of Diego Garcia and Other Chagos Atolls. *Atoll Research Bulletin* No. 149: 163-170. Stoddart, D. R. and Taylor, J. D. (Eds). Washington DC: Smithsonian Institution.

FISH-EATING BY THE COBRAS *NAJA MELANOLEUCA* AND *NAJA NIGRICOLLIS* (ELAPIDAE) IN THE NIGER DELTA (PORT HARCOURT, RIVERS STATE, NIGERIA)

LUCA LUISELLI [1,3], LYNETT BIKIKORO [1,2],and LINDA CHIYERE UDE [1,2]

[1] *Department of Animal and Human Biology, University of Rome "La Sapienza", via Alfonso Borelli 50, 00161 Rome, Italy (fax: **39-6-8411964)*
[2] *Rivers State University of Science and Technology, Port Harcourt, Rivers State, Nigeria*
[3] *Address for correspondence: Dr Luca Luiselli, via Olona 7, 00198 Rome, Italy.*

INTRODUCTION

Forest Cobras *(Naja melanoleuca)* and Spitting Cobras *(N. nigricollis)* are widespread and abundant elapid snakes in rainforests and mangrove forests of southeastern Nigeria (Romer, 1953; Butler and Reid 1986, 1990). In the Niger Delta (Port Harcourt, Rivers State) they are found in a wide variety of different habitats. Forest Cobras are especially common in primary and secondary swamp forests, whereas Spitting Cobras are more common in semicultivated and drier habitats. In some localities, however, they are sympatric. In one of these localities we observed a peculiar foraging behaviour shown by both Forest and Spitting Cobras: foraging on fish. This peculiar foraging behaviour is described in this note.

STUDY AREA

All observations given here were made at Orubiri (N 04º 42' 2.5", E 007º 01' 13.6"), a locality on the Niger Delta situated close to Port Harcourt, the biggest town of River State (Figure 1). This locality is characterized by arboreal mangrove formations, with patches of secondary permanently flooded swamp forest. The observations were made in September-October, 1996. Times of observations given here follow Lagos time.

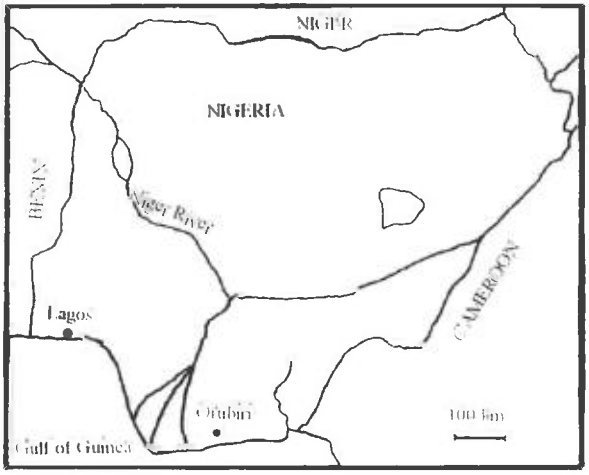

Figure 1. Map of Nigeria showing the site where records of fish-eating by cobras were collected.

RECORDS AND DISCUSSION

On 28 September, at 1105 a.m., we observed a juvenile male *N. melanoleuca* (snout-vent length = 63.2 cm, tail length = 12.8 cm) swimming in a muddy pond surrounded by mangroves. The cobra moved quickly along the borders of the pond, trying to capture *Periophthalmus* fish. These fish were extremely abundant in the ponds of the study area. In about fifteen minutes of monitoring, the snake was able to ingest two fish and failed to capture another fish. He ingested the fish immediately after capture, without using envenomation to kill the prey. On 6 October, at 18.35, close to the locality where the above observation was made, we found a freshly road-killed male *N. nigricollis* (snout-vent length = 74.5 cm, tail broken). It was dissected to obtain any food item. In the stomach we found remains of a lizard *(Agama agama)* and two *Periophthalmus* fish. The total ingested biomass was 29.2 g, whereas the snake weighed 143.5g.

These data show that, at least in the mangrove forests of southeastern Nigeria, both cobra species feed upon fish. We speculate that *Periophthalmus* species, due to their peculiar "semi-terrestrial" behaviours, may represent ideal prey types for predators like cobras that frequently inhabit wet areas and pond borders. Predation of cobras upon fish is, to our knowledge, a rarely reported occurrence in the scientific literature. The few dietary records from Nigeria indicated that *N. melanoleuca* feed upon eggs, and *N. nigricollis* upon lizards and small mammals (Butler and Reid, 1990). No fish-eating is recorded. According to Phelps (1989), *N. melanoleuca* is at least semi-aquatic throughout many parts of its range, and feeds largely upon fish and amphibians. Conversely, fish were to our knowledge never reported as prey for free-ranging *N. nigricollis,* a species that is known to prey usually upon small mammals, toads, birds, eggs, and reptiles including snakes (Phelps, 1989).

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REFERENCES

Butler, J.A. and Reid, J. (1986). Habitat preferences of snakes in the Southern Cross River State, Nigeria. *Studies in Herpetology* (Prague), pp. 483-488.

Butler, J.A. and Reid, J.C. (1990). Records of snakes from Nigeria. *Nigerian Field* **55:** 19-40.

Phelps, T.E. (1989). *Poisonous snakes.* Blandford Press, London, 237 pp.

Romer, J.D. (1953). Reptiles and Amphibians collected in the Port Harcourt area of Nigeria. *Copeia* **1953:** 121-123.

A SHORT NOTE ON THE HERPETOFAUNA OF LANGKAWI ISLAND, MALAYSIA

FRANK D. BOWLES

37, Albany Terrace, Dundee, DD3 6HS.

INTRODUCTION

A childhood ambition to visit the tropics was fulfilled last spring when my wife and myself managed to obtain a 'long-haul' package to Langkawi, a hilly, rain-forested island in a small archipelago lying off the north-west coast of the Malayan peninsula. Separated from the mainland near the Thailand border, Langkawi has until recently escaped the attention of developers. The government has however just declared the island to be a duty-free zone to attract tourism, and though much of the interior and northern coast is protected, the west coast, with its extensive sandy beaches, is being built up fast, and the interesting sand dune and scrub hinterland which divides the shore from the paddy-fields and rain forest is disappearing rapidly, jeopardising the herpetofauna that is found there.

We were based in accommodation at Pantai Cenang Bay in the extreme south-west of the island, and made expeditions to Kuah Town and its environs, the north coast, and the smaller islands of Dayang Buting and Singar Besar, a wildlife sanctuary. We were in Langkawi from April 1-15, 1996.

AMPHIBIA

We saw five species of frogs and toads; all situated between a narrow, sewage infested swamp that divided the coastal scrub from the rain forest, and the beach. We identified them later in the U.K., from descriptions, photos and sketches made in the field. One species of Pelobatidae we are still uncertain about.

Bufonidae

Bufo melanostictus. This species, which looks superficially very similar to *Bufo bufo* in appearance, though paler and with black vericosing of the flanks, was seen once, about 23.00 hours, trying to escape the dance-floor of a crowded outdoor restaurant situated by a small lake just above the beach.

Ranidae

Rana erythria. A smallish typical frog with green back and chestnut brown flanks. Found in fairly large numbers on the edge of paddy fields and the rain forest, both in irrigation ditches and around sheets of sewage contaminated stagnant water.

Rana doriae. A small olive green frog with longitudinal darker bars and, in some specimens, a light vertebral stripe. At night they were very active around stagnant water, but during the day were to be found in quite large numbers under discarded hardboard and other similar refuse.

Microhylidae
Kaloula pulchra. Two specimens seen at night in the hotel grounds: one sitting on a flower-bed muching an insect, the other attempting to climb up some wire-netting. This is a strikingly marked toad about 7 centimetres long, with a brown back and white flanks, with a further irregular brown stripe retreating back behind each eye. Popular text-books in Malaysia describe it as "The Malaysian Narrow-Mouthed Toad."

Pelobatidae
Megophrys nasuta. "Asian Horned Toad". Two of what could have been this animal seen on foliage on edge of rain forest.

REPTILES

We were rather disappointed to find that it was unusual to see snakes outside the rainy season, which commenced in July. We did, however, observe a small, greyish-green colubrid of unknown species at the side of a forest path in the north of the island on 2 April about 12.40 hours.

We identified seven different species of lizard: three geckos, two agamids, a skink and a monitor.

Gekkonidae
Hemidactylus frenatus. A small, pinkish brown gecko, about 10 centimetres long, found in considerable numbers both inside and outside buildings. Twelve were observed together waiting for insects beneath the strip lighting of an illuminated hotel sign. They were regarded as pests by hoteliers, presumably because they excreted on wall surfaces.

Cyrtodactylus marmoratus. We found this 12 centimetres long gecko underneath pieces of bark and small bits of wood just above the shore line about 0800 hours on 4 April. Its ground colour was a creamish ochre and it was heavily spotted and blotched with dark brown. Another specimen was seen at the base of a fence post in the hotel garden the next morning.

Gekko gecko. A specimen of this huge, brilliantly coloured gecko was seen just inside the roof of a woodland shelter. It was over 30 centimetres long and was sea green in colour, covered with turquoise and bright orange spots. Its relatively large eyes were a tawny yellow. Although this animal has one of the loudest voices in the reptile kingdom, it remained completely silent during the several minutes that we watched it. It was seen about 15.30 hours in the nature reserve on Singa Besar Island on 12 April.

Agamidae
Leiolepis belliana or Butterfly Lizard. On April 3, we took a taxi to Kuah, the island's capital. In a formal garden surrounding the mosque we saw what we first thought were thrushes rushing about the lawns. Closer inspection revealed that the creatures were in fact agamid lizards, mostly males competing for territory. These lizards lived in holes dug in the sandy soil of the lawns. They were about 35 centimetres long, olive brown in colour, the males adorned with an orange and black 'flash' above the shoulders. They were very timid and exceedingly difficult to photograph.

Acanthosaura armata. We visited Kuah again on April 11, and walked along the wood-fringed coast beyond the harbour. About 13.00 hours we observed an exotic looking agamid with a serrated crest on the back of its head and neck. About 30 centimetres long, light golden-brown in colour with both white and darker markings attenuated limbs and strange "eyelash" designs round its eyes, it was the most unusual lizard that we saw in Langkawi. It was standing motionless on a stone, and made very little effort to make off.

Scincidae

Mabuya multifasciata. This very common skink was ubiquitous in Langkawi. About 25 centimetres long with small but quite well-formed limbs, this animal could be disgtinguished by its bright orange-red flanks which contrasted with its otherwise sober livery of bronze upper surfaces and light grey belly. It was most often observed basking at sunrise and sundown on banks, rubbish dumps and road edges.

Varanidae

Varanus salvator, Water Monitor. We first encountered this two metre long reptile late in the afternoon of April 5 on the edge of a paddy field, following a young girl herding a flock of ducks and ducklings. Seeing the animal silhouetted against the setting sun, we first thought it was a slender mammal of the mongoose variety. However the field glasses soon confirmed it was a large hungry lizard hoping to grab a duckling dinner. Seeing us standing in its path, it abandoned the idea and trotted sideways into the adjacent forest. Our second meeting with a monitor was more dramatic: the next morning about 08.00 hours we were looking for skinks and geckos amongst the bushes lying above the shore line, when we disturbed a basking adult which rushed out literally at our feet with the noise and vigour of a fox, giving us quite a fright. During the following days we saw several of these creatures, basking by lakesides and rivers, excavating food items such as eggs with their powerful clawed feet, swimming across estuaries. We watched a brightly marked youngster cut through the water at great speed, its body twisting from side to side like a snake, its head held erect. Although they were usually timid, one seen on Dayang Bunting Island was scratching up the earth for food at the edge of a path crowded with tourists.

Although we only saw one snake in the wild, a kind local Malay, hearing about our interest in reptiles, guided us to an acquaintance of his who had a collection of native snakes. These consisted of several rather shabby Reticulated Pythons (*Python reticulatus*), a few subdued cobras (*Naja naja*), a single King Cobra (*Ophiophagus hannah)*, and one seven foot long Mangrove Snake (*Boiga dendrophilia*), which he insisted on winding round our necks.

Although the Saltwater Crocodile (*Crocodylus porosus*) is now extinct around Langkawi's shores, there is a well maintained crocodile farm on the island where this animal can be seen in various stages of development. There is also quite a good python enclosure there.

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I would like to thank Dr. C.J. McCarthy, British Museum (Natural History) for his help in identifying the reptiles described above.

REFERENCES

Capula, M. (1990.) *The Macdonald Encyclopaedia of Amphibians and Reptiles.* Macdonald Orbis, London.

Grzimek, B. (1970.) *Grzimek's Animal Life Encyclopaedia, Vol. 5.* Van Nostrand Reinhold Company, New York, Cincinnati, Toronto, London, Melbourne.

Mattison, C. (1992.) *Frogs & Toads of the World.* Blandford, London.

Mattison, C. (1986.) Notes on Some Frogs Observed in West Malaysia. *British Herpetol. Soc. Bull. 17, 28-30.*

LANGKAWI ISLAND

A Pantai Cenang
B Kuah Town
C Dayang Bunting Island
D Singa Besar Island

0 **5 Miles**

NOTES ON THE BIOLOGY, KEEPING AND BREEDING OF *ELAPHE HELENA HELENA* (Daudin, 1802)

PAUL M. KORNACKER

Locher Str. 18, D-53359 Rheinbach, Germany

INTRODUCTION

The Indian Trinket Snake (*Elaphe helena*) is one of the numerous *Elaphe*-species found on the Asian continent and was first mentioned by Russell in 1796 (quote from Smith, 1943). In the German literature this snake was described for the first time by Schetty (1950). So this species has been well-known for almost 200 years, and has been given various names by the native population. The Sinhalese use the name *"Mudu Karavala"* or *"Kalu Kateya"*; *"Kattu pambu"* is the name used by the Tamils.

DESCRIPTION

Two subspecies of *Elaphe helena* are known, differing in colour pattern and different ventral count (Schulz, 1992).

Elaphe helena helena (Daudin, 1802)
The ground colour of the body is dark to light brown; young snakes appear to be more of an ochre colour.

They have two black dorsal stripes starting just behind the head, which gradually fade as they stretch towards the centre of the body and then change into spots which gradually fade over into unclear, shadowy markings (Front Cover). On each side of the head, there are two dorsolateral stripes which also change into black spots stretching right down to the Ventralia. Directly behind the eyes, there is a thin, downward-pointing diagonal stripe which, on some snakes, reaches right back to the Infralabialia. The heads of young and sub-adult snakes are often light olive in colour. On fully-grown snakes, there may also be a black stripe between the Parietalia.

The dorsal scales have white edges and are evenly spaced. And so a pattern emerges which, especially on the young ones, can take the form of a zig-zag band. The rear of the body has no pattern but changes into a brown colour ending in a darker tone at the sides (Plate 1). The ventral side is creamy-white with no markings. Gohil (1983) reported the discovery of an albino in India.

The pholidose ratio is as follows:
2 Praefrontalia; 10 or 11 Supralabialia, of which either the 5th and 6th or the 5th to 7th touch the edge of the eye. The Dorsalia show in the middle of the body a strong reduction from 27 to 23 rows. On the front part of the body, the dorsal scales are slightly keel-shaped. Ventralia: male 210-234, female 226-244; Subcaudalia: 79 to 100. The anal shield has no parting.

Figure 1 shows the head-pholidosis of the female, which was caught in 1974 by the author in Sri Lanka.

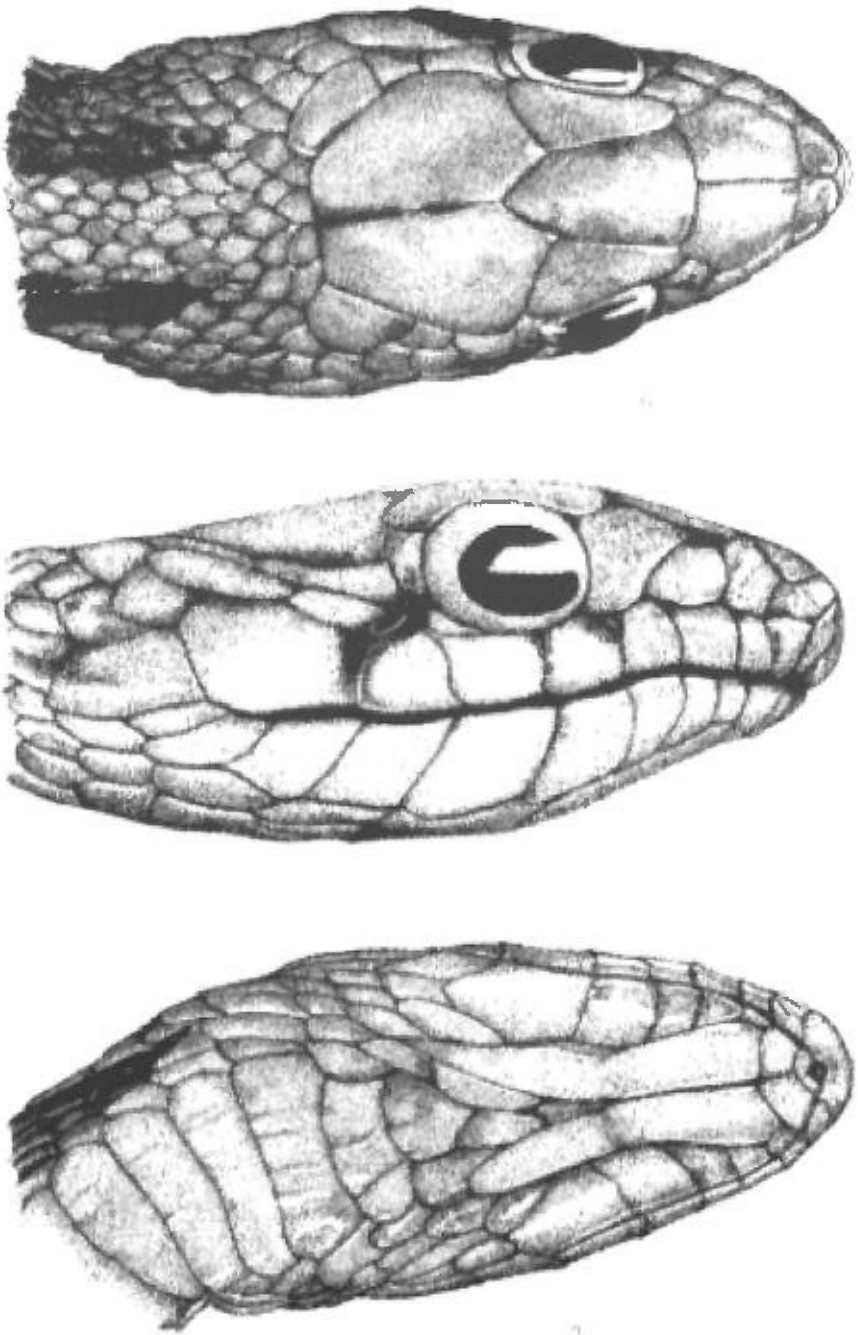

Fig. 1 - Head pholidosis and pattern of *Elaphe helena*, drawn by Uschi Euler

Elaphe helena monticollaris (Schulz, 1992)
According to Smith (1943), the ringed variety has no longitudinal black stripes. Its characteristic mark is a black-edged white collar. Murthy & Chandrasekhar (1989) described snakes collected from the hills in Tamil Nadu, South India and give some remarks about the colour pattern of this subspecies. In the publications by Niehaus & Schulz (1987), one finds a very good colour chart from Wall (1913) on which one can clearly see the back markings. In Figure 4, a courtesy from Schulz (Schulz, 1992) the different colour patterns are easily seen. They consist of yellow or white ocelli with black edges, which are evenly spaced out across the longitudinal axis in chain-forming belts. The number of these small cross-bands vary between 21 and 23. Another distinctive character compared to the nominate form is the higher number of ventral scales.

The pholidose ratio is as follows:
2 Praefrontalia; 9, seldom 8, Supralabialia, of which the 5th and 6th touch the edge of the eye. The Dorsalia show in the middle of the body a mostly constant number of 25 rows, sometimes a reduction to 24 or 23. Ventralia: male 216-242, female 247-260; Subcaudalia: 75 to 101. The anal shield has no parting.

E. helena has a slim body, a slightly pointed head and a pointed tail. The tongue has a black septum and sometimes the mouth has a black mucous membrane.

The sex of adult animals, can easily be determined because of their marked sexual dimorphism. The female Indian Trinket Snake can grow up to 130 cm in length, whereas the male, which is much slighter, grows to less than 100 cm. The sexes also differ in the number of ventral scales.

DISTRIBUTION

E. helena is found in an area reaching from the Himalayas in the north, throughout the whole Indian Subcontinent down to Sri Lanka (Fig. 5). In India it is mostly found in the provinces of Assam, Kashmir, Sikkim and Madras. The nominate form is restricted to the plains and hilly country between sea-level and 900 m above sea-level. Only in Nepal does it reach altitudes of 1500 m (Schulz, 1992). *Elaphe h. monticollaris* lives in the hills mainly in the Western Ghats along the southwestern coast of India, between 600 and 2000 m above sea-level.

According to De Silva (1980) and A. De Silva (1990) *E. helena* is found all over the island of Sri Lanka. From the dry north (Jaffna), down to the humid south (Ratnapura) and from the east coast (Trincomalee) to the west coast (Colombo), living at altitudes ranging from sea-level to over 1500 m. In Sri Lanka they are mostly found at altitudes of about 500 m. The snake was observed by the author in Deltota, Gampola and Peradeniya (Central Province) as well as in Ruwanwella (Western Province), all of which are between 400 and 500 m above sea-level (Kornacker, 1988).

ECOLOGY AND BIOLOGY

All specimens found by the author were in a hot and humid lowland area differing in climate from all the other regions of the island by its yearly precipitation of over 2000 mm and an average temperature of 20ºC. The results of some sporadic temperature measurements showed 21ºC in the morning and 28ºC in the late afternoon. The humidity fluctuated between 85% and 75%.

Fig. 2 - The distribution of *Elaphe helena*

E. helena is an eurytope series, which means it colonises various biotopes. *E. helena* was mostly observed at the edge of the tropical rainforest, but also in a meadow clearing, in a rice field and close to a village. Its most active time is at dawn and during the night. During the day, it usually hides on the ground under stones, branches or bark or curled up in compact tree growth or bushes. As a semiarboricole species, the Indian Trinket Snake often climbs into bushes or low-lying branches. One specimen was found in a rubber plantation curled up in a latex-catching jar. The only young snake, found by chance, was observed on a dam in the middle of a rice field, from where it immediately escaped into the water. This also proves the oral communication from De Silva, who could only observe young snakes in the vicinity of standing water. Therefore, it is possible that the different *Rana*- and *Rhacophorus*-species are eaten for food. According to A. De Silva (oral communication), *E. helena* also hunts lizards, especially the young of *Calotes versicolor*, *Otocryptis wiegmanni* and *Mabuya carinata lanakae*. However, the main diet is small mammals.

Up to now, ophiophagy as described by Smith (1943), Deoras (1965) and other authors, could not be observed.

A vast selection of other snakes could be found in the same habitat, including *Ptyas mucosus*, *Lycodon aulicus*, *Dendrelaphis tristis*, *Vipera russelli* and *Naja naja*, which are all classed as eurytope species like *E. helena*.

Of the endemic Ophidiofauna (39 of the 92 species are endemic), only *Xenochrophis asperrimus* and *Bungarus ceylonicus* could be found.

Even though *E. helena* is a very calm and sociable species, its behaviour can suddenly change, if threatened with danger. If the distressed snake sees no way of escape, it will display a defensive behaviour similar to that of *Elaphe radiata* (Kornacker, 1986, 1988 and Schulz, 1986). The front of the body is raised to stand erect and bent back in an >S< shape (Fig. 6). The sides of the neck flatten out and the mouth opens slightly. When it strikes, the snake attacks forward and bites hard.

Very little is known about the reproduction cycle of *E. helena* in the field. It is known that many factors play a role.

Knowledge of the exogenous parameters such as temperature, humidity, photoperiod, population density and behaviour can be very valuable for later keeping and successful breeding in the terrarium. *E. helena* appears to be capable of breeding at any time of the year. A. De Silva captured a pregnant female in September and found clusters of eggs in January, March and December, whilst H. De Silva reported eggs from March, June and September. All these dates were given by oral communication. Whitaker (1978) noticed the laying of eggs in the Snake Park in Madras (India) in February, August and December. As shown in Table 1, reproduction in a terrarium can happen over the whole year.

MAINTENANCE

The author has kept the subspecies *E. h. helena* since 1974, but a suitable pair first started breeding in 1981. In the following four years the snakes were separated, according to sex, into two terraria, similar in size and interior. They were only allowed to mix for a short period of time when breeding. Later, all the snakes were put into one terrarium where they are kept today. The terrarium [size 100 x 70 x 90 cm (length/width/height)] is laid out with a root, several different sized branches and various bromeliads, ferns and climbing plants (for example *Cissus discolor* or *Scindapsus pictus*). The soil, 10 cm deep, consists of a mixture of sand, earth and peat in a ratio of 1 : 1 : 1. *Ficus diversifolia, Pellionia repens* or *Pilea cardiere* are soil plants, which cover the bottom and give the snakes a good shelter. A three litre plastic bowl is used as a water basin. The simulation of day and night is achieved by using two lamps, each of 38 watts, and an automatic timer on a 12-hour cycle. 300 Lux are projected onto the soil and 2200 Lux onto the tops of the branches. No further heating is needed, as the room in which the terrarium is situated has a temperature of 26ºC-28ºC. At night the temperature drops to about 20ºC and could be dropped to about 16ºC without causing any harm. Despite the relatively low humidity of 50%-70%, skin-shedding problems are very rare.

Feeding is done exclusively with laboratory mice. The bodysize of the mice has to be carefully controlled as the male snakes only dare to attack half-grown mice and flee from larger animals. The fully grown females, on the other hand, will eat mice of any size. The mice are killed in the *Elaphe* manner of constriction. Every 8 weeks they are given a multivitamin preparation which has been fed to their prey.

One specimen suffering from a lung infection was restored to health by using Tetra-Tablinen, a preparation manufactured by the firma Sanorania, Germany. Treatment took place over a period of 10 continuous days. The dose given on the first day was 100 mg/kg body weight and from the second to tenth day, 50 mg/kg. One side effect was the shedding of its skin 11 times that year! The snake was isolated in an almost sterile tank for several months. An infra-red lamp was used at the first signs of lung infection before starting the antibiotic treatment. A few drops of eucalyptus oil were added to the soil in the terrarium to help relieve the snake's breathing (Kornacker, 1988).

BREEDING

The breeding results from 1981 to 1991 are listed in Table 1 and 2. As already mentioned, the snakes were separated according to sex from 1981 to 1984. So it is even more surprising that the four copulations (the fourth taking place unobserved at the end of December 1983) resulted in 8 clutches. Obviously this was the result of the phenomenally delayed impregnation (sperm storage, Amphigonia retarda), already practised by many different kinds of reptiles. This special way of biological reproduction in snakes was first described in 1938 by Kopstein (quote from Petzold, 1982), and consists of conserving the sperm in the female genital tract over a period of time (up to several years). This seems to be the first observation in an Asian *Elaphe*-species.

A few days before mating, the total length and weight of the snakes was 118 cm and 305g for the female and 85 cm and 125 g for the male. Before copulation they often chased each other until the male, trembling heavily, tried to climb onto the back of the female. A mating bite, a habit which lots of snakes demonstrate, could not be observed. The snakes did copulate several times per day, and each time could last up to four hours. The female continued to eat normally right up until she was ready to lay her eggs. Then she searched for a suitable place, which was usually a densely planted flowerpot. One important factor when she is about to lay her eggs is that there should be a moist area in the terrarium, well protected from external disturbance. The heavily pregnant female is quite helpless at this stage and requires absolute peace.

The deposition of the eggs, which was observed both during the day and night, can take up to several hours. The eggs, some of which were stuck together, were carefully separated, numbered with a pencil, weighed and measured and then immediately put into an incubator. Instead of a proper incubator, a drying cabinet was used, where the exact temperature could be set - in this case 27ºC. The necessary humidity of 85%-95% was achieved by standing a number of waterbowls inside. A mixture of peat and soil, which was kept moist, was used as a nesting substrate. (A suitable alternative would be Vermiculite).

Eggs with a mycosis infection were powdered with charcoal and on several occasions healthy young snakes were hatched. Only heavily infected or malformed-eggs had to be removed. During the incubation period, it could be seen how the eggs grew in size and weight but they were not measured.

In the FI Generation (Tab.1), 39 snakes hatched out of a total of 51 eggs, a hatching rate of 76%. The average incubation time was 65 days. After first splitting the shell, they stayed inside the eggs for several hours until finally emerging (Fig. 7). The hatchlings were of an average length of 305 mm, and an average weight of 8.5 g. After a few days they shed their skins for the first time. Shortly afterwards, they were fed with newly born mice. The rearing of the young snakes followed without any problems although some had to be specially fed during the first four weeks. In these cases mice were not used as food but chopped up pieces of heart from cattle, given the odour of mice. When fed regularly, snakes reach mating size within about 18 months. The female has then reached a size of about 110 cm and the male nearly 70 cm.

Table 1.
Breeding data of the F1-Generation

Date of mating	Date eggs laid	Number of eggs	Average length (mm) and weight (g) of eggs	Incubation time (days)	Number of hatchlings	Average length (cm) and weight (g) of hatchlings
05.11.81	02.01.82	7	39.4/ 9.6	67-68	5	30.4/ 8.2
	15.03.82	8	43.6/10.8	65-69	8	31.9/ 9.2
30.03.82	29.05.82	6	43.7/10.5	65	4	31.1/ 8.8
	22.09.82	8	42.5/10.1	61	3	31.0/ 9.1
25.02.83	27.04.83	8	43.6/11.2	63-65	8	32.3/10.4
	20.08.83	4	41.1/ 9.5	64	1	29.1/ 7.5
?	02.03.84	3	38.9/ 8.0	61-67	3	27.8/ 6.9
	16.08.84	7	40.2/ 8.9	63-69	7	30.1/ 8.2

In 1986 a pair was chosen, which had hatched in August 1984, in order to try and breed an F2 Generation. Between 1986 and 1991 43 eggs were layed and 37 snakes hatched, a hatching rate of 86%. The incubation time was usually 67 days. The breeding results can be seen in Table 2. As in the F1 Generation, the remaining eggs were unfertilised.

The breeding results of the F1 and F2 Generation are compared in Table 3.

Table 2.
Breeding data of the F2-Generation

Date of mating	Date eggs laid	Number of eggs	Average length (mm) and weight (g) of eggs	Incubation time (days)	Number of hatchlings	Average length (cm) and weight (g) of hatchlings
	19.05.86	5	41.6/ 9.1	66-71	5	30.4/ 8.2
	17.08.87	4	39.2/ 8.6	67	1	29.4/ 7.6
16.03.88	23.05.86	4	42.8/10.8	68	4	31.2/ 9.6
	07.09.88[1]	Two unfertilized, deformed eggs - 68.5 and 71.2 mm in length				
26.01.89	31.03.89	7	39.7/ 8.9	62-65	7	30.8/ 9.4
	02.08.89	4	41.2/10.2	66-68	3	29.8/ 8.7
21.02.90	28.04.90	8	38.4/ 8.5	69-71	8[2]	29.2/ 8.5
	19.07.90	4	40.8/ 9.7	65-66	3	30.5/ 8.9
	08.04.91	3	41.2/10.1	69	4	31.8/10.1
25.06.91	27.08.91	4	40.1/ 8.9	62-64	3	30.2/ 9.3

1) Egg-clutch disregarded in statistic.
2) One animal with deformed vertebral column, an other born with an open ventral side.

Plate 1 - Young "helenas" show a very clear pattern

Plate 2 - The subspecies *Elaphe helena monticollaris*

Plate 3 - The typical defensive behaviour of *Elaphe helena*

Plate 4 - Hatchlings in an incubator

Table 3.
Comparison between F1- and F2-Generation

	Summary of clutches	Number of eggs	Average of eggs/ clutch	Average length (mm) and weight (g) of eggs	Average incubation time	Summary of hatchlings	Average length (cm) and weight (g) of hatchlings
F1-Generation	8	51	6.4 eggs/clutch	41.6/ 9.8	64.8	39 = 76%	30.5/ 8.5
F-2 Generation	9	43	4.8 eggs/clutch	40.6/ 9.4	66.8	37 = 86%	30.4/ 8.9

ADDENDA

In May 1988, after 14 years in the terrarium, the female used for the whole F1 Generation finally died. She was 121 cm in length and had been captured by the author in 1974 in Gampola, at the time measuring 116 cm in length.

When kept in proper conditions, the Indian Trinket Snake has proved to be easily adaptable to life in a terrarium, which means it is a good species for terrarium beginners. Due to the vast amount of breeding in the last couple of years by terrarium keepers, one should only keep those bred in captivity, thereby protecting the environment and the different species.

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REFERENCES

Broer, W. & M. Engelhhardt (1981): Haltung und Zucht einer selten importierten Schlange: *Elaphe helena*. *Salamandra*, Frankfurt/M. 17(1/2): 63-70.

Deoras, P.J. (1965): *Snakes of India*. New Delhi (National Book Trust), 142 p.

De Silva, A. (1977): Some observations on the development of *Elaphe helena* eggs. *Hamadryad*, Newsletter of the Madras Snake Park Trust 2/2: 8-9. -(1990): *Colour guide to the snakes of Sri Lanka*. Avon (R & A Publishing Limited), 130 p.

De Silva, P.H.D.H. (1980): *Snakes of Sri Lanka*. National Museum Of Sri Lanka, 472 p.

Gohil, K.K. (1983): An albino trinket snake *(Elaphe helena). Hamadryad*, Newsletter of the Madras Snake Park Trust 8/1: 14.

Kornacker, P. (1986): Die Indische Schmucknatter. herpetofauna, Weinstadt, 8(44): 10. -(1988): Bemerkungen zur Biologie, Haltung und Zucht von *Elaphe helena* (Daudin, 1802). *herpetofauna*, Weinstadt, 10(57): 27-33.

Murthy, T.S.N. & S.V.A. Chandrasekhar (1989): Remarks on the colour pattern of the Indian trinket snake *Eaphe helena* (Daudin) (Serpentes: Colubridae). *The Snake* 21: 51-53.

Niehaus, G. & K.-D. Schulz (1987): Die hinterasiatischen Kletternattern der Gattung *Elaphe:* Teil XI *Elaphe helena. Sauria,* Berlin, 9(4): 3-7.

Petzold, H.-G. (1982): *Aufgaben und Probleme bei der Erforschung der Lebensäußerungen der Niederen Amnioten (Reptilien).* (reprint 1984), BINA-Verlag, Berlin, 323 p.

Schetty, P. (1950): *Elaphe helena*. Wschr. *Aquar.-Terrarkde*., Braunschweig 55: 277-278.

Schulz, K.-D. (1986): Die hinterasiatischen Kletternattern der Gattung *Elaphe:* Teil VII *Elaphe radiata. Sauria,* Berlin 8(4): 3-6.
- (1992): Die geographischen Unterarten der Indischen Schmucknatter *Elaphe helena* (Daudin, 1803). *Salamandra,* Bonn 28(1): 14-24.
Smith, M.A. (1943): *The fauna of British India, Ceylon and Burma, including the whole of the Indo-Chinese sub-region, Reptilia and Amphibia, Vol. III Serpentes.* London (Taylor & Francis), 567 p.
Wall, F. (1913): A popular treatise on the common Indian snakes Part XIX, *Coluber helena. J. Bombay nat. Hist. Soc.* **22**: 22-28.
Whitaker, R. (1978): *Common Indian snakes.* New Delhi (Macmillan Company of India), 154 p.

THE LIZARDS OF REDONDA

MATTHEW B. HARRIS

Reptile Section, Cotswold Wildlife Park, Near Burford, Oxfordshire, OX18 5JW.

INTRODUCTION

Situated between Nevis and Montserrat of the West Indies, Redonda is a remote, uninhabited island in the Lesser Antilles, belonging to Antigua. However it is not the idyllic, Caribbean paradise fringed by palm trees and beaches that this description might suggest. Rather it is an intimidating, inaccessible outcrop of volcanic rock guarded by steep cliffs up to 1000 feet tall. My desire to visit Redonda was thus fuelled not by its natural beauty but by its considerable herpetological interest. With three species recorded and reports of more to be discovered, this half-mile square piece of rock proved to have at least four, and possibly five lizard species.

Though technically a dependency of Antigua, the island was claimed as a kingdom by a Montserratian, Matthew Shiel, in 1862. Successors to this throne have included J.B. Priestley, Dorothy Sayers, Victor Gollancz and Lawrence Durrell. However, Redonda has always remained uninhabited, except for a guano and phosphate mining operation in the last century, and for the Rastafari who visit to catch the large goats that live there. One such Rastafarian, with the express mission of catching a goat for himself, was our guide on a boat trip to Redonda which included myself and two archaeologists, there to confirm reports of relics from Arawak and Carib Indians, who used to visit the island to collect birds eggs.

Accessing the island was not easy. Whilst many Montserratian fishermen boasted having visited Redonda, few in reality actually had. It transpired that there was only one boat on Montserrat large enough to survive the choppy sea journey and yet small enough to get close enough to the shore to disembark. Hiring this boat took two weeks to organise. There is no landing point on Redonda, so we had to swim through the rocks to reach the shore. With vertical cliffs on all sides, the only route to the top of the island is by a steep scree slope of loose boulders.

HABITAT

The habitat on Redonda appears quite bleak, consisting of scattered boulders interspersed with one or two species of low-growing herbs. Fig trees (*Ficus citrifolia*) grow on the steep cliffs where the goats cannot reach them, and the only other tree is a lone *Casuarina equisetifolia*. There is also a small stand of *Agave* sp. Derelict buildings and materials provide some shelter for the lizards, goats and rats.

Sphaerodactylus sp. (Sauria: Gekkonidae).

Sphaerodactylus geckoes are a group of tiny, leaflitter-dwelling lizards that are found throughout the West Indies, Central America and Northern South America. There are no literature reports of this species occurring on Redonda and no specimens had been obtained from there, although members of this genus are found on nearby islands. Despite this, a Sphaerodactylus species appeared quite common on the island, being found under most of the stones, paving slabs and logs turned over during the visit.

Adults of this species appeared to be quite large (SVL mean= 31.8mm, N=5,) with the head seeming to be relatively large compared to other species in the region. The dorsal surface was light reddish-brown in colour, with light and dark speckles. In young specimens the light speckles were formed into transverse bands, usually 5 or 6 on the body. The dorsal scales were noticeably large and keeled, with the ventrals being mostly smooth. Many of the scale characteristics measured showed overlap with those of Sphaerodactylus species on nearby islands (*S. fantasticus, S. vincenti, S. sabanus, S. microlepis* and *S. elegantulus)*, which made identification difficult. Although scale characteristics are usually the most accurate morphological aids to identification, the small size of these animals makes this difficult here, even when examining anaesthetized animals under a confocal microscope. There also appears to have been a degree of subjectivity in defining scale areas in the past. In specimens from Redonda, the only keeled scales on the ventral surface occurred in a narrow band across the gular region, a feature apparently shared only with *S. elegantulus*. The ontogenetic pattern change from transverse stripes in the young to speckles in the adult is also unique to *S. elegantulus* among species on nearby islands. The species found on Redonda has therefore been tentatively identified as *S. elegantulus*, the species found on Antigua, to which Redonda belongs. Although not the nearest island to Redonda (Nevis, St. Kitts and Montserrat are nearer), materials brought there during the mining operation there would have been brought from Antigua, and it is not unlikely that small geckoes such as these would have 'stowed away' amongst planks of wood and food supplies. Some voucher specimens were collected in the hope of conforming this species' identification.

Hemidactylus mabouia (Sauria:Gekkonidae).

According to Schwartz and Henderson (1991), this species of house gecko has not been recorded on Redonda, despite being common on most other islands in the region, where it is a familiar sight in and around buildings. Several were caught on Redonda, mostly under the paving slabs around the buildings, though not in the buildings themselves. Clutches of eggs were found in the hollow stems of dead Agave plants.

Ameiva pluvianotata atrata (Sauria: Teiidae).

This indigenous subspecies is the most conspicuous lizard on the island, and is the source of local rumours of 'black iguanas' inhabiting Redonda. Currently listed as a melanistic (all-black) subspecies of the Montserratian. *A. pluvianotata*, these animals may well represent a full species in their own right. Growing to nearly two feet in length, they are jet black, with purple spots on the lower flanks. Several were seen during the visit, despite the overcast weather on the day. One was caught as a voucher specimen, this species reportedly never having been photographed alive.

Anolis nubilus (Sauria: Iguanidae).

An indigenous Redondan species, this type has previously been described as a subspecies of *A. bimaculatus* (Williams, 1962). Originally described as a full species by Garman in 1888, it was restored to this state by Lazell (1972), though its relationship to other anoles in this region remains unclear. Looking much like a drab version of the very colourful *A. lividus* on nearby Montserrat, both males and females are dull grey-brown in colour, with the female having more contrasting grey and white body stripes. Very few were seen during the visit, and these were all in the derelict buildings on the island. Some specimens were collected, and tail tips were returned to the UK for future analysis in order to resolve their phylogenetic position.

OTHER WILDLIFE

A small herd of feral goats live on Redonda, probably left over from those brought for food for the mineworkers. These shelter in the guano caves and buildings, and through their feeding probably restrict the plant species that can survive on Redonda. They appear larger than those on nearby Montserrat, and may represent a rare breed. An unknown species of rat also proliferates on the island, probably feeding on insects, lizards, and the chicks and eggs of ground-nesting birds. They have also been seen eating the fresh droppings of seabirds. Frigate birds nest on the fig trees on the cliffs, whereas Boobys and Cormorants nest between the rocks and in the *Casuarina* tree. There is also a dwarf burrowing owl, endemic to this region, which has become extinct on Antigua. Insects appeared abundant on the island during our visit, being particularly associated with the low-growing flowering herbs. These insects are undoubtedly an essential food source for the smaller lizards.

CONCLUSION

For any naturalist travelling the area, Redonda is worth making the effort to visit. Ground-nesting birds, feral goats, hand-tame rats, rare burrowing owls, cave-dwelling bats and lizards found nowhere else in the world can all be seen and photographed easily. Climbing to the top provides a spectacular view of the current volcanic activity on Montserrat as well as of nearby Antigua, Nevis and St. Kitts.

Redonda holds interest for the scientific community as well. Oceanic islands such as those of the West Indies are ideal for studying evolutionary and ecological theory (Malhotra and Thorpe, 1991 a,b; Gorman et al., 1980; Losos, 1995; McArthur and Wilson, 1967; Thorpe et al., 1994). For example, Darwin's theory of evolution was greatly influenced by his studies on the Galapagos islands. The isolation of an initially small colonizing population on an island will lead to more rapid divergence than if it were part of a mainland population. As a result, many islands in a group will have different, indigenous species, making them ideal for between-island comparative evolutionary studies. Because of the difficulties in colonising, islands tend to have simpler faunas, which will mean that there will be fewer competitors and fewer predators for a species that does manage to colonise. This means that a species will be able to obtain a larger population size and there will be more available ecological niches into which a species can diversify. The resultant variation and high population size facilitates the use of such species as models for within-island evolutionary ecology studies. Whilst other West Indian islands feature regularly in such studies, Redonda seems to have been rarely visited by scientists, probably due to its inaccessibility.

Very few people visit the island, so it would appear that the habitat suffers little at the hands of humans. Recent very dry summers have meant declines in the goat population, as there is no running water. This may result in succession of the low herbage vegetation to scrubby woodland which may affect the lizard population. It is likely that the Anolis species and Ameiva subspecies evolved before man introduced goats to the island, so a return to the original vegetation type should the goats become extinct might benefit them. Rats probably eat the lizards and their eggs, so they may have wiped out other species present before their introduction, although the current species seem to have adapted to their presence.

Being such a small island, the lizard populations on Redonda would seem to be vulnerable to disasters such as outbreaks of disease, hurricanes, introductions of exotics or anything else that might upset the delicately balanced ecology of the island. Unlike most mainland species, an island species cannot easily adapt its range if conditions become adverse, and then recolonise when they return to normal. Some degree of protection would therefore seem in order for the wildlife of Redonda.

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REFERENCES

Blankenship, J. (1990). *The Wildlife of Montserrat*. Montserrat National Trust, Montserrat, West Indies.

Gorman, G.C., Buth, D.G. and Wyles, J.S. (1980). *Anolis Lizards* of the Eastern Caribbean: A Case Study in Evolution III. A Cladistic Analysis of Albumin Immunological Data, and the Definition of Species Groups. *Syst. Zool.*, 29(2): 143-158.

Lazell, J.D., Jr. (1972). The Anoles (Sauria, Iguanidae) of the Lesser Antilles. *Bull. Mus. Comp. Zool.*, 143(1): 1-115.

Losos, J.B. (1995). Community Evolution in Greater Antillean *Anolis* Lizards: Phylogenetic Patterns and Experimental Tests. Phil. *Trans. Roy. Soc. Lond.* B., 349: 69-75.

Malhotra, A. and Thorpe, R.S. (1991a). Microgeographic Variation in *Anolis oculatus*, on the Island of Dominica, West Indies. *J. Evol. Biol.*, **4**: 321-335.

Malhotra, A. and Thorpe, R.S. (1991b). Experimental Detection of Rapid Evolutionary Response in Natural Lizard Populations. *Nature*, 353: 347-348.

McArthur, R.H., and Wilson, E.O. (1967). *The Theory of Island Biogeography*. Princeton University Press, Princeton, New Jersey.

Schwartz, A. and Henderson, R.W. (1991). *Amphibians and Reptiles of the West Indies: Descriptions, Distributions and Natural History*. University of Florida Press, Gainesville, FLA., USA.

Thorpe, R.S., Brown, R.P., Day, M., Malhotra, A., McGregor, D.P. and Wuster, W. (1994). Testing Ecological and Phylogenetic Hypotheses in Microevolutionary Studies. In *Phylogenetics and Ecology* (P. Eggleton and R. Vane-Wright, Eds.), pp. 189-206. Academic Press.

Underwood, G. (1959). The Anoles of the Eastern Caribbean (Sauria: Iguanidae) III, Revisionary Notes. *Bull. Mus. Comp. Zool.*, **121**: 191-226.

Williams, E.E. (1962). The Anoles of the Eastern Caribbean (Sauria: Iguanidae) IV. The Anoles of the Northern Leewards, Anguilla to Montserrat: New Data and a New Species.' *Bull. Mus. Comp. Zool.*, 127(9): 451-478.

THE DECLINING AMPHIBIAN POPULATIONS TASK FORCE

JOHN BAKER

Department of Biology, The Open University, Walton Hall, Milton Keynes, MK7 6AA

A BRIEF HISTORY

The Declining Amphibian Populations Task Force (DAPTF) was established in 1990, under the auspices of the Species Survival Commission, the largest and most active of the commissions of the IUCN (the World Conservation Union). The Task Force's mission has been to establish the nature and extent of amphibian declines that have been reported from around the world. Originally based in Corvallis, Oregon, USA, in 1994 the DAPTF office moved to the Open University, in Milton Keynes, under the direction of Professor Tim Halliday. The current Chair, Ron Heyer, is based at the Smithsonian Institution in Washington, DC, whilst the Board of Directors consists of eminent herpetologists representing Africa, the Americas, Australia, Europe and Asia. The DAPTF operates through a system of regional working groups. These groups are run on a voluntary basis, and feed information to the central office. The DAPTF network now extends into over 90 countries around the world.

The Task Force was created in response to amphibian declines of a specific nature. The activities of humans on this planet are directly leading to the decline and, in some cases, extinction of populations and species from various taxa. However, there are aspects of some amphibian declines that make them a special case. Declines have been reported from areas that have been largely undisturbed by direct human activities. The disappearance of the Golden Toad from Costa Rica exemplifies the phenomenon (see Pounds & Fogden, 1996). Amphibian declines in such pristine areas are particularly alarming, because they are indicative of the possibility that environmental degradation is occurring on a wider scale than had been formerly appreciated, affecting even regions remote from human activities and areas that have been specifically designated as reserve areas, supposedly free from adverse human influence.

There were, and still are, good reasons for thinking that amphibians are organisms likely to be sensitive to subtle, previously undetected changes in the environment. They have naked, permeable skins and produce eggs without shells, giving them little protection from environmental contaminants at any stage of their life cycles. Their dependence on water and their ectothermy also make them likely to be sensitive to climatic changes. The biphasic life cycles of many of the species also makes them potential sampling tools of both the aquatic and terrestrial environments. Amphibians have recently been proposed as being indicators of the health of the natural environment. The widespread geographic distribution of the reported declines raised a further alarming possibility that whatever lay behind them may be acting over a large area or even at a global level. The possibility that a worldwide decline of amphibians may be a response to widespread environmental degradation entered both scientific and popular spheres.

However, the 'global decline' scenario has been met with mixed reaction and an alternative explanation is that the observed declines may just be the downward cycles of natural population fluctuations. The question of 'global declines' has been regarded with healthy scepticism by amphibian biologists in the UK (e.g. see Griffiths & Beebee, 1992). There are good reasons for this scepticism, particularly for biologists working in

Europe. Neither the UK, nor indeed anywhere else in Europe, has witnessed the dramatic and inexplicable population crashes that have been noted in other parts of the world. Furthermore, Europe is an unlikely place to witness such declines. Europe has very little pristine habitat, and very few areas that are not subject to direct human interference. So, although amphibians are in decline in Europe, as elsewhere, there is no need to suspect the action of subtle, and as yet unidentified casual factors. In general, amphibian declines in Europe are directly linked to human activity, through habitat destruction.

THE WORK OF THE DAPTF

The work of DAPTF's groups and associates has yielded several results. One result has been the mobilization of personnel and the accompanying generation of attention to amphibians. For example, in Canada the DAPTF is represented by a very active working group, DAPCAN, which has instigated national surveys, convened annual meetings and produced educational material. The achievements of this group are considerable. One of the most significant successes of the work of DAPCAN has been the involvement of a wider section of professional biologists and the public in amphibians survey work and a general raising of awareness of amphibians. Both of these have been important in gathering data and influencing the decisions of policy makers.

A second result is seen in the findings generated from work on amphibian populations and addressing the problems inherent in such work. To answer a superficially simple question of whether an amphibian population is in long-term decline is rarely easy. Two approaches have been adopted: long-term monitoring and re-surveying sites for which historical records are available. Long-term monitoring, by its nature, cannot yield immediate results. However, attention to the issue of declining amphibian populations has not only stimulated monitoring to gather such data, but it has also brought attention to bear on several long-term studies that were already in existence. The findings of these studies, such as those at Rainbow Bay, South Carolina, USA (Pechmann *et al.* 1991), or from Switzerland (Grossenbacher, 1995) frequently show that, in the long-term, amphibian population dynamics has to be held in mind during investigations of amphibian declines.

However, even allowing for natural fluctuations, it is becoming clear that some populations are in severe decline. The initial reports of population declines, that provided the stimulus to investigate the problem of declining amphibian populations, have been confirmed. There is now a volume of published work documenting population declines in Australia, the Western US, South America and the Caribbean. However, it is also readily apparent that not all amphibians are in decline. Some species are clearly expanding their ranges, sometimes with the help of transportation by humans, to the extent that some of them, such as North American Bullfrogs and Cane Toads, are pest species in their new homes. The geographic and taxonomic patterns of decline also show variability. Within a single location, some species may be in decline, whilst others are stable. For example, in the Cascade Mountains of the Pacific Northwest, USA, Cascade Frogs and Western Toad populations are declining at locations where Pacific Tree Frogs seem to be faring well (e.g. see Blaustein & Wake, 1995). Even within a single species, some populations may be in decline, whilst others are stable. For example, the European Common Toad has proved quite adept at survival in the agricultural landscapes of much of its range, however, there are cases where it appears to be experiencing inexplicable declines, such as on the Hvaler Islands, Norway (Semb-Johansson, 1992) or unusually high spawn mortality, such as on Jersey.
Research work stimulated by the issue of amphibian declines is beginning to show that although the declines are spread across the world, there is no single, suspected or proven, 'global' factor responsible. Instead, it appears that there is a range of actors involved. For example, in the Pacific Northwest increased incidence of ultraviolet-B has certainly

killed amphibian eggs, as has *Saprolegnia* fungus. Either, or both, factors may be responsible for declines in that area, and perhaps in other regions. However, elsewhere other factors also seem to be involved. In the US Great Basin, California, and Dickinson County, Iowa, the full severity of the impact of introduced species (bullfrogs and fish) is only now becoming clear. In Australia some researchers suspect that pathogens, possibly imported with fish, are responsible for the declines noted there, whereas in Costa Rica and Brazil analysis of weather records has led researchers to believe that unusual climatic conditions were probably responsible for the disappearance of amphibian populations. More comprehensive accounts of work on the issue of declining amphibian populations can be read in Blaustein & Wake (1995), or in FROGLOG (the DAPTF newsletter). A very readable account of such work is also provided in Phillips (1994).

LOOKING TO THE FUTURE

In spite of all that has been achieved over the last seven years, since attention has been brought to bear on initially inexplicable amphibian declines, there still remain many questions to be answered. Most of the survey and research work has been carried out in the world's more affluent and developed countries. There are huge areas of the world, such as South America (where amphibian biodiversity is at its greatest), Southern and East Asia and Africa, where information on the status of amphibians is much more limited, anecdotal or non-existent. Work in such areas is likely to progress only with the injection of financial aid and, in some cases, expertise from outside. However, even in the regions where amphibian research work is funded, there are still unknowns and uncertainties. The casual factors of some well-documented declines, such as the decline of five anuran species in the Yosemite region of California (Drost & Fellers, 1996) still lack conclusive explanation. It is hoped that future survey and research on declining amphibians will further enhance our knowledge of amphibian ecology and population dynamics, and allow an evaluation of the global status of amphibian populations. The DAPTF is envisaged to run through to the year 2000 to help to achieve these goals.

DAPTF AND THE UK

The UK has a relatively long history of interest in amphibian survey and research. Furthermore, there has also been a tradition of natural history that has resulted in the involvement of the public in amphibian survey and conservation work. This, combined with the relative paucity of native amphibian species means that much of the information that the DAPTF would wish to collect was already in existence for the UK. However, liaison between DAPTF and existing amphibian initiatives in the UK is a valuable two-way information exchange. It is true that factors lying behind amphibian population declines in the UK are generally well-understood. Habitat loss has been responsible for the majority of the declines, whilst more subtle, but rectifiable, vegetational changes have been responsible for declines in the nationally rare Natterjack Toad. However, there are still questions to be answered: What factors lead to outbreaks of 'frog plague' in Common Frogs? What lies behind Common Toad spawn mortality and declines in Agile Frogs on Jersey? Have Pool Frogs disappeared from Eastern England, and what is the causal factor, or factors, involved? Future work may well reveal that local factors are responsible for such declines. However, such investigations can only benefit from sharing the experiences of workers from other countries. In turn, workers from abroad can benefit from work carried out in the UK. Long-term population monitoring, such as Cooke's Crested Newts in Cambridgeshire (Cooke, 1995) adds to the body of evidence supporting the notion that large population fluctuations are the norm for amphibians. Research work on factors adversely affecting amphibians can throw light on comparable situations elsewhere. For example, although there is no evidence to suggest that 'frog plague' is having major, ecologically significant effects in the UK (Beebee, 1996), furthering knowledge of amphibian pathogens and their transmission may well elucidate

more serious situations elsewhere. To this end the DAPTF has funded Andrew Cunningham, at the Institute of Zoology, London, to continue his investigations into the spread of pathogens between frogs.

Amphibians are by no means the only group of life on earth that is suffering population declines. However, among the amphibians there are cases of decline with no obvious cause. These cases deserve special attention, since their investigation can do, and has done, much to teach us about the world around us, and the hazards confronting it.

ACKNOWLEDGEMENT

The DAPTF is grateful for a financial donation from BHS. The DAPTF is reliant on such donations to fund its operations and research.

FROGLOG

The newsletter, FROGLOG, which is in part funded by donation from Frog's Leap Winery (P.O. Box 189, Rutherford, CA 94573, USA), contains information and news for those concerned with the issue of declining amphibian populations. It is available to interested parties on request from the DAPTF coordinator, John Wilkinson, Department of Biology, The Open University, Walton Hall, Milton Keynes, MK7 6AA. It can also be viewed on the World Wide Web at: http://acs-info.open.ac.uk/info/newsletters/FROGLOG.html

REFERENCES

Beebee, T. (1996). Frog mass mortality: scurrilous disease or panic attack? *British Herpetological Society Bulletin* **55**, 15-16.

Balustein, A.R. & Wake, D.B. (1995). The puzzle of declining amphibian populations. *Scientific American* (April 1995), 56-61.

Cooke, A.S. (1995). A comparison of survey methods for crested newts (*Triturus cristatus*) and night counts at a secure site, 1983-1993. *The Herpetological Journal* **5**, (2) 221-228.

Drost, C.A. & Fellers, G.M. (1996). Collapse of a regional frog fauna in the Yosemite area of the California Sierra Nevada, USA. *Conservation Biology* **10(2)**, 414-425.

Griffiths, R. & Beebee, T. (1992). Decline and fall of the amphibians. *New Scientist*, June 27, 25-29.

Grossenbacher, K. (1995). Observations from long-term population studies in Switzerland. *FROGLOG* 15, December 1995, 3-4.

Pechmann, J.H.K., Scott, D.E., Semlitsch, R.D., Caldwell, J.P., Vitt, L.J. & Gibbons, J.W. (1991). Declining amphibian populations: The problem of separating human impacts from natural fluctuations. *Science* 2 5 3, 892-895.

Phillips, K. (1994). *Tracking the Vanishing Frogs: An Ecological Mystery*. St. Martin's Press, New York, 244 pp.

Pounds, J.A. & Fogden, M.P. (1996). Conservation of the golden toad: a brief history. *British Herpetological Society Bulletin* **55**, 5-7.

Semb-Johansson, A. (1992). Declining populations of the common toad (*Bufo bufo* L.) on two islands in Oslofjord, Norway. *Amphibia-Reptilia* **13**, 409-412.

BOOK REVIEW

Geckoes, Biology, Husbandry and Reproduction. By Frederick-Willhelm Henkel and Wolfgang Schmidt. Translated from the original German text by John Hackworth. Krieger Publishing company, Eurospan, 3 Henrietta Street, Convent Garden, London WC2 8LU. ISBN 0-89464-919-1. UK price: £39.95. 237 pages, illustrated with line drawings and colour plates.

Reviewed by Stephen Davies and David Blatchford

Since its original publication in 1981 this book has been the definitive guide to all aspects of gecko care and reproduction, and it provides a wealth of highly detailed information. Henkel and Schmidt are authors of international repute and are two of the foremost keepers and breeders of Geckoes in Germany with many year's experience in all aspects of husbandry.

This hardback book contains 237 pages with 93 full colour plates and several line drawings and it is printed on high-quality, glossy paper. There are five chapters; the first section covers evolutionary history, systematics, distribution, habitat and gecko biology. There are chapters on all aspects of reproduction, foods and feeding and an extensive and detailed description of the various forms of caging necessary for these animals. The bulk of the text however is given over to geckos kept in captivity encompassing 76 species from 43 genera. All species covered have detailed and precise information regarding appearance, husbandry and reproduction.

This is not a book aimed at the complete novice and is a further indication that reptile keeping and its attendant literature has come of age. Partly because of the detailed nature of the text and partly because this is a translation, common names for the animals are virtually non-existent. In addition the text could be considered technical and in places down-right baffling.

This is a quality publication that is regrettably flawed by sloppy editing and, it has to be said, an inconsistent translation. Even if these tasks were undertaken by individuals with no knowledge of herpetology the mistakes that pepper the first half of this book should have been spotted by anyone conversant with the elements of zoology. Unfortunately, what should have been a classic has been marred by such gaffs as: "net-skin" (p24) which should read - retina, the German for retina is "Netzhaut" netted or gauze skin; "Below the epidermis there is the leather skin" (p10) the German for dermis is Lederhaut i.e. Leder - leather and haut-skin; on page 25 mention is made of a "dominant recessive gene"?; "optical signals" should read visual signals (p35), and another example of the mis-use of optical appears on page 37: "this optical imitation of a dangerous insect". Even more puzzling is a section on page 47 devoted to "Advance fertilisation" which presumably means delayed fertilisation or sperm storage. Unfortunately these are not isolated examples.

The bulk of the book is devoted to an exhaustive description of species. Whilst the authors describe this as "Geckoes frequently kept in captivity" it is worth pointing out that of the 76 species included approximately only 23 are regularly or only occasionally available in the UK. Each species description follows the pattern of distribution, habitat, size, colouration and appearance, recommended vivarium type, husbandry and reproduction and food. In many cases very detailed information is offered with regard to reproduction and yet in others recommended cage temperatures are omitted.

Despite these reservations this is a superb book and deserves a place on the shelves of anyone with an interest in lizards.

HERPETOLOGICAL JOURNAL REPORT 1996

Manuscript submissions to the *Herpetological Journal* have risen for the sixth consecutive year, such that the journal is now receiving approximately twice as many papers as it was five years ago. This has resulted in a decrease in the proportion of papers accepted (about half of those submitted in 1996 were eventually accepted for publication), and if submissions continue to rise then so will the rejection rate. Overall, however, this will result in an increased scientific standard for the journal. In terms of geographical coverage, about 30% of the papers were from Great Britain and 36% from the rest of Europe. Hence over a third of all papers submitted are from outside Europe, which is a reflection of the increasing international appeal of the journal. We have continued to manage to obtain the services of an Associate Editor with external funding from the European Social Fund obtained through the University of Kent. During the year Lesley Constantine completed her term as Associate Editor and was replaced by Simon Bibby. Leigh Gillett continued as second Associate Editor with main responsibility for proof reading and checking. The rise in manuscript submissions has also increased the burden on our ever-increasing pool of referees, to whom we are indebted for maintaining the scientific rigor of the papers which are published.

Richard Griffiths
Editor

OBITUARY
JOSHUA WILLIAM STEWARD

From salamanders to the secret service

Polymaths are in short supply these days, but mix together geologist, palaeontologist, herpetologist - of world repute - multi-linguist, mandolinist, athlete (in his earlier days), army intelligence officer businessman (in the sand and gravel trade), devoted family man, and you have Josh Steward, who has died aged 83.

He left formal education early but even when at school he had become fascinated with geology. This led to his lifetime's enthusiasm for reptiles and amphibians. And that led to a lake-sized hole in his parent's London garden, stocked with captives from his forays into Kent - tolerant parents are always vital for budding naturalists.

The need for employment took him into insurance. His abilities in French and German took him increasingly to the continent. A liking for gypsy music allegedly was the spur for learning Hungarian, just as a later wish for corresponding with Soviet herpetologists was, again allegedly, the reason for adding Russian to his list of languages. The polyglot and travelling insurance man just failed to be included among the 1936 British Olympic water-polo team (as he could not spare the training time), but he watched the Berlin games all the same.

With the war he was first a commando and then a member of Field Service Security, later the Intelligence Corps, arriving in France on D-Day plus two. At the war's end he stayed on in Germany having been absorbed within M16. There he made fulsome use of his German and Russian skills, discovering via interrogation, the new enemy's plans, its order of battle, and arranging agents. The senior naval officer in Hamburg at the time, a colleague in this business, was John Harvey-Jones, later chairman if ICI who remained a close and life-long friend of the Steward family. Both men retired to England in the mid-1950s, Josh with the rank of Lieutenant-Colonel.

His wife and two daughters - born in Hanover and Kiel respectively - were then able to live in a single home rather than numerous dwellings throughout the British Zone. Nevertheless they were not its only occupants, with terrapin eggs in the airing cupboard, a conservatory with snakes, and a huge herpetarium in the garden with an underground compartment for better temperature control. A bad tempered South American cayman could, according to Josh, only be handled by his mother-in-law. Fire-bellied salamanders, Herman's tortoises, and black or white axolotls were some of his favoured species. He bred them and kept them alive far longer than most, and became a renowned authority on herpetology. *The Tailed Amphibians of Europe* and *The Snakes of Europe* published in 1969 and 1971, were written and illustrated by him.

Just as his boyhood fondness for cold blooded vertebrates came into its own so did his passion for and knowledge of geology. After joining the mineral extraction industry he often had to negotiate with farmers. "Could we be looking here at late Permian or early Triassic?" he asked of one individual. "Maister we allus thowt it were nowt but bluddy limestone."

His zest for all manner of knowledge continued unabated. Much of his animal breeding programme was dedicated to an understanding of the evolutionary process. He tacked Afrikaans, Dutch, Italian and Spanish on to his fluent languages. He visited Kenya

several times, learning more about early man. He became an energetic translator of foreign texts, particularly those of a technical nature. He was active with the Nyiregyhaza Friendship Committee, an Anglo-Hungarian group concerned with better commercial cooperation between the two countries. And there was always time for his family, including the three grandchildren.

Anthony Smith

Joshua William Steward, polymath, born November 26, 1913; died January 11, 1997.

Reprinted from the GUARDIAN *4/2/97*

Editorial Note:
Joshua Steward was a very active member of the Society for many years. He was the first Chairman of the Conservation Committee.

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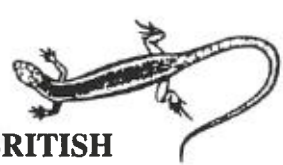

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CORRECTION TO SPRING 1997, BULLETIN, No. 59

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

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

It should read:

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

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

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

Should read:

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