

**THE BRITISH
HERPETOLOGICAL SOCIETY
BULLETIN**



**No. 24
Summer 1988**

BRITISH HERPETOLOGICAL SOCIETY

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

Correspondence, membership applications, subscription renewals and purchase orders for the British Journal of Herpetology should be sent to the above address.

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

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

Meetings

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

Subscriptions

Ordinary Members £15. Junior Members £5. (Junior Members do not receive the British Journal of Herpetology). Institution rates £25 (U.S. \$40).

All subscriptions become due on the first day of January each year.

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 Simon Townson

Contributions and correspondence arising from the Bulletin should be sent to:
John Pickett, 84 Pyrles Lane, Loughton, Essex IG10 2NW

REMAINING LONDON MEETINGS 1988

Meetings are held in the Lecture theatre of the Linnean Society of London, Burlington House, Piccadilly, London W1, and start at 7.00 pm, ending at 9.00 pm, unless indicated otherwise.

- SEPTEMBER 10th *Care and breeding of amphibians and reptiles: an open meeting.* Contributions from members – live animals, slides etc. There will be facilities for the sale and exchange of members' private home-bred stock. A special Saturday afternoon meeting from 2.00 to 5.30 to be held in the Meeting Room of the London ecology Centre, 45 Shelton Street, near Covent Garden, London WC2. The Coffee Shop on the ground floor will be available for members' use.
- OCTOBER 13th Paul Edger (herpetologist, Operation Raleigh): The herpetofauna of Seram, eastern Indonesia.
- NOVEMBER 30th Mike Linley ('Survival', Anglia Television, London, and chairman, Captive Breeding Committee) will show some herpetological films not previously screened by Anglia TV.

SECOND JOINT U.K. HERPETOLOGICAL SOCIETIES SYMPOSIUM - 1988

The above symposium will take place on Sunday 11th September at London Zoo's main lecture theatre between 1.15 pm and 7.30 pm.

The proposed list of speakers is as follows:

- | | |
|--------------------|---|
| Roger Pewtress | "The Stinkpot Musk Turtle, its natural history and captive maintenance" |
| Chris Mattison | "The American southwest, a visitor's perspective" |
| Patrick Wisniewski | "The husbandry and reproduction of Tailed Amphibians" |
| Patrick Thorpe | "The extensive husbandry approach to amphibians and reptiles" |
| David Blatchford | "Aspects of Reptile cage design" |
| Mike Linley | "Lizards of New Zealand" |
| Mark O'Shea | "Herpetofauna of the Ilha de Maracá, Peraima, northern Brazil" |
| Bob Applegate | "History, maintenance, management and breeding of large scale Colubrid Snake collections in the U.S.A." |

Entry to the symposium is by pre-purchased ticket only, at a cost of £6.50 (Cheques payable to J. Coote) plus the provision of a stamped self addressed envelope, or £6.68 if a stamped addressed envelope is not included. Tickets are only available on written request to Jon Coote, 195 B College Street, Long Eaton, Nottingham, NG10 4GF. Tickets are strictly limited to a total of 200, and are available only on a first come first served basis.

THE SCOTTISH BRANCH OF THE BRITISH HERPETOLOGICAL SOCIETY

REPORT ON THE SPRING MEETING, 1988

The Scottish Branch of the BHS organised a very successful, day-long meeting in conjunction with the Edinburgh based Scottish Herpetological Society in the education facility at Edinburgh Zoo on March 20th, 1988.

Two formal talks were presented thus allowing ample time for the BHS members to conduct a business meeting whilst the remainder of the delegates visited the Zoo's reptile house.

Both lecturers were from the Department of Zoology of the University of Aberdeen; the first, Wolfgang Wüster, spoke on the "Evolution and dispersal of Asiatic Cobras", and in the afternoon Roger Thorpe gave a presentation on the "Lizards of the Canary Islands". The lectures were very well received and of such quality and content that it is hoped that they can be included in a future BHS publication - details have been sent to Jon Coote.

The BHS business meeting - effectively an AGM - resolved to continue with the established programme of two meetings a year to be held alternately in Edinburgh (at the Zoo) and in Glasgow. Whilst the Director of Glasgow Zoo has been particularly cooperative, with the Society, the Zoo is situated at the very edge of the Glasgow conurbation and has, at the moment, only limited facilities for public lectures. Consequently it was decided that the incoming officers should locate a more central meeting place either in the University of Glasgow or at the nearby Kelvingrove Museum.

The following officers were elected: Secretary, Dr. Roger Downie (Department of Zoology, University of Glasgow); Treasurer, Dr. W. Wales (Dept. of Biology, University of Stirling), and the Representative to the main BHS Council, Mr. A.W. Darby (36 Newton Crescent, Dunblane, Perthshire FL15 0DZ, tel: (0786) 512163).

Mr. I. Stewart and Mr. D. Blatchford will continue as ordinary Committee members.

It was especially gratifying to see most of the BHS members at this particular meeting - some came from as far afield as Oban (a 5-hour drive), Dumfries and Dundee; all members had been informed of the meeting directly by letter.

It had not been our intention to recruit new members at this meeting, but we are mindful of the precarious nature of the Society in Scotland.

To overcome some of the problems associated with joint meetings it was also resolved to hold a third meeting every year - for BHS members only - at the University of Stirling. This meeting will be organised directly by Dr. W. Wales against the business of the Society and the two regular meetings will be managed by Dr. Downie.

D. Blatchford (BHS Scottish Group Representative)

ABSTRACTS OF TALKS PRESENTED AT BHS MEETINGS

1 "BIOGENETIC RESERVES" AND CONSERVATION OF EUROPEAN HERPETOFAUNA

KEITH CORBETT

*BHS Conservation Officer and Chairman,
Conservation Committee of Societas Europaea Herpetologica, c/o Institute of Biology,
20 Queensberry Place, London SW7 2DZ*

Key sites and areas in Europe are to be recommended for Biogenetic Reserve designation to safeguard endangered species and noted assemblages of herpetofaunal species. This is to be achieved by:

1. Compilation of a comparative conservation rating for the European species based on defined criteria.
2. Determination of the distribution, status, habitat requirements and conservation needs of the most threatened species.
3. Analysis of species habitat utilization in areas with noted species abundance and diversity.

The reptiles and amphibians of mainland Europe, as in offshore Britain, are experiencing a sad decline due to habitat loss, degradation and fragmentation; water table lowering; direct persecution; pollution; and many other threats. Because of their ecology they are often localized and so subject to even short term habitat changes, and are therefore recognized as an especially vulnerable group of animals. At the same time they can be good indicators for undisturbed, and sometimes pristine, habitats.

The Council of Europe (CoE) has been carrying out a useful programme of Biogenetic Reserve designations to encompass the genetic integrity and resources of major European habitats. While these have been mostly botanically orientated, threatened amphibians and reptiles were selected as the first faunal targets for these reserves. Compared with Unesco's Biosphere Reserves, faunal and floral protection takes pride of place in the Biogenetic Reserve (BR) with man's cultural and economic considerations not given such importance. It is still up to individual countries to accept and implement any proposed BR designation, but as BRs can be seen to embrace many of the intentions of the Berne Convention on nature conservation which 15 of the CoE's 21 countries and the EEC have now ratified, we can be optimistic that most of the herpetofaunal measures will be implemented.

A network of national contacts was established to obtain current data concerning the local status of species, from which it was possible to consider the national and international implications for conservation. Selection of priority species and areas followed.

For a few species such as the marine turtles and *Bombina orientalis* (BR recommendation for the western border of its distribution in Sweden, Denmark and northern Germany), we were able to deduce conservation needs from existing information and from the results of ongoing research. However, for most of the endangered species it was necessary to refine the conservation options from the results of our own field research. For the species assemblage investigations, experienced biologists were placed in the selected areas for up to a season.

The large BR proposal on Mallorca for the unique frog *Alytes muletensis* also contains rare birds such as *Aegypius monachus*, *Pandion haliaetus* and *Falco peregrinus*, as well as many important plant endemics.

The remnant distribution of *Rana latastei* parallels the relicts of the valuable riverine forests of the Po Valley in Italy and the BR proposals therefore do likewise.

Elsewhere in Italy we have recommended a large BR to contain the best surviving population of the montane *Vipera (ursinii) ursinii* in a landscape of spectacular beauty.

The future is less secure for its lowland relative *Vipera (ursinii) rakosiensis* which, together

with its rich meadow habitat, continues to slide to extinction within the CoE's area and is seriously endangered in its remaining range elsewhere. Only prompt conservation measures in conjunction with the two recommended BRs will save it in Austria.

Another seriously threatened snake is *Vipera (lebetina) schweizeri* confined to certain of the western Cyclades together with the endemic lizard *Podarcis milensis*. Here the field research, which led to a proposal for a large BR on Milos, also led to the first ever arrest in Greece of a commercial snake collector, and to renewed interest in the species' protection.

The separately evolving lizard populations of the islands, islets, and even rocks, around the Balearics can be likened to a European Galapagos; yet they are under increasing pressures from development, tourism, collecting, and military damage. A series of small but representative BRs for the endemic *Podarcis pityusensis* and the even rarer *Podarcis lilfordi* have therefore been proposed. The provincial nature conservation authority recognizes that some of these lizard BRs have a shared value for marine turtles and for the potential re-establishment of the critically endangered monk seal (*Monachus monachus*).

Similarly helpful provincial support was found in the Canary Islands where a project had been initiated to re-establish the giant Hierro lizard (*Galottia (aff.) simonyi*) within the area proposed for the BR. This strange lizard is currently confined to a world range of one small cliff ledge, and had previously been assumed to be extinct.

It seems that the most serious conservation situation within the CoE area concerns the marine turtles, mainly the loggerhead turtle *Caretta caretta* but also locally the green turtle *Chelonia mydas*. The vulnerability of their ancestral breeding beaches and their marine approaches to tourist developments and disturbance, and their extended period to maturity of 20 years or more, seriously questions the species' long-term future in the Mediterranean. The situation is even more critical for the few remnant populations now left in Sicily and Sardinia, and in the Balearics where "accidental deaths" from long-lining for sharks are estimated to be killing some 17,000 maturing turtles.

There have been a number of research projects on Europe's remaining marine turtles, but unless there is adequate and immediate protection for the known breeding beaches and feeding grounds, the results could be academic. These essential habitats are proposed as BRs as the best means of ensuring the protection of marine turtles.

Fieldwork in eastern Sardinia assembled data on a grouping of 18 species and their habitat. Amongst endemics, the cave salamander (*Hydromantes 'genei'*) was discovered to be very abundant in oak forest. The concentration of other species observed was found to be astonishingly high, and the whole area also supported the endangered *Aegypius monachus*, *Monachus monachus*, and *Caretta caretta*. A large BR has been recommended to include the inland habitats of the Gulf of Orosei and its marine approaches. However, its safeguard will not be assured without urgent action to control the recent tourist developments of a new road, restaurant, and embryonic harbour/marina on this otherwise unspoilt coast.

At the other end of the Mediterranean the report reveals an even greater wealth of wildlife; an area of Greece with a remarkable assemblage of 39 herptile species in undisturbed habitats of open oak and pine woods and contrasting stream valleys. The abundant tortoises and snakes are themselves key elements in the food-chains of diverse and notable raptor species. The proposal for this area of Thrace embodies the whole concept of the Biogenetic Reserve approach.

In the future, members of the SEH Conservation Committee would hope to be actively involved in the management and monitoring of this nucleus of herptile reserves.

Ed. Note: This account is based on one published in the World Wildlife Fund Yearbook 1985/86 and reprinted under SEH-News in *Amphibia-Reptilia*, February 1987, the journal of Societas Europaea Herpetologica published by E.J. Brill - Leiden.

2 ACTION PROGRAMME FOR PROTECTING *TESTUDO HERMANNI* IN SOUTHERN FRANCE

DAVID STUBBS

84 Westbourne Park Villas, London W2 5EB

Hermann's tortoise (*Testudo hermanni*) is the only species of land tortoise found on mainland France and is declining in its remaining stronghold in the Massif des Maures, Var. Tortoises are vulnerable to increasingly frequent forest fires, casual collecting by tourists, habitat destruction from building developments, modern agriculture and the changes in traditional land management. The old-fashioned peasant cultivations, scattered amongst the Mediterranean evergreen forest, have mostly been abandoned in recent decades. These formerly open plots provided ideal nesting habitat for tortoises, but now heavy predation-pressure on nests in the few sites that remain is preventing sufficient recruitment, and the population is ageing (Stubbs & Swingland, 1985).

Local people have taken an active interest in the findings of this research, and have launched an urgently-needed conservation programme. The project has full support from the local authority, the regional conservation trust ('ARPON'), France's leading tortoise ecologist, and international bodies such as the pan-European Societas Europaea Herpetologica and the Fauna and Flora Preservation Society, London.

'SOPTOM' (Station d'Observation et de Protection des Tortues des Maures), Rances, a new tortoise society specifically dedicated to the conservation of French tortoises, was founded in 1985.¹ It has two basic aims. The first is to carry out practical conservation work by means of habitat restoration (especially to provide more suitable nest-sites), not unlike the habitat management carried out by the BHS Conservation Committee for the rare British species, and to develop a protected rearing programme whereby eggs are removed from wild nests to nearby protected outdoor enclosures. There they can be incubated under natural conditions but free from predators. The hatchlings will be kept for about 4 years and then released back into the wild. Existing populations will be restocked, as will areas from which tortoises have recently disappeared.

The second aim of SOPTOM is to promote and develop public concern for nature conservation in the Massif des Maures. This will be achieved by means of press articles, posters, stickers, lectures, stands at country fêtes, membership recruitment, and a 16mm film on the natural history of tortoises which will be shown principally to schools throughout the Var and neighbouring Departments.

These tortoises are the only 'popular' reptiles found in the region, and as one of France's most endangered species, they provide an ideal focus for developing this important conservation initiative. Ultimately, the progress and success of this subject may influence the approach to other wildlife campaigns in the Mediterranean region.

Requests for further information, membership subscriptions (60 Ff), and donations (payable to SOPTOM) should be sent to the Secretary, M. Bernand Devaux (La Tuilière des Angès, Les Mayons 83340, France).

REFERENCE

Stubbs, D. & Swingland, J.R. (1985). The ecology of a Mediterranean tortoise *Testudo hermanni*: a declining population. *Canadian Journal of Zoology* 63, 169-180.

Footnotes

¹In 1986, SOPTOM won the rural zones prize of 20,000 French francs from the Fondation Nature et Patrimoine (Foundation for Nature and Heritage), Paris, for their work on *Testudo hermanni* in the Massif des Maures.

Ed. Note: As part of an education and breeding programme, SOPTOM's Tortoise Village

in the Massif des Maures (Centre de Repeuplement des Tortues des Maures) will have an official opening on Saturday, 28th May 1988. Shortly after the 3rd European Chelonian Symposium, organised by the Société Herpétologique de France, will take place at the Natural History Museum in Marseilles, 6-8th July 1988.

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3 NATURAL BIOCLIMATIC RANGE AND THE GROWTH OF CAPTIVE-BRED MEDITERRANEAN *TESTUDO* L. IN NORTHERN EUROPE: IMPLICATIONS FOR CONSERVATION FARMING

MICHAEL LAMBERT (Chairman, BHS)

The distribution of the Mediterranean spur-thighed tortoise, *Testudo graeca graeca* L., was defined in Morocco by locality records and related to data from nearby or equivalent meteorological stations within the range (Lambert, 1983). Bioclimatic data included mean annual rainfall (mm) (*P*) and mean minimum (*m*) and maximum (*M*) daily temperatures (°C) for the coolest and warmest month of the year, respectively. Emberger's quotient (*Q*₂) is defined by:-

$$2000P$$

$$(M + m + 546.4) (M - m)$$

and was plotted against *m* to produce a pluviothermic climagram since vegetation is influenced by bioclimatic factors and tortoises are dependent upon vegetation for shelter and food.

Tortoises are absent from the Arctic-Alpine bioclimate in Morocco and do not occur above 1900m. They occur where *m* is below 0°C when associated (90.0%) with *Quercus ilex* L. and *Quercus suber* L. oak woodland. Tortoises are also absent from the *hammada* and cases within the Arid or Saharan bioclimate and where in the Steppe bioclimate without riverine habitat, *Q*₂ is below 19.5 (*P* = 139mm). Below *Q*₂ = 39.1, they occur in association (88.9%) with *Argania spinosa* (L.) Maire woodland in the south-west and other broad-leaved and mixed wood- and scrubland species elsewhere.

Using bioclimatic data from a further 216 meteorological stations within their ranges in southern Europe, North Africa generally and Asia Minor, pluviothermic climagrams have similarly been constructed for all species and subspecies of Mediterranean tortoise. The eastern Mediterranean *Testudo graeca ibera* Pallas is present in cool (cold steppic) extremes (*m* + -13.3°C; Erzurum, Turkey), Hermann's tortoise (*Testudo hermanni hermanni* Gmelin) occurs in wet extremes (*P* = 2062mm; Gjirocastra, Albania) and the Egyptian tortoise (*Testudo (Pseudotestudo) kleinmanni* Lortet) in warm (*m* = 12.3°C; Rashid, Egypt), dry extremes (*P* = 38mm; Ismailia, Egypt). *Q*₂ ranges from 3.4 (Ismailia) in the Arid or Saharan (subdesertic) bioclimate (*T. (P.) kleinmanni*) to 251.9 (bandar-c Pahlavi, Iran) in the Moist (temperate axeric) bioclimate *T. g. ibera*). The pluviothermic climagram for *Testudo hermanni robertmertensi* Wermuth lies completely within that of *T. h. hermanni* and that for *Testudo graeca terrestris* Forskål almost completely within that of *T. g. graeca*. Mean annual sunshine ranges from c. 2000h (2013h; Calafat, Romania) in southern Europe (*T. h. hermanni*) to c. 3500h (3562h; Alexandria, Egypt) elsewhere (*T. (P.) kleinmanni*). The northernmost record (45°39'N; Trieste, Italy) is for *T. h. hermanni*; *T. g. ibera*'s is 45°16'N (Isaccea, Romania).

Comparing pluviothermic climagrams for the Mediterranean tortoises with one for northern Europe (lat. (45°40' to 60°N) from 192 lowland (100m) meteorological stations west of long. 36°E, all but *Testudo graeca zarudnyi* Nikolsky (not Mediterranean) and *T. (P.) kleinmanni* overlapped at least partly. Where they overlapped, sunshine is within the ranges only in cold subaxeric southern Hungary and cold steppic southern Ukraine, U.S.S.R. If introduced to suitable habitats, *T. h. hermanni* and *T. g. ibera* would probably reproduce there. The Carpathian mountains and brackish swamps of the Danube Delta in Romania are probably barriers to further extension of the natural range.

Growth in some home-bred hatchlings of the EC-import prohibited species, *T. graeca*, *T. hermanni* and the marginated tortoise (*Testudo marginata* Schoepff), in southern England may be more rapid than in wild tortoises, but often resulted in stunted adults with deformed carapaces and pyramid-like costal and vertebral scutes (Lambert, 1986). Growth annuli are related to size, but not age in years, and growth rates varied greatly between individuals and clutches. the weight (g): carapace length (mm) ratio, as described by Jackson (1980), increases from unity after about 70mm, but the allometric exponent (using logarithms) is a constant. In pooled (not being significantly different), often overweight, *T. graeca* and *T. hermanni*, 3.37 compared with 2.97 in field *T. graeca*, but 2.72 compared to 2.94 in *T. marginata*. Weight fluctuated annually in Gilbert White's "Timothy", as in two other externally full-grown female *T. graeca* garden-reared in southern England for over 60 years, and increased in the latter by 36 and 16% in the last 17 and 27 years of life, respectively.

Median survivorship of home-bred *T. graeca* (72) is 1.5 and *T. hermanni* (64) 1.75 years, in contrast to 18.2 (167) and 14.0 years (768), respectively in field-aged tortoises sighted in the wild; and 2.3 years in home-bred *T. marginata* (86).

The results may have implications for commercial farming by the pet trade to obviate the need to collect wild tortoises and augment natural populations, and the advantages of doing so in the natural bioclimate range should be discussed.

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4 ECOLOGY OF THE COMMON TOAD WITH REFERENCE TO BREEDING STRATEGIES

C.J. READING

*Institute of Terrestrial Ecology, Furzebrook Research Station,
Wareham, Dorset BH20 4AS*

The breeding behaviour of a common toad (*Bufo bufo*) population was studied at a breeding pond on Portland, Dorset in 1982/83. The main migration of toads from their hibernating sites to the breeding pond occurred on warm, wet nights when the minimum night ground air temperature did not fall below 6°C. Males were first to arrive at the pond resulting in an initially exaggerated male biased sex ratio which slowly fell as the breeding season progressed and the number of females arriving at the pond increased.

Most females (88-94%) arrived at the pond already paired with a male. Once in the pond 28% of paired females lost their male to other males. Thus the overall chance of a paired male keeping his female during fights with single males was 0.72 compared with an estimated overall chance of a single male obtaining a female in a fight with a paired male of 0.075. Some single males left the pond and later returned paired with a female. Their estimated chance of successfully pairing with a female whilst away from the pond was 0.085. This was not significantly different from the value for males staying in the pond. There was therefore no additional advantage to be gained by a single male in either staying in the pond and trying to obtain a female through a fight with a paired male or leaving the pond and searching for an unpaired female.

Although large males were more successful at obtaining a female than small males, no size assortative pairing, in which large males paired preferentially with large females and small males with small females, was found.

Throughout the breeding period males remained at the pond 2-3 times longer than females. In both sexes, however, the duration of the stay in the pond shortened as the temperature increased. Females left the pond immediately after spawning whilst males stayed and some (very few) were successful in obtaining additional females.

An additional factor affecting toad breeding success in 1983 was the presence of large numbers of comon frogs (*Rana temporaria*). Because the breeding period in 1983 was unusually cold and frogs are active at lower temperatures than toads, male frogs were able to successfully pair and spawn with female toads. The result was that a minimum of 30% of female toads in 1983 spawned with male frogs and produced infertile eggs.

Excluding the interference by common frogs in 1983, which can be regarded as exceptional, the overall breeding success of male common toads at the breeding pond on Portland can be summarised by the data collected in 1982 and shown in Fig. 1.

REFERENCE

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Reading, C.J. (1984). Interspecific spawning between Common frogs (*Rana temporaria*) and Common toads (*Bufo bufo*). *J. Zool., Lond.* 203: 95-101.

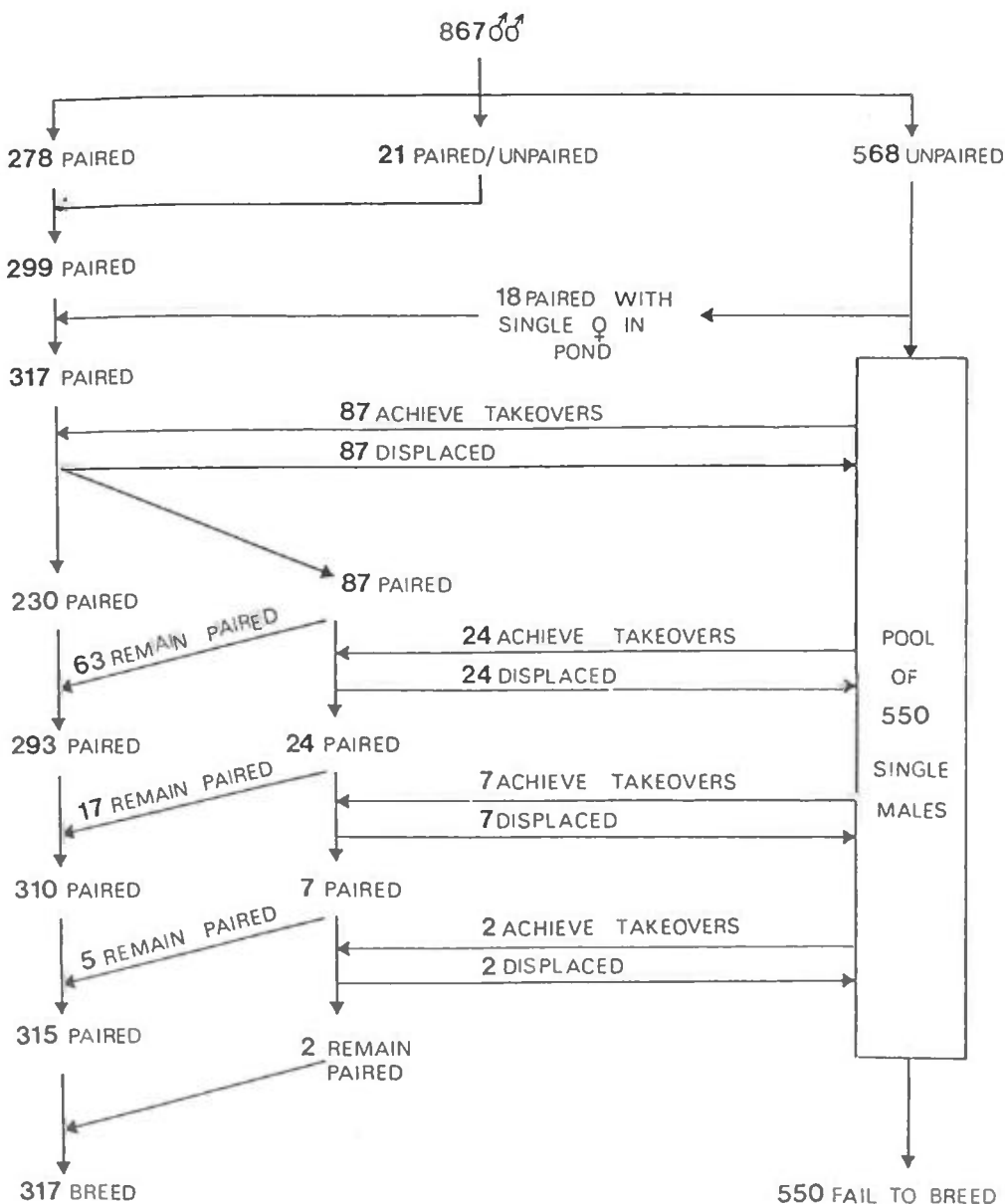


Fig. 1. Male Spawning Success in the Common Toad

AMENDMENTS TO "NOTES ON REPTILES IN CYPRUS"

MICHAEL LAMBERT

Chairman, BHS

Since submitting an earlier note to press (Lambert, 1987), further publications on the amphibia and reptiles of Cyprus have come to my attention.

Boulenger's (1910) list of species has been published elsewhere (Bucknill & Boulenger, 1913) in a more widely distributed work. Birkenmaier (1953) is another recorder of herpetofauna in Cyprus and Börner (1974) has also made some observations in winter (December-January) on the lizards while based at Varosha, a suburb on the south side of Famagusta (now inside Turkish occupied territory).

The common lizard species in Cyprus, *Ophisops elegans*, known in Europe by the name of snake-eyed lizard, is also wide-spread and abundant in Mediterranean coastal Turkey, preferring dry habitat conditions (Lambert, 1970).

The starred agama, *Stellio (Agama) stellio*, known in Israel also by the name of hardûn, is widespread in SW Asia.

Ablepharus kitaibelii, also known as snake-eyed skink, which was found sympatrically with *Hemidactylus turcicus* under rocks behind the harbour in Paphos, was also reported from Paphos, together with *Acanthodactylus schreiberi*, in a collection examined by Knoepffler (1963).

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- Bucknill, J.A.S. and Boulenger, G.A. (1913). Reptilia and batrachians. In *The handbook of Cyprus*, 7th issue. London, Lukach, H.C. and Jardine, D.J.
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REPTILE BREEDING FOUNDATION IN CRISIS: APPEAL FOR FUNDS

We have received the following appeal for help from the Reptile Breeding Foundation of Ontario, Canada:

Dear friend of the Reptile Breeding Foundation:

I am writing to inform you of the severe financial crisis which the Reptile Breeding Foundation is facing.

In 1971, I began a project to breed endangered species of reptiles and amphibians, inspired by the work of Gerald Durrell. This became an incorporated charitable foundation in 1975, and moved to a specially designed building which I constructed for it in Picton, Ontario, in that year. Since then, the Reptile Breeding Foundation has become recognized as the world's leading centre for reptile and amphibian propagation and conservation. The scientific and educational benefits which it has brought to Prince Edward County, the Province of Ontario, Canada, and the world have been enormous.

Over the seventeen years of its existence, I have contributed close to a million dollars to the development and operation of the Foundation. While many others have participated financially and otherwise, the bulk of its funding has always come from me. As the costs have grown and the Foundation's work has expanded, I have found my personal financial resources unable to meet its demands. About a year ago, we began to seek alternate funding from government and private sources, and last summer we operated the Exotarium, a public display, in an effort to raise funds. While we have been assured of extreme goodwill on the part of all levels of government and other conservation groups, we have yet to come up with adequate ongoing sources of funding. Unless we can solve this problem immediately, we will be forced to close our doors in a few months time, and the priceless collection of animals and the expertise of our staff will be dispersed, and much of the last seventeen years of work will come to naught.

The amount of money needed to maintain our current level of operations is tiny, compared to the budgets of many other institutions: \$150,000 per year. To establish a permanent public display and educational facility, which we would like to do, is relatively easy, since there are grants and low-cost loans for new capital developments. But there are no such ready sources of funds for our basic day-to-day expenses, for food for our animals, or for the salaries of our five employees. We are therefore launching an ongoing fundraising program to enable us to continue our work: this will include a membership drive, a benefit dinner, the publication of a series of posters of our animals, an opportunity for individuals and groups to adopt animals in our collection, and many other events.

I am inviting you, as a long-time supporter of the Foundation's work, to participate in these efforts in whatever way you can: by volunteering your labour, your ideas, but, most urgently, your financial support. **Please help us to save the Reptile Breeding Foundation from extinction!**

Yours sincerely,
Geoffrey Gahert, Ph.D. President

HOW IMPORTANT IS THE CONTINUED EXISTENCE OF THE REPTILE BREEDING FOUNDATION?

The Reptile Breeding Foundation is a minute cog in the global conservation machine. Would its absence affect the operation of that machinery? Perhaps not. I am sure that machine would continue to operate for a very long time, but it may not be able to perform all of its functions. The World Wildlife Fund, the Friends of the Earth, the International Union for the Conservation of Nature and Natural Resources, Wildlife Preservation Trust International, and a myriad of other organizations are doing a great deal toward protecting wildlife and our natural resources. But, these organizations are not reproducing Mongolian Frog-eyes Geckos, Jamaican Boas, or Red-footed Tortoises. They are not visiting classrooms and giving children the opportunity

to view a rare lizard up close, to observe a turtle feeding, or to touch a snake and dispel the myth that these fascinating creatures are slimy.

Attempts to save the Giant Panda, the Blue Whale, the California Condor, and many other species from extinction is a big job. But, there is a limit to what any one organization can do. The Reptile Breeding Foundation is the *only* organization in the world that is specifically working to save reptiles. It is therefore unique. It is therefore important. It may not be as big as these other groups. It certainly isn't as influential, or as well known. It doesn't employ as many people. But it does something that no one else is doing, and it is therefore, just as important, just as vital, and just as relevant to the conservation movement.

The Reptile Breeding Foundation has made many great strides in its 15 year history. We have reproduced a considerable number of endangered reptiles in captivity, many for the first time anywhere. We have provided numerous lectures and presentations to a variety of organizations and school groups. We have published over 50 papers on captive husbandry and propagation of reptiles. We have assisted zoos, governments, universities, museums, and private individuals by providing information and other services, toward our commitment to the preservation of reptiles and amphibians.

It is our hope that we will be able to continue these services for a long time to come. However, we are facing a very serious crisis. The continued existence of the Reptile Breeding Foundation is at stake. I sincerely believe that what we are doing is so important, so beneficial and so relevant, that it should not be allowed to die. However, if it is to survive, an alternative source of funding must be found.

From our inception, our funding has come primarily from the contributions of one major benefactor, Dr. Geoffrey Gaherty. Until now, he wished to remain anonymous, but due to the serious financial position in which we now find ourselves, he has come forward to make an appeal. His letter to you will be found enclosed with this newsletter.

Although Dr. Gaherty still supports us, and has brought us to this point, he can no longer provide the funds necessary to continue the operation of the Foundation. We need your financial assistance to insure our survival.

Last summer we opened The Exotarium, an exhibit of live reptiles and educational displays, in Picton. This venture was extremely successful and proved quite popular with tourists, school classes and other visitors. Admission was charged, and a small gift shop generated some income for the Reptile Breeding Foundation. We are presently planning another exhibit for the coming summer, and believe that the creation of a permanent public facility could ultimately secure the future of the Reptile Breeding Foundation.

However, before this project can generate enough revenue, and put on on the road to self-sufficiency, we must solicit funds for our operating costs. We need to raise at least \$150,000 per year for the next few years. If we can do that, it will give us time to permanently establish The Exotarium, and generate enough revenue to pay our operating costs.

If we can't raise the needed operating capital, then we will need to make some harsh decisions, which will ultimately result in the demise of the Reptile Breeding Foundation.

I don't like to ask for money, but I also don't want to see a project, which I believe in so strongly, die an untimely death. The Reptile Breeding Foundation is unique. There is not another organization in the world which is doing so much for the unjustly maligned family of reptiles. As human beings, and the highest form of life on this planet, we have a responsibility for the conservation of natural resources, wildlife, and the Earth. It is our responsibility alone, and we cannot ignore it! Will you help us to fulfill our commitment to one small segment of that responsibility? Will you help us from also becoming extinct? Your donations are urgently needed.

How important is the continued existence of the Reptile Breeding Foundation?

THE DECISION IS YOURS!

Thomas A. Huff, Director

Correspondence to: Reptile Breeding Foundation, P.O. Box 1450, Picton, Ontario, Canada K0K 2T0

EEC RESTRICTIONS ON EXHIBITION OF ENDANGERED SPECIES

DAVID NEVILLE
P.O. Box 900, London SE3 0UB

On 3rd March 1973, the Convention on International Trade in Endangered Species was signed in Washington, intended to protect endangered species of wild fauna and flora by regulating international trade in such species. This agreement is commonly known as the CITES CONVENTION.

It was presented to our Parliament in November 1973, and came into force in the United Kingdom on 31st October 1976. The 'teeth' of this international legislation, providing the penalty in the UK, is in fact The Endangered Species (Import and Export) Act 1976.

Most of us realise that such controls exist to police the import or export of endangered species, but how many of us realise that it is also an offence to display to the public certain birds, animals or reptiles for commercial gain? Yes, folks, before you lecture with live exhibits, and are paid a fee for so doing, take care, you may be committing an offence which carries a maximum fine of £2000 or imprisonment for a term of two years.

It is absolutely a waste of time to say, "I'm sorry, but I didn't know that law existed." It may be mitigation, but it is certainly no defence. So when did this apparently draconian regulation spring upon us, and from where?

The Council of the European Communities in its wisdom prepared COUNCIL REGULATION (EEC) No 3626/82 on 3rd December 1982, and as with the CITES CONVENTION, it needed legislation in this country to provide a penalty. This is to be found in the Control of Trade in Endangered Species (Enforcement) Regulations 1985.

The British Parliament had absolutely no choice at all, it was mandatory that legislation be drawn following the EEC Regulation, and so the animal keeper has yet another law to observe, and observe we must. It is now not sufficient to be professional in our care of our animals, we must also be professional in our knowledge of the legislation governing not only the welfare of them, but also that which governs the sale, movement, and now the showing of them if it is for commercial gain.

It is an offence for any person to display to the public for commercial purposes any specimen referred to in certain articles of the EEC Regulation 3626/82. As far as snakes are concerned, those so listed are all fairly rare, but to ensure that all members of the BHS are properly kept informed of the law, we list them for you.

Madagascar Boa	<i>Acranthophis spp.</i>
Round Island Boa	<i>Boleyria spp.</i>
Keel scaled Boa	<i>Casarea spp.</i>
Puerto Rican Boa	<i>Epicrates inornatus</i>
Jamaican Boa	<i>Epicrates subflavus</i>
Virgin Island Tree Boa	<i>Epicrates monensis</i>
Argentine Boa Constrictor	<i>Boa constrictor occidentalis</i>
Orsini's Viper	<i>Vipera ursinii</i> (European populations only; USSR populations excluded)
Indian (rock) Python	<i>Python molurus molurus</i>
Madagascar tree Boa	<i>Sanzinia madagascariensis</i>

These are the only snakes listed in Appendix 1, which is said by the Regulation to include all species threatened with extinction which are or may be affected by trade. Trade in specimens of these species must, according to the Regulations be subject to particularly strict regulation in order not to endanger further their survival, and must only be authorised in "exceptional circumstances".

There are of course certain exemptions to the display or sale regulations, such as if the specimen was bred in captivity, it is intended for research, teaching or breeding purposes, and of course Zoos are exempt.

That's all very well, but it won't be used in this country ... wrong, early in March a wildlife lecturer was fined a total of £400 for displaying two birds of prey and certain owls to the public for commercial gain. He is a man who has earned his living by lecturing to schools, colleges and other organisations for many years. His lectures were truly educational, and gave many youngsters the opportunity to see birds which many of them never would in the wild.

His birds were bred in captivity, yet the magistrates still found him guilty. He had no certificate of exemption (licence) from the DOE.

However savage this sentence seems measured alongside some fines meted out to thieves or persons who commit assaults, it is highly likely that as the RSPB have brought what is believed to be the first prosecution under this legislation, more court cases will follow.

If you are in any doubt at all, consult the DOE at Tollgate House, Houlton Street, Bristol, BS2 0DJ (0272 218811). They will advise you, and are only too pleased to do so.

Advertisement

CONSERVING SEA TURTLES

by Nicholas Mrosovsky

Published by the British Herpetological Society

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"Conserving Sea Turtles" is a critical review of the current problems and controversies of sea turtle conservation. In the words of the author: "Sea turtles are beautiful complex creatures, mysterious enough to become addicting for the biologist, absorbing for anyone to watch, and of great value for their eggs, meat, shell and leather. This book is not concerned with demonstrating that sea turtles are worth preserving; that is taken for granted. It is concerned with the methods being used to achieve that end; it argues that much is wrong. If my criticisms can be refuted, then current activities on behalf of the turtles — and the turtles themselves — will emerge all the stronger. If my criticisms stand, then it is time that a strong light was shone into the dark corners of the conservation biology of these species — and of others too perhaps. I am also convinced that the intentions of those active in sea turtle conservation are irreproachable. It is only the means of proceeding that I wish to debate"

It is written in a clear and uncomplicated style, and will be of interest to the general reader as well as the specialist biologist. The principles discussed are currently of crucial political importance, not only for sea turtle conservation but applied generally to the conservation of the world's fauna.

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MELANISTIC NATTERJACK TOADS ON THE SEFTON COAST, MERSEYSIDE

R. A. HALL and D. A. NISSENBAUM

36 Lathom Road, Southport, Merseyside

INTRODUCTION

The yellow vertebral stripe of Natterjack toads (*Bufo calamita*) is the main diagnostic feature. Thus Smith (1951), states that in the British Isles it is never absent. It is known, however, that Natterjacks without stripes do occur. Cooke et al (1983) describe three such animals, one of which was considered to be melanistic. This note records the occurrence of stripeless, apparently melanistic Natterjacks in the coastal dunes of north Merseyside.

DESCRIPTION

Whilst undertaking regular Natterjack survey work at Birkdale on 28th April 1986, the authors located four stripeless toads. In 1987, at the same breeding pool, two were found on the 6th of April, one on the 14th, and one on the 21st. The individuals located on the 6th of April were temporarily retained for detailed examination. The following description is based upon notes taken by the authors and Dr. P.H. Smith.

Snout-vent lengths (mm) : individual 1 51 individual 2 46.

General description: Both toads were similar in appearance, this description relating to both. The upperparts were uniformly dark brown. As in normal Natterjacks the skin was warty. The main warts were dark orange on their upper surface, and paler on the sides. The parotid glands were short and well demarcated, diverging slightly anteriorly; they were orange-brown in colour. The underparts were pinkish grey. No vertebral stripe was present. The edge of the jaws were creamy brown. The fore digits were yellowish, the 3rd and 4th tipped brown, while the hind digits were darker, lacking the blackish tips. The iris was a very dark brown colour, the pupil black. The gait was typical Natterjack, running rather than hopping. The general body structure was also characteristic of the Natterjack. The calls were identical to those of male Natterjacks.

The toads were photographed and released, where found, on the 7th April.

DISCUSSION

The specimens are unusual as they lack the yellow vertebral stripe. In Britain only five stripeless Natterjacks have been recorded in the literature, one of which was melanistic (Cooke et al 1983). The Merseyside individuals appear to lack white, yellow and green pigments in their skins. This in turn suggests either a lack of, or non-functioning of lipophore and guanophore skin pigment cells. Thus their colouration must be due to the melanophores (Frazer 1983).

The Natterjacks described would therefore appear to be melanistic toads.

ACKNOWLEDGEMENTS

The authors would like to thank Dr P.H. Smith, of Liverpool Polytechnic Biology Department, for corroborating the identification of the specimens and for comments on the manuscript. Thanks also to Paul Franks for developing and printing the photographs.

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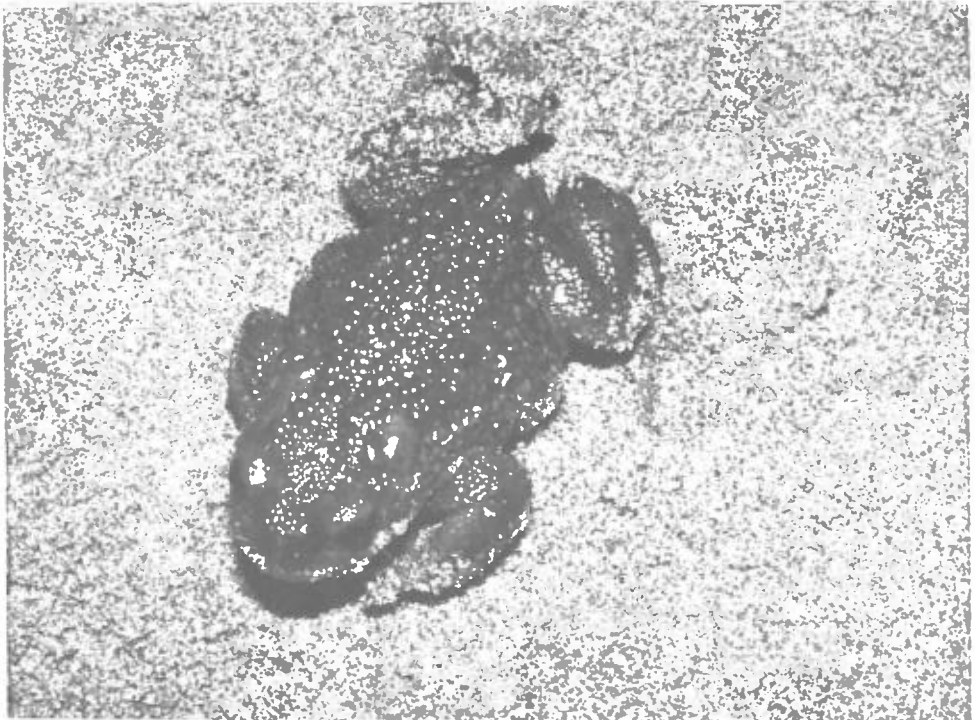


Plate 1. Melanistic Natterjack Toads. Birkdale, Merseyside 1987

AN OVERVIEW OF THE REPTILES IN THE ESTUARIES OF INDIA, WITH BRIEF NOTES ON THEIR HABITS AND DISTRIBUTION

T.S.N. MURTHY

Zoological Survey of India, Madras 600028

SUMMARY

Reptiles found in estuaries, mangrove forests and/or swamps, tidal rivers, and creeks of India are diversified though not great in numbers. Information on the estuarine reptiles of India is, with few exceptions, scanty. This paper, which deals with species of estuarine reptiles, is both an overview and an introduction to these animals, of which much remains to be learnt. Brief notes on the habits and distribution of the species discussed has been provided.

INTRODUCTION

Reptiles are far less sensitive to the salinity of water than the amphibians. In addition to the distinctly marine reptiles like the sea turtles and sea snakes, there are a considerable number of turtles, lizards, and snakes and a single species of crocodile that live in the estuaries. However, information concerning the herpetology of estuaries is wanting, probably because the herpetologists, like most reptiles, are active on land. The only publications dealing with the estuarine reptiles are those of Annanadale (1907, 1917, 1921) and the recent study in India is concerned only with the giant and endangered reptiles like the Saltwater Crocodile, Water Monitor, and the King Cobra. The present paper, which introduces the estuarine reptiles of India, is primarily intended to stimulate further studies on the subject.

SPECIES ACCOUNTS

CROCODILES

Family Crocodylidae

Saltwater Crocodile, *Crocodylus porosus* Schneider, 1801. – This crocodile inhabits the mouths of muddy rivers and canals near the sea and is often found far out at sea. It ascends the rivers, but is not known to penetrate beyond the tidal limits. It spends considerable time on land amidst thick mangroves. The juveniles eat mainly Crustacea, insects, and small fish, while the adults take an increasing proportion of large vertebrates. It is not surprising that this large and ferocious reptile turns an occasional man killer and most of the attacks on humans in India are attributed to this crocodile. But it seems that it is only the adult, which is pressed by hunger and is in a changed mood, that attacks the huge beasts and men. The female lays from 50 to 60 eggs and builds a nest mound for them. The female keeps a constant vigil over the nest until the hatchlings emerge. She responds even to the calling of the young and carries them to water.

This crocodile, which was abundant wherever its preferred habitat, i.e. the estuarine mangroves flourished, is now severely depleted, being restricted to a few pockets in the Sundarbans (West Bengal, Bhitarkanika (Orissa), and Andaman and Nicobar Islands).

TURTLES

Family Emydidae

River Terrapin, *Batagur baska* (Gray), 1830. – This turtle inhabits the estuaries, deep slow-flowing rivers and canals. It is a thoroughly aquatic species, feeding mainly on vegetable matter comprising the stems, leaves, and the fruits of plants on the banks. It is a shy creature. The female lays about 60 eggs in three batches in the sand banks near the tidal estuaries.

This edible turtle formerly ranged extensively in the Ganges system, but is now severely depleted

and has almost become scarce. It has been recently reported from a few islands in the Sundarbans (West Bengal), which are probably the turtle's unspoilt breeding grounds in India.

LIZARDS

Family Varanidae

Water Monitor, *Varanus salvator* (Laurenti), 1768. – The most aquatic of monitors, the Water Monitor is at home in fresh as well as saline water. It frequents the coastal estuaries in search of Crustacea and molluscs. It is often found far out at sea. It climbs trees readily. The female lays from 25 to 30 eggs at a time and deposits them in holes on the river banks or in tree-holes or termite nests near the water.

In India, the Water Monitor is found in the mangroves of Assam, Orissa, West Bengal, and in the Andaman and Nicobar Islands.

SNAKES

Family Achrochordidae

Asiatic File Snake, *Chersydrus* (= *Achrochordus*) *granulatus* (Schneider), 1799. – This is an obese, sluggish, inoffensive fish-eating snake, which is found in salty and brackish waters of the river mouths and coasts. Although it lacks the usual serpentine grace, the file snake is a swift and graceful swimmer, but is helpless on land. It is a live bearer, the female producing from 6 to 8 young at a time.

Found from India to New Guinea, this snake is incredibly numerous in the Chilka Lake, Orissa. Murthy (1974) says that the paucity of the records of the occurrence of this species, apart from the Lake Chilka, is probably because the few occasional specimens which are caught in fishing nets escape the notice of herpetologists.

Family Colubridae

Mangrove Snake, *Boiga dendrophila* (Boie), 1827. – This is a cat snake, which has been appropriately named as it is strictly arboreal, rarely descending to the ground. Its other name, 'Black and Gold Tree Snake', is also an apt description of its colouration. Although it is a rear-fanged snake with an aggressive disposition, the cat snake is not considered dangerous to man. It preys upon birds and bats.

The mangrove snake, which represents the Malaysian element in the herpetofauna of India, is found only in the Nicobar Islands.

Schneider's Smooth Water Snake, *Enhydryis enhydryis* Schneider, 1799. – This is a mud-living snake, preferring the sluggish water of the lakes, estuaries, and the coasts. It feeds principally on fish and is harmless. The female brings forth from 6 to 18 young at a time.

It is common on the east coast of India.

Dog-Faced Water Snake, *Cerberus rhynchops* (Schneider), 1799. – This is a common estuarine snake of India, with an unusually prominent lower jaw, like that of a bulldog's. It feeds voraciously on fish. It is generally a mild tempered and lethargic snake, although it hisses loudly and bites viciously, if provoked. It gives birth to from 6 to 30 young at a time.

The Dog-Faced Water Snake is abundant on the east and west coasts and in the estuaries, tidal rivers and creeks of India. Smith (1943) considers such a common snake as "rare on the coasts of India". Whitaker (1969) and Murthy (1970) however, have established its widespread occurrence.

Glossy Marsh Snake, *Gerardia prevastiana* eydoux and Gervais, 1832. – This is a thoroughly aquatic snake, frequenting the tidal rivers and estuaries. It is often found along the coasts. It is rather lethargic on land and is not inclined to bite unless provoked.

White-bellied Water Snake, *Fordonia leucobalia* Schlegel, 1837. – This is a rare species, found on the coasts of the Nicobar Islands. It is said to swim far out at sea and live on crabs. Very little is known of its life-history.

Yellow-banded Mangrove Snake, *Cantor* *violacea* Girard, 1857. – This is another rare species, confined to the coasts of the Andaman Islands.

Family Elapidae

King Cobra, *Ophiophagus hannah* (Cantor), 1836. – The King Cobra, which is feared for its amazing length (6m) for a venomous snake and deadly venom as well, is usually partial to the dense jungles, assured of a heavy rainfall and thick forest floor. It is diurnal, feeding mainly on snakes, sometimes including its own kind. It is probably the only snake in the world to construct an elaborate two-chambered nest of leaves and twigs, the lower for depositing the clutch of about 20 eggs and the upper one for the brooding female. Despite several authentic reports and tall tales about the snake's unprovoked attacks on humans and beasts alike, recent studies indicate that the King Cobra is a timid snake and makes off without delay when encountered in the wild.

The King Cobra, which was hitherto considered a snake in the rain forests in the Western Ghats, South India and Himalayas (Assam and West Bengal), has since been reported from the mangrove swamps in the Sunderbans, Orissa, and the Andamans.

Family Hydrophiidae

Beaked Sea Snake, *Enhydrina schistosa* (Daudin), 1803. – This is one of the most widely distributed and abundant sea snakes, which is easily recognised by its snout which is hooked and looks like the beak of a bird. It is considered as the most dangerous of sea snakes as its venom has proved to be much more powerful than that of the cobra.

This sea snake is generally found in shallow waters with a muddy bottom. It is also frequently noticed in coastal streams to about the limits of tidal flow. It enters the tidal creeks during the monsoon. Murthy (1977) recorded this snake in good numbers from the estuaries of Ennore, Adyar, and Kovelong, near Madras.

Eccentric Sea Snake, *Hydrophis obscurus* Daudin, 1803. – This sea snake is rather eccentric in appearance: the head is very small and the much elongated body is slender anteriorly and much compressed posteriorly.

Recorded from Madras to the Sunderbans on the east coast. It is common at the mouths of the Hoogli River, and in the Chilka Lake, Orissa. Annandale's (1915) contention that this species is more an inhabitant of the brackish water than the sea seems to be valid because the snake can be expected with each haul of fishing nets operated in the Chilka Lake.

ACKNOWLEDGEMENTS

I am thankful to the Director, Zoological Survey of India and Dr. K.V. Rama Rao, Scientist 'D' for suggesting that I present the review under discussion.

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DO DIVING LEATHERBACKS PURSUE GLOWING JELLY?

JOHN DAVENPORT

Animal Biology Group,

Marine Science Laboratories, Menai Bridge, Gwynedd, North Wales

Last year N. Mrosovsky (1987) publicised the remarkable ability of the leatherback turtle *Dermochelys coriacea* to dive to abyssal depths (at least to 1200m). The experimental studies had been carried out by Eckert's group (University of Georgia), and followed earlier investigations off the Virgin Islands (Eckert *et al* 1984, 1986) which had revealed an ability to reach the more modest (but still impressive) depths of 400-500m. Eckert *et al* exploited the nesting habits of female leatherbacks to attach a harness and pressure sensitive device to a female during her beach crawl to lay eggs; the device was collected on a subsequent nesting episode about 10 days later.

In his article Mrosovsky concentrated upon the thermal problems involved in deep dives, since there is evidence that adult leatherbacks are capable of endothermy (virtually essential for a reptile spending long periods of activity at depths below 1000m where temperatures below 5°C are universal, whatever the latitude). There are other interesting physiological problems, particularly concerning respiration, avoidance of nitrogen embolism ("bends") and buoyancy which must be encountered and solved by the leatherbacks, but the most pressing question concerns the reason for such dives.

It has long been known that leatherbacks subsist almost exclusively upon jellyfish and related animals (such as siphonophores), a rather unlikely diet for such large animals given the low organic content (perhaps as little as 2-5% of wet weight) of coelenterates. This diet imposes a requirement for large quantities of food; young leatherbacks eat 5-10 times as much bulk of food as young green or loggerhead turtles of similar size. In pursuit of jellyfish, adult leatherbacks forage far into temperate waters (they are regular summer visitors to Canadian, Norwegian, British and Peruvian waters for example), where their endothermy (presumably due to active biochemical and physiological processes, since they must spend weeks at temperatures of about 10-12°C) allows them to exploit swarms of jellyfish such as *Cyanea arctic*.

The author has some familiarity with the use of midwater nets trawled (from R.V. *Discovery*) in tropical and subtropical areas of the eastern Atlantic (where adult leatherbacks were occasionally observed at the surface). The catch at depths between 800 and 1500m is dominated in bulk by gelatinous animals; medusae, ctenophores, siphonophores and salps. Particularly noticeable and common are the large *Pyrosoma* (pelagic tunicates) which may be more than 0.5m long. A 1 hour trawl with an 8 m² net often caught several kg of jelly, and gelatinous animals were invariably present in reasonable quantities. Though the biomass of deep water is generally lower than at the surface, there is evidently a constant supply of jelly at depth (this supply is probably substantially independent of latitude as the abyssal environment is affected little by surface conditions). This constancy of distribution contrasts with the situation in surface waters where jellyfish distribution is patchy, both geographically and temporally.

Abyssal water is not only cold, but dark (little if any light penetrates below 1000m) and most midwater animals are bioluminescent. This is especially true of gelatinous animals and it has been suggested by Marshall (1979) that medusae and siphonophores luminesce to warn potential predators of their generally toxic, stinging properties. The leatherback is apparently immune to such toxins (Mrosovsky, 1987), so the flashes of blue/green light (often lasting for several seconds) will enable it to locate prey readily, probably giving a much better fishing efficiency than the nets of research vessels.

Deep diving may be used generally by leatherbacks when surface supplies of jelly are poor, but there may be a particular problem for nesting animals (the subject of Eckert's studies). Adult females lay eggs on about 6 occasions during a breeding season (Pritchard, 1971), at

intervals of about 10 days. These animals therefore have to remain in a restricted area for 8-9 weeks. During this period they will be unable to forage widely for surface-dwelling jellyfish (which are probably less expensive to collect in energy terms), but the remote nesting areas are usually close to deep water, enabling them to exploit the reliable source of glowing, abyssal jelly.

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MAKING A HERPETOLOGICAL COLLECTING TRIP TO AFRICA

STEPHEN SPAWLS

Moeding College, Private Bag 11, Lobatse, Botswana

This article is not aimed at the experienced professional herpetologist but more at the enthusiastic amateur who has done some collecting in Europe and would like to try his hand at a combined holiday/collecting trip to Africa. For the experts among you, my information may seem simplistic, for this I apologise.

Planning and timing are important. Not all of Africa is tropical and reptiles and amphibians are not active throughout the year. In countries north of 15N, i.e. from Mauritania east through Morocco, Algeria and Libya to Egypt and the northern Sudan, winter occurs the same time as in Europe and although it does not get as cold, herpetological activity is greatly reduced. One can collect in Egypt in November, but little is to be found other than diurnal lizards. In north Africa, herpetological activity begins in March and continues through to September, although from June to August there is a reduction of daytime activity, due to the high temperatures. Rainfall is not particularly important, as it is ephemeral and in north Africa tends to fall in the winter months. Good times for collecting trips to north Africa are April/May, when creatures are starting to emerge and nocturnal activity begins, and late August/September, when hatchlings are around. At the other end of the continent, the reverse applies. Winter is from May through to August in South Africa, Namibia, Botswana, southern Mozambique and Zimbabwe. There is little activity at this time, save diurnal lizards and snakes; no amphibians are seen. Herpetological activity begins around late September and continues until April. Rainfall is significant. In southern Africa the rain falls in the summer, usually commencing in September (except for extreme southern South Africa, which gets some winter rain. Herpetological activity is often triggered by the first heavy rainfall: in Botswana I have noticed that in September most nights are hot enough for the nocturnal snakes to emerge and yet nothing seems to happen until the rain actually falls, then suddenly everything is out and active. If your collecting trip happens to coincide with the first good rainfall of the season, you can get fantastic results, but the date of this first fall can vary a lot, so a collecting trip to southern Africa is best timed after the rains have definitely begun, say November-December or later. March-April is also a good time, as hatchlings are around and there is a lot of activity by animals hunting for a last meal before hibernation begins.

In west, central and eastern Africa, herpetological activity is largely controlled by rainfall. In west Africa (Senegal east to Cameroon), the rainy season commences in late March/April and continues to October; peak herpetological activity occurs between April and July, with rainfall triggering initial activity and hatchlings appearing in May/June. You can collect in west Africa throughout the year and get results, but December and January tend to be a bad time. It is colder than usual, especially at night, and a dry, cold wind, the Harmattan, blows from the Sahara and fills the air with haze. There are no amphibians around and the nocturnal reptiles are active for only an hour or so after sunset. Late August and September also tend to be unproductive, as they are cold, wet months.

In East Africa, one can collect almost throughout the year. However, in Kenya, April and May are probably the best times, when the long rains commence, and December/January is a good time to collect at the coast. In highland Kenya, July and August tend to be unproductive as it is dry and cold, but this does not hold for Ethiopia, when much rain falls at this time. For more specific information on rainfall and mean monthly temperatures, a good school atlas, or one of the Michelin motoring maps of Africa, will be useful. In general, time your trip to co-incide with a warm period shortly after the rainfall commences.

Your second consideration when deciding where to go will be whether the country is geared for tourism. Such countries have the following advantages: (a) they'll be used to foreigners, and you should be able to travel freely, (b) transport (if you need it) should be available, (c) travel and accommodation shouldn't be too expensive. Good countries in this category

are: Morocco, Tunisia, The Gambia, Kenya, Zimbabwe, Swaziland, Lesotho (and Botswana, Tanzania and Zambia to a limited extent). Obviously, tourism won't concern the collector with a very specific trip or expedition in mind – if you want to be the first person to collect a live *Bitis parviocula*, you'll be going to Ethiopia come hell or high water – but be warned, Ethiopia (and quite a few other African countries) are very expensive and difficult to move around freely in, something essential to field herpetology. For obvious reasons, you'll want to avoid war areas.

Your third consideration will be the length of the trip, and how long to stop in each place. If you're taking, say, a two week package and it offers the possibility of one week in two different locations, then take it – you will see a different habitat. However, don't go overboard, especially if you're driving – if you're mobile, then for best results I'd say spend two or three days (or more) in each area to get good results. If you set yourself an over ambitious itinerary, you could find yourself spending most of the time driving or recovering from it and little time collecting. On dirt roads, 300km can be an exhausting day's journey which leaves you too shattered at the end to collect.

Your fourth consideration: what is the attitude of the government of that country to the collecting herpetologist? It can vary wildly from country to country. For example, in Egypt, you can collect what you like, more or less where you like (although military areas, and the unmarked minefields of the Gulf of Suez and the Sinai should be avoided!) and there are no problems exporting specimens (apart from chameleons and monitor lizards). In Kenya, you can collect freely, except in the National Parks and some of the western forest, but the Game Department does not issue export permits and there is a customs examination on leaving the country, and this can cause problems. (You should also remember that officially, you are not allowed to transport live animals in your personal baggage: there are specific IATA regulations governing the transport of live animals. A customs or security official discovering live animals in your baggage before the flight may well prevent you taking them on board). In Ghana, officially you need a permit to collect more than one of any species of reptile, and there are rigorous customs searches on leaving the country. And so on

So, six months before you go, if you live in the U.K., write to the Department of the Environment (Endangered Species Branch, Tollgate House, Houlton Street, Bristol BS2 9DJ) stating the country you intend to visit, and the numbers and species of animals you intend to collect. If you're not sure what species occur there, then Ken Welch's "Herpetology of Africa" (1982 Robert E. Krieger publishers) should give you some idea. I'm also happy to point anyone interested towards more detailed regional checklists, where they exist.

After some weeks, the DOE should send you CITES (Convention on International Trade in Endangered Species) import permits for the species you want, usually with the proviso that the specimens should not be sold. What this import permit generally does not state, however, is what controls exist within the exporting country – for example, for animals on schedule B, a licence to import into the U.K. from Botswana is freely granted, without condition, and makes no mention of the fact that you cannot officially collect within and export anything from Botswana without a permit from the department of wildlife and national parks but there is no customs examination when you leave the country.

There are two possible approaches to this problem. One is to simply get your permits, collect quietly in the country, put the animals in your suitcase and return home, making sure you are legal at the U.K. end. This is fine, unless you run foul of officialdom at the African end – e.g. at the customs examination on leaving, or if an official of the local game department finds you collecting or in possession of specimens. In Africa, great importance is attached to documentation and if you're found collecting without any sort of paperwork, especially in countries with a game policy, at the very least you could find yourself wasting a lot of time explaining. However, many will prefer to risk the quiet approach.

The second, and best, approach is to make everything legal (if possible) (this is essential if you're making any sort of official or sponsored expedition). When requesting your import permit from the DOE, ask for the address of the controlling authority within the country of export, or alternatively, apply for an import permit for a chameleon, python or monitor lizard – movement of these reptiles is strictly controlled under CITES regulations, and your

permit will contain the proviso that you obtain an export permit from the country of origin, and will give you the address to apply to. Write to the authority at this address (allow at least two months for a reply, bureaucracy moves slowly in Africa), asking if you need a permit to collect and export, and if the permit can be obtained in advance. Explain that you don't intend to collect commercially. If you're doing some sort of research, or can get hold of an official letterhead, or have published and can send them photocopies of your work, so much the better. Where an application by a private individual collecting for his own pleasure might be refused or ignored, a seemingly official request might well be granted. Keep a copy of your letter and don't despair if you do not get a reply, at least someone will be forewarned.

If you get a reply indicating that you should make application in the country, then do so as soon as you arrive, don't leave it until the last afternoon. In Africa, wildlife officials will often be out on safari, and many government departments only work in the mornings. An important point (although not herpetology!) is, if you've got to visit a government department to get permits, dress smartly, daft though it may seem in a hot country. In Africa, great importance is attached to dress – it indicates status – and although us British like to dress casually on holiday, if you turn up at a government office to see an official while dressed like a tramp, you'll be treated like one.

Coming back, remember to put your captures in crushproof containers: airlines have been known to do funny things to suitcases. Most aircraft have warmed and pressurised cargo holds, but the smaller older planes may not. Put the containers in the middle of the suitcase and insulate them with your clothes.

Finally, if possible, don't go alone, take a friend or two: things are much easier, especially if you should get ill, injured or bitten (or come up against some bloody-minded officialdom).

The equipment you are going to take with you will depend on the scale of your trip – you might be taking two 4-wheel drive vehicles, all your provisions, drift fencing, funnel and pit traps and radio telemetry gear – in which case, you don't need my advice. For the small scale herpetologist, I advise the following (without bothering to state the obvious, like light, comfortable clothing etc.). Firstly, good maps of the areas you'll be visiting, 1:50 000 or even larger scale are very useful and will give you a chance in advance to plan your excursions and locate collecting spots, very important if you haven't got transport. In the U.K., maps can be obtained from Edward Stanford, 12-14 Long Acre, London WC2, or the Ordnance Survey (Overseas Branch), Kingston Road, Tolworth, Surbiton, Surrey; both are very good for maps of ex-colonies. If you're going to be mobile, then get the mentioned Michelin motoring maps of Africa, which give excellent road information. For data on topography and vegetation, I sometimes use tactical pilotage charts (flying maps), which are most useful. Get a guide book to the country or local area if possible.

A powerful torch or hand lamp is a must for night hunting, which can be very rewarding in Africa. Your best bet is a tough plastic or rubberised torch, giving a fairly wide beam; a hand lamp or strip light is also useful although not so good for spotting sleeping tree snakes. Take spare bulbs, and, if your light doesn't use very common batteries (i.e. HP 7), then take all the batteries you'll need, as they can be hard to come by in many places in Africa. Rechargeable torches are nice, but you could find yourself in a place where there is no electricity, or it only comes on for a few hours at night (when you'll want to be hunting). Night hunting can be addictive – you could find yourself hunting 3 or 4 hours a night – so allow for the right number of batteries.

A pair of polarised sunglasses are useful: apart from keeping your eyes comfortable (especially if driving – the glare in Africa can give you a bad headache) they cut out reflected light from water, very important for turtle and amphibian enthusiasts. Take a floppy hat, useful for many things as well as the obvious. If you're keen on photography, remember to take all the film you'll need, plus a good blower brush (dust is often a problem in Africa) and remember to insure your gear before you go: the hardware around your neck could represent a year's wages to someone in Africa. A small pair of binoculars can prove handy, especially on hills and for peering up into trees.

Your basic field collecting gear will depend on you and the size of your expedition. If you're working from a vehicle, then a crowbar, a 2 or 3m grabstick, bottles of preservative and



Plate 1. West African Gaboon Viper, *Bitis gabonica rhinoceros*



Plate 2. Close up of head of West African Gaboon Viper, *Bitis gabonica rhinoceros*

a stout compartmented holding box will be useful, but they are impossible hindrances if you're on foot or travelling by public transport. Your equipment will also vary according to what you're looking for; an amphibian enthusiast won't want a press stick, but may well like to have a tape of frog calls and a portable cassette player; a snake enthusiast will not want

a net. What I take into the field, when I'm on foot, are a hookstick and a small canvas bag slung on one shoulder (I find a backpack is restrictive and difficult to get things out of in a hurry). My hookstick is a sawn off golf putter, bent round at the end to form a hook and filed flat on the underside of the hook. It is light and robust, and serves as a press stick, a hook for turning ground cover, and as a light crowbar for prising off rock flakes and stripping bark. A commercial stump ripper will serve the same purpose. In my bag I have a pair of 30cm surgical tongs, of the sort used to take things out of sterilisers. These can be used for picking up poisonous arthropods, small poisonous snakes, for getting the head of bigger poisonous snakes when they've been pressed or grabbed, extracting animals from shallow refuges and poking about in holes. I carry three or four bags, one very large, the size of a pillow case, with sewn-in strings: there is nothing so maddening as trying to tie a bag with a big struggling animal in it and finding you've lost the string. I also carry a pair of industrial leather gauntlets, not for handling, but to protect the hands if I'm turning a lot of rocks (especially if they're hot) or sticking my hand into a hole or a bird's nest. Also in the bag are some small plastic containers, which fit into one another (film cannisters, if well washed, are handy for small animals, as are screw-topped plastic jars). If you think you might meet a Spitting Cobra, then you'll need goggles (or a wrap-around pair of sunglasses). It goes without saying that you shouldn't go into the field without a pair of stout comfortable shoes or boots that preferably cover your ankles, for you'll be turning rocks and logs and walking distances. Take some insect repellent, sun-tan cream, aspirins, and your map. If you're going to spend much time in the field then take plenty of drink and maybe something to eat. If you're going to be out late, take your torch. A good pocket knife may also be useful. That's that basic stuff – if you feel that's too much, you may want to follow the example of a friend of mine, an American herpetologist, whose field equipment consisted of a water bottle, one bag in his pocket and a pocket knife to cut himself a stickwith! Enthusiasts may want to add to their field equipment some plastic bags (good for amphibians), a digging tool (a little trowel is very useful, but a shovel is only practical if you're working from a vehicle), binoculars, camera equipment, a cloacal thermometer, field guide, phrase books, some small change to pay local helpers, a 2m piece of thin plastic tubing (used to thread down holes so you don't lose your way while digging them out) and thin wire and fishing line for noosing lizards. But remember, success for the field herpetologist depends on mobility: don't overload yourself!

If you are really keen, then before you go, find out what the local languages are, get yourself a phrase book and learn a few useful expressions, such as “Hello”, “I am hunting for snakes”, or “I will pay so much if you can show me snakes”, etc.!

Remember that much of Africa is malarious and there are some nasty diseases. Take malaria prophylactics before, during and after your trip; get your vaccinations (especially typhoid and polio) in plenty of time. In the field, be careful as far as possible with what you eat: tummy problems will prevent you travelling and collecting, and beware of the sun, especially between 10 am and 4 pm. Be very wary about entering water, for as well as obvious dangers like crocodiles, most African water bodies will contain the parasite that causes schistosomiasis (bilharzia). If you're an amphibian enthusiast, consider taking your wellies or waders. If you have to enter water, dry yourself off smartly and thoroughly as soon as you leave the water. Get yourself medically insured before you go – it costs less than you think, and can save a lot of hassle. If you're going to catch dangerous stuff, then remember that medical aid may be a long way away, inexperienced or even non-existent, expensive, and treatment for a bite may involve a blood transfusion (you all know about AIDS). Deliberately catching dangerous snakes probably invalidates your medical insurance. If you're still keen, consider taking serum (I'm happy to point out serum sources to those interested) but remember that it needs to be kept cool and you should not use it yourself; if you are bitten take it with you to a doctor.

In the field use your map to pick good collecting sites (and if your aircraft lands or overflies your area, have a good look out the window!). If you're offered a choice of places when booking your holiday, see if you can locate any of them on the map, which will give you an idea of the available habitats. Semi-rural areas are often good, as there will be junk around for turning, and often remarkable lizard colonies around habitation. Hill slopes, rocky outcrops, kopjes and sheet rock will be good for skinks and agamas, the edges of areas of

bare ground (even if artificially cleared) and road verges may have a population of Lacertid lizards or small agamas. Abandoned farms, quarries and sawmills (especially in forest) and any water sources are good collecting sites. For sheer visibility of reptiles in Africa, there is little to beat rocky outcrops in semi-desert or savanna.

Open desert is a tough place to collect. There is limited depth of field, you won't have to climb trees, but it can be an exhausting place to hunt. Use your time sensibly, get going at dawn. In dune country, hunt on the sheltered side in the day; best results will be after dark. Look for wadis, seasonal river valleys, as these often contain vegetation, and also for broken ground and boulder piles where there will be shade during some of the day, of great importance to diurnal desert reptiles. When travelling on desert roads, check culverts and drain tunnels, excellent for geckoes. Hunt at night (I'll come to this presently). High forest is also a tough proposition, the reptiles and amphibians are there but hard to find as there is so much cover and the habitat ranges from 5m down to 50m up, of which you can only search a few metres depth. Collecting in forest requires specialised techniques, one of which is night hunting. During the day, look for habitation, abandoned or used, around which there will be cleared ground and cover to turn. In primary forest, try debarking trees and raking through leaf litter. Look for river valleys: the litter is less deep on the slopes and there will be fallen logs and protruding rocks, and rocks in the streambed. Dig in the soil and leaf mould around the base of big trees. Shake small trees and bushes to start immobile tree snakes into motion. Smoke out hollow trees (taking care not to start a fire). In secondary forest, where the growth is thicker and lower, keep looking up: tree snakes have pale bellies. Go slowly, watch for things moving off ahead of you, or basking in open sunlit glades. Snake hunting in high forest is the one place where it's worth having a 2 or 3 metre grabstick.

If it's practical on your budget, consider hiring a vehicle, even just for a day: you can survey collecting sites and choose likely ones to be later reached on foot. (N.B. If you are intending to hire a vehicle, book it up beforehand if possible and find out the terms and conditions; hiring a car in many African countries is much more dicey than Messrs. Hertz and Avis would have you believe!).

Choose the right times to go into the field. It is inadvisable to hunt in the heat of the day: you run the risk of heat exhaustion, dehydration and sunburn, especially if not used to a hot climate. In really hot countries even reptiles are not active in the hottest hours. Make short trips initially. Very early morning is a good time to start hunting; nocturnal animals will have moved under ground cover and diurnal animals will still be there and cold, hence easier to catch. As the day warms up, you'll see things coming out to bask. Around 11, follow their example and take a siesta, recommencing in the late afternoon. Evening is a very good time; a surprising number of nocturnal animals will move up to the mouths of their holes as dusk approaches, sitting and watching, and frogs start to call.

For daylight work in the field, there is little better technique than walking slowly, keeping your eyes open and turning ground cover. Rake through the soil under rocks and logs when you turn them; fossorial creatures may be hiding there. Stumps and fallen logs can be debarked, rotten logs broken up – good places for amphibians and egg clutches – but it should go without saying that ground cover should be replaced, and do your best not to destroy habitats. Snake enthusiasts in South Africa have been known to smash every exfoliation slab off kopjes in their hunt for crevice-dwelling snakes, ruining the habitat and exterminating the local population. Don't be greedy and wipe out colonies if you strike lucky.

Abandoned farms and houses are good places for grass heaps and brush piles, which should be raked over. Termite hills with open holes on the exterior are good hiding places and worth watching for basking animals (but please noose such animals: these hills are part of the African landscape and smashing them down or pouring chemicals into them completely destroys them for habitats). Watch for tracks, especially in sandy areas in the early morning. Snakes and lizards often leave obvious spoor; perhaps you can track them back to their holes or even find them buried just under the sand. In the early morning, tree snakes are often sunning on the outer and upper branches on the eastern side of trees. Later in the day, they may be in the densest part – look with your binoculars into the clumps. Trees with bird nests (especially colonial birds such as weavers) attract snakes such as Boomslangs, Egg-Eaters and Cobras.

In open country, isolated big trees should be checked: reptiles may be in the shade, buried in soft soil under and around roots, lizards may be sheltering in cracks on the trunk. Areas with many rat runs and nests will attract rodent-eating snakes; look for tracks entering a hole, or holes with clear entrances, no cobwebs and looking used (N.B. holes with a broad, shallow entrance, the upper side conspicuously curved, are usually scorpion holes). If you don't want to dig out a hole that seems to be occupied, you can put some chloroform or petrol down, or put some mothballs in the entrance and fan the fumes down, but remember the fumes can damage your quarry and have long term effects on the environment: use such chemicals sparingly and never in colonial habitats.

Rocky hills are good habitats, with plenty of refuges. Use your torch to peer into cracks and under exfoliating slabs; get high up and use your binoculars. If you want to catch something hiding under a slab, put down a big bag for it to run under when you lift the slab.

Once in a while, sit down in a shady place, look and listen. Watch birds of prey quartering (especially Snake Eagles, also known as Harrier Eagles) and see if you can spot what they catch: it may lead you to a lizard colony. Certain bird species – especially bulbuls and sunbirds, and sometimes babblers – will mob snakes. Their calls can be heard from a distance; if you hear them cursing follow them up (bearing in mind they may be mobbing an owl or a domestic cat!).

If you're collecting near habitation, you will acquire a retinue of small boys; enlisting their help can be very profitable, and a little money goes a long way – BUT remember that if you encourage them to catch stuff and someone gets bitten, you're in trouble. Encourage them to point out stuff to you and reward accordingly. If they do start catching things, either refuse to buy or warn them never to touch a snake (they probably know already, but the coins you offer as reward may be a small fortune to them – if a snake appears to be about to escape before you get there they may do something rash). Taking an illustrated field guide or a selection of photographs is a good idea; you can show them what to watch out for, what you want and, if you're interested, find out some local names.

There are various techniques for collecting lizards, especially where there is too much cover to simply chase. Going at dawn when they're cold is one. Many lizards will let you approach to within a metre or so if you move slowly and their refuge is not far, and noosing, with a fishing rod, thin bamboo rod or car aerial fitted with a running noose of fishing line works well for Crag Lizards (*Cordylus*) and Agamas. If you're after museum specimens, you can try shooting them with rubber bands cut from a car inner tube (this method isn't recommended if you want healthy undamaged specimens!) In sandy country, chase your specimen into its hole and carefully dig it out (watching out for other inhabitants of the hole), or find the hole, wait until your quarry is out, then slip a sock or a boiling tube inside the entrance of the hole (or a stout net if you're after a monitor lizard!) and chase the animal back. Work in pairs if possible when hunting snakes and lizards; you remain motionless and your friend chases the quarry towards you.

If you should find a fast moving snake such as a Bush Snake (*Philothamnus*), Sand Snake (*Psammophis*) or Racer (*Coluber*) (or a Mamba!) resting near cover, give the snake a chance to settle and then approach it very slowly and obliquely, bringing your head or grab stick up very slowly – you should be able to seize it. If it does dash off, remember that such snakes rarely move far (while moving they are vulnerable to birds of prey) and a careful look around will probably reveal the snake lying quietly nearby. Don't rush, plan your approach. In likely spots, look carefully before walking in; if you can spot your quarry before it spots you, then you've got a big advantage. With most nocturnal snakes, once you've found it you've got it.

Tortoise enthusiasts – your quarry will be active in the early morning and late afternoon. If you can get to a vantage point and watch the country below, using your binoculars, you may see one moving. The smaller southern African species often take cover under rocks and logs during the day. You can also arm yourself with a stout wooden pole, such as a broomstick or billiard cue, for poking down likely holes; a tortoise in such a hole makes a very characteristic thwack when poked with a pole. In sandy country, tortoises can be tracked, and this is one time when it is worth waiting until the heat of the day, then you can follow up the animal

and find where it has taken cover. To initially locate a track, drive in the late morning along a dirt road and look for spoor. Crocodile and turtle enthusiasts may also be out in the heat of the day, checking suitable sites (semi-submerged logs, rocks, beaches) for basking specimens. Crocodile watchers can also go out at night with a torch, for crocodiles like to come close inshore at night. Hold your torch close to your head and you will see red eyeshine (but remember that crocodiles do come onshore at night, and in some areas of Africa they are notorious man killers).

Amphibian enthusiasts will of course be looking for fresh water sources, but bear in mind that amphibians can often be found in quite dry areas at night, especially if rain has fallen recently. During the day, amphibians may be under well-seated ground cover, in rotten logs, hiding between leaves or between the leaf stalk and the stem of certain plants (especially bananas), sitting on reed stems or leaves (especially of monocotyledonous plants in wet areas), in shady bushes or down holes, inside flowers or under bark and in leaf litter. Around buildings, look for pits and cattle dips, which act as amphibian traps; in water storage tanks, especially on the sides just above the water; under rocks around standpipe and tank taps, in water meters, in bathrooms and toilets, under baths, in and behind cisterns. Check around outside lights at night, where amphibians gather to eat insects (these are also good places for geckoes).

Night hunting can be very rewarding. Most species of African snake and nearly all amphibians are nocturnal and lizards can be caught easily as they are slow to move. However, a few initial words of precaution.

When night hunting, by vehicle or on foot, don't go into areas that you haven't surveyed beforehand during the day. You may get lost (and if your torch then goes out you're in trouble), wander into danger (e.g. into a swamp, near a cliff or into the presence of big game) or into a security area, such as a police or military installation. In Egypt, checking a suitable road for night cruising, I once drove into a missile site. In the daytime, nobody minded: at night it might have been a different matter. Check the ground before you go.

Night cruising is driving slowly at night along roads, picking up animals crossing the road or sitting on the road absorbing heat from the surface. Tarmac (metalled) roads give the best results, as reptiles show up well on them (although their eyes do not shine). Snakes look like pale lines on the road, geckoes and amphibians as pale lumps of the appropriate shape. Dirt roads are also productive, although you have to look more carefully and go slower, and there are often sticks and other debris on them that look like reptiles.

If you're going to hire a car and use it for night cruising, then when you collect it check, apart from the obvious things like has it got a properly inflated spare wheel, jack and wheel spanner, that (a) it has headlights (no joke), (b) they work on both full and dipped beam, (c) they can be adjusted (if properly adjusted, they'll be slightly too high for night hunting, if not, they may be pointing anywhere); (d) the instrument panel lights up when the lights are on; (e) the brake, indicator and hazard warning lights work.

The best time for night cruising is just after dark, when it is warmest and the road surface retains some heat, encouraging reptiles to bask on it. If rain has fallen during the morning or early afternoon, so much the better. Late afternoon and evening storms tend to depress the temperature; you will get more amphibians but fewer snakes, unless the late storm happens to be one of the first of the season. As the night cools down, the numbers of active animals will decrease, but there are certain species that favour a low temperature – this is the ecological niche they inhabit. Examples of such species are the Burrowing Vipers (*Atractaspis*) and Shield Snakes (*Aspidelaps*).

Drive slowly when night cruising, about 30 km per hour; even at that speed you'll overrun specimens: the smaller animals often don't show up until you're almost on top of them. This is why motorcycles are better for road cruising than cars; you get a much closer look at the target and can turn more quickly. Pick a quiet road – you don't want other vehicles around – and be very careful, especially at dusk. This is the time when vehicles without headlights (not an uncommon sight in some parts of Africa) will be rushing to get home. If feasible, don't drive towards the west at dusk, when the afterglow makes it difficult to see the road surface. Raised roads are not so good as ones that are level with the country, and roads

with deep concrete drains on both sides are a dead loss. Choose roads in uninhabited areas; roads along valley bottoms, beside swamps or rivers or through forest are excellent. In forest, shine your headlamp or torch into the trees once in a while for sleeping tree snakes, which look white in the beam.

Don't go night cruising alone. If there are two of you, then when a snake is seen, one can get out and start catching while the other gets the car off the road. Never be tempted to leave the car standing in the middle of the road because "the snake is escaping and the catch will only take a few seconds". It may not and your car could cause an oncoming vehicle to crash. If someone comes up behind you when cruising, let them get past and never brake hard when someone is close behind you. Don't jump out into the road – an unlighted vehicle may be behind you – and when you're out, don't flash your torch at oncoming vehicles – it may confuse them (and in many parts of Africa, a torch flashed at oncoming cars is a signal of a police or military road block).

Everyone in the car should have a good torch. Also useful is a plastic bag full of sand, or something similar: if you overrun a specimen, your partner immediately drops the bag out; when you have turned it will show you roughly where the specimen was; distances (especially when slowing down) can be hard to judge at night. I have found hard containers better than bags at night – specimens can be simply dropped into them.

Initially, until your eyes are attuned, you'll probably miss a few specimens. It's always worth going back to check the "might have beens", which often are. If you do come across a poisonous snake, remember that it may be very active – catching a Puffadder at night is quite a different proposition to catching one during the day.

Don't drive for too long at night; take turns and if you find you're getting tired, get home before you make a mistake.

Night hunting on foot is also productive; you will cover less ground but can search in more detail. Before you set out, see if you can change your torch bulb in total darkness! (or perhaps take a small spare torch). Start with your immediate surroundings, bearing in mind the need to be circumspect if you're staying in a hotel; management and fellow guests may not be happy about a fellow occupant having snakes (or lizards, many species of which are regarded as poisonous in Africa) in his/her room. Consider finding the night watchman and explaining what you're doing – you don't want to be mistaken for a prowler and he may even know where some specimens are.

Look for geckoes around the lights, amphibians around the taps and ponds. Walls, especially long ones, are excellent snake traps: a snake meeting one will start crawling along beside it. Check both sides and look on the wall for geckoes. If the skinks and agamas on the walls and trees and culverts have eluded you in the day, catch them sleeping. Turning ground cover at night is a good way of catching diurnal lizards. Check around those big immovable rock piles, heaps of building debris or open termite hills; whatever is hiding in there may be coming out.

Reptiles moving at night often make a surprising amount of noise, especially in well vegetated areas. Once in a while, sit down, switch off your torch and listen. If you're walking along a road, look for animals basking on the tarmac (checking roads very early in the morning may reveal road kills, giving you an idea of what is in the area). Shine your torch on trees and bushes; chameleons and sleeping snakes show up remarkably well in torchlight: they look white and are obvious from some distance. Hunt alongside water courses at night; as well as amphibians there may be frog eating snakes active on the ground or asleep in the reeds or trees beside the river. Working water courses at night is an excellent technique in forest. On rocky hills, geckoes will be out and are slow to react at night. Isolated rock slabs may be used as basking sites: they retain heat. In urban areas and along roads, look in ditches and drains, especially deep concrete ones. As well as finding larger animals crawling along the bottom, such drains often act as traps for smaller, burrowing reptiles. During the day, ground cover lying in dry drains is well worth checking.

There are, of course, more advanced collecting techniques than those I've mentioned; if you're ambitious, or planning a larger scale trip, you may wish to try some. One is setting a drift

fence. It doesn't need a lot of equipment, just some rolls of plastic sheeting and some large plastic bags to use as pitfall traps, plus a digging tool. To support the fence, cut yourself sticks (for details on more advanced drift fencing and traps, see Vogt and Hine (1982)). If you're going into forest for a while, consider finding a sawmill and asking if you can accompany a logging team. In villages, contact the chief and ask him to spread the word that you're in the area and will pay for reports. Find out if there are any recently constructed dams in the area: water rising will drive stuff out of their refuges. If there's a school in the area, have a chat with the headmaster about getting pupils to report reptiles – you might find yourself dragooned into giving a talk to the pupils, but in return you could be directed towards plenty of specimens. Consider approaching the local department of wildlife; in return for a little of your expertise you could benefit from some of theirs. If you're after aquatic creatures, find the local fishermen and ask about what they see; you might be able to go out with them. Working from a boat, you can check islands and shoreline vegetation.

Some final thoughts on security. In many African countries, people are very nervous about spies, and a white person with maps, cameras and unfamiliar gear poking about in unfrequented areas can arouse suspicion. So be circumspect. Don't take military or paramilitary clothing, especially camouflage jackets, and watch where you point your camera. Carry documentation – a wildlife permit, CITES import licence or even a good reptile book in your pack can ease suspicion, and a few specimens may break the ice. Travelling and staying in remote areas, consider dropping in at the local police post and telling them who you are and what you're doing. Many people won't like doing this – us British, abroad, tend to believe in our right to go anywhere and do anything without hindrance. But remember, in many African countries, life isn't as free and easy as it is in the western world. In some countries you may find you have by law to report to the authorities in every town you intend to stay the night in (although in countries with a thriving tourist trade this is rarely so). Reporting can save a lot of hassle: they know who you are and if someone comes in later and says there's a white spy poking about by the river, instead of coming after you with guns they'll be able to tell the informer "It's only that crazy snakeman". In addition, you may well engender some interest and even help; I have been snake hunting from a Kenya police landrover on more than one occasion. So be friendly, make yourself known and be prepared to chat to people who approach you.

Lastly, don't be put off by the bureaucracy involved – get organised and go. There is no experience on earth to beat actually being there, and seeing the creatures themselves in the wild.

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THE SAW-SCALED VIPER (*ECHIS CARINATUS*)

J.L. CLOUDSLEY-THOMPSON

*Department of Biology (Medawar Building), University College, University of London,
Gower Street, London WC1E 6BT*

Between the ages of about seven and ten, my favourite story was Rudyard Kipling's 'Rikki-Tikki-Tavi'. It contributed towards a lasting interest in tropical reptiles and left me with a misconception about the "Karaite, the dusty brown snakeling that lies for choice on the dusty earth; and his bite is as dangerous as the cobra's. Bue he is so small that nobody thinks of him, and so he does the more harm to people". For some years afterwards, I visualized a Krait as some kind of venomous *Typhlops*, for Kipling had confused the Krait (*Bungarus caeruleus*) with the Saw-Scaled, or Carpet Viper (*Echis carinatus*). Even his description of the latter is somewhat misleading because *E. carinatus* is a typical stocky viper, reaching the length of up to nearly one metre – quite a hefty 'snakeling', though nothing like the size of a Puff Adder or Gaboon Viper.

The Saw-Scaled Viper is a desert species ranging from the Sahara southwards into equatorial Africa and eastwards through central Asia to India and Sri Lanka. (The specimen illustrated here was photographed in the Wahiba Sands, Oman). The various populations of *E. carinatus* differ in size and behaviour.

Most Carpet Vipers are excellent sidewinders. Although they can travel in other ways, such as by undulatory and concertina movements, sidewinding is the most efficient over a smooth, sandy surface. It may also help to avoid overheating when the snake is in the open, because the loops of the body are raised slightly above the heated ground.

When disturbed, these vicious snakes inflate their bodies, form themselves into open horseshoe-shaped coils, and rub the oblique lateral saw-toothed scales against one another. The vibration produces a hissing sound like violently boiling water. The Sand Viper *Cerastes vipera*, the Horned Viper (*C. cerastes*), as well as Egg Eating Snakes (*Dasypeltinae*) are said to do the same. (Although the latter are harmless, they have a marked resemblance to the dangerously

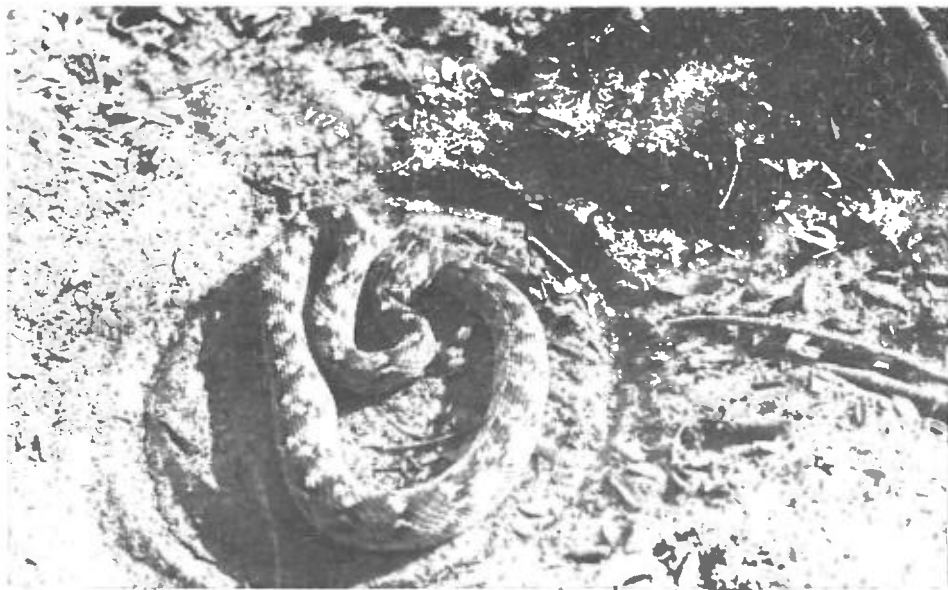


Plate 1. *E. carinatus* showing the marks of its coiling in the sand.

poisonous Saw-Scaled Viper). It is believed that this method of sound production is an adaptation that reduces water loss in arid environments.

The venom of *E. carinatus* has a high toxicity, with an L.D.50 (ug/g mouse) of 0.44 - 4.80 (intravenous) and 6.55 (subcutaneous). It destroys the tissues rapidly, and is said to be extremely painful. It is not surprising, therefore, that the Saw-Scaled Viper should be mimicked by harmless species such as Egg-Eating Snakes, some back-fanged bush snakes (*Boiga* spp.), and possibly by the gecko *Teratolepis fasciata* in Pakistan.

The colour pattern of *E. carinatus* has multiple functions. Initially it is cryptic, as Kipling pointed out but, after the snake has been annoyed and begins coiling round itself and hissing, its colours become aposematic and have a warning function. The light coloured lines that cross the back are outlined by black scales. These, and the pale dorsal blotches, render the Saw-Scaled Viper more conspicuous than are vipers with unicoloured dark patches on a light background; while inflation of the body emphasises the contrast of the cross bands. Not only is *E. carinatus* a model for several batesian mimics but, at the same time, there is müllerian mimicry with *Cerastes* spp. In fact, both genera are mimicked by *Dasypeltis* spp. in eastern Africa where the latter have patterns of elongated saddles and dark heads without markings.

Of all the sounds emitted by reptiles, the most characteristic one is the hiss. Turtles, tortoises, crocodiles, alligators, monitor lizards, chameleons and snakes, both venomous and non-poisonous, make hissing noises in defence. The term 'deimatic' is used to include all non-specific intimidating displays, postures and frightening noises which may be produced by both harmless and harmful animal species. But whether the hiss of a harmless snake is mimetic or deimatic is debatable. In my opinion, it is probably more often the latter than the former. A loud hiss is a vicious and frightening sound and may be quite sufficient to deter without any investigation as to its cause!

SNAKES DIE TO PROVE MANHOOD OF COMMANDO GIRLS

YEHUDAH L. WERNER

Dept. of Zoology (Sturman Bldg.), Hebrew University of Jerusalem,
91904 Jerusalem, Israel

This bit of old news is bad news. Four years ago television viewers anywhere, realizing their occupational risk, were confronted with the apparition of a uniformed troupe of bonnie girls ferociously gnawing live snakes. I obtained the details only recently.

Somewhere in Syria, on 1 October 1983, a ceremony marked the graduation of "Youngsters of the Revolution" troops from a military parachuting course. As one of assorted demonstrations of heroism, each commando girl grabbed a large snake, alive and squirming, held it to her mouth, and, attacking the neck, bit it to death. The mutilated snakes were then grilled picnic-style and eaten.

One snake clearly had been a *Malpolon monspessulanus*; others appeared to have been *Coluber jugularis* and *C. nummifer* but most could not be identified on the screen. The numbers of snakes involved are also unknown. There appeared to be tens of girls involved. Presumably each killed one snake. Presumably in order to amass a live collection of tens of snakes of choice size, it would have been necessary that many more be caught and brought in; my guess is, at least a hundred. If such ceremonies are now a tradition repeated annually or even more frequently, the effect on populations could begin to parallel that of other snake extermination enterprises (Alvey, 1978; BBC, 1982; Softly, 1971).

Because such largish snakes are mostly rodent consumers, I believe the Syrian armed forces would be well advised to relinquish the snakes. Failing this, the snakes, granted their lives, could serve to demonstrate even greater daring: rather than having their own head bitten off, let them bite the would-be heroes! Having done their bit, or bite, it probably would not be practical either to release the snakes at their individual sites of origin, or to keep and feed them till the next ceremony. Instead, they could be donated to non-profit reptile breeding establishments.

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Figure 1. Off the TV screen: Syrian commando killing snake by biting through its neck.
(Courtesy IDF spokesman)

This article is reprinted from the Guardian newspaper May 17, 1988

RECIPES FOR SALVATION

The taste for fried iguana is helping tropical rain forests.

PAUL SIMONS REPORTS

Fried iguana may not be your idea of gourmet cooking, but they and a few other wild animals could be the salvation of tropical forests.

You've heard it all before – the tropical forests have to be saved for the sake of the planet and mankind. But try explaining that to a peasant farmer with 10 children and a wife to support. Peasant fact number one: food is more important than ecologists. Peasant fact number two: forests are there to be used.

Conservationists are beginning to realise that you must involve local people if you want successfully to conserve their land and wildlife. And that means using the forests and wildlife without slaughtering every animal that moves. Conservationists in Panama are using the forests as a sort of giant farm for rearing half-tamed animals. And that benefits everyone – the peasant farmer gets meat from the wild animal; the forest remains untouched because the animals have to feed there; and the original wildlife stays out of harm's way.

One of the most advanced projects is to re-introduce green iguana lizards into the forests of Panama. The green iguana is the only reptile that both feeds and lives in trees. It is also a gourmet dish in Latin America. And why not? The meat tastes like chicken, and a decent-sized iguana has as much meat as a large chicken. Then there is the added bonus that the eggs are used as an aphrodisiac.

Unfortunately the iguanas are so popular on the Latin American dinner table that they have been hunted almost to extinction in many places. Worse than that, their forest homes are fast disappearing. So biologist Dagmar Werner, funded by a variety of aid and conservation agencies, is restocking the forests with green iguanas by first farming them at a research station, and then reintroducing them to the wild.

This is easier said than done. Firstly the animals have to be persuaded to reproduce, and the females to lay eggs in the right place. Then there is the tricky job in incubating the eggs, rearing the young iguanas, and finally re-tuning their psychology – from wild animals shy of humans to domestic animals that will return to their owner.

Dagmar Werner's interest first started from studying the behaviour of wild iguanas in their most famous location, the Galapagos islands. Many scientists scoffed at the idea that iguanas could be bred. But she began by trying to create as natural conditions as possible for iguanas in captivity, based on her observations in the wild.

Often a number of females will select the same nesting site, returning there each year. Normally the female will dig a nest, and then leave 30-40 eggs buried in the loose soil. In the wild, predators easily locate these sites and dig up the eggs, or catch the hatchlings as they emerge from the nests. So the key to survival is to protect the reptiles during the egg and hatchling stages.

Werner created artificial nests – basically, solid walls, a roof, and entrance tunnel. Once the eggs were laid, they were removed to polystyrene coolers where they were incubated under carefully controlled temperature and humidity. The results were impressive: 90 per cent of eggs hatch, compared to 50 per cent in the wild. In fact 5,300 inguanas were hatched last year at her research station in Soberania National Park outside Panama City. Eggs were also hatched in the artificial coolers out in a village for the first time last year. Results so far are impressive – incubating increases their survival 45-fold.

The iguanas are then raised in captivity for 7-9 months before release into the wild. Since the reintroduction programme began in 1985, over 4,000 lizards have been released into the

wild, where the species had almost disappeared. Follow-up counts at the release sites are encouraging and show survival similar to that of wild-grown counterparts. And the released iguanas live more closely together – instead of wild populations of about 45 animals per hectare, the new populations are three to six times denser. Two and a half hectares of degraded grazing land in many parts of Central America yield only about 33 pounds of beef a year. That same land if left as forest and given over to raising iguanas could produce more than 500 pounds of meat, without the catastrophic damage to the environment.

An important key to success is feeding the iguanas with supplements of protein at regular dinner tables in the forest, or in peoples' backyards. The iguanas then faithfully return to feed at the same place each day. That also keeps them used to humans, so for the peasant farmer, the iguana can be harvested like a semi-domestic animal. They can be branded just like cattle to mark ownership. And because green iguanas are found from Mexico to Paraguay (with similar reptiles living in Asia and Africa), the programme has great appeal elsewhere. In fact inquiries have come from as wide as China to Namibia, and training programmes have now been started for Costa Rica, Guatemala, Honduras, and Nicaragua.

But one of the strongest points of her programme is Werner's drive to teach the locals how to restore iguana populations in rural areas, so that farmers will be able to hunt them in the future. She regularly visits rural communities, where the locals have taken a keen interest in the project.

"I had to talk to the mayor, to the director of the natural resources department, to all the important local people to make a special contract, to give it importance, because Panamanians do not respect laws and otherwise the iguanas would be stolen", she comments. "You have to have good educators and you have to be very patient. And it is a lot of work. You can't go with a consultant's attitude and tell people to do this or that."

After years of indiscriminate hunting, the locals are now relieved to have the iguana back. And as the success of the project grows, so does their pride. In the future, Werner foresees five more years of work before iguana management is fully viable, to find out about iguana diseases and how to treat them, as well as their nutrition, to make the meat cheaper and better.

But the rewards for conservation could be tremendous. "If it works we have a tool to justify the existence of tropical forests, because then you can tell people, not only that the trees are so pretty. Now we can say that if you leave those trees you can make money. And that is much more convincing." Unfortunately so little forest remains in the inhabited parts of Central America, that iguana farming would be limited. But it could be used as a way of promoting reforestation, particularly with the native species of trees that iguanas need.

And iguanas aren't the only animals on the forest menu. On a research station on an island in the Panama Canal, Nick Smythe has tamed pacas, *Agouti paca* – an aggressive rodent, that looks like a cross between a dog and a large guinea pig. The paca usually spends a fairly solitary life in tropical forests, defending its territory fiercely. But he has found a way of converting the animal into a docile, community-living "pet" by "imprinting" it at birth.

This type of learning was first discovered by Konrad Lorenz in his famous geese experiments, where he imprinted freshly-hatched chicks with his own image, and they took him to be their mother. Nick Smythe is taking pacas at birth and getting them used to humans and other pacas. During their first two weeks they are kept within sight of a human handler as much as possible and handled for at least 2 hours each day. Then they are mustered together with as many other babies of roughly the same age as possible.

Although they eat fruit in the wild he has got them used to yucca, maize, soybean flour, wild and cultivated tree leaves. "One of our intentions is to feed them on a high leaf diet, to make it much more economic and easier to obtain," comments Smythe. And the animals are so sociable that they actively seek contact with each other, and even sleep in a heap.

One advantage over the iguana is the that the animals grow fast – a young animal weighing about a kilo puts on about a hundred grammes a day. And the meat? Like the iguana, paca meat is an expensive culinary delight in Latin America. So there is no problem getting farmers

interested in raising the animals. Smythe does not know yet whether tame pacas could be raised outside concrete and wire netting cages, in which he houses them at present. But the signs look promising. Pacas that were accidentally let out when cage doors have been left open have returned to the cages voluntarily. And the few offspring so far raised from tamed pacas have also learnt the tame behaviour, which is very encouraging for future farming projects.

And there are other animals being raised from the wild. The white-tailed deer was common in Pacific dry forests, before most of these were felled in Central America. Now a project in Costa Rica is trying to re-establish a colony of these deer in the proposed Guanacaste National Park, in the north-west of the country, so that peasant farmers there can use the forest without having to destroy it. And all these wild animal projects could contribute to the salvation of forests throughout the world.

BOOK REVIEW

THE AMPHIBIANS AND REPTILES OF BOTSWANA

By R.D. Auerbach.

Published by Mokwepa Consultants, P.O. Box 40261, Gaborone, Botswana, distributed in Botswana by Botswana Book Centre, P.O. Box 91, Gaborone. Softback, 295 pages, 19 pages full colour plates, plus black and white pictures and line drawings. Price Pula 65 (approx 21 Pounds sterling, excluding postage).

The credit list for this massive work is quite remarkable; author Ronald Auerbach, photography (mostly) by Ronald Auerbach, line drawings by Ronald Auerbach, editor Ronald Auerbach, published by Mokwepa Consultants (Managing Director Ronald Auerbach). Auerbach has spent several years in Botswana, actively travelling and studying the herpetofauna and this book is the result of his work. It contains a remarkable amount of information. The 21-page introduction contains an account of the activities of early herpetologists in Botswana, brief sections on herpetological anatomy and physiology, ecology, palaeontology, traditional knowledge and beliefs, an excellent section on snake bite in Botswana with statistics and notes on seasonal incidence (with a section on arthropod envenomation as well), and a short note on conservation by the noted African herpetologist Malumo Simbotwe, present senior wildlife biologist at the department of Wildlife and National Parks in Gaborone. This is followed by a systematic description of the 36 amphibian, 3 land tortoise, 5 turtle, one crocodile, 65 lizard, eight amphisbaenian and 76 snake taxa occurring or suspected to occur in Botswana. Each description starts with a comment on the illustration (where it exists), combined synonymy and pertinent reference list and a list of names in various languages, not all local. Then comes a description (lepidosis and colour), and notes on size, reproduction, diet, field notes (including local legend and mythology, venom type and symptoms where relevant), distribution Africa-wide ecological affinity and finally a list of recorded localities, supported by museum specimens, and a map of Botswana showing these localities by quarter-degree squares, a separate map for almost every species. Following this account there is a 20 page bibliography, a six page gazetteer with both old and new place names and their location in the appropriate quarter-degree square, two indices, totalling 30 pages, of scientific and common names, a six page key to the local amphibians and a 23 page key to the reptiles, based on colour. There are 19 colour plates, illustrating some 110 taxa (including one dinosaur!), 43 black and white photographs, several of which are of rare and interesting plates from early herpetological works, 20 line drawings and one large map showing major place names.

In many ways, this book reminds me of those classic early works, produced in an age where expense in publishing natural history was considered no object and the emphasis was on completeness. In preparing this work Auerbach either visited or corresponded with nearly all museums and institutions that house a significant collection of the Botswana herpetofauna, and he also made extensive safaris to many areas of Botswana. As a result, the distribution lists and maps are as accurate as can be. The book is well written, with some genuine field observations and occasional flashes of dry wit – Auerbach recommends that anyone who believes the lower vertebrates are insensitive to pain should try stamping on a Black Mamba's tail!

That said, the book has a number of shortcomings. Only 1000 copies were produced (Auerbach

financed it himself) and it is rather cheaply bound; the cover is very soft. The photographs vary wildly in quality, with the general trend poor. Auerbach seems to have trouble with depth of field, presumably from using too high a shutter speed; in many of the photographs only a very narrow plane of one or 2 cm depth is in sharp focus. Many are poorly composed, badly lit and with distracting backgrounds; the Boomslang perched on a metal gate at twilight on plate 18 being an example, and in many the subject is too far away for good identification. Some technical errors have crept in, on plate 17 the *Philothamnus angolensis* is upside down, the colour separation of the *Philothamnus ornatus* is missing a component so that the green snake appears red, and a curious pink cast has turned a green *Philothamnus semivariegatus* into a pink snake! on plate 12 the colours of the *Platysaurus guttatus* have somehow been reversed; it should have a red tail and green body, not the opposite as shown. On plate 7 a *Pelomedusa subrufa* is mis-identified as a *Pelusios sinuatus*. Some of the black and white plates are so poor as to be pointless, especially those of museum type specimens, which convey nothing and waste space. There is a half page photograph of an *Atheris desaixi*, a species found only in Kenya.

The text contains many typographic errors, too numerous to list (some quite amusing both herpetologically and otherwise, for example innaccuracies (page 1), *Archaeoptreyx* (page 10) and Tautara (page 81). It appears not to have been proof read. Some scientific terms are mis-used or mis-spelled, or out of date, examples being the use of the ordinal name Testudines (p 67) for shield reptiles (it should be Chelonii), or Auerbach's assertion that the family Viperida (p 203) is divided into 3 families (it should be sub-families). These errors, coupled with the typographic errors are very irritating, especially since both could have been avoided by having the text proof read by a competent herpetologist. The choice of significant references is somewhat eclectic; Auerbach lists all his own works, most of which were published in non-technical journals without any sort of peer review. The vast lists of local names accompanying most species accounts are interesting but it is nowhere stated where the languages are used – how many people know where the languages Naron, Nyanja, Tumbuka and San Salvador are used? A number of species accounts are included for animals that have not yet been recorded in Botswana, but found near its boundaries, and this gives a misleading impression of a higher species count than actually exists – I feel these accounts should have been placed in a separate appendix. The bibliography is an over-long rag-bag of mostly herpetological works, many seemingly irrelevant – for example, there seems little justification for including Wolfgang Bohem's description of a new *Bitis* from Ethiopia, or various sensationalist newspaper articles, and yet leaving out Bocage's (1895) scholarly work on the herpetology of Angola and the Congo. In addition, the bibliography is difficult to scan, as the authors names are neither in bold type nor upper case and subsequent entries are not indented. The index of common names refers one back to the index of scientific names, something infuriating for the non scientist.

All things considered, this is a useful work but it is somewhat spoilt, purely by the lack of a competent editor. With the U.K. selling price likely to be over £30, due to transport costs, it compares badly with recent popular works on the herpetology of southern Africa, but for the serious African herpetologist, interested in raw facts and data, it is absolutely invaluable.

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Stephen Spawls

LETTERS TO THE EDITOR

Dear Sirs,

I am a herpetologist here in the United States and am looking for a fellow enthusiast on your side of the ocean with whom to correspond and exchange useful information, if there is a member of your organization interested in doing this, please pass my address along to them.

Sincerely,
Jef Hewitt

401 S. Cloverdale Ave, Los Angeles, CA 90036.

The early days of the Conservation Committee

Sirs,

The enclosed letter may be of interest to your readers. Mr. Steward's progress report of February 1970 shows the same concerns for rare species as occupy the conservation Committee today. the BHS can be proud that it was a pioneer in U.K. herp. protection and continues to lead in this role. At that time Mr. Steward was worried about a fee of £15, hardly pocket money 18 years later.

Yours etc.

G.A.D. Haselwood

British Herpetological Society, Conservation committee

Dear Professor Haselwood,

In your report on the Conservation Committee for the year 1987 (BHS Bulletin No. 23) you say that the earliest record you have of Conservation Committee meetings is for 11th July 1972. I am happy to be able to add to your records.

The Conservation Committee (initially for a short while called the conservation Sub-committee) was established in 1969 and I was its first chairman. Its primary task was to assess the status of the British species and arrange implementation of any measures of conservation thought necessary. Following a lot of work carried out in 1969 it was decided that immediate effort should be devoted to the conservation of *Lacerta agilis*, *Coronella austriaca* and *Bufo calamita* as being in potential danger of extinction in this country. Enclosed is a copy of my progress report dated the 3rd February 1970 to the society, giving information on this and some of the work being carried out at the time.

I hope that this information will be of interest to you.

Yours faithfully,
J. W. Steward

MEMBERS' ADVERTISEMENTS

The attention of members is drawn to the various Acts of Parliament and EEC regulations governing the import, possession and sale of reptiles and amphibians. Advertisements are accepted on the understanding that animals are legally obtained and offered for sale.

- **Wanted:** "Les Salamandres d'Europe, d'Asie et d'Afrique du Nord", Lechavalier, Paris, 1968; author R. Thorn. Also contact with anyone who has bred *Tylotriton verrucosus* or *Pachytriton brevipes*. **For Sale:** Quality thermostatic aquarium heater (unused) £5. Two Northern Water Snakes (*Nerodia sipedon sipedon*), approx. 11", £10 each. Plains Red Sided Garter Snake, slightly damaged tail, free to good home.
Martin Riley, 12 Blackbrook Avenue, Sheffield 10, Yorkshire S10 4LT. Tel: Sheffield (0742) 305547.
- **For Sale:** Captive bred hatchlings; pythons, boas, tri-colors and albinos. Send a business size addressed envelope for 1988 pricelist.
Joe E. Pierce, HCO2-BX25012-9614, Alturas, California 96101, U.S.A.
- **For Sale:** Captive bred baby Boa Constrictors £65, Californian Kings £35, Yellow Ratsnake (3ft) £25, baby Emerald Tree Boas (*Corallus canina*) expected in August.
Simon Townson, Tel: 01-531 1378.

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Chairman, Conservation Committee:	Mr W.J. Whitaker	48 Lavidge Road, Nottingham, London SE9 3NF Tel: 01-857 8407
Chairman, Captive Breeding Committee:	Mr M. Linley	'Survival', Anglia Television, 113 Park Lane, London W1Y 3AJ. Tel: 01-408 2288 (home: (0734) 475745)
Chairman, Research Committee:	Dr T.R. Halliday	Biology Department, The Open University, Walton Hall, Milton Keynes, MK7 6AA Tel: (0908) 653831 (home: (0865) 512163)
British Museum (Natural History) Representative:	Dr C.J. McCarthy	Reptile and Amphibian Section, Department of Zoology, British Museum (Natural History), Cromwell Road, London SW7 5BD. Tel: 01-589 6323, Ext. 292
North-West England Group Representative:	Mr R. Paul	21 Moss Grove, Prenton, Birkenhead, Merseyside L42 9LD. Tel: (051) 608 3427 (office: (051) 031 4463)
Scottish Group Representative:	Mr A.W. Darby	36 Newton Crescent, Dunblane, Perthshire FL15 0DZ, Scotland. Tel: (0786) 824120

Ordinary Members

Mr A. Quayle 28 Richmond Drive Glen Parva Leicestershire LE2 9TJ Tel: (0533) 775204	(2nd year)	Mr B. Banks (Regional Group Development Co-ordinator) 30 Frenches Farm Drive The Ridgeway Heathfield East Sussex TN21 8BW Tel: (043 52) 2480 (office: (0273) 476595)	(1st year)
Mr D. Stubbs 84 Westbourne Park Villas London W2 5EB Tel: 01-221 2882	(1st year)	Dr R.A. Griffiths Department of Biological Sciences North East Surrey College of Technology Ewell Surrey KT17 3DS Tel: 01-394 1731	(1st year)
Mr D.R. Bird Jacaranda Cottage New Buildings Spetisbury Blandford Forum Dorset DT11 9EE Tel: (0258) 857869	(1st year)	Dr S.M. Halpern 37 Harold Road London E11 4QX	(1st year)

Officials

Conservation Officer:	Mr K.F. Corbett	c/o British Herpetological Society, c/o Zoological Society of London, Regent's Park, London NW1 4RY
Legal Officer:	Mr P. Curry	Centre for Life Studies, Zoological Society of London, Regent's Park, London NW1 4RY Tel: 01-586 3910

Honorary Life Members (maximum 10)

Mr A. Leutscher (1952), Mrs M. Green (1960), Dr J.F.D. Frazer (1982), Prof. A. d'A. Bellairs (1982),
Prof. J.L. Cloudsley-Thompson (1983), Prof. R. Conant (1983), Dr D.G. Broadley (1983),
Prof. H. Saint Girons (1984).

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