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THE BRITISH HERPETOLOGICAL SOCIETY

BULLETIN

No. 6 December 1982

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.

Publications

British Journal of Herpetology, published each June and December, contains papers or original research in herpetology.

British Herpetological Society Bulletin, also published each June and December, contains notices, news items, articles and original papers on all aspects of herpetology.

The Care and Breeding of Captive Reptiles, a new book containing a collection of papers on recent developments in breeding reptiles in captivity. This publication is not included in members' subscriptions, but is available to members at a price of £3.00. Applications to purchase should be made to the Chairman of the Captive Breeding Committee.

Meetings

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

Subscriptions

Ordinary Members £10. Junior Members £3.00 (Junior Members do not receive the British Journal of Herpetology). Institution rate £17.
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
Simon Townson and **John Pickett**

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

MEETINGS 1983

The meetings are held in the Lecture Theatre of the Linnean Society of London, Burlington House, Piccadilly, London W1 and start at 7.00 pm unless indicated otherwise.

FEBRUARY 23rd	Dr. P.A. Arak (Dept. Zoology, University of Cambridge): Female choice in natterjack toad *(Bufo calamita)* breeding behaviour.
MARCH 22nd	Annual General Meeting followed by Mr. Lionel Kelleway (Dept. Zoology, University of Swansea): Control of reproductive behaviour in the adder, *Vipera berus;* to include a 16mm research film.
APRIL 14th	Professor H.C. MacGregor, Mrs. M.A. Horner and Mr. S. Sims (Dept. Zoology, University of Leicester): European crested newts and their chromosomes; a study in evolution, development and molecular biology. Organised by the Linnean Society of London, all, including BHS members, welcome. Meeting starts at 5.00 pm. Tea served at 4.30 pm in the Library, where BHS Library books are housed. There will be an informal BHS gathering after the meeting at *ca.* 7.00 pm in The Chequers, 16 Duke Street, London SW1.
MAY 5th	Mr. Keith Lawrence, MRCVS: Diseases of reptiles caused by captivity.
MAY 26th-27th	Dr. M.W.J. Ferguson (Anatomy Dept., Queen's University, Belfast), organiser: A joint two-day symposium with the Zoological Society of London on "Reptile biology" in honour of Professor Angus Bellairs on the occasion of his retirement, in the Meeting Rooms, Zoological Society of London, Regent's Park, NW1. Admission by ticket: full programme and application forms available from the Zoological Society by end of March 1983. Details to be announced in *BHS Bulletin.* A Symposium Volume will be published by Academic Press.
JUNE 15th	*Amphibians and reptiles of the *New World.* A discussion on care and breeding organised by the Captive Breeding Committee.
JULY 13th	*A visit to the London Zoo.* A meeting organised by the Captive Breeding Committee during a Members' Evening of the Zoological Society of London. BHS members and guests should meet at the Fellows' Entrance in the Outer Circle of Regent's Park. If late, please tell the Gateman you are with Dr. S. Townson.
SEPTEMBER 21st	*Amphibians and reptiles of the *Old World.* Details as for June 15th.
OCTOBER 1st	Joint meeting between the BHS and the British Veterinary Zoological Society (BVZS) on the captive breeding, husbandry and veterinary care of reptiles and amphibians. To be held at the Centre for Life Studies, Regent's Park. Full details will appear in the next *BHS Bulletin.*
OCTOBER 8th	A joint Saturday meeting with ASRA (Association for the Study of Reptilia and Amphibia) at the Cotswold Wildlife Park, Oxon. Details to be announced in *BHS Bulletin.*
NOVEMBER 22nd	Dr. A. Hailey (Zoology Dept., University of Nottingham): Ecology of the viperine snake, *Natrix maura.*

*Members are encouraged to bring live animals, preserved specimens and 35mm colour slides for display and to illustrate discussions.

SUBSCRIPTIONS

Members are reminded that subscriptions for 1983 became due on January 1st. Ordinary membres £10.00, Juniors £3.00, Institution and Library rate £17.00.

BULLETIN GOES QUARTERLY

The Editors are pleased to announce that from 1983 the *BHS Bulletin* will be published quarterly, each March, June, September and December. This has become possible as a result of the steady increase in number and quality of contributions.

A LETTER FROM DR. J. F. D. FRAZER, RETIRING PRESIDENT TO THE PRESIDENT, COUNCIL AND MEMBERS OF THE BHS

Addressed to Dr. M. R. K. Lambert, Chairman:

Dear Michael,

I have already told you how much I appreciated the kindness of the Committee in both doing me the honour of making me an honorary member, and also for the gift of the most lifelike and lovely frog paperweight. Now I find that once again you have shown your kindness in dedicating the recent (June) number of the Journal to me. It's absurd to try and find words to express my feelings about all these repeated kindnesses: so may I just ask you, please, to be so kind as to tell the President and Committee that I am both conscious of the honours they have done me and deeply grateful for the kind thoughts implicit in giving them. Thank you all most heartily and humbly.

With all best wishes to you all,

DERYK, Warren Farm, Boxley, Maidstone, Kent. September 7th 1982

Ed. Note — The frog paperweight was moulded by the sister of our President, Lady Juliet Simpson, and we are most grateful to her for her skill. Dr. Frazer hopes to be able to write an anecdotal account of some of his memories of the earliest BHS members, based on his talk given at the BHS Meeting held in the Royal College of Surgeons of England on 14th September 1982 in honour of Dr. Edward Elkan.

CAPTIVE BREEDING COMMITTEE (CBC) REPORT 1981/82

Considerable progress has been made during this period. As mentioned in the previous CBC Report, there has been a further increase in the number of species bred by our members, some for the first time. Many of these original observations and results have been published in the BHS Bulletin or other specialist periodicals.

Despite being short of funds, CBC members have initiated several new projects and publications which we hope will continue to benefit the membership in general. Details of these activities are provided under the sub-headings below.

1. Revised CBC Membership

Listed below are the names and addresses of present members of the CBC, with their special areas of interest in parentheses. Brian Makin has now left the CBC due to heavy commitments at work and we would like to thank him for his support and enthusiasm. We are delighted to welcome four new members, Dr. H.R. Bustard, Mr. P.C. Curry, Mr. B.A.W.A. Langerwerf and Mr. K. Lawrence. Members of the BHS with any herpetological queries are encouraged to write to CBC members at the addresses below, and we will do our best to help.

Dr. Simon Townson (Chairman), 23 Fladgate Road, Leytonstone, London E11 1LX. Tel:01-989 9570. (Reptiles and amphibians in general, particularly snakes).

Dr. Anthony Millwood, 8 Whiteshott, Basildon, Essex. Tel: 0268 415168. (Amphibians).

Mr. John Pickett, 84 Pyrles Lane, Loughton, Essex. Tel: 01-508 6624. (Reptiles and amphibians in general).

Dr. Malcolm Peaker, The Hannah Research Institute, Ayr, Scotland KA6 5HL. (Reptiles and amphibians in general, particularly Snakes and Chelonians).

Mr. Dudley Lucas, 13 De Bohun Avenue, Southgate, London, N14. Tel: 01-449 5658. (Reptiles and amphibians in general, particularly snakes, including venomous species).

Mr. Peter Bennett, 45 Holdenhurst Avenue, Finchley, London, N12. Tel: 01-346 8685. (Amphibians).

Mr. Nick Millichamp, MRCVS. Working abroad at present.

Dr. H.R. Bustard, Airlie Brae, Alyth, Perthshire, PH11 8AX, Scotland. Tel: 08283 2501. (Reptiles and amphibians in general, particularly the captive breeding and conservation of Crocodiles and Sea Turtles).

Mr. Peter Curry, Centre for Life Sciences, Regent's Park, London NW1. Tel: 01-586 3910. (Reptiles and amphibians in general, particularly the reproductive biology of amphibians).

Mr. Bert Langerwerf, Beneden Kerkstraat 36A, NL5165CC, Waspik, Netherlands. (Large-scale breeding of Lizards).

Mr. Keith Lawrence, MRCVS, 30 Beanhill Road, Ducklington, Witney, Oxon, OX8 7XX. Tel: Whitney 72449. (Veterinary aspects).

2. JOINT BHS/BRITISH VETERINARY ZOOLOGICAL SOCIETY (BVZS) MEETING OCTOBER 1st 1983. Call for papers.

A joint meeting has been arranged between the BHS and BVZS to be held at the Centre for Life Sciences, Regent's Park, NW1, on Saturday 1st of October. It is hoped that eight papers will be presented on a variety of topics concerned with captive breeding, husbandry, conservation, and veterinary care of reptiles and amphibians. The proceedings of this meeting will subsequently be formally published in a joint BHS Captive Breeding Committee/BVZS volume and will be made available to BHS members at reduced rates.

Persons wishing to contribute to this meeting should send the title and a brief summary of the paper to the Chairman of the CBC.

Full details of this meeting will be published in the next Bulletin.

3. SPECIES BRED BY BHS MEMBERS

Listed below are the species which have been successfully bred during 1981/82. Unfortunately the list is not complete as we have not received up to date notification from some members. However, the number of species bred is now substantial, with successful breedings beyond the first generation becoming commonplace as our understanding of methods and reproductive biology increases.

The quite remarkable 1982 breeding results of Bert Langerwerf of Holland have been listed separately. In the past 12 months Mr. Langerwerf has successfully hatched **1700** reptiles, mostly lizards from temperate regions which are kept in outdoor vivaria. Some of the species he has bred are hardly known in the western world, and others he has now bred successfully over many generations.

Amphibians

Alytes obstetricans, Bombina orientalis, Bombina variegata, Discoglossus pictus, Bufo bufo, Bufo calamita, Bufo viridis, Rana temporaria, Rana esculenta, Xenopus tropicalis, Xenopus laevis, Hyla arborea, Hyperolius marmoratus, Litoria infrafrenata, Litoria caerulea, Ambystoma mexicanum, Salamandra salamandra, Pleurodeles waltl, Triturus marmoratus, Triturus alpestris, Triturus vulgaris, Triturus vittatus, Triturus cristatus, Triturus helveticus, Triturus boscai, Cynops pyrrhogaster.

Reptiles

Testudo graeca, Testudo hermanni, Testudo marginata, Testudo pardalis, Lacerta viridis, Lacerta vivipara, Lacerta lilfordi, Podarcis pityusensis, Anguis fragilis, Ptychozoon kuhli, Eublepharis macularius, Physignathus cocincinus, Chamaeleo jacksoni, Iguana iguana, Thamnophis sirtalis sirtalis, Thamnophis sirtalis infernalis, Thamnophis sirtalis concinnus, Thamnophis sirtalis parietalis, Thamnophis radix, Thamnophis butleri, Thamnophis elegans, Nerodia sipedon. Natrix natrix, Elaphe obsoleta obsoleta, Elaphe obsoleta quadrivittata, Elaphe obsoleta spiloides, Elaphe

guttata guttata x Elaphe guttata emoryi, Elaphe situla, Elaphe longissima, Pituophis melanoleucus melanoleucus, Drymarchon corais couperi, Lampropeltis getulus getulus, Lampropeltus getulus californiae, Lampropeltis getulus floridana, Lampropeltis getulus niger, Lampropeltis calligaster, Lampropeltis triangulum sinaloae, Boaedon fuliginosus, Constrictor constrictor, Lichanura trivirgata gracia, Epicrates cenchris cenchris, Epicrates cenchis maura, Eunectes notaeus, Python molurus molurus, Python molurus bivittatus, Python reticulatus, Python regius, Liasis fuscus, Bitis caudalis.

Species and numbers bred by Bert Langerwerf in 1982

Lacerta lepida lepida 37, *Lacerta lepida pater* 426 (176 black), *Lacerta trilineata* 306, *Lacerta viridis* 85, *Lacerta agilis agilis* 35, *Lacerta agilis exigua* 18, *Lacerta parva* 7, *Lacerta strigata* 160, *Lacerta laevis laevis* 6, *Lacerta laevis troodica* 6, *Lacerta saxicola brauneri* 173, *Lacerta saxicola saxicola* 3, *Lacerta unisexualis* 32, *Lacerta armeniaca* 39, *Lacerta monticola cyreni* 27, *Lacerta rudis obscura* 22, *Lacerta rudis svanetica* 9, *Lacerta horvathi* 7, *Lacerta danfordi anatolica* 35, *Lacerta praticola pontica* 34, *Lacerta graeca* 10, *Lacerta mosorensis* 24, *Lacerta raddei* 1, *Lacerta jayakeri* 2, *Lacerta ?* 3, *Podarcis erhardii* 10, *Podarcis milensis* 2, *Podarcis peloponesiaca* 7, *Eremias arguta* 13, *Eremias velox* 3, *Algyroides nigropunctatus* 2, *Agama caucasia* 30, *Agama stellio* 24, *Agama lehmanni* 32, *Agama sanguinolenta* 11, *Tarentola mauretanica* 1, *Gerrhonotus multicarinatus* 20, *Natrix natrix* 38.

4. JAMAICAN BOA PROJECT

In September 1980 the Jersey Wildlife Preservation Trust (JWPT) deposited six Jamaican Boas *(Epicrates subflavus)* with the CBC on breeding loan. These six specimens (four female, two male) were bred by the Trust three years previously. It is hoped that further generations can be bred to help the Trust establish strong captive breeding populations of this threatened species.

Three Jamaican Boas have progressed well and have approximately quadrupled their size since they were received. However, previous studies have shown this to be a slow-growing species, and it is estimated that it will be at least a further 18 months before these snakes are sexually mature.

Although apparently healthy, two specimens have failed to feed well, and have only doubled their size still only accepting small numbers of baby mice when they are quite large enough to feed on adult mice. Alternative food such as chicks and baby rats has not encouraged them to eat more. Finally, one specimen died in August 1981 from a large cloacal abscess and several microabscesses in the kidney. Up to this time it had been feeding and progressing well, with no obvious sign of illness until 2-3 days before death. The body was immediately sent to Mr. John Cooper, MRCVS, who kindly performed the *post mortem* examination (see report below). Following this, the body was donated to the British Museum (Natural History) collection.

Post Mortem Report

"The male Jamaican Boa *(Epicrates subflavus)* (my ref. 81/517) arrived safely on 3rd August and was examined *post mortem* on that day and again on 5th August. A routine radiograph (enclosed copy for you) confirmed the presence of a soft tissue swelling behind the cloaca but no other abnormalities were detected.

At *post mortem* examination the only significant macroscopial finding was marked post-cloacal swelling. When this was dissected it was found to contain large quantities of greyish-white nodular pus which extended caudally for 4cm within the muscle of the tail and appeared to be associated with an inflamed "capsule". Internal organs appeared normal but the liver was slightly pale.

Histopathological examination of tissues confirmed the severity of the abscess but gave no indication as to its origin. Heart, lung and thyroid showed no abnormalities but there were several microabscesses in the kidney. Sections of the liver are still being prepared.

The pus from the cloaca was cultured aerobically on blood agar and MacConkey and yielded heavy growths of two Gram negative bacilli, one of them probably an *Aeromonas* sp. Further identification of these organisms was not attempted but routine sensitivity tests showed a mixed culture to be sensitive to carbenicillin but resistant to penicillin, oxytetracycline, neomycin, amoxycillin and Septrin.

The findings suggest that this snake died as a result of the abscess and related lesions in the kidney. I think it unlikely that the sections of liver will throw any more light on the case but if they do I shall let you know.

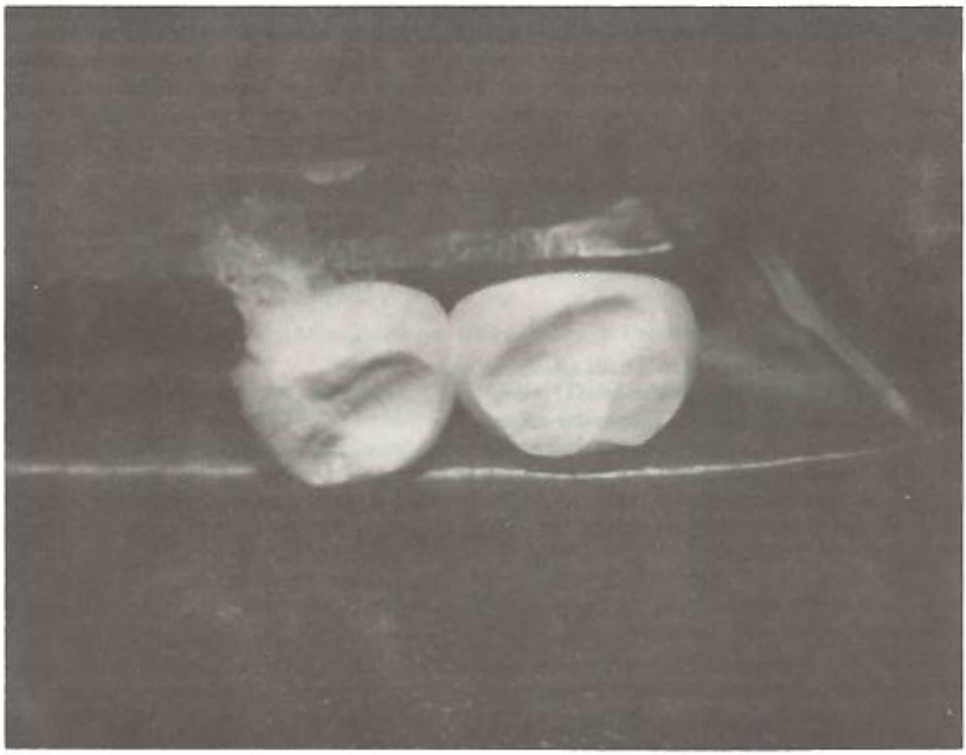
J.E. Cooper, BVSc, DTVM, MRCVS, FIBiol.
The Royal College of Surgeons of England."

During February 1982 Dr. Townson visited Jamaica, and with the co-operation of the Natural Resources Conservation Department, made some preliminary observations on the status of the Jamaican Boa. The main cause of the decline of this species has been predation by the introduced mongoose, which is also a serious threat to other Jamaican wildlife. Although no Boas were seen in the wild, numerous specimens were seen in zoos and tourist attractions around the island, and enquiries revealed that wild specimens were occasionally found, even in downtown Kingston.

A visit to the most wild and remote area of Jamaica, known as the 'Cockpit' Country because of the characteristic holes eroded in the limestone of that region, revealed that the Boa was not uncommon there and according to the local people it could be found out basking in the rainy season. The uninhabited Goat Islands off the south coast of Jamaica were also visited, and recommendations made to the Jamaican government as to their suitability as nature reserves for native herpetofauna; however, the ubiquitous mongoose would first have to be exterminated.

It is normally assumed that Jamaican Boa/mongoose confrontations end up with the mongoose killing and eating the snake. It was interesting to note that the tables may sometimes be turned (Herp. Review 13(1) 1982 pp.18), since a faecal sample from a newly caught Jamaican Boa revealed the remains of a large mongoose, although it is possible that the mongoose was eaten as carrion.

5. *PHELSUMA* BREEDING PROJECT



Newly laid *Phelsuma ornata* eggs stuck to a leaf (photo by Terry Thatcher).

During July 1982 the CBC received a consignment of beautiful green Day Geckos under special licence from the Mauritian government. Altogether, 20 *Phelsuma guimbeaui,* 3 *P. ornata,* and 2 *P. cepediana* were delivered by hand to London by Mr. Carl Jones, a research worker at the Black River Government Aviary in Mauritius. These unusually curious and active lizards have been of particular interest to both professional and amateur herpetologists alike, and it is the main purpose of this project to establish breeding groups so that specimens can be supplied to other interested members. None of these three species are endangered or rare in the wild, but one of them, namely the forest-dwelling *P. guimbeaui,* is not normally available to herpetologists and therefore little is known of its requirements and habits.

All of the specimens received by the CBC have been divided into pairs or small groups and are on breeding loan to BHS members (T. Thatcher, S. Norris, N. Millichamp, P. Curry, R. Hine, C. Rose and R. Avery) with expertise in gecko husbandry and breeding. Several eggs have already been hatched and it is hoped that specimens will be available to other BHS members later in 1983. Interested persons with previous experience of raising geckos should contact the Chairman of the CBC.

6. CRESTED NEWT BANK

A Crested Newt *(Triturus cristatus)* "bank" has been formed by members of the CBC to provide a source of captive bred Crested Newts for distribution to members who wish to establish colonies in their garden ponds. The importance of garden ponds as refuges for amphibians cannot be overstressed, and in many areas of surburban Britain they support large populations of amphibians where few alternative breeding sites exist. The Wildlife and Countryside Act 1981 has made it illegal to catch wild Crested Newts for the stocking of garden ponds, the only possible source now being captive bred specimens. The CBC has established two captive colonies, made up largely by animals taken from garden ponds before the Wildlife and Countryside Act was passed. A limited number of Crested Newt eggs and larvae will be available to members during the spring and summer of 1983. Interested persons should contact either Mr. John Pickett, Dr. A. Millwood, or Dr. S. Townson. A special leaflet has been produced entitled "Establishing and maintaining Crested Newts in Garden Ponds", which details pond design, the setting up of a colony, and management, etc. This leaflet is free to BHS members (see under "publications" below).

7. PUBLICATIONS

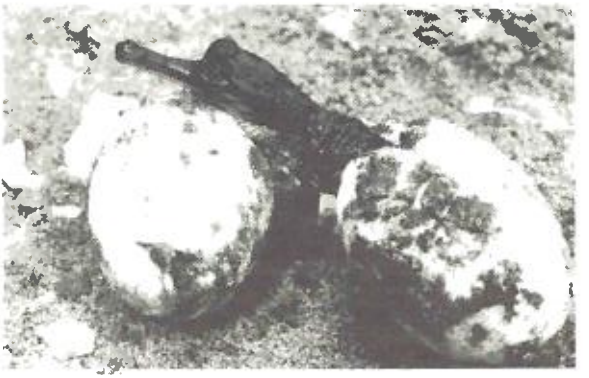
(i) **Information Sheets.** Members are reminded that information sheets on the care of reptiles and amphibians in captivity are available from Dr. S. Townson, 23 Fladgate Road, Leytonstone, London E11 1LX. Please enclose a large stamped addressed envelope. Subjects at present covered are listed below:

1. Tortoises
2. Terrapins
3. Yellow and Fire Bellied Toads (*Bombina* sp.)
4. Clawed Frogs (*Xenopus* sp.)
5. Salamanders (mainly *Salamandra salamandra*)
6. Treefrogs *(Hyla cinerea* and *arborea)*
7. European Lizards (mainly *Lacertids*)
8. Iguanas *(Iguana iguana)*
9. Garter snakes (*Thamnophis* sp.)
10. Pythons and Boas
11. Rat and King Snakes (N. American *Elaphe* and *Lampropeltis*)
12. Venomous Reptiles and the Dangerous Wild Animals Act 1976. (This deals with legal aspects only and not care).
13. Painted Frogs *(Discoglossus pictus)*
14. Axolotls *(Ambystoma mexicanum)*

(ii) The CBC publication entitled **"The Care and Breeding of Captive Reptiles"** is still available (see advertisement). Following several excellent reviews this volume has sold well and publication costs have been fully recovered. A total of 507 copies have now been distributed (370 to individuals, 115 to bookshops, and 22 (free) to contributors/reviewers). Sales should continue for some time, albeit at a slow rate.

THE CARE AND BREEDING OF CAPTIVE REPTILES

Edited by: S. Townson, N.J. Millichamp, D.G.D. Lucas and A.J. Millwood



A collection of papers published by the
British Herpetological Society. (ISBN 0 9507371 0 0)
This new paperback volume contains 100 pages,
22 photographs and numerous figures and tables.

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To Order: To BHS Members, £3.00
Non members, £5.00

Postage is an additional 50p worldwide (surface mail).

Please send cheques or international money orders (made payable to the British Herpetological Society) to:

SIMON TOWNSON, 23 Fladgate Road, Leytonstone, London, E11 1LX, England.

(iii) **"Establishing and Maintaining Crested Newts in Garden Ponds"**. This leaflet is free to members and details pond design, management, acquiring captive-bred stock and the setting up of a colony. Please send a stamped addressed envelope to either Mr. J. Pickett, Dr. A. Millwood or Dr. S. Townson (addresses as above).

The following publications will be available during 1983 or later.
(iv) **"Conserving Sea Turtles"** by Prof. N. Mrosovsky. A new paperback book which should be available by February 1983. This volume is a major contribution to the present controversial debate on sea turtle conservation, and is a 'must' for anybody interested in sea-turtle conservation, breeding, politics, and the general ecology and biology of these marine monsters. It is hoped that this book can be distributed free of charge to BHS members. Full details will be published in BHS Bulletin No. 7 (March 1983).

(v) A new booklet of notes on husbandry and captive breeding (compiled by Peter Curry) should be available by June 1983. Details will be announced in subsequent Bulletins.

(vi) The papers presented at the joint BHS/BVZS meeting at the Centre for Life Studies on October 1st 1983 will subsequently be formally published in a jointly sponsored volume. This will be available to members at reduced rates in early 1984.

8. FINANCES

Income:

£ 700.00 — 1981 grant from main Society
£ 800.00 — 1982 grant from main Society
£1757.88 — income from booksales, reprints, and postage
£ 6.00 — donations

Total:
£3263.88

Expenditure:
£1157.00 — deficit from 1980 for publication costs of "The Care and Breeding of Captive Reptiles".
£ 199.45 — postage and envelopes for booksales.
£ 35.00 — authors offprints from "The Care and Breeding of Captive Reptiles".
£ 13.60 — Book advertisement in "The Aquarist".
£ 40.00 — photocopying, postage, envelopes, etc.
£ 100.00 — printing costs for Crested Newt leaflet.
£1900.00 — committed to publication of "Conserving Sea Turtles", by N. Mrosovsky.

Total:
£3445.05

Deficit at start of 1983 £181.17.

We are very grateful to Mrs. Urich and Mrs. M. Hope for their donations to CBC funds.

Other expenses incurred by CBC members, such as travel, electricity, maintenance of livestock and foodstuffs, have not been charged to the Society.

Simon Townson (Chairman)

INTERNATIONAL MEETING ON PATHOLOGY OF LOWER VERTEBRATES

The First International Colloquium on the Pathology of Reptiles and Amphibians was held from 29th September — 2nd October at Angers, in France. The meeting was organised by Professor G. Matz of the Laboratoire de Biologie Animale of the University of Angers and Professor C. Vago of the Laboratoire de Pathologie Comparee, Montpellier.

The programme was divided into four main sessions, dealing with pathophysiology, infectious

and parasitic diseases, tumours and lesions of the integument and developmental abnormalities respectively. In addition there were round tables (workshops) on environmental and nutritional problems, neoplasms and the use of reptiles and amphibians as animal models.

This meeting proved to be a great success and attracted seventy delegates from many countries of the world. A particularly encouraging feature was the varied disciplines and backgrounds of the speakers and audience who ranged from veterinary pathologists and medical microbiologists to zoologists and herpetologists. In addition, while many were concerned with spontaneous disease others were primarily experimentalists. As a result, disease problems in reptiles and amphibians could be discussed from different standpoints. Perhaps the most important single point which emerged from the Colloquium was that the pathology of lower vertebrates is worthy of study — partly for its own sake and partly because it is providing data which are of value in research on human and veterinary medicine.

The Proceedings of the meeting are to be published. The Second Colloquium on the Pathology of Reptiles and Amphibians will be held in Britain in September 1984 the probable venue being the University of Nottingham.

J. E. Cooper

THE BHS AS A NON-GOVERNMENTAL MEMBER OF IUCN

The BHS is a member of IUCN (International Union for the Conservation of Nature and Natural Resources) as a non-governmental organisation (NGO) and sends a member of the Council to sit on the UK Committee for IUCN, whose secretariat is provided by the International Branch of the Nature Conservancy Council (19-20th Belgrave Square, London SW1X 8PY). The UK IUCN members include (July 1982):

State members: Countryside Commission; Countryside Commission for Scotland; Nature Conservancy Council. **Government Agencies:** Agriculture and Fisheries Department, Hong Kong; Peak Park Planning Board; Royal Botanic Gardens, Kew; **Non-Governmental Organisations:** British Ecological Society; British Herpetological Society; British Museum (Natural History); British Ornithologists' Union; Conservancy Association, Hong Kong; Council for Environmental Conservation; Council for Environmental Education; Field Studies Council; Mammal Society; National Trust for Scotland; Otter Trust; People's Trust for Endangered Species; Pheasant Trust; Royal Geographical Society; Royal Society for Nature Conservation; Royal Society for the Protection of Birds; Royal Society of Arts; Scottish Wildlife Trust; The Royal Society; Wildfowl Trust; World Wildlife Fund — UK; Zoological Society of London. **Affiliate:** International Institute for Environment and Development. **International members originating in UK:** Fauna and Flora Preservation Society; Friends of the Earth International; Wildlife Preservation Trust International.

The BHS is represented on the UK Committee for IUCN by Dr. M.R.K. Lambert, and in more specific instances by Prof. G.A.D. Haslewood in his capacity in the BHS Conservation Committee. In addition, Dr. I.R. Swingland sits on the UK Committee in his capacity as Chairman, IUCN/SSC Tortoise Group.

The IUCN is an independent, international organisation, which was founded in 1948 to promote scientifically-based conservation including sustainable use of living natural resources. Its current membership (21.9.1982) of some 500 drawn from 111 countries, includes 57 governments as State Members, 120 government departments and agencies, and 300 private organisations like the BHS. IUCN collaborates closely with the World Wildlife Fund (WWF) and the United Nations Environment Programme (UNEP). Over 1,500 scientists and other specialists contribute expertise to IUCN on ecology, survival of species, national parks and protected areas, and environmental planning, policy, law, administration and education. Through its secretariat based at Gland, near Geneva, Switzerland, IUCN monitors the status of nature conservation and natural resources; develops plans to deal with global problems, such as the World Conservation Strategy; promotes remedial action by governments and other authorities; and provides advice and assistance for implementing conservation measures.

At present, the only other herpetological interest with IUCN membership is the American

Society of Ichthyologists and Herpetologists (ASIH), based at the Smithsonian Institution, Washington, D.C. Although the BHS is the only herpetological organisaton represented in Europe, it is hoped that as its Conservation Committee becomes more established and the society more representative, the European herpetological society — Societas Europaea Herpetologica — will take over or share with the BHS's involvement, with contributions towards the IUCN membership subscription from several of the European Societies. It is perhaps of interest that the UK is second only to the USA in the number of organisations which are members. In the UK, there are 29 members (and three international members); in the USA, 53 members (and about nine international members). Among other countries, Australia also has 29, France 10 and FR Germany 14 members.

The IUCN also publishes the *IUCN Bulletin*, which is received by the BHS Library (see advertisement in this issue of the *BHS Bulletin*). The IUCN works closely with the World Wildlife Fund WWF, also helping them to promote their publications (see advertisement in this issue of the *BHS Bulletin*).

It is hoped BHS members will take an interest in the Society's input to IUCN.

M. R. K. Lambert

London, UK

October 8th 1982

SYMPOSIUM ON "REPTILE BIOLOGY" IN HONOUR OF PROFESSOR A. d'A. BELLAIRS ON THE OCCASION OF HIS RETIREMENT

To be held jointly by the Zoological Society of London and the British Herpetological Society.

The symposium, organised by Dr. M.W.J. Ferguson, Department of Anatomy, Queen's University, Belfast, will take place in the Meeting Rooms of The Zoological Society of London, Regent's Park, London, NW1 4RY, England (a Festschrift volume of the *Symposia of the Zoological Society of London* will be published by Academic Press) on Thursday 26th and Friday 27th May, 1983.

Provisional Programme (as of November, 1982)

*denotes that the person has not yet given either a firm acceptance or the definitive title of his contribution. All unmarked speakers and titles are definite.

Thursday, 26th May, 1983

9.00- 9.15	**M.W.J. FERGUSON — Introduction.**
MORPHOLOGY	
Chairman:	PROFESSOR A.S. BREATHNACH*
9.15	C. GANS (?)
9.45	G.L. UNDERWOOD The Reptilian eye
10.15	R. PRESLEY Lizards, mammals and the primitive tetrapod tympanic membrane
10.45	COFFEE
11.15	J.M.F. LANDSMEER Morphology of the anterior limb in relation to sprawling gait in *Varanus*
11.45	E.N. ARNOLD Variation in the cloacal and hemipeneal muscles of lizards and its bearing on their relationships
12.15	Either B. GROOMBRIDGE* Snake Anatomy or P.F.A. MADERSON* Reptile Skin

12.45	LUNCH

DEVELOPMENT

Chairman:	PROFESSOR L. WOLPERT, FRS*
14.00	B.K. HALL Developmental processes underlying the evolution of cartilage and bone
14.30	S.V. BRYANT Regeneration and development of vertebrate appendages
15.00	L.S. HONIG Pattern formation and limb development*
15.30	TEA
16.00	M.W.J. FERGUSON Craniofacial development in *Alligator mississippiensis*
16.30	H.C. SLAVKIN et al. Development of tooth enamel*
17.00	Either K.W. JONES* Sex determining sequences in vertebrate DNA or J. BULL* Sex determining mechanisms in reptiles or N. MROSOVSKY Temperature determination of sexual differentiation in sea turtles and other reptiles
17.30	W. SACHSSE Reproductive stimuli and teratogenic factors during the captive propagation of a soft shelled turtle, *Dogania subplana*
18.00	Session closes

Friday, 27th May, 1983

PHYSIOLOGY AND ECOLOGY

Chairman:	Dr. M.R.K. LAMBERT
9.00	R.A. AVERY Physiological aspects of lizard growth
9.30	R.A. COULSON How metabolic rate and anaerobic glycolysis determine the habits of reptiles
10.00	F.E. RUSSELL Snake venoms
10.30	COFFEE
11.00	V. LANCE Reproductive physiology of reptiles*
11.30	H.R. BUSTARD Breeding the gharial
12.00	G.J.W. WEBB* Age structure, sex ratio and survivorship in *Crocodylus johnstoni* or J. LOVERIDGE* Uricotely and Ureotely or J. HUTTON* Biology of the *Crocodylus niloticus* in Zimbabwe
12.30	P.C.H. PRITCHARD Form and function in turtles*
1.00	LUNCH

EVOLUTION

Chairman:	PROFESSOR EMERITUS J.Z. YOUNG, FRS*
14.00	O. RIEPPEL Miniaturization of the lizard skull: its functional and evolutionary implications
14.30	A.D. WALKER Homologues of the temporal and mandibular arteries in reptiles and birds

15.00	J.W. OSBORN Evolutionary considerations in the reptile dentition
15.30	TEA
16.00	M.J. BENTON Relationships of the diapsid reptiles
16.30	A.J. CHARIG Competiton between therapsids and archosaurs during the Triassic period: a review and synthesis of current theories
17.00	R. REED* Histology of dinosaur bone
17.30	Closing address by Professor A. d'A. Bellairs
18.00	Session closes

AMPHIBIAN ECOLOGY GROUP IN BRITAIN

The Amphibian Ecology Group consists of representatives from all the centres in Britain, where active research into amphibian ecology is taking place. The group first came together at Leicester in January 1982, and the second meeting, which is reported here, took place at the UWIST (University of Wales Institute of Science and Technology) Field Centre, Newbridge-on-Wye in October 1982. The aim of the meetings is to provide a forum for the exhange of ideas on amphibian ecology, in order to define more clearly research objectives and to standardise methods and procedures. It is hoped that meetings will take place in the autumn each year, when accounts of the preceding summer's field work will be presented. The next meeting will be held at Monks Wood Experimental Station, Abbots Ripton, Huntingdonshire, in the autumn of 1983. Anybody wishing for further details of the group should contact Dr. S.P. Gittins, Department of Applied Biology, UWIST, King Edward VII Avenue, Cardiff CF1 3NU, Wales, or through the British Herpetological Society, c/o Zoological Society of London, Regent's Park, London NW1 4RY, England.

Report on AMPHIBIAN ECOLOGY SEMINAR, 29-31 OCTOBER 1982, WALES

Held at at Uwist Field Centre, Llysdinam, Newbridge-on-Wye, Powys.

Participants met on Friday evening, with four sessions of talks on Saturday and three on Sunday. Sessions consisted of three speakers giving 30 min. talks, with a total of 20 papers being presented. Attempts were made to divide sessions and talks are listed below, followed by a list of addresses of participants.

Session 1. Timing of Breeding Season

Fred Slater	— The timing and duration of the breeding migration of amphibians to breeding sites in mid-Wales.
Jon Harrison	— The breeding migration of Smooth and Palmate Newts at a pond in mid-Wales.
Arnold Cooke	— A scoring system for the designation of SSSI's on the basis of assemblages of amphibians.

Session 2. Population Dynamics of the Natterjack

Clifford Davies	— Population dynamics of the Natterjack toad.
Tim Clifford	— Conservation management for the Natterjack toad.
Brian Banks	— Reproductive success of the Natterjack toad.

Session 3. Population Dynamics of the Common Toad and Common Frog

Clive Cummins	— Egg size in anurans
Jon Steeds	— Population age-structure of the Common Toad at a lake in mid-Wales, determined from annual growth rings in phalanges.
Paul Gittins	— Population dynamics of the Common Toad at a lake in mid-Wales.

Session 4. Population Dynamics of the Common Toad and Common Frog

Chris Reading	— Growth and age structure in a Common Toad population.
Tim Halliday	— Year to year variation in frog and toad breeding dynamics.

Session 5. Behaviour and Mate Assortment

Anthony Arak	— Non-random mating in frogs and toads.
Julie Roberts	— Reproductive isolation in *Triturus helveticus* and *T. vulgaris*.
Paul Verrell	The reproductive biology of the Smooth Newt.

Session 6. Amphibian Habitats and Behaviour

Mary Swan	Fecundity and production in relation to habitat.
Robert Oldham	— The terrestrial habitat of the Common Toad.
Trevor Beebee	— Amphibian niches across a heath-farmland interface.

Session 7. Conservation and General

Richard Griffiths	— Ecological aspects of rhythmic behaviour patterns in newts.
Mark Simmonds	— *Xenopus* in Britain.
Patrick Wisniewski	Amphibian conservation and the research worker.

Participants and addresses

Mr. Anthony Arak, The Zoological Laboratory, University of Cambridge, Downing Street, Cambridge CB2 3EJ.

Dr. Roger Avery, Department of Zoology, University of Bristol, Woodland Road, Bristol BS8 1UG.

Mr. Brian Banks, 3 Highside Drive, Humbledon Hill, Sunderland, Tyne and Wear.

Dr. Trevor Beebee, School of Biological Sciences, University of Sussex, Biology Building, Fulmer, Brighton, Sussex BN1 9QG.

Mr. Tim Clifford, NCC, Sandbanks, Sea View, Salt Fleetby, St. Clements, Louth, Lincolnshire.

Dr. Arnold Cooke, NCC, PO Box 6, Godwin House, George Street, Huntingdon PE18 6BU.

Dr. Clive Cummins, ITE, Monks Wood Experimental Station, Abbots Ripton, Huntingdon PE17 2LS.

Mr. Clifford Davis, Department of Biology, Liverpool Polytechnic, Byrom Street, Liverpool L3 3AF.

Dr. Paul Gittins, Department of Applied Biology, UWIST, King Edward VII Avenue, Cardiff CF1 3NU.

Mr. Richard Griffiths, Department of Zoology, Birkbeck College, University of London, Malet Street, London WC1E 7MX.

Dr. Tim Halliday, Department of Biology, Open University, Walton Hall, Milton Keynes, MK7 6AA.

Mr. Jon Harrison, Department of Applied Biology, UWIST.

Dr. Robert Oldham, School of Life Sciences, Leicester Polytechnic, PO Box 143, Leicester LE1 9BH.

Dr. Chris Reading, ITE, Furzebrook Research Station, Nr. Wareham, Dorset BH20 5AS.

Miss Julie Roberts, Department of Biology, Open University.

Mr. Mark Simmonds, Department of Zoology, Westfield College, University of London, Hampstead, London NW3 7ST.

Dr. Fred Slater, Department of Applied Biology, UWIST.

Mr. Jon Steeds, Department of Applied Biology, UWIST.

Miss Mary Swan, School of Life Sciences, Leicester Polytechnic.

Mr. Paul Verrell, Department of Biology, Open University.

Mr. Pat Wisniewski, Glamorgan Nature Centre, Tondu, S. Glamorgan.

A SYMPOSIUM ON THE TORTOISE

A one day course on Saturday, March 12th 1983, in the Department of Zoology, University Road, Bristol, starting at 10.00 am and finishing at approximately 4.30 pm. Fee: £15.00 (including lunch, tea and coffee).

This one day meeting offers herpetologists and veterinary surgeons an opportunity to expand their knowledge of the anatomy, conservation and diagnosis of diseases of tortoises. The aim is to aid herpetologists and vets in the provision of the best possible care and management of tortoises. The meeting, given by leading experts in the field, is run in association with the British Chelonia Group.

Prior enrolment for this course is essential

Programme

Morning Session	Chairman, Dr. R.A. Avery.
10.00 am	ANATOMY. Dr. R.N. Smith.
11.00 am	Anatomy Demonstration and Coffee
11.30 am	CONSERVATION — Effects of the tortoise trade on Mediterranean populations of *Testudo graeca.* Dr. M.R.K. Lambert.
12.00 noon	CONSERVATION — Survival rates in imported tortoises: a preliminary report. Mr. K. Lawrence.
12.30—2.00 pm	LUNCH
Afternoon Session	
2.15 pm	DIAGNOSIS OF DISEASE — Clinical examination. Mr. P.E. Holt.
2.45 pm	DIAGNOSIS OF DISEASE — The use and diagnostic value of radiography. Dr. O.F. Jackson.
3.30-4.00 pm	TEA
4.00 pm	DIAGNOSIS OF DISEASE — The role of laboratory investigation. Mr. J.E. Cooper.
4.30 pm	DISCUSSION and End of Meeting.

Tickets (£15) can be obtained from:
Dr. D.J. Hill, Dept. Extra-Mural Studies, 32 Tyndalls Park Road, Clifton, Bristol BS8 1HR. Tel: Bristol 24161 ext. 426 (am only).

SOCIETAT CATALANA D'ICTIOLOGIA I HERPETOLOGIA (SCIH)

The Catalan Society of Ichthiology and Herpetology was founded in Spain in 1981. It aims to achieve greater union and co-ordination between herpetologists in Spain and in other countries. BHS members interested in Spanish species or in working on the herpetofauna of Spain, especially in Catalonia (NE Spain), may like to make contact with the Secretary, Ms. Nati Horta, Apartat 27405, Barcelona, Spain. Tel: 3520207-3082568.

NEXT GENERAL MEETING OF SOCIETAS EUROPAEA HERPETOLOGIA

The 2nd General Meeting of the SEH will take place 11-14th September 1983 in Leon, Spain. Herpetologists wishing to read papers should contact the co-ordinator, Prof. A. Salvador (Catedra de Zoologia, Universidad de León, Spain) as soon as possible, sending him the title and summary in English.

Applications for membership of the Society (70 German marks) should be made to the Vice-Treasurer: Dr. Franz Tiedemann (Herpetologisches Sammlung, Naturhistorisches Museum, Postfach 417, A-1014 Wien, Austria).

INFORMATION FROM THE SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES, USA

The 1983 SSAR joint meeting with the Herpetologists' League will take place in Salt Lake City, Utah, USA, in August.

The 7th Annual Regional Herpetological Societies Conference will be held sometime during the SSAR meetings. Information on regional herpetological societies (over 50) in the various States of the USA is available from the SSAR Regional Herpetological Society Liaison Committee: Chairman: Ms Janice Perry (Dallas Zoo, 621 East Clarendon Drive, Dallas, Texas 75203, USA).

Applications, with full details, for the SSAR Grants-In-Herpetology competition 1983 are welcomed from outside the USA and should be sent in by the deadline of 15th March 1983 to the SSAR G-I-H Committee Chairman: Dr. Linda Maxson (Department of Genetics and Development, University of Illinois, 515 Morrill Hall, 505 South Goodwin Avenue, Urbana, Illinois 61801, USA). Other members of the Committee are Robert Mount (Conservation Research), Malvin L. Skaroff (Regional Herpetological Society Projects), Donald C. Forester (Graduate Student Research) and Dale L. Marcellini (Zoo Research).

A World List of herpetological societies will appear in SSAR's *Herpetological Circular* No. 13 (1983).

SSAR GRANTS-IN-HERPETOLOGY

The Society for the Study of Amphibians and Reptiles is pleased to announce that proposals are now being accepted for the 1983 Grants-In-Herpetology Programme. This Programme is designed to provide financial support to deserving individuals or organizations engaged in research on or conservation of amphibians and reptiles. Grant proposals will be considered in the following areas:

1. GRADUATE STUDENT HERPETOLOGICAL RESEARCH.
2. HERPETOLOGY-ORIENTED CONSERVATION.
3. REGIONAL HERPETOLOGICAL SOCIETY PROGRAMS OR PROJECTS.
4. HERPETOLOGICAL RESEARCH IN ZOOS.

Each proposal should include the following information: (PA) *Background & Objectives* of the proposed project, in terms of its relevance to herpetology, (PB) *Methods* of carrying out the research or conducting the project, (AC), *Budget for the project,* which should not exceed $400 in each category, and (PD), *Curriculum Vitae* and *Letter of Support* (if applicable). (A) The proposal must be typed double spaced and must *not* exceed 5 pages, excluding cover page, abstract, budget, curriculum vitae, and bibliography. Deadline 15th April 1983.

For additional information on proposals see the December 1982 issue of *Herp. Review* or write:

Dr. Linda Maxson, Department of Genetics and Development, University of Illinois, 515 Morrill Hall, 505 S. Goodwin Avenue, Urbana, IL 61801, USA.

NORFOLK REPTILE AND AMPHIBIAN RECORDS

In 1984 a report on reptiles and amphibians in Norfolk wil be produced on behalf of the Norfolk and Norwich Naturalists' Society. BHS members are invited to contribute positive records of species seen within the county in the last few years. Although precise localities will not be given in the report, for the records to be of greatest value they should consist of:— name of species observed, date, locality, grid reference and brief information about the observation. Records from the west of the county would be particularly welcome.

Further information may be obtained from John Buckley, 77 Janson Road, Shirley, Southampton SO1 5GL, to whom records should be sent.

ASSOCIATION FOR THE STUDY OF REPTILIA AND AMPHIBIA

Headquarters: The ASRA Rooms, Reptile House, Cotswold Wildlife Park, Burford, Oxon.

ASRA Monthly Meetings for the first half of 1983.

Regular meetings are held in the ASRA Rooms above the Reptile House of the Cotswold Wildlife Park on the second Saturday of every month.

SATURDAY 12th FEBRUARY:
"Chelonia of the Aldabra Atoll"
by Charlie Gibson, 8 pm.

SATURDAY 12th MARCH:
"Axolotls"
by Peter W. Scott, 8 pm.

SATURDAY 9th APRIL:
Awaiting confirmation at time of publication.

SATURDAY 14th MAY:
"Giant Reptiles"
by John Cheetham, 8.00 pm.

SATURDAY 11th JUNE:
"The Competitive Behaviour of the Adder *(V. berus)*".
by Lionel Kelleway, 8.00 pm.

EVOLUTION IN THE GALAPAGOS ISLANDS — REPORT OF A SYMPOSIUM, LONDON, 1982

A one-day Symposium 'Evolution in the Galapagos Islands' was held by the Linnean Society of London, in association with the Charles Darwin Foundation, on Tuesday 9th December 1982. The symposium took place in the Lecture Theatre of the Linnean Society (where meetings of the British Herpetological Society are held), Burlington House, Piccadily, London W1, England. The meeting was chaired in the morning by Prof. R.J. Berry (University Coll., London), 1982 President of the Linnean Society and Editor, the *Biological Journal of the Linnean Society*, and in the afternoon by Dr. P. Kramer (Essen, F.R. Germany), President of the Charles Darwin Foundation (CDF) and Dr. O. Hamann (Denmark), European Secretary of the CDF.

The talks ranged from a general consideration of 'islands and evolution' (Prof. A.J. Cain, Univ. Liverpool), through the geological formation (Dr. B.R. Rosen, Brit. Mus. (Nat. Hist.)), genetical processes, specific vertebrate groups, effects of the introduction of the ant on other vertebrates (Dr. Y. Lubin from USA, CDF) and colonization by flora (Prof. D. Porter, Univ. Virginia, USA), to the impact of man on fragile ecosystems (Dr. P. Kramer). Four of the twelve papers were on or involved a herpetological interest (giant tortoises):—

Dr. F. Sulloway (Harvard Univ., Cambridge, Mass., USA): 'Darwin and the Galapagos'.
Dr. J. Patton (Univ. California, Berkeley, USA): 'Genetical processes in the Galapagos'.
Dr. T. Fritts (US Fish & Wildlife Service): 'Tortoises'.
Dr. H. Snell (Univ. Colorado, Boulder, USA): 'Iguanas'.

The Symposium constituted part of the Linnean Society's Centenary Commemoration of Charles Darwin's death in 1882 (19th April, in Kent, buried seven days later in Westminster Abbey). The papers will be published in full, together with others that the Symposium time did not allow, in 1983 (August) in part 1 of the second volume *(20)* of the *Biological Journal of the Linnean Society*. A hard cover edition will also be prepared for wide circulation.

It may also interest members to know that nine essays on Charles Darwin: the man, his theory and his life, were published in February 1982 in *Biological Journal of the Linnean Society* 17(1). This journal, already emphasising the processes of organic evolution in the broadest sense, is to concentrate on this sphere from 1983.

M.R.K.L.

HERP REPRINTS NEEDED IN INDIA

The Madras Snake Park is a self-supported private Trust with a million visitors a year. It is the only solely herpetological organisation in India and the office of the IUCN/SSC Snake Group. We already have the largest collection of herp references in the country but are only just on the way to bring a real reference centre. Gifts in the form of spare reprints and back issues of herp journals will be gratefully acknowledged. We can reciprocate with reprints from here in your area of interest.

Romulus Whitaker, Director, Madras Snake Park Trust, Raj Bhavan Post Office, Madras-600 022, India.

NEW ZEALAND HERPETOLOGY

Proceedings of a Symposium held at Victoria University of Wellington January 1980

Editor D.G. Newman

* A collection of 27 papers and transcripts of the ensuing discussions.
* Research work is reviewed, research and management needs discussed and priorities for research identified.
* Four papers cover New Zealand amphibians, both native *Leiopelma* species and introduced *Litoria* species.
* Ten papers address the tuatara *Sphenodon punctatus,* topics covered include current distribution, water relations and excretion, locomotion, thermoregulation, ecology on Stephens Island and breeding in captivity.
* Eleven papers deal with New Zealand lizards: taxonomic issues (7 papers), ecological studies (3 papers) and a physiological investigation.
* The list of parasites recorded from New Zealand reptiles is updated.
* The role of New Zealand amateur herpetologists is reviewed.
* Prize NW $25.00 includes packing and postage (overseas: surface mail only).
* Orders should be sent to: The Accountant, Department of Internal Affairs, Private Bag, Wellington, New Zealand.
* Please make cheques payable to: Department of Internal Affairs.

The deluxe patron's edition, for the collector and connoisseur, is *strictly limited to 300 copies,* of which 250 are for sale.

Patron's copies will be exquisitely handbound using the finest imported materials, including red morocco leather spines with raised bands, genuine hand-marbled covers with vellum tips, 24-karat gold top edges, headbands and gold ornamentation. Patrons will receive a separate set of the 25 watercolour plates, individually printed on a heavy acid-free stock suitable for framing. These are held as loose sheets in a portfolio bound in leather to match the book. Both volumes will be placed in a custom-made protective slipcase

Each patron's copy will be signed by the authors and individually numbered. Patron's copies will be reserved on a first-come, first-served basis.

TO ORDER. Orders may be placed with your own bookseller or directly with the Society by writing Dr. Douglas H. Taylor, Department of Zoology, Miami University, Oxford, Ohio 45056, U.S.A. A price-list of other books, pamphlets and journals published by the Society together with information on membership can be obtained from Dr. Taylor.

The Society publishes *Journal of Herpetology, Herpetological Review, Facsimile Reprints in Herpetology, Herpetological Circulars, Contributions to Herpetology* and *Catalogue of American Amphibians and Reptiles.* Currently, dues for individuals are $15 for students, $18 for regular members plus a $5 postal surcharge for members outside the United States.

SSAR members can obtain substantial discounts by placing their orders directly with the Society. These should be sent to Dr. Douglas H. Taylor, Department of Zoology, Miami University, Oxford, Ohio 45056, U.S.A. Please make cheques payable to "SSAR". Payments must be in U.S. funds. Receipts sent on request only.

Individual members of the Society may purchase copies at the following reduced rates providing that *orders are received by 15 April 1983.* Afterward, prices will revert to the regular rates advertised on the previous page. Please mark the edition you desire and return order form with payment to Dr. Taylor. *All prices include surface postage, world-wide.*

Regular edition, clothbound $35

Patron's edition, leatherbound $250

If you request a patron's edition, a deposit of $75 is required with order.

THE IUCN RED DATA BOOK — AMPHIBIA — REPTILIA

Part 1 of the IUCN Red Data Book Volume, Amphibia-Reptilia, is now available. It is a fully revised (1982) edition produced by the IUCN Conservation Monitoring Centre, Cambridge, England, and edited by Dr. B. Groombridge (a BHS Council Member), assisted by Mrs. L. Wright. A talk to the BHS on the work of the Conservation Monitoring Centre and the preparation of the Amphibia-Reptilia volume was given by Mrs. Wright on Brian Groombridge's behalf on 24th November 1982. The BHS is a member of IUCN.

Part 1 of the Amphibia-Reptilia volume covers 83 threatened taxa in the orders Rhynchocephalia, Crocodylia and Testudines, from all zoogeographic regions, and comprises 480 pages hardback bound, price £10.00.

For each taxon, detailed and up-to-date accounts of distribution, population status, habitat and ecology, threats to survival and conservation measures are provided along with a comprehensive reference list. There are also summary paragraphs at the start of each species account. As well as an alphabetical index, species lists are provided arranged taxonomically and by country of occurrence and there are explanatory introductory sections dealing with methodology and giving overviews of the conservation problems of the groups covered.

Orders may be placed through: IUCN Conservation Monitoring Centre, 219(c) Huntingdon Road, Cambridge CB3 0DL, England.

Outside the Americas books may be order directly from: IUCN Publications, Avenue de Mont-Blanc, 1196 Gland, Switzerland. Price per volume (incl. postage) payable with order: £11 sterling (US $22) (surface mail) or £13 sterling (US $26) air mail.

In the USA, Canada, Latin America and the Caribbean orders may be placed with: UNIPUB, Box 433, Murray Hill, New York, NY 10016, USA. Price per volume (incl. postage) payable with order: US $21 plus any appropriate state tax.

Further volumes in the Mammal and Amphibia-Reptilia series are in preparation as are editions covering invertebrates, birds and fish; all enquiries concerning these should be addressed to the Conservation Monitoring Centre.

NOTES ON THE MOSOR ROCK LIZARD, *LACERTA MOSORENSIS* KOLOMBATOVIC 1886, AND ITS REPRODUCTION IN CAPTIVITY

BERT LANGERWERF

Postbus 82, NL 5165 ZH, Netherlands

INTRODUCTION

Lacerta mosorensis is a rather rare lizard and very rarely kept in terraria. It inhabits places which are often difficult to reach in the Dinaric Alps of Yugoslavia east of the line Split-Kotor and south of Sarajevo. It is about the same size as the common Wall Lizard *(Lacerta muralis),* but is easily distinguished from it: the skin is very smooth, almost like a skink; the head is flat to enable the lizard to enter narrow openings in the rocks; the colour may be bluish, brown, grey or yellowish, always with black spots on the body (see plate 1). The typical colouration is grey, unlike any other species of *Lacerta* which I have seen. *Lacerta mosorensis* seems to be closely related to *L. oxycephala, L. graeca* and *L. danfordi.*

The lizard is most often found at an altitude above 1000m, ususally between 1100m and 1500m (Ragovanovic 1951), where it inhabits rather cool and humid places. Other writers state that the lizard is found at an altitude of 600m — 1500m (Arnold et al, 1977).

The species was first discovered in the Mosor mountains near Split, Yugoslavia, in 1886.

LACERTA MOSORENSIS IN CAPTIVITY

On November 6th 1981 I received two pairs of *Lacerta mosorensis* from a friend. They were collected in the region of Durmitor, high in the mountains of Yugoslavia. On February 20th 1982, I received another 10.

Two of the animals received on November 6th were placed immediately in a small (70cm x 70cm) glass terrarium in the garden. Here they commenced hibernation in December, and appeared again in February.

The animals received on February 20th were kept warm and active for a month before I put them in the same garden terrarium with those received earlier. They disappeared and remained inactive until the end of April. In May their activity increased and they began to eat more of the crickets *(Gryllus bimaculatus)* offered to them.

In June all the animals began to copulate regularly, whether or not they had hibernated. Copulation was so frequent that one of the females later died as a result of injuries caused by the males during copulation. By the end of June mating seemed to have ceased: I observed no more copulation, but it is quite possible that mating continued unobserved beyond this time. In July eggs were laid as follows: on July 16th I found 10 eggs, but as they were mixed with those of *Lacerta parva* I cannot be certain how many were laid by *mosorensis.* More eggs were discovered on July 26th and 29th, full details of which are given in the table (table 1).

TABLE 1

Date eggs discovered	No.* of eggs	Approximate age of eggs at time of discovery	Incubation temp.	Date of hatching	Incubation period period (days)
16 July	?	+ 2 days	28°C	7 Aug (3); 8 Aug (1)	2 + 22 or 23
26 July	5	+ 3 days	31°C	14 Aug (2); 15 Aug(3)	3 + 19 or 2(
26 July	8	1 day	31°C	16 Aug (3); 17 Aug (3) 18 Aug (1)	1 + 21, 22 or 23
29 July	7	1 day	28°C	19 Aug (5); 20 Aug (2)	1 + 21 or 22

*From a total of 4 females

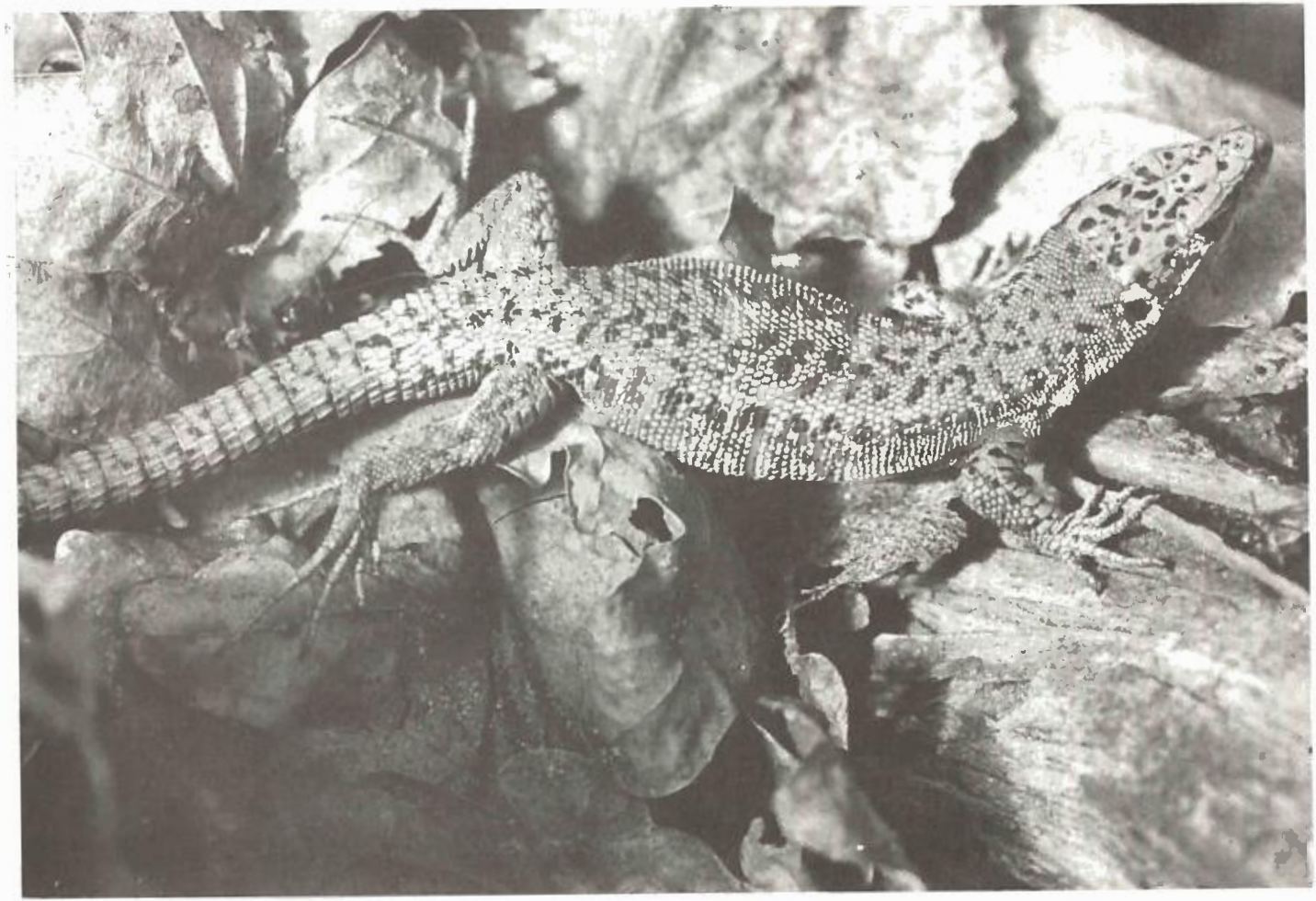

Plate 1. *Lacerta mosorensis*, adult

From the table it will be noticed that the length of incubation is amazingly short: about 23 days in all instances. All of the females laid only one clutch of eggs this year (and possibly every year?). The number in each clutch seems to vary from 4 (July 16th?) to 8.

At birth the young lizards have the small black spots characteristic of the adults, and most of them have a blue tail, though the blue is not as clear as in the young of some other *Lacerta* species (e.g. *saxicola, danfordi, monticola*) and some of them had no blue colouration at all.

At hatching the lizards are quite small. Two average sized examples which I measured had a head and body length of 2.7cm and tail length of 7.2cm in one and 2.8cm and 7.2cm respectively in the other. They grow slowly, similar to *L. saxicola* and *L. horvathi.* Within 2-3 months *L. graeca, L. danfordi* and *L. laevis* which were about the same size at hatching and kept under the same conditions were double the size of the *mosorensis.*

The species seems to do well in small, outdoor glass-covered vivaria in our rather fresh and humid climate, which is to be expected as in Yugoslavia it is a lizard of the high mountains.

The most exceptional thing about this lizard is the very short incubation period of the eggs. I have bred almost every species of Lacerta, but until now the shortest incubation periods of any of them have been near 40 days. *(L. graeca* and *L. monticola).* Now I find one with a period of about 23 days. It would be interesting to know how far advanced in development the embryos are when the eggs are first laid.

Now at the time of writing in November, the lizards show themselves every sunny day, just as do *L. monticola, saxicola* and *caucasia.*

Plate 2. *Lacerta mosorensis,* juvenile

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A STUDY IN WILDLIFE LAW ENFORCEMENT: THE UNITED STATES "SNAKESCAM" OF 1981

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INTRODUCTION

Wildlife protection laws have recently come into focus in the United States. A controversial wildlife "sting" operation, now tagged "Snakescam", was undertaken by the United States Department of the Interior Fish and Wildlife Services (USFWS) in 1981. The aftermath of this event has raised many questions as to the acceptability of the law enforcement techniques employed, which demonstrated a disregard for civil rights and created a huge "black market" for protected wildlife (Behme, 1981; Meyer, 1982). The operation resulted in the destruction of many rare animals and the research being done with them, and has created an unprecedented paranoia among zoological personnel throughout the United States (Fife, 1981; Miller, 1981). The wildlife laws and regulations which precipitated this event appear to be incompatible with sound wildlife conservation strategies, effectively "protecting" species into extinction while doing little to curtail the major causes of wildlife decline.

THE "SNAKESCAM" OPERATION

The "Snakescam" operation was begun in the late 1970's. In 1980 and 1981 the USFWS operated a false business front, the "Atlanta Wildlife Exchange", which solicited live reptile trade (Iker, 1982b). The purpose of the "Atlanta Wildlife Exchange" was to "infiltrate the trade" in illegal reptiles (Iker, 1982b). This "infiltration" was apparently done with no concern for the welfare of the animals. The "Exchange" was operated by USFWS agents who had no experience in reptile care (Iker, 1982b). Animals purchased from this "Exchange" were received with broken bones, burn lesions, and fatal parasite infestations (Celebucki, 1982; Lilley, 1981). A large number of the animals handled by this "Exchange" died, including several endangered species (Meyer, 1982).

This false "Wildlife Exchange" created a large market for illegal reptiles where only a small illicit trade normally operated. The "Exchange" encouraged the taking of animals out of the wild through financial inducements (Behme, 1981; Meyer, 1982), offering incredibly high prices for protected animals during economically depressed times (Behme, 1981; Bloomer, 1982). It is the prospect of high profits that encourages illegal trade in protected animals, and USFWS agents were paying up to four times the going rate for specimens (Behme, 1981). The "Exchange" encouraged customers to purchase illegal animals at greatly reduced rates (Cauble, 1982; Delles, 1982). Tactics such as refusing to ship or receive legitimate animals unless illegal animals were included in the ordere were used (Ruiz, 1982). The "Exchange" also insisted on accepting animals either through illegal channels or not at all; i.e. snakes through the U.S. Postal Service (Lilley, 1982a; Ruiz, 1982). By these and other questionable methods the USFWS agents created their own criminals, while providing a practically unlimited market for protected wildlife and contributing to a substantial increase in the taking of wildlife (Meyer, 1982).

The artificial market thus created was then "uncovered" in a dramatic series of raids, conducted in cooperation with several state wildlife agencies (Iker, 1982b). The media was invited to cover these raids and told that "hundreds of thousands of U.S. reptiles are illegally taken from the wild each year for a thriving black market, with a very large portion smuggled to Europe and Japan (USFWS, 1981)." Newspapers and magazines portrayed wildlife agents as "astonished at the scope of the traffic" and the "Snakescam" as the "most successful Fish and Wildlife law enforcement operation ever conducted" (Behme, 1981; Iker, 1982b). This dramatization of the supposed "success" of the operation created the illusion that the USFWS was actually saving wildlife from unscrupulous animal dealers, while in fact the operation severely harrassed and entrapped many of this nation's top reptile researchers and most productive breeders (Brunner, 1981b; Lilley, 1981).

The raids themselves, which culminated the operation on July 16th, 1981, were highly unacceptable and unjustifiable in most cases. In these raids animals with registered permits were seized (Cauble, 1982; Lilley, 1981), as well as animals not requiring any permits (Cauble, 1982; Delles, 1982). Unsigned, undated search warrants were used to gain access to facilities (Brunner, 1981a). More than 109 important research animals were confiscated (Cauble, 1982; Lilley, 1981). Wildlife agents released an entire research collection of African lizards into southern California (Lilley, 1981). Illegal seizure of research papers, permits, business records, and the destruction of personal property — all by the USFWS (Brunner, 1981a; Lilley, 1982a). Reports of blatant entrapment are numerous (Behme, 1981; Ruiz, 1982), such as USFWS agents shipping illegal protected animals to persons unordered (Bloomer, 1982). During these raids wildlife agents demonstrated a remarkable inability to identify confiscated animals (Lilley, 1981), resulting in citizen's legal property being seized and taken away. In one case wildlife agents thought Rhinoceros Iguanas, *Cyclura cornuta,* might be the Gila Monsters, *Heloderma suspectum,* they were looking for (Celebucki, 1982). Large numbers of confiscated animals died through placement in inadequte care facilities, these deaths including many rare captive born animals (Cauble, 1982; Lilley, 1981).

Activities of the USFWS (and cooperating state agencies) since these raids were even more alarming. Requests for the return of illegally confiscated animals, research records, photographs, articles for publication, business records, and permits were refused (Behme, 1981; Lilley, 1982a). When illegally confiscated animals were ordered returned by a court of law the wildlife agency holding them promptly claimed they had been "stolen" (Lilley, 1982b). Wildlife agents reportedly intimidated victims into plea bargaining through various tactics of coercion, harrassment, and threats of financial 'ruin; apparently to avoid court trials and the accompanying exposure of their methods of operation (Behme, 1981; Tedder, 1981). This assured an impressive record of convictions to justify the "Snakescam" operation. In one of the few instances where a defendant did fight charges, all seized animals were ruled legal and ordered returned after lengthy court battles (Lilley, 1982b). (Several of these animals, seized in good health, were returned to the defendant dead). Taped conversations, being used as court evidence, in several instances appeared to have been modified and edited, where portions of the conversation favorable to the defense were inaudible or not recorded (Crutchfield, 1982; Lilley, 1982a). Several defendants were told to prove that their animals were not obtained in violation of any state or federal laws (Crutchfield, 1982; Lilley, 1982a); in short, they must prove their innocence — a direct violation of the United States Constitution, which guarantees innocence until proven guilty in a court of law! A wildlife warden actually stated in a public interview that the burden of proof is on the defendant (Ryan, 1981). With these indications that the USFWS was placing itself above the law a paranoia ensued, frightening wildlife breeders into incinerating their animals or releasing them into unnatural environments (Miller, 1981).

REASONS AND IMPLICATIONS

The reasons for initiating the "Snakescam" are not clear, but were probably an attempt to justify the existence of an ineffective and overgrown bureaucracy in the face of massive US government budget cuts and departmental phase-outs. The USFWS law enforcement division thus conceived "Snakescam" which, according to a USFWS press release, "uncovered a massive illegal trade in protected and endangered US reptiles." (USFWS, 1981). As it can be shown that the USFWS in fact created this "massive illegal trade" to begin with, the suggestion that the entire operation was an attempt to demonstrate a need for the service of the law enforcement division holds some merit.

This theory is further advanced by the ineffectivensss displayed by the USFWS in halting the most basic causes of wildlife decline — habitat loss and market hunting. As shown in the case of the tiny Snail Darter fish vs. the Tellico Dam project in 1976 (Iker, 1982a), the USFWS is frequently unable to stand up to powerful commercial lobbies and demands for construction sites for energy, natural resources, and housing. Significantly, habitat loss and degradation is by far the greatest cause of wildlife decline, and without adequate habitat preservation all other efforts to preserve wildlife have little meaning. The USFWS is also frequently ineffective in protecting wildlife from commercial market hunting, as shown in the recent furor over bobcat harvests in the US (Becker, 1980), where powerful fur interests have resisted any reduction in the take of bobcat pelts. Live animal trade, however, is an easy target as it is made up of small businesses and private individuals who do not have the resources to survive "power plays" by a

government agency such as the USFWS. The "Snakescam", then, might have been an attempt to "save face" in the midst of a losing battle for wildlife preservation by going after the "little guys" (the live animal trade).

It is almost certain that more animals died as a result of the "Snakescam" than were "saved" by it. Moreover, far from having curtailed truly illicit poaching operations, many of the persons charged had no dealings with wild caught animals, but were hobbyists and researchers disbursing captive bred offspring (Brunner, 1981b). Further, many of the allegations and charges had nothing to do with wildlife protection, but involved mislabelling packages and minor shipping violations (Behme, 1981; Brunner, 1981b). In sum, the operation appears to have encouraged poaching and destroyed meaningful captive research and breeding programs — exactly the opposite results one would expect from wildlife conservation operations. The public funds used in the "Snakescam" could certainly have been more wisely expended in *bona fide* conservation measures, such as habitat preservation, captive propagation, and public education.

The implications of this event are serious and of international concern. The "Snakescam" event is a dramatic example of a bureaucracy "run wild", seemingly concerned only with its own existence and heedless of the consequences of its actions. The wildlife laws which empower wildlife agencies to act in such a manner are clearly unacceptable. These laws are frequently to the detriment of the animals they were meant to protect. One would hope that the intent of wildlife laws would be to encourage the development of effective wildlife preservation strategies such as captive breeding programs, which now represent the very last hope of survival for an increasing number of species. Yet current laws and regulations preclude the development of large, genetically stable, captive populations which substantially enhance species survival (Parrot, 1977). Current restrictions prohibit the sale, trade, or transport of captive born protected animals over state or international bounderies. Permits for transactions are usually either unobtainable or impractical for large scale production of offspring (Baudy, 1982; Bruning, 1981). The expense of housing and feeding offspring that cannot be moved, sold, or traded is prohibitive (Bruning, 1981; Parrot, 1977). Rare and endangered species are being isolated or even euthanized in the US because of this situation (Baudy, 1982; Bruning, 1981). For example, a rare cat breeder is reporting a 90% reduction in births (Treanor, 1982). The endangered Indian Python, *Python molurus molurus,* is being crossbred with the Burmese Python, *P.m. bivittatus,* to avoid trade restrictions on the offspring (Porras, 1978). This practice pollutes gene pools and results in pure-blooded *P.m. molurus* being rarer than ever before. Breeders are refusing to breed the endangered Jamaican Boa, *Epicrates subflavus,* (Porras, 1978) and many avicultural facilities have stopped breeding the endangered Rothschild's Mynah, *Leucopsar rothschildi* (Bruning, 1981). Meanwhile, habitat loss is proceeding at an unprecedented rate worldwide, especially in areas of greatest species diversity. Species are thus prevented from breeding in captivity while their homes in the wild are being steadily destroyed — what better way to ensure species extinction?

The "Snakescam" operation has underscored the problems with wildlife protection laws. It has shown that enforcement of current wildlife legislation has serious negative impacts on wildlife, and has caused many wildlife breeders to pull their animals out of production (Parrot, 1977; Treanor, 1982). Specific legislation of concern includes the Endangered Species Act of 1973, the Convention on International Trade in Endangered Species of Wild Fauna and Flora of 1973, and the Lacey Act of 1900. It is critically important that this legislation be amended to effectively deal with the basic cause of wildlife decline — **habitat loss** — and to **encourage and assist** captive breeding programs, public education, and all other positive approaches to wildlife preservation. A one-and-only-one approach to wildlife preservation — prohibition — is a poor and unworkable strategy (Parrot, 1977). This problem must be resolved before irreversible damage to conservation programes is sustained, and future "Snakescams" systematically destroy our wildlife and our civil rights.

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PRELIMINARY RESULTS OF A COLLECTING TRIP TO ALGERIA — AMPHIBIANS AND REPTILES

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INTRODUCTION

The Algerian herpetofauna has received little attention, especially during the last decade, (Busack, 1976 and later literature), and so far the parts of North Africa most investigated are Morocco and Tunisia. The main aim of this journey was to make a collection of amphibians and reptiles, which were deposited in the Natural Museum of the Polish Academy of Sciences in Kraków. Also some living specimens were brought to Poland for further observations in captive conditions. Besides this, flies from the family *Ceratopogonidae,* scorpions and other invertebrates as well as Lichens were also collected.

Five species of amphibians and twenty eight species of reptiles were recorded during a 40 day journey in north-eastern Algeria in 1981. The trip was undertaken by plane to Alger and then with tents and rucksacks by buses, on foot and occasionally private cars to the Mediterranean Sea coast, Little Kabylie Mountains and Sahara, so collecting was limited. There were special difficulties in the Sahara, where care had to be taken of a few living animals, preserved specimens and photographic equipment (high temperatures and very fine sand), whereas dependence on water restricted free movement (lack of car). Thus the trip should only be regarded as reconnaissance prior to more detailed studies. Nevertheless comparatively good results were possible thanks to the fine cooperation of my friends Jan Ochalski, Dr. Ryszard Szadziewski and Dr. Krzysztof Toborowicz. The following localities were visited (see map):

1. Oued Berd (about 6km S. of Kherrata) in Petite Kabylie — Chaine des Babores at the picturesque flood plain (artificial lake) 11-12 April.
2. About 4km N of Kherrata 12-13 April.
3. Souk el Tenine 13-15 April.
4. Oued Ziama near Ziama Mansouriah 16-18 April.
5. Grarem 18-21 April. The camp was situated on a river bank among bushes of *Nerium oleander* and *Tamarix* sp. (plate 3). Day temperature about 22°C (40°C in sun); at night the temperature fell as low as 8°C. Every evening there were strong rains.
6. Guellal (about 2km S of Sétif) 24 April.
7. About 3km S of Ras Isly (Monts du Hodna) — NE of Magra 24-26 April and 3-4 May. Day temperature about 24°C, evening 12°C, early morning 4°C. Dry mountains (plate 2), rich life, especially in valleys near streams which had not yet dried up.
8. Oasis 33km N. of Biskra 27-28 April. Temperature during day 28-30°C, evening 16°C.
9. 6km S of Biskra 28-29 april. Sandy desert with tussocks of desert grasses and great abundance of roving animals at night.
10. Oumache (32km S of Biskra) 29-30 April.
11. Sowalah (about 10km SE of El Oued) 30 April-2 May. Typical Saharan oasis with date palms. Temperature in shaded tent 40°C, outside about 29°C.
12. Chegga 2-3 May.
13. Sétif 5 May. 1074m above sea level — meadows surrounding town.
14. Aokas 6-8 May.
15. Tichi 8-9 May.
16. Béjaia (2km NW of the town) 9-12 May. Picturesque rocky seacoast with typical mediterranean vegetation (maquis thickets, plate 1) and groups of monkeys, *Macaca sylvanus.* Day temperature about 22°C, night about 12-16°C, temperature on the surface sea water 17°C.
17. Akbou 12-13 May.
18. Surroundings of Tazmalt 13-14 May. Night temperature abut 13°C, day 25-27°C (in sun 47°C.)
19. 13km W of Mansoura 14-15 May.

A LIST OF SPECIES

Amphibians

1. *Pleurodeles poireti* Gervais (plate 4). Localities: 14. Two specimens (♀ — SVL 75 TL 152 and ♂ — SVL 60 TL 115 mm) collected under stones between road and beach in marshy area.
2. *Bufo mauritanicus* Schlegel. Localities: 1, 3, 5, 7, 8, 14, 15, 17, 18. Common even in arid region N of Biskra (8) where these toads dug in sand during the day and called very loudly in evening from a shallow stream. Juvenile specimen about 5cm in length found in Aokas and brought to Poland was swallowing newborn mice!
3. *Discoglossus pictus* Otth. Localities, 1, 14. Juveniles were especially common in these localities.
4. *Hyla meridionalis* Boettger. Localities: 14. Only some recently metamorphosed young seen.
5. *Rana ridibunda* Pallas. Localities: 1, 2, 3, 5, 7, 14, 17, 18. Very common in almost every locality but desert region. Near Ras Isly frogs called in the morning even when termperature fell to 4°C.

Reptiles

1. *Mauremys caspica leprosa* Schweigger. Localities: 3, 7. Four juveniles caught in Souk el Tenine (plastron length from 26 to 39mm). Near Ras Isly very large specimens observed basking on the bank as well as one young captured.
2. *Testudo graeca graeca* Linnaeus. Localities: 5. One little tortoise only found during the whole stay in Algeria. Such a decrease of population has probably been caused mainly by collection for export to France (Lambert, 1980).
3. *Hemidactylus turcicus* Linnaeus. Localities: 16, 19. Two specimens caught (SVL 42 and 50mm). Near Mansoura these geckos together with *Tarentola mauritanica* were hidden under stones.
4. *Ptyodactylus hasselquisti* Donndorff (plate 5). Localities: 7. Several adults collected on rocks during early morning (SVL 50-59mm).
5. *Stenodactylus stenodactylus mauritanicus* Guichenot (plate 6). Localities: 9. Two specimens preserved (o SVL 46 TL 85 and o SVL 63 TL 113mm). This beautiful gecko is active only at night hunting on dune insects. The female had 2 eggs in her oviducts.
6. *Tarentola mauritanica* Linnaeus (plate 7). Localities: 5, 7, 10, 11, 16, 17, 18, 19. Very common on rocks, fences, under stones, etc. The specimens from Oumache dunes were larger (two specimens preserved — SVL 82 TL 170 and SVL 88mm) and quite possibly they belong to another subspecies (maybe *deserti*?). Also a juvenile individual was captured under date palm leaves in Sowallah (SVL 35 TL 70mm). The largest specimen outside of Sahara measured SVL 71 TL 149mm (18).
7. *Chalcides chalcides* Linnaeus. Localities: 5, 6. Several specimens caught (largest SVL 112mm). Juveniles were common in Guellal by the roadside among pieces of paper, tins, etc.
8. *Chalcides ocellatus tiligugu* Gmelin. Localities: 7, 9, 14, 16, 18. Abundant on the seacoast west of Souk el Tenine, more rare elsewhere. Near Tazmalt one specimen seen when trying to eat a snail crushed by accident with stone. In Aokas these skinks were hiding under pieces of paper, foil bags, rags, etc. A female with complete lack of ocelli was captured near Biskra. This rare phenotype was determined with recently published key (Pasteur 1981, also Pasteur letter communication).
9. *Scincus scincus* Linnaeus. Localities: 11. One specimen caught (SVL 116mm) by local children using a hand-made trap similar to a mousetrap with dried fly as bait. We were told these skinks are "toys" for Arab children.
10. *Chamaeleo chamaeleon* Linnaeus. Localities: 18. One female caught while slowly walking from one bush to another on river bank stones.
11. *Acanthodactylus boskianus asper* Audouin. Localities: 9, 10. Two specimens preserved (SVL 58 TL 165 and SVL 59 TL 165mm). Common near Biskra.
12. *Acanthodactylus inornatus* Gray. Localities: 12. See comments for *A. scutellatus.*
13. *Acanthodactylus pardalis* Lichtenstein. Localities: 13. Two individuals found under stones (SVL 68 and 73mm).

14. *Acanthodactylus savignyi* Audouin. Localities: 3, 5, 7, 14, 17, 18, 19. Abundant in most places visited. The largest specimen from Souk el Tenine measured 182mm (SVL 70mm), smallest 105mm (SVL 40mm). Hatchlings reach SVL 28 TL 65mm.
15. *Acanthodactylus scutellatus* Audouin. Localities: 12. Two distinct forms of *Acanthodactylus* found in Chegga were common. The identification using key of Bons and Girot (1962) as well as letter communication with Pasteur and Bons led to the tentative conclusion that there were two separate species of *Acanthodactylus scutellatus* complex — *A. scutellatus* and *A. inornatus* (temporary I do not consider subspecies level). These extremely fast and agile lizards are ideal for observations. They seem to be very inquisitive, approaching the vicinity of my tweezers or running after a little stone thrown by me, which suggests vital necessity for these lizards to catch every small moving object. Capturing a frightened lizard was, however, almost impossible.
16. *Mesaline guttalata* Lichenstein. Localities: 8. Two specimens seen only (one caught SVL 44 TL 120mm).
17. *Mesaline olivieri* Audouin. Localities: 12, 19. Two specimens collected (largest SVL 46 TL 118mm).
18. *Ophisops occidentalis* Boulanger. Localities: 7. Two specimens only seen and caught (larger measured SVL 43 TL 120mm).
19. *Lacerta lepida pater* Lataste. Localities: 1, 3, 4, 5, 7. Common ashore east of Souk el Tenine, both large adults and juveniles (smallest SVL 57 TL 155mm). Very aggressive lizard, painful bites. The north African subspecies is regarded recently by Bischoff (1982) as valid species *Lacerta pater.*
20. *Podarcis hispanica* Steindachner. Localities: 7. Two specimens collected (larger SVL 46 TL 136mm).
21. *Psammodromus algirus* Linnaeus. Localities: 1, 2, 3, 4, 5, 7, 14, 16, 17, 18. The most abundant reptile not found only in Sahara. Both juveniles (largely SVL 35 TL 109mm) and adults emitted squeals when handled.
22. *Psammodromus blanci* Lataste. Localities: 13. Two specimens collected (SVL 46mm and SVL 42 TL 123mm). Also squealed when captured.
23. *Coluber hippocrepis* Linnaeus. Localities: 5. One adult specimen captured in the morning in dew grass, another found killed. Very aggressive when photographed evoking fear in faces of some local men observing this enterprise.
24. *Macroprotodon cucullatus* Geoffroy St.-Hilaire. Localities: 6, 16. Two specimens caught, one — from Guellal SVL 323 TL 390mm — was placed in the jar with *Ch. chalcides,* where it swallowed the skink even though it had been disturbed. This specimen, brought to Poland alive, did not want to eat offered lizards of all sizes, but immediately ate a dead *Ch. chalcides.*
25. *Malpolon monspessulanus* Hermann. Localities: 5. One young individual found under the stone.
26. *Natrix maura* Linnaeus (plate 8). Localities: 5, 7, 14, 17, 18. The most common snake. One specimen from Aokas disgorged three little eels in herpetological bag. Collected both juveniles and adults.
27. *Natrix natrix astreptophora* Seoane. Localities: 14. One large adult seen.
28. *Vipera lebetina mauritanica* Gray. Localities: 18. One young individual found under stone and brought to Poland alive. The African subspecies are now sometimes regarded as *Vipera mauritanica mauritanica* and *V.m. deserti.*

Lastly, some words should be added concerning *Uromastyx acanthinurus* and *Varanus griseus.* Though none were seen in the field, stuffed specimens could be bought in every souvenir shop or market. In El Oued I saw a full car with freshly prepared monitors for trade. Surely this cannot be irrelevant to population quantity.

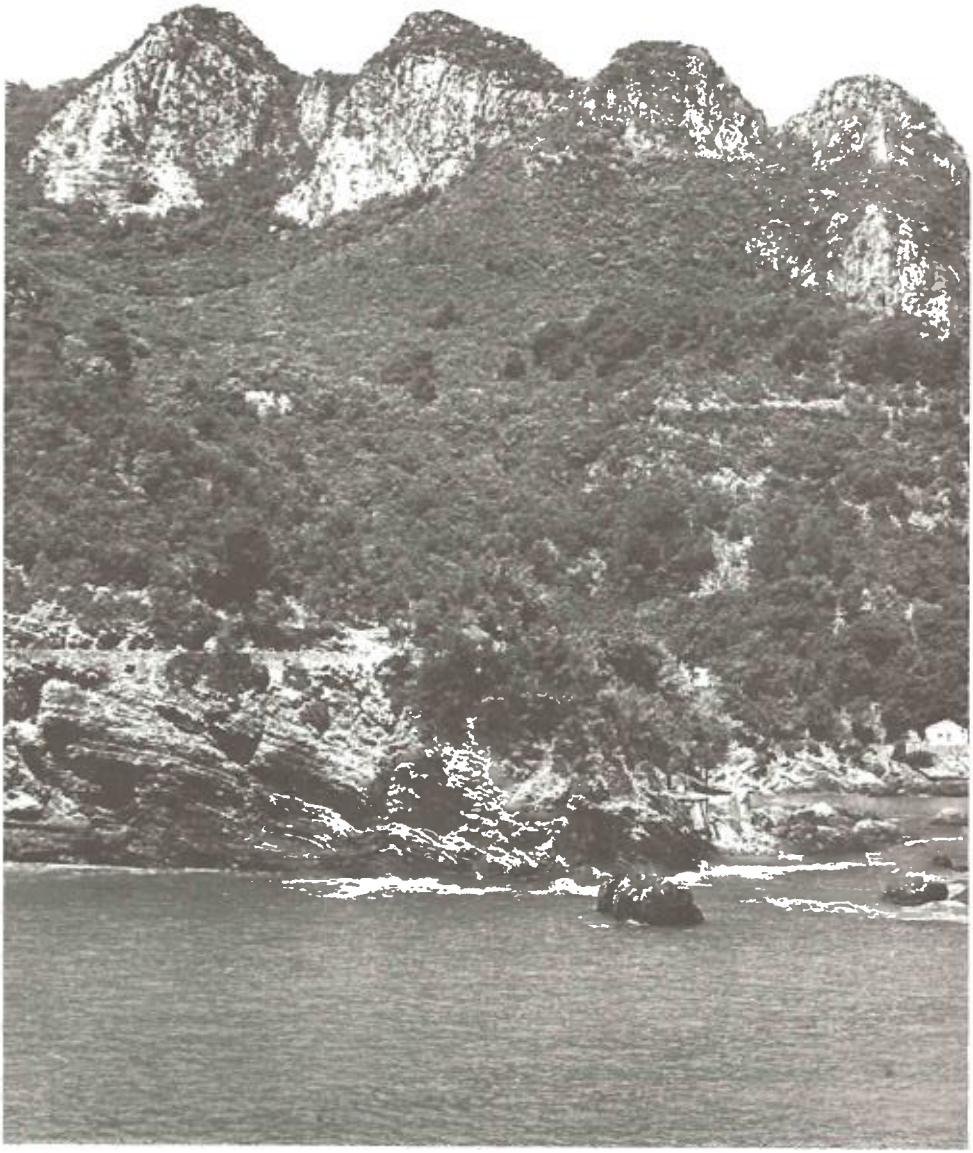

Plate 1. Mediterranean Sea coast near Béjaia.

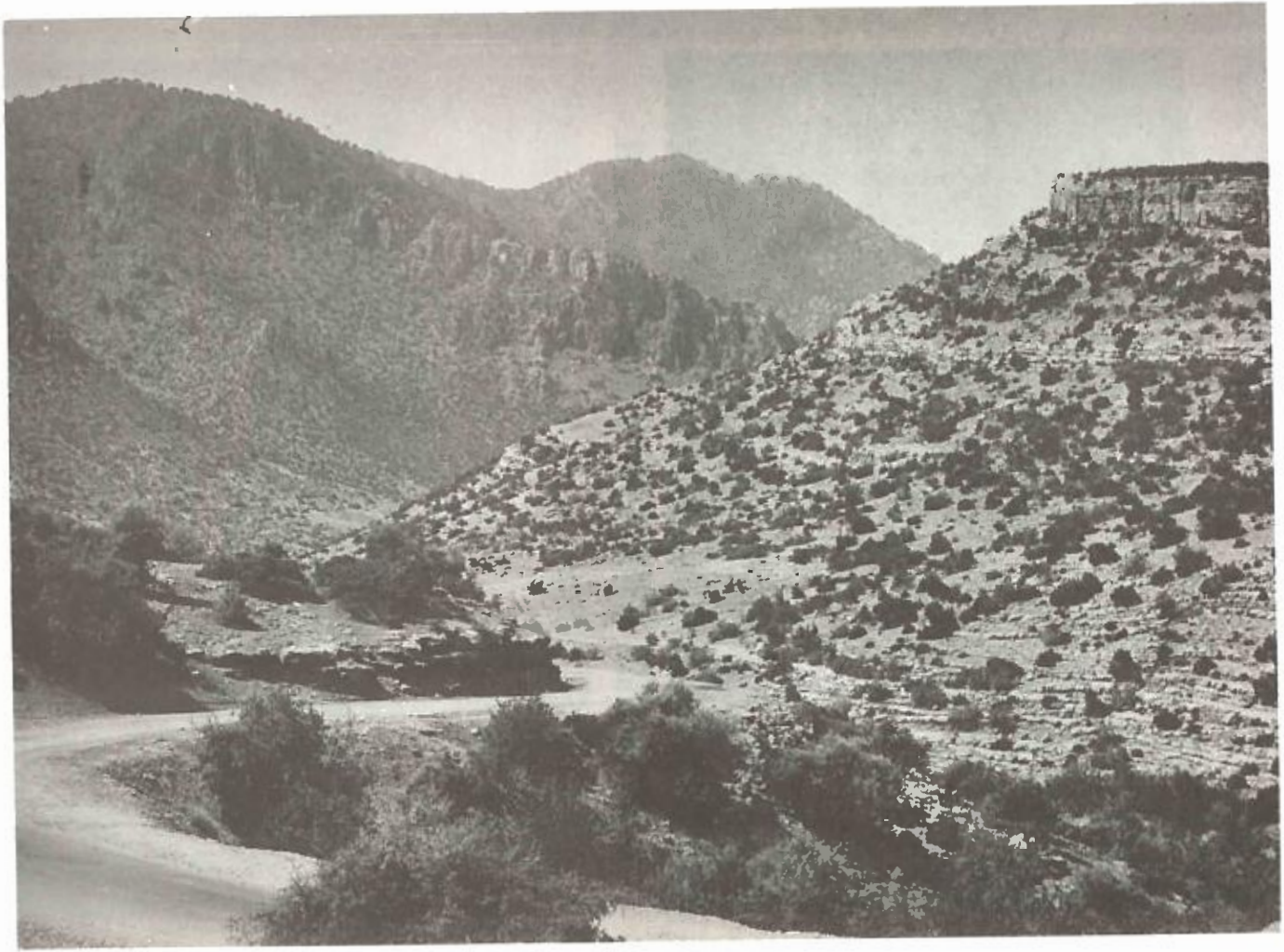

Plate 2. View of the Monts du Hodna near Ras Isly.

Plate 3. Biotype in the vicinity of Grarem.

Plate 4. A female of *Pleurodeles poireti.*

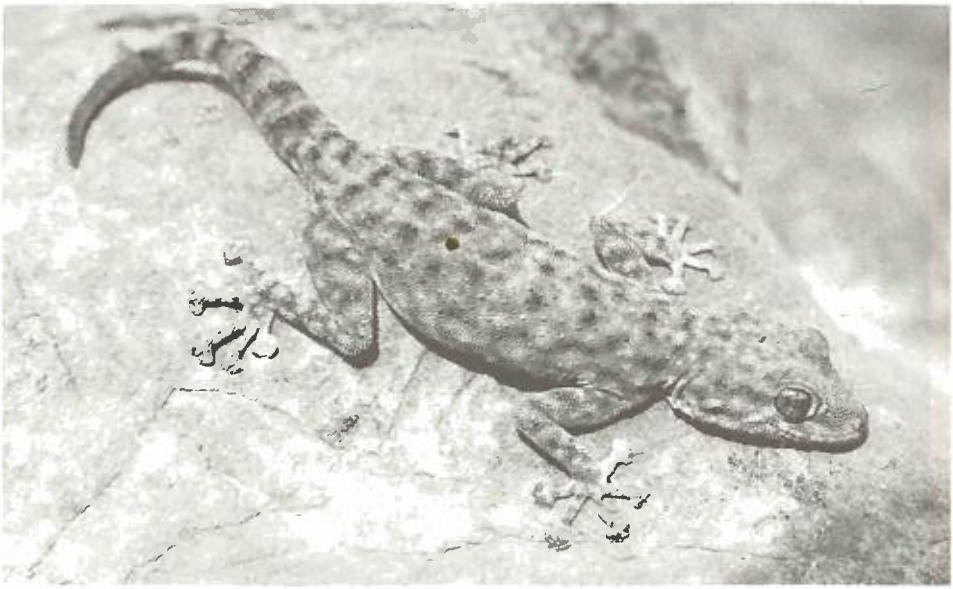

Plate 5. *Ptyodactylus hasselquisti.*

Plate 6. *Stenodactylus stenodactylus mauritanicus.*

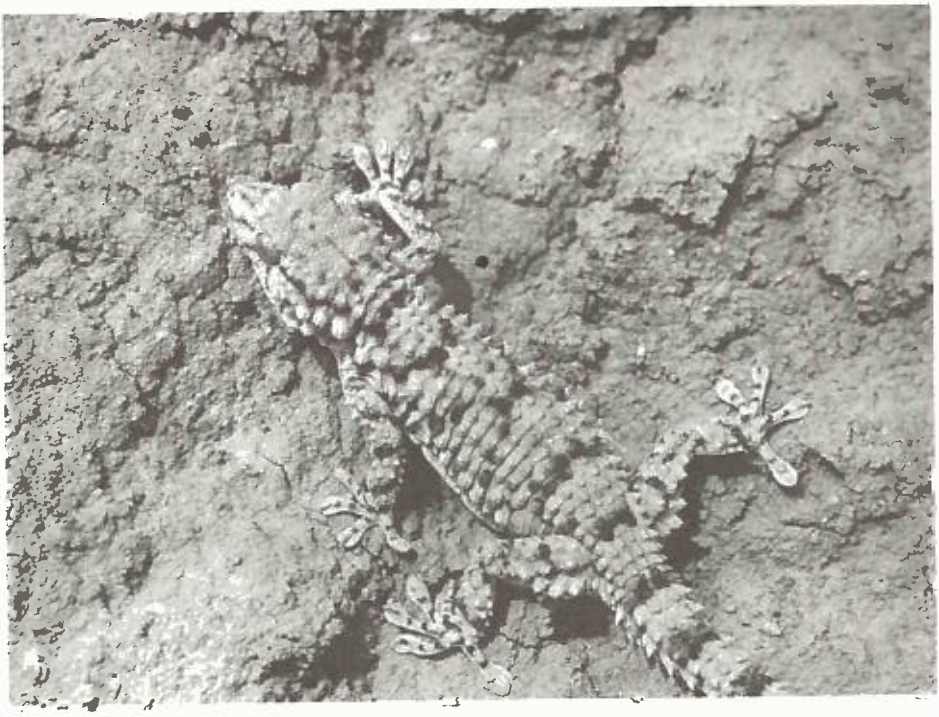

Plate 7. *Tarentola mauritanica* from Oumache.

Plate 8. Juvenile *Natrix maura.*

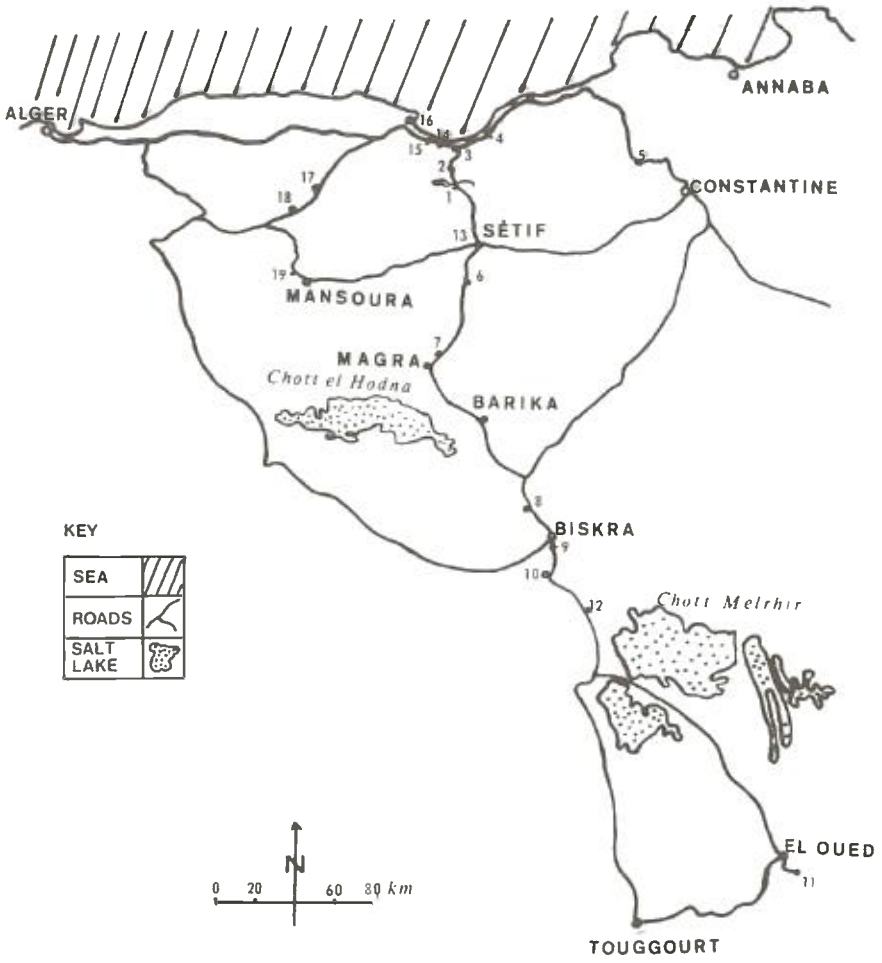

Fig. 1. Map showing localities in north-eastern Algeria visited by the author.

ACKNOWLEDGEMENTS

I am grateful to Professors G. Pasteur and J. Bons for their help in some lizard species identification.

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NOTES ON THE INCUBATION OF THE EGGS OF THE GRASS SNAKE, *NATRIX NATRIX NATRIX*

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INTRODUCTION

The methods employed by herpetologists to artificially incubate reptile eggs are numerous, and many of these appear to be successful. In addition to a variety of incubation mediums there is often a diverse approach to the thermal and moisture levels of the incubation medium. During incubation there are many reports of changes in the dimensions and the masses of the eggs (see Packard et. al., 1977, for review). Few of these data however have been quantified. This paper reports on a method used to incubate a clutch of grass snake *(Natrix natrix natrix)* eggs based on a regime of fluctuating temperatures. Information is given on the results of this method and also of the changes in mass and dimensions of the eggs as incubation proceeded.

METHOD

On the September 23rd 1980 a clutch of ten eggs were deposited by a newly imported female Italian grass snake *Natrix natrix natrix*. These eggs ranged in length from 25-30mm, in width from 16-18mm and in mass from 5.2-6 grammes. The eggs were incubated in vermiculite to which water was added. The ratio of water to vermiculite was in the region of five parts water to one part vermiculite (in weight). The eggs were sunk into the medium until they were approximately two thirds buried. The container was heated by an incandescant light bulb which was turned on around 0700 hrs each morning until around 2300 hrs each evening. This produced fluctuations in temperature (Fig. 1). Throughout incubation records were taken of the changes in length, width and masses of the eggs at 10, 20, 30 and 40 day intervals. Length and width were straight line measurements across the eggs. Egg mass was determined by triple balance scales.

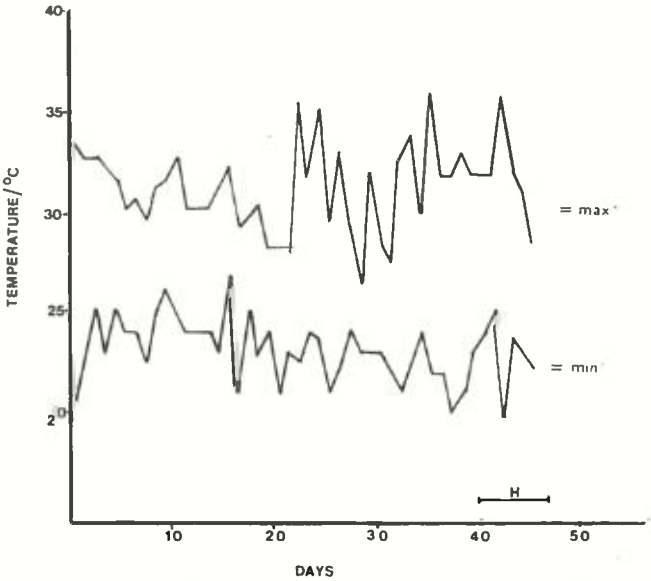

Fig 1. A graph showing the maximum and minimum temperatures recorded to incubate *N. natrix* eggs. Throughout incubation a maximum temperature of 36°C and a minimum temperature of 20°C was recorded. The mean temperature based on all temperature records was 27.1°C (n = 90). The hatching period (H) is shown at the lower end of the graph.

RESULTS

During incubation three of the eggs showed signs of collapse. On opening these no sign of embryonic development could be found. Hatching in the remaining eggs began after 40 days; the last egg hatched after 46 days. Complete emergence by the young snakes took place 18-48 hours after first splitting of the shell casings. On inspection one of the young grass snakes was found to have a deformity of the spinal column.

Throughout incubation changes in length, width and mass were observed. Final lengths just previous to hatching were from 29-33mm, widths from 23-27mm and masses from 14-18 grammes. The changes in dimensions and mass are highly correlated (length v. mass, $r = 0.87$, $P < 0.001$: width v. mass $r = 0.93$ $P < 0.001$). Growth between these variables can be described by the equation $y = b + m \log X$. Where the egg length or width (y) in mm is related to the logarithm (loge) of the mass x in grammes by the y intercept b and the slope m. This gives for egg length,

$$y = 16.9 + 5.2 \log x \qquad (1)$$

for egg width,

$$y = 4.09 + 7.64 \log x \qquad (2)$$

It is interesting to note that a slightly higher correlation has been found between egg width and mass. Figure 2 shows the data plotted on semi-logarithmic coordinates with lines taken through the data predicted by the constants in these equations. The data are based on 5 successive measurements on the 7 eggs which reached full term (i.e. $n = 35$).

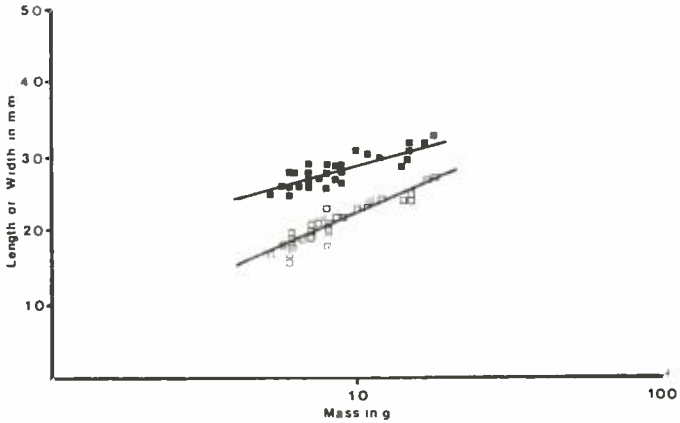

Fig. 2. A graph on semi-logarithmic coordinates of egg mass plotted against egg length (■) and egg width (□). The lines taken through the data are based on equations (1) and (2) in the text.

Three dimensional growth can be described after transforming the data to logarithms and by the multiple regression,

$$y = o \times \beta_1 m \beta_2$$

where the mass (y) in grammes is related to the egg length (x) and egg width (m) in mm by the constants o, β_1 and β_2; 95% levels of significance have been attached to β_1 and β_2 using the t distribution (Bailey 1959). Thus,

$$y = 0.00054 \times 1.31 \pm 0.6m \; 1.75 \pm 0.32 \; (r^2 = 0.88, n = 35) \qquad (3)$$

This equation has a slightly higher correlation than equations (1) and (2); i.e. $r = \sqrt{r^2} = 0.94$.

Changes in egg mass are also time dependant. This can be estimated from the quadratic equation,

$$y = 6.273 - 0.062 X + 0.007 X^2 \; (r^2 = 0.93) \qquad (4)$$

Where the egg mass y in grammes is determined from the incubation period x in days. Figure 3 is a graph showing these time dependant changes in mass for *Natrix* eggs with a line taken through the data predicted by the constants in this equation.

After a period of 4 weeks during which the young snakes would accept no food they were placed in a small container and subjected to a winter cool period. On April 10th 1981 they were housed in a heated vivarium and offered small *Xenopus laevis* and their larvae which they eagerly accepted.

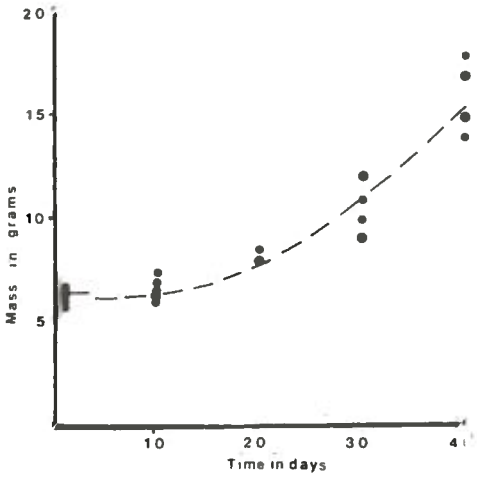

Fig. 3. A graph showing time dependant changes in mass of grass snake eggs. The large circles represent more than one data point. The line taken through the data is based on equation (4) in the text.

DISCUSSION

According to Smith (1973) Rollinat recorded a 42 day incubation period for *Natrix* eggs at 20-26°C. This is in approximate agreement with Riches (1976) who states that at 27-29.5°C incubation should take from 40-46 days, but it is marginally longer than a clutch incubated by Swailes (1979). Although it would appear that persistant high or low temperatures are to be avoided (Swailes, 1979; Riches, 1976), the fluctuating temperature regime described in this paper resulted in a normal incubation term of 40-46 days. The growth recorded for these eggs might therefore also be regarded as typical and the mathematical models obtained from the data a useful tool in determining the egg masses at successive stages during incubation. A quantative comparison of growth of the eggs of the lizard *Basiliscus basiliscus* has been described in tabulated form by Claesson (1979) and it is interesting to note that equation (3) agrees well with these data.

ACKNOWLEDGEMENTS

I thank David Hinchcliffe for giving me the grass snake eggs. Alan Jayes and Dr R.S. Thorpe critically read and made helpful suggestions on the manuscript. Helen Meek typed the manuscript.

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OBSERVATIONS ON THE SEXUAL BEHAVIOUR OF THE BOA CONSTRICTOR, *CONSTRICTOR CONSTRICTOR*, IN CAPTIVITY, WITH NOTES ON AN UNSUCCESSFUL PARTURITION

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INTRODUCTION

This is a summarised account of the sexual behaviour of a pair of *C. constrictor*, observed through the winter of 1981. There are two females and three males in the collection, but only one pair showed any signs of sexual activity, the other three specimens being rather small (4½'), and probably sexually immature.

The snakes are maintained in a room with a background temperature of approximately 70°F in summer, with a gradual fall to approximately 65°F in winter. Additional warmth is provided by 75w spotlamps positioned at one end of each cage, giving a temperature gradient of around 90-75°F in summer, and 85-70°F in winter. The snakes receive 14 hours of artificial light per day, with no natural sunlight reaching the basement room. For most of the year the sexes are kept separately in cages measuring 6' x 2' x 2', only being placed together from October to February. Newspaper is used as a substrate, and cork bark is provided for hiding places.

The male (5½' approx.) was introduced to the female (7½' approx.) on 11.10.81. Initially she appeared to be very interested in him, flicking her tongue over his body for several minutes. However, this exploratory, inquisitive behaviour very quickly changed to apparent aggression, the female thrashing her tail and bobbing her head violently. At this stage physical contact with the male was avoided if possible, and he showed no interest in her. After a few hours the snakes had settled down, and would coil up together under the lamp.

On 28.11.81 the female shed her skin, and the male took an immediate interest in her, following her around the cage and exploring her body with his tongue.

On 4.12.81 the male shed his skin.

On 22.12.81 the first attempted copulation was observed. The male coiled over the female's body, attempting to stimulate her with alternate hard contraction and relaxation of his body, sliding coils slowly up and down her length in the process. On only a few occasions did the male bring his spurs into play, scratching them rapidly over the dorsal and lateral regions around the female's cloaca. However, use of the whole body in stimulation appeared to be far more common. These periods of activity lasted for several hours, generally taking place in the dark either early in the morning before the lights had been switched on, or at night after they had been turned off. The male would try to press his cloacal region into contact with the female's, but she continually resisted his efforts, and did not co-operate in any way. Additionally, the male tried to stimulate the female by pressing his chin on the top of her head, with occasional rubbing and bumping (see plate 1). This behaviour was observed very infrequently.

The first successful copulation was observed at 7.45 am on 27.12.81. The male and female were lying apart with their bodies pointing in opposite directions, joined only at the cloacal region. The male's hemipenis was just visible. The total time of copulation is unknown, but it was maintained for a further 45 minutes. Copulation was again observed on the following two evenings, and lasted for over an hour on both occasions.

Sexual activity ceased on 29.12.81. The female accepted her last meal for 102 days on 24.1.82 (she did not feed again until 6.5.82, when she took one dead rat). She resumed normal feeding habits on 30.7.82, after parturition.

By early May the female was visibly pregnant, the posterior half of her body being consideraly enlarged. She spent most of May hiding under the newspaper and bark in the cage, but by early June she was making frequent appearances, basking under the spotlamp for long periods. It was observed that once her body temperature had reached a certain level, she would "shuttle" very

frequently, presumably maintaining her internal temperature within very precise limits. Variable amounts of the posterior $^2/_3$ of the body were hidden and exposed alternately, the cranial end remaining concealed for most of the time (see plate 2).

By early July she was looking distinctly pregnant. The posterior $^2/_3$ of the body was rather pear-shaped in cross-section, with the vertebral column protruding significantly above the dorsal surface. Posterior regions of the body were noticably distended, with considerable areas of skin showing between the scales. The point of maximum width on the body was 12cm, as compared with 8cm before mating — an increase of some 50%. The anterior $^1/_3$ of the body was extremely emaciated, with a lot of folded, loose skin. Occasionally the female would be found lying on her side, and she would hardly ever coil up tightly. At this stage the males were removed, and placed in cages of their own.

On 12.7.82 very rapid breathing was observed (1 inhalation/exhalation per second approx.) at approximately half hour intervals. This was accompanied by sudden, rippling contractions over the posterior half of the body. This activity lasted about one minute and was only observed for one day.

On 20.7.82 rapid spasmodic contractions of the whole body were observed, with violent lateral compression. Some uric acid was passed, with a little clear fluid.

From 25.7.82 — 28.7.82 she was very restless, continually moving round the cage and under the newspaper.

On the morning of 29.7.82 she was equally unsettled, but now her tail was also held raised in the air for long periods of time. On returning to the cage at 8.00 pm, it was found that she had produced her young. All were still confined to their membranes, and all but one were dead. The one that was still alive died about 15 minutes after being removed from its membrane. In total 9 babies and 12 infertile ova were produced (see plate 3). Mean length of the young was 37.3cm, with a range of 26.5-42cm.

Some of the young showed considerable deformation of the vertebral column, and many had unclear markings (see plate 4). The reasons for this unsuccessful parturition are not clear, although failure to absorb available calcium has been implicated as a possible causative factor.

Any comments or suggestions fom members would be welcome.

Plate 1. Male boa (top) pressing and rubbing female's head.

Plate 2. Thermo-regulation in the gravid female boa.

Plate 3. Dead neonates and infertile ova as found.

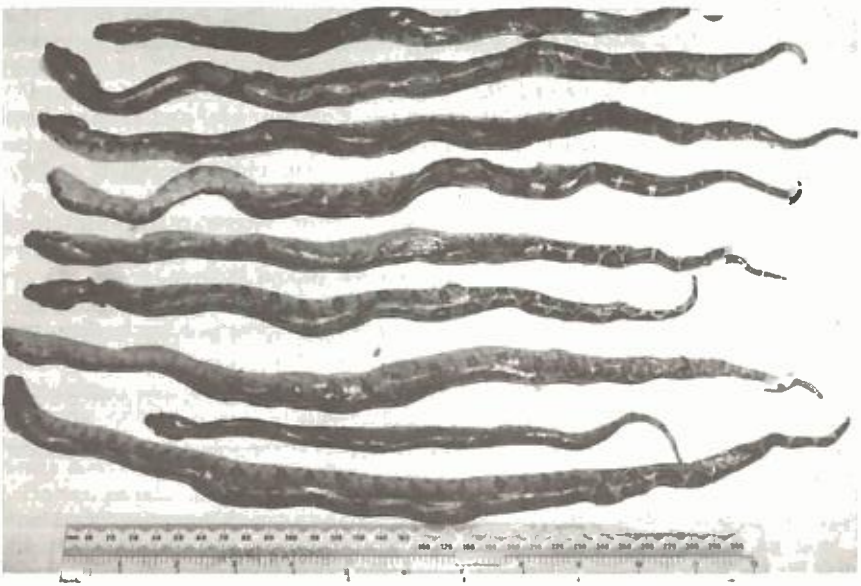

Plate 4. Neonates showing deformation of the vertebral column.

A SURVEY OF TORTOISES IMPORTED INTO THE UNITED KINGDOM DURING 1982 — WITH SPECIAL REFERENCE TO OXFORDSHIRE

An Interim Report

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INTRODUCTION

Tortoise importations have been licensed since 1970 under the Animal (Restriction of importation) Act 1964. This act was superceded by the Endangered Species (Import and Export) Act 1976, which implemented Britain's obligations under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITIES) 1973. Tortoise importation data has been collected since 1965 (Lambert, 1980). Tortoise imports into this country during the period 1965 to 1982 were made up of three species, *Testudo graeca, T. hermanii* and *T. horsfieldii. T. graeca* has always made up the majority of the imported species, with *T. horsfieldii* never making up more than 5% of the imports after 1967, with none being imported since 1972. During the current year (1982) licenses were issued by the Department of the Environment to import 35,000 tortoises, this compares with an average of 145,958 per year for the period 1968 to 1977 (Lambert, 1980) and 50,000 per year for the period 1979 to 1982 (estimated figures). This reduction is as a result of a voluntary agreement between the importers and the D.o.E. All licenses granted this year (1982) related only to the importation of *T. graeca.* The tortoises imported originate from one area of European Turkey (Baltrock, personal communication).

As a result of pressure from conservation and animal welfare groups the D.o.E., acting under the Endangered Species (Import and Export) Act 1976, issued a section 6 directive in May 1982. This direction requires that from the time of import the tortoises must be kept under conditions suitable for their survival in the United Kingdom. The supplier of the tortoise being required to obtain a signed undertaking from the purchaser to this effect.

The 'conditions suitable for their survival in the United Kingdom' were discussed at a meeting held on the 6th April 1982. The meeting at the Nature Conservancy Council, Belgrave Square, London, was attended by representatives from the D.o.E., R.S.P.C.A., Pet Trade Association, and an independant veterinary advisor. The conditions agreed are set out below:—

1. Access to weatherproof accommodation whenever a tortoise is kept outdoors, and overwintering either in hibernation at a minimum temperature of 5°C or in an active state at a minimum temperature of 20°C.
2. Constant access to food and water, except when preparing for and during hibernation. Food supplied must contain fruit and vegetables (especially green vegetables) and must be supplemented occasionally with canned dog meat, vitamins (particularly A, D3, E and B12) and Calcium.
3. Except when confined for hibernation, transportation, veterinary treatment, temporary display for the purposes of retail sale, tortoises will not be kept at a density of more than:
   (a) Two per square metre, for animals between 10 and 15cm in length, or
   (b) One per square metre, for animals more than 15cm in length.
   Tortoises will not be kept on their backs, nor will they be unnecessarily disturbed when hibernating.

The author has undertaken a survey to assess the survival rate of tortoises imported during 1982 and the rate of compliance with the section 6 direction. The survey is based on Oxfordshire and only tortoises supplied directly to pet shops in Oxfordshire, purchased and still resident in the county are included.

520 tortoises were directly supplied to pet shops in Oxfordshire. 370 were supplied by Bio Pet Ltd., Unit B4, Button End Industrial Estate, Harston, Cambridge CB2 5NX and 150 were supplied by Ladydell Livestock Importers Ltd., Hangleton Lane, Ferring, Worthing, Sussex BN12 6PP.

11 tortoises were found dead on arrival at the pet shops, which was the first time they were unpacked after shipment from Turkey, 6 from those supplied by Bio Pet Ltd. (this represents a mortality of 1.6%) and five from those supplied by Ladydell (this represents a 3.33% mortality). The mortality for these tortoises from shipping to arrival at the pet shop is therefore 2.1%.

10 tortoises died in the shop before they could be sold. This represents a mortality of 1.9% for the period from delivery at the shop to point of sale.

Therefore 21 tortoises from the two consignments totally 520 animals died in the period from leaving Turkey to point of sale, this represents a mortality of 4.03%.

205 tortoises (41%) were sold to purchasers living outside the Oxfordshire County boundary. The species and sex of the remaining 315 tortoises were determined:—

Species

Testudo graeca ibera	305 (97%)
Testudo hermanni	10 (3%)

Sex

Males	260 (82%)
Females	55 (18%)
Sex ratio Males : Females approx. 4:1	

160 tortoises were weighed and measured, the body mass in grams, length in mm, Carapace length in mm, Plastron length in mm, and width of the fourth vertebral scute in mm were all recorded. All were larger than the 100 minimum length voluntarily agreed by the D.o.E. and the Pet Trade Association. Lengths varied from 140mm to 223mm. Carapace lengths from 180mm to 264mm. Body mass from 180 grams to 2200 grams. Jacksons Ratio', (Jackson, 1980) was determined for each tortoise; the majority fell within normal limits.

The morphometric characteristics will be compared with those published for the wild *T. graeca ibera* populations in W. Turkey and N.E. Greece (Lambert, 1982). The initial impression is that the carapace length frequency distribution in the imported animals reflects that found in the wild population.

88 of the 160 tortoises have been followed up in greater detail to check if the undertaking is understood and being adhered to. The owners were asked a series of questions:—

1) Do you understand the undertaking that you signed and do you understand the P.T.A. leaflet on Tortoise Husbandry and Breeding. (This leaflet was provided with each tortoise sold)?.

100% of owners said they understood the undertaking and leaflet with only 4 owners asking any supplementary questions about the leaflet. This response I feel reflects a reluctance to appear ignorant, as close questioning soon revealed large gaps in their knowledge.

2. What food is supplied for your tortoise?

The types of food were split into five main divisions:

a) Lettuce and green vegetables.
b) Tomato and cucumber.
c) Meat.
d) Fruit.
e) Other foods. These included green beans, peanuts, cheese and dog biscuits.

73 of the owners supplied Lettuce and Greens. (82.95%).
45 of the owners supplied Tomato and Cucumber. (51.11%).
33 of the owners supplied Meat. (37.5%).
20 of the owners supplied Fruit. (22.72%).
8 of the owners supplied other foodstuffs. (9.09).

3. Do you provide a vitamin and mineral supplement?

21 owners supplmented the diet as per direction. (25%).
67 owners didn't supplement the diet. (75%).

4. Do you provide shelter for your tortoise?

81 owners provided a satisfactory weatherproof shelter. (92%).
7 owners provided no shelter. (8%).

5. Have you previously owned or do you currently own a tortoise?
25 people had previously owned tortoises.
14 people currently owned tortoises.
6. How long had you had the tortoise before it died or how long have you had your tortoise?
37 tortoises had died, 32 in hibernation and 5 from causes unconnected with hibernation. The average life-span of these tortoises was 5.4 years with a range of 6 months to 25 years.
18 tortoises were still alive, the average period in captivity was 4.3 years with a range of 18 months to 15 years.

Of the 88 tortoises followed up 7 died before hibernation, this represents a mortality rate of 7.95% and 3 were lost (3.4%).

Of the seven tortoises that died, three died from complications associated with abscessated limbs, two didn't eat and died in spite of veterinary treatment, one was found dead after being left out on a cold wet night and one died from an overwhelming infection associated with an under-running infection of the scutes.

Therefore of the 88 tortoises visited 7 died in the period between point of sale and hibernation and three were lost. The accumulative mortality rate is therefore:

i. Shipping to delivery at petshop	2.09%
ii. Delivery to point of sale	1.90%
iii. Point of sale to hibernation	7.95%
Total	11.94%

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NOTES ON SOME OF THE REPTILES AND AMPHIBIANS OF LANGUEDOC, SOUTHERN FRANCE

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The following is an account of the herpetofauna I observed during a two week holiday at Valras Plage, between 28th August and 8th September, 1982. Valras Plage is a small resort near Béziers, in the department of Herault.

The first species observed was the Green Lizard, *Lacerta viridis*, which was quite common in and around the thick bamboo hedge which surrounded the campsite. This species was also seen in densely-vegetated parts of the dry salt-marsh that separated the campsite from the coastal dunes. The dunes themselves proved to be very interesting, harbouring reasonable numbers of the Spanish Sand-Racer, *Psammodromus hispanicus*. Although this species has been recorded from relatively few places in France, it is said to be present at Sete, a few kilometres to the east, so it's presence at Valras is not very surprising. Two other species were seen on the dunes, the first, a Montpelier Snake, *Malpolon monspessulanus*, was found in hiding under an old board, and, on being disturbed, slid fluidly away through the marram grass. About twenty metes from this spot, a large male *Lacerta lepida* was basking on an old oil-can. Despite spending many hours in the dunes, this was the only Eyed Lizard that was seen.

The wall lizard, *Podarcis muralis* was seen almost everywhere, (with the exception of the dunes), but the greatest numbers were found on the walls of the old city of Carcassonne, where literally hundreds of lizards were scuttling about.

One particularly humid evening proved to be to the liking of the resident amphibians on the camp. In the space of about thirty minutes I counted six Natterjacks, *Bufo calamita*, wandering across a sandy field in an empty part of the site. A Parsley frog, *Pelodytes punctatus*, was found squatting at the base of a tree; I was particularly pleased to find this animal as it was the first of this species that I had ever seen. Two large *Hyla meridionalis* were resident in the shower block, and were often observed late at night feeding on the insects that were attracted to the lights.

Two notable road casualties were seen near the camp: the first, an Asp viper, *Vipera aspis*, was found by a vineyard; the second, a large Western Spadefoot, *Pelobates cultripes*, was found on a small lane passing through sandy meadows near the dunes.

British Herpetological Society Bulletin, No. 6, 1983

A NOTE ON THE CAPTIVE MAINTENANCE AND BREEDING OF THE PYRENEAN MOUNTAIN SALAMANDER *(EUPROCTUS ASPER ASPER* [DUGÈS]

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The nominate subspecies of the Pyrenean Mountain Salamander is an inhabitant of rocky, montane streams at an altitude of 600m or more in the Pyrenees of Spain, Andorra and south-west France, where it spends much of its life in water or beneath waterside stones. Several authors (e.g. Steward, 1969) have considered this and other montane urodeles impossible to maintain under captive conditions because of their low temperature and high oxygen requirements.

Two pairs of *E. a. asper* were obtained in November 1981 and housed in 30 x 20 x 20cm plastic tanks, one pair per tank. Each tank was fitted with a polystyrene and glass lid, the layer of polystyrene allowing the entry of an air-line but preventing the escape of the salamanders. A thin layer of coarse gravel was used as a substrate and each aquarium was filled to a depth of 8cm with well-matured tap water. Several small, sloping pieces of slate and plant pot were placed on each tank bottom to serve as retreats whilst land areas were provided by supporting large flat slates upon rocks. Vigorous aeration was provided and the tanks placed at floor level in a cool, dark corridor. Temperature varied with the ambient temperature, between a minimum of 0°C (aeration prevented freezing) and a maximum of 18°C (mean temperature 9.5°C). The salamanders, although sluggish at all times, remained active throughout the year. Tank cleaning was kept to a minimum, the water being changed once a month and each animal was fed individually once a week, thus avoiding undue disturbance.

All specimens accepted food readily, taking small pieces of earthworm (always rejecting pieces larger than about 2cm) and ox-heart enriched with Vionate. Various small aquatic invertebrates i.e. *Chironomus riparius* larvae, *Asellus aquaticus* and *Ephemeroptera* spp. were also taken. Feeding occurred only in the water and these specimens have been observed to spend very little time on land.

Mating behaviour, as described by Ahrenfeldt (1960) has occurred in every month of the year and is prolonged, pairs often feeding whilst coupled. On 10.6.82, three, creamy white eggs were found attached to the underside of a submerged piece of slate, although one egg had unfortunately been crushed. In addition, two clear jelly masses were found close to the eggs. On 23.6.82, the same pair produced a further five eggs. Mean temperature during the month of June was 15°C. All eggs were moved to a well aerated bowl of matured water. The first two eggs hatched on 11.7.82, approximately one month after laying. Of the second batch, one egg hatched on 17.8.82, one egg disappeared and was presumably eaten by one of the tadpoles and the other three were infertile and were attacked by fungus (*Saprolegnia* sp.).

The tadpoles were fed upon *Paramecium* and *Cyclops,* these having been cultured in 'green' water enriched with "Liquifry No. 2". As they grew, they also accepted small *Culex* sp. larvae and chironomids. Three months after hatching, the largest tadpole attacked the two smaller tadpoles, killing one individual and mutilating the other, such that it died of its injuries three days later. Clearly, youngsters will have to be separated in future, although similar species e.g. *Salamandra s. salamandra,* have not proven to be so aggressive towards their peers (Wisniewski & Paull, in prep.).

The remaining youngster, a male, now measures 4cm at the age of six months and is feeding well upon whiteworms (Enchytraeidae).

Both adults and tadpoles have proved to be reasonably hardy, even when their aeration system

failed during hot weather. Under conditions of minimal disturbance, cool temperatures and high humidity it should be possible to breed this species regularly.

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A NOTE ON THE BREEDING OF THE RED-SPOTTED NEWT IN CAPTIVITY

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In a previous note (Verrell, 1982), I described a regimen for maintaining adult red-spotted newts *(Notophthalmus viridescens)* in breeding condition in the laboratory. I here describe a method for rearing juvenile newts, or efts, from eggs deposited in captivity.

This method was employed in the spring breeding season of 1982 as part of a larger investigation of the reproductive biology of this species. All of the adults used were derived from the same source and maintained under the same conditions as described previously (Verrell, 1982). Thirteen adult females were paired with adult males, and each was allowed to become inseminated with a single spermatophore. These females were then isolated in transparent plastic boxes measuring 20 x 12 x 12cm, and containing unaerated, aged tap-water at a temperature of about 20°C and fragments of a variety of water weeds. The females were fed daily with chopped-up earthworms, and all eggs deposited in the weed removed and placed in an opaque plastic trough measuring 27 x 24 x 15cm; this contained aerated, aged tap-water at about 20°C. Details of the breeding efforts of the 13 females are presented in Table 1. Although all were inseminated, three of the 13 females failed to lay any eggs. For the 10 females which did lay, the interval from the time of insemination to the onset of oviposition ranged from one to five days. There was a positive correlation between the number of eggs laid and female snout-vent length ($r = 0.7$, $P < 0.05$).

TABLE 1. The Breeding Efforts of the Thirteen Inseminated Female Newts

Female	Snout-vent length/mm	Number of eggs laid
1	43	None
2	44	20
3	45	56
4	46	21
5	46	23
6	46	48
7	47	52
8	48	34
9	49	None
10	49	58
11	49	101
12	50	78
13	51	None

A total of 491 eggs were produced by the 10 females. These eggs were checked daily and any tadpoles found were removed and placed in one of several plastic troughs as described above. These were filled with aerated, aged tap-water at about 20°C, and contained fragments of water

weeds and small piles of stones which broke the surface of the water. The tadpoles, which appeared to be wholly carnivorous, were given a liberal diet of zooplankton collected from local ponds.

The onset of metamorphosis was marked by a reduction in the size of the tadpoles' external gills. Metamorphosis took place between 24 to 73 days after hatching. Newly metamorphosed newts, juveniles known as efts, left the water and climbed onto the piles of stones provided. These efts were removed and placed in a transparent plastic container measuring 24 x 12 x 12cm, floored with damp tissue paper and kept at a temperature of about 10°C. They were given a liberal diet of live fruit flies.

Although 491 eggs were laid, only 26 efts were produced; 25 of these are still alive at the time of writing. Ninety two per cent of the total mortality observed occurred during the tadpole stage of development. For instance, on one occasion, there was mass mortality in one of the 'tadpole troughs', apparently caused by rapid fouling of water. It is hoped that, with more careful management, future attempts at breeding red-spotted newts will be more successful.

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THE CARE AND BREEDING OF THE EDIBLE FROG *(RANA ESCULENTA)* IN CAPTIVITY

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DESCRIPTION, DISTRIBUTION AND HABITAT

The edible frog *(Rana esculenta)* is a large, handsome frog which can attain an overall length of 12cm, but a more usual size is 8-9cm for females and 6-7cm for males. This frog has a rather streamlined appearance; the snout is slightly pointed while the long back legs are very powerful. Markings and colouration vary considerably, in fact, no two specimens are ever identical. The back is usually green, brown or a combination of the two; dark brown spots and blotches are usually present on the back and sides and many individuals possess a yellow or green vertebral stripe. The rear part of the thighs is marbled with dark brown and yellow or orange; the underside is white, speckled with grey. There is no dark brown temporal area characteristic of most *Rana* species.

The edible frog is found throughout Western Europe ranging as far as Southern Sweden, Western Russia, Rumania and Hungary. It seldom strays far from water, being extremely aquatic in its habits; it will bask for long periods on the sunny bank of a pond, lake, stream or ditch, splashing into the water with a prodigious leap at the approach of danger. Because of its liking for sunshine it is not usually found in thickly wooded areas.

Although the edible frog is not now thought to be indigenous to Britain, many thousands of adults caught in France and Belgium were released in various localities in East Anglia during the last century. These introduced frogs formed colonies which usually thrived for a few years before disappearing completely. However, I know of an extant colony in the Breckland area of Norfolk which is still thriving; this particular area has contained breeding communities of edible frogs for over one hundred years.

CARE IN CAPTIVITY

In view of the large size of this frog, coupled with a nervous disposition, plenty of room in a large vivarium is essential for its successful maintenance. Added to the above traits, its sun loving propensity means that it should be kept in an outdoor vivarium, be it a reptiliary, greenhouse or large cold-frame.

Whatever type of enclosure is used a pond is an essential feature, the larger the better, but certainly no smaller than 60cm x 60cm x 45cm. It should be well stocked with submerged aquatic plants and several large rocks or stones should be placed around its perimeter on which the frogs can bask in the sun. The arrangement of the vivarium as regards plants and general layout is, of course, a matter of personal choice, but there should be plenty of ground-cover in the form of low growing vegetation. The depth of soil on the base of the vivarium should be sufficient to ensure a frost-proof retreat during the winter months. I would add that the edible frog is extremely hardy, being well able to endure the severest weather, even when quite small.

Feeding

This can be rather a problem as, with very few exceptions, edible frogs do not become tame. They will dive into their pond in fright whenever their vivarium is approached; however, there are exceptional individuals which do become tame; I have one specimen which is confiding enough to be approached and hand-fed without taking fright. I have, as yet, never encountered an edible frog which will allow itself to be handled or touched.

A further problem is that edible frogs are mainly nocturnal in their feeding habits; it is therefore advisable to introduce large numbers of earthworms, slugs, woodlice, etc., into the vivarium. These will soon reproduce themselves, forming colonies for the frogs to prey upon naturally. The vivarium should be watered each evening to bring out the worms and slugs during the night.

Another useful idea is to grow plants with strong scented flowers in the vivarium to attract flying insects on which the frogs will readily prey. I have often observed my own edible frogs seize and devour bees or wasps without showing signs of having been stung. Presumably they are either immune from or impervious to the sting of these insects.

Breeding

Under the conditions described above, breeding should take place regularly each year; spawning does not occur immediately after emergence from hibernation in mid April but is usually delayed until late May or early June. During the first few weeks after emergence from hibernation both sexes remain fairly inactive, sitting listlessly around the pond or in the water with heads protruding. As the weather becomes warmer the frogs are progressively more active and the males commence their loud, raucous call. They are extremely vociferous during the breeding season, calling throughout the day and night in chorus; one male will start up, triggering off all the others. Where large numbers are present the noise is quite deafening and can be heard from a considerable distance; a passing aeroplane, lawnmower or even thunder will also start them calling.

When thus engaged, the males swim excitedly around in the water seizing any female or male they encounter; a male that is seized emits a "grunt" which is the signal for the other male to release him. Amplexus is axillary but the grip of the male is not particularly tenacious; the pair will usually separate if disturbed or handled. They should therefore be left alone during spawning.

The spawn, usually laid in the early hours of the morning, is deposited on underwater vegetation to which it adheres. It is laid in several small clusters about the size of a golf ball and the eggs themselves are smaller than those of *Rana temporaria.* The vitelline sphere is light brown in colour on the upper surface, white below. The white area gradually diminishes in size until the whole egg is brown, by which time it has become elongated in shape. Within a few more hours the head and tail of the developing embryo are clearly discernible; development is rapid, the tadpoles usually hatch within 48 hours of the spawn being laid. The newly hatched tadpoles are remarkably small resembling minute brown-grey slugs. They cling to the spawn for about 2 days before becoming free-swimming, when they browse actively on algae or other soft, underwater vegetation.

Rearing the tadpoles

During the first three weeks after hatching, edible frog tadpoles are most vulnerable. Mortality can be at a very high level if the correct conditions are not provided during this critical period of development. These conditions are, in fact, quite easy to provide; they are:

1) **Sunshine** — edible frog tadpoles are particularly fond of basking in sunlight just under the surface of the water, diving rapidly to the depths whenever disturbed.
2) **Warmth** — if the tank or receptacle in which the tadpoles are kept is placed in a sunny position in the garden the water will become very warm during the day, to the liking of the tadpoles, but water temperature will drop considerably during the night.

   To remedy this the tank can be brought indoors in the evening and taken out again each morning. Alternatively, an aquarium heater and thermostat set at about 24°C can be used, this will prevent rapid temperature changes. By the time the tadpoles have attained an overall length of 2cm, which they should have done within four weeks of hatching, they are hardy enough to be left outdoors, permanently without artificial heat.
3) **Space** — overcrowding must be strictly avoided. About 6 tadpoles per square metre is the optimum number. These tadpoles have enormous appetites, feeding voraciously on flaked fish food, "pond pellets", or pieces of raw or cooked meat and fish. I usually keep a few water snails with the tadpoles to eat any food that is not immediately devoured by the tadpoles.

If the above conditions are met, an overall length of 6-7cm, exceptionally 9cm, should have been reached by their seventh week after hatching. Five or six weeks later the front legs are visible and metamorphosis should be complete within another week. The average size of the froglets when they have absorbed their tails is 20-25mm. It follows that froglets of this size can tackle quite large

prey; they are quite capable of eating blowflies, small earthworms, or half-grown mealworms without difficulty.

Care and hibernation of the froglets

The froglets are also voracious, so growth is rapid. They can easily attain an overall length of 4cm by the time they are ready to hibernate in early November. They can therefore be allowed to hibernate outdoors naturally. They may well be sexually mature the following year but full size is not usually attained until the year after.

Although the edible frog is a highly excitable, nervous creature which seldom becomes tame, its large size and beautiful colours make it a very desirable inmate for the larger vivarium.

CRYPTOSPORIDIUM INFECTION IN SNAKES

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Cryptosporidium (Family Cryptosporidiidae) is an obligate intracellular protozoan parasite which completes its life cycle in the lining of the bowel in vertebrates (Levine, 1973).

The life-cycle is usually direct, with infected reptiles shedding oocysts which further develop into infective sporozoites in the environment. The cycle is completed by the engestion of the infective sporozoite by the reptile. The disease is of little significance in wild reptiles, but infection can rapidly build up in vivaria to pathogenic levels in the event of insanitary conditions. *Cryptosporidium sp.* infection has been recorded in many vertebrates and it has been shown to have little host specificity and must therefore be considered a potential zoonoses.

Brownstein et al (1977) reported *Cryptosporidium sp.* as a cause of chronic hypertrophic gastritis in snakes. The course of the disease was chronic, with the recorded symptoms including weight loss, regurgitation and the presence of a firm midbody swelling. In the one confirmed case I have treated, a Black Rat Snake *(Elaphe obsoleta obsoleta),* treatment proved ineffective and the vivarium proved difficult to disinfect. The snake passed large numbers of oocysts in the faeces, for a period of three months until its death. *Post mortem* examination revealed a haemorrhagic gastritis, with the lumen of the stomach much reduced because of thickening of the stomach wall. Many oocysts were seen on impression smears of cut sections of the stomach wall and no significant bacteria were cultured.

Marcus (1981) advises that coccidia should be considered in any investigation of enteritis in reptiles, although Keymer (1981) considers *Cryptosporidium sp.* infections in reptiles to be rare.

Campbell et al (1982) have tested a number of recommended disinfectants against *Cryptosporidium* oocysts obtained from infected calves. Only ammonia and formaldehyde completely destroyed the oocysts and they must be considered the disinfectants of choice in the event of a confirmed *Cryptosporidium* infection. Likewise they should be used as the disinfectants of choice for any coccidial infection. Both ammonia and formaldehyde are potentially toxic and must be used in accordance with manufacturers instructions in a well ventilated room or preferably out of doors. The vivarium once disinfected must be repeatedly rinsed with plain water before any reptiles are re-housed.

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A CASUAL HERPER IN EASTERN NORTH AMERICA

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The herpetofauna of North America (north of Mexico) consists of about 477 species (194 amphibia, 283 reptiles), as listed by Behler & King (1979); 112 salamanders, 82 anurans, 3 crocodilians, 49 chelonians, 115 lizards, 1 amphisbaenid and 115 snakes. Conant (1975) lists 331 species (135 amphibia, 196 reptiles) for eastern and central North America alone, which with subspecies include 574 kinds of herpetofauna! This compares with the 135 species (45 amphibia, 90 reptiles) listed by Arnold, Burton & Ovenden (1978) for Europe west of a line joining the White Sea and Sea of Azov (Moscow is on longitude 37°42'E) in USSR. Our island herpetofauna in Britain and Ireland (Smith, 1951), in contrast, can only boast twelve indigenous species! With this huge herpetofauna and a human population of 244 million (USA and Canada), it is not surprising that a substantial interest is taken in amphibians and reptiles by North American zoologists. Three national and over 50 state societies support and help cater for this interest. The two purely herpetological national societies, the Society for the Study of Amphibians and Reptiles (SSAR) and the Herpetologists' League (HL) held respectively their 25th Anniversary and 30th Annual meeting jointly at Raleigh, North Carolina, 1-6th August 1982. Like the BHS in Europe, the American Society of Ichthyologists and Herpetologists (ASIH) is a non-governmental member of IUCN.

While touring eastern North America with my wife in August and early September 1982, after the Raleigh meeting, and as a casual 'herper', I could not help but come into contact with several species of amphibia and reptiles without making any particular or detailed effort to do so by looking for them in their natural habitats. In effect, many species come to you and one only has to be observant! This is of possible interest and indeed relevant in that it is only the typically widespread and abundant species adapted to a wide range of habitats and not immediately threatened that are likely to be recorded in this way. Furthermore, it is of possible value to record precise localities where individual species are observed in order that distribution atlases can be compiled in due course. Such records, which anyone, trained or untrained, can make, especially with information on the state of habitats, has been requested by the Societas Europaea Herpetologica Conservation Committee for Europe (Corbett & Podloucky, 1982).

During the joint SSAR/HL meeting at Raleigh, a liquid entertainment one dry evening (2nd August) at the State Fair Ground at Cary, near Raleigh, was, perhaps needless to say, not intended to yield species, but one of the younger participants produced an adult American toad, *Bufo a. americanus,* which he found in the woods during the proceedings. This is a very widespread and abundant species in north-eastern North America.

Florida: Our stay with Peter Pritchard, the turtle enthusiast, and his wife, Sybille, and their three boys, in Oviedo, near Orlando, was (and indeed elsewhere in the deep south of the USA in August) frequently interrupted by rain storms. Drainage channels by the sides of the roads were invariably full. Not infrequently, pairs of Florida red-bellied turtles, *Chrysemys nelsoni,* were seen basking on half-submerged logs and sliding quietly into the dark water to leave only wide ripples indicating their presence when distributed. The Florida snapper turtle, *Chelydra serpentina osceola,* is also common in many Florida pools, even entering brackish water, and on land strikes, lunging forward with mouth wide agape. The omnivorous diet includes fish, carrion and vegetable matter. The reddish appearance of *Chrysemys nelsoni* contrasts with the darker peninsula cooter, *Chrysemys floridana peninsularis,* which inhabits lakes and which human divers equipped with face masks can see under banks of clear streams and in springs of central and northern Florida.

Many of the human denizens of Florida maintain swimming pools in their gardens to provide relief from the sub-tropical summer heat. Sadly, being heavily chlorinated and otherwise treated to prevent the growth of green algae, they are death traps to amphibia roaming the lawns and garden paths at night, especially after rain. The corpses of unfortunate, usually half grown frogs

and toads were invariably found in swimming pool exit filters. Over four days (13th-17th August), three species were collected. The eastern spade-foot toad, *Scaphiopus h. holbrooki* (21 collected), is only found east of the Mississippi River, inhabiting sandy or loose soils in the forested areas of the South and South-East USA. It is very abundant, emerging with rain. It bears red spots on a darkish grey background colour. The southern toad, *Bufo terrestris* (two collected), is likewise abundant and the common toad of the South, becoming active at twilight and foraging well into the night. It roams garden lawns and paths by houses, and adults are often seen on roads at night and invariably squashed flat by motor traffic. The species ranges from Louisiana to extreme south-east Virginia, breeding in shallow water. The less widespread Florida gopher frog, *Rana areolata aesopus,* was only collected once (17th August) in the swimming pool filter. It has black-brown marks on a pale greyish background with yellow dorso-lateral ridges and white belly with spotted throat. It burrows diurnally in sand, sometimes quite deeply in the burrows of the gopher tortoise, *Gopherus polyphemus,* the "gopher" of the Deep South.

Although quite common now after protective legislation, American alligators, *Alligator mississippiensis,* were not observed by me in Florida drainage channels, but have been seen by tourists visiting the Kennedy Space Centre at Cape Canaveral in deep flood pools by the entrance of the car park. Gators can be pests in back gardens.

Georgia: In the Stephen Foster Memorial Park near Fargo, part of the Okefenokee Swamp, alligators are able to breed unmolested. Several were seen (18th August) swimming in the dark brown swamp water, seeking their turtle prey, and basking, even in overcast conditions on half-submerged logs by waterways. The females were nest-guarding. Gators have a predilection for dogs as food, and cases of dog snatching from anglers' punts are not unknown, but humans, even two-year olds falling into the water nearby are quite ignored. The cedar trees emerge stark from the water and the reflections of their silhouettes in the still dark water convey an air of tranquility and perhaps mystery. Occasional pig frogs, *Rana grylio,* a "bull frog" with a rather narrow pointed head and mouth, jump into the water from floating logs by waterways when disturbed in their 'guttural grunt of a pig'-like croaking.

Ontario: Continuing northwards, the number of species declines. In the Canadian North, tundra offers little protection to ectothermic species like amphibia and reptiles. Amphibia abound by the Great Lakes, however. The northern leopard frog, *Rana pipiens,* has a widespread distribution across the northern USA and Canada, except the far west, and has commonly been used for dissection in schools and collected for physiological research purposes. One half-grown frog was collected (29th August) in a damp, recently-cut, grassy meadow above the R. Maitland at Benmiller, near Goderich on Lake Huron, and another seen (1st September) by the river at St. Mary's, near Stratford, the centre of the Theatre Festival in Canada. A young eastern garter snake, *Thamnophis s. sirtalis,* no doubt at times preying on leopard frogs, was seen basking on a rock and quietly slid into the water.

New York State: Entertained by Kraig Adler, the SSAR 1982 President, and his wife, Dolores, with son, Todd, another opportunity was taken to see some of the common amphibia of north-eastern USA. Cornell University is based at Ithaca and one of the eight 'Ivy League' Universities in eastern USA (others comprise Harvard, Yale, Princeton, Columbia, Dartmouth, Pennsylvania and Brown). Ithaca is situated amongst woodland and hills among the superb Finger Lakes country of Upper New York State. Investigating one of Cornell's ecological study areas 9km east of Ithaca, the several amphibia included (2nd September) many red-efts of the red-spotted newt, *Notophthalmus v. viridescens,* crawling on open grass and amongst fallen leaves by half-embedded trunks near a muddy swamp. These newts can be seen still crawling in the early morning on garden lawns often in enormous numbers during spring breeding. Extremely common and producing a noxious secretion, they have also been the subject of ecological and behavioural work. The red-backed salamander, *Plethodon c. cinereus,* is terrestrial, often with earthworm-like habits and found ubiquitously under discarded refuse and flattish objects by swamps and near houses in wooded areas. It occurs in two phases: red-backed (straight-edged reddish stripe from the base of the head to tail, bordered by dark sides) and lead-backed (uniformly dark grey to almost black). By the swamp under a half-buried tree trunk and amongst decaying leaves, a half-grown spotted salamander, *Ambystoma maculatum,* was found. It is a widespread Eastern species, but one of 'special concern' to New York State's Endangered

Species Unit. It is black, bearing pale or yellow spots in an irregular dorso-lateral row, and not unlike spotted individuals of the European fire salamander, *Salamandra salamandra,* similarly sized, and no doubt occupying a similar ecological niche. Most of the time is spent underground,beneath logs and stones, but as an early spring breeder, it makes mass migrations to woodland ponds with the stimulus of warm rains. An adult green frog, *Rana clamitans melanota,* was also captured jumping among dead fallen leaves by the swamp. Another widespread species, dark olive-green in colour, but often more brown than green in individuals and tending to be very dark in Canada and northernmost USA. Inevitably, the ubiquitous American toad, *Bufo a. americanus,* was also found here. Several half-grown specimens, often in a scattered group, had also been previously seen elsewhere, near South Norwalk, Connecticut (23rd August), and on an earlier visit to USA near Valpariso, Indiana (21st May 1972). The habitat range is enormous; suburban back yards to mountain wildernesses, with the basic requirements shallow bodies of water and abundant invertebrate prey. Not unexpectedly with such adaptability, this toad does well in captivity, so long as loose soil is provided to hide away from light and they are little handled.

The same evening (2nd September), after late afternoon rain, several more *Bufo a. americanus,* including an adult female of 7.7cm, were seen on the road two or three hours after darkness, together with *Rana c. melanota* and other species. A northern spring peeper, *Hyla c. crucifer,* was heard during the day by the swamp and another collected on the road at night. It is a small (3.5cm) frog of woodlands, especially by small or temporary swamp pools. Its voice is a high, piping whistle, a single clear note repeated at 1 second intervals. Several pickerel frogs, *Rana palustris,* included an adult (6.7cm). The back bears square spots in two parallel rows and bright yellow or orange on the concealed surfaces of the hind legs. It typically inhabits cool, clear water in the North — in sphagnum bogs, rocky ravines and meadow streams. Probably being distasteful on account of skin-gland secretions, few snakes will eat pickerel frogs. A single immature wood frog, *Rana sylvatica,* was also collected off the road at night. The individual was pale pinkish-brown, with a dark patch, rather like the European 'brown frogs' such as the common frog, *Rana temporaria,* extending behind the eye to include the tympanum. The frog can be almost black in some colour phases. It is usually encountered in wooded areas, often wandering great distances from water. It occurs in north-eastern USA and ranges farther north into the Alaska-Labrador range in Canada than any other North American amphibian or reptile. Finally, of the species squashed on the roads near Ithaca that night besides red-efts and a red-backed salamander, a half-grown eastern garter snake had been bissected by a motor vehicle's tyre.

Earlier, during the afternoon, a visit had been made to the Ornithological Centre near Ithaca, where there is a lake with many aquatic species of bird. Through field glasses, about ten painted turtles, *Chrysemys p. picta,* could be seen, struggling to maintain their balance and bask on a rounded floating log, which rolled every time another turtle tried to clamber on. Kraig Adler also reported finding a wood turtle, *Clemmys insculpta,* early one evening on the road home about 7km east of Ithaca. The shell is very rough, each scute in the form of an irregular pyramid rising upward in series of concentric grooves and ridges. Orange on the neck and limbs led to a vernacular name of 'red leg' when sold as human food in the early part of the century. It is a somewhat terrestrial turtle, although at home in water and hibernating there, and frequently wanders through woods and meadows, across farmlands, and — often with fatal results — on roads.

Road-kills: Motor vehicles are a particular hazard to amphibia and reptiles traversing roads through wild habitats in USA. Peter Pritchard had earlier showed me two eastern box turtles, *Terrapene c. carolina,* which he had found on the road. One a bright-coloured, red eyed male from 12km east of Millville, New Jersey (6th August), and the other, a smaller female from the Appalachian mountains near Hickory, North Carolina (9th August). He had also collected a road-killed specimen from near the latter in North Carolina. Road-kill amphibia and reptiles, if not too damaged, provide useful specimens for museum and teaching purposes when appropriately preserved. Indeed one of the policy statements made at the inaugural meeting of the IUCN/Species Survival Commission Tortoise Group urges the collection of dead specimens found in the wild, including on roads through natural habitat, for depositing in museum collections as bone or pickled material with full locality, date and other information recorded. This will hopefully help in reducing the random collection of living specimens from the wild.

For Europe, USA and elsewhere with species of amphibia and reptiles, road-kills can often also provide useful locality data and give information on the distribution of species for later mapping and conservation purposes, particularly when habitat information is included for the latter!

Material collected in North America has been deposited with the Amphibian and Reptile Section, British Museum (Natural History), London.

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ABSTRACTS OF LECTURES GIVEN AT BHS EVENING MEETINGS

1) MEETING IN HONOUR OF DR. ELKAN

On Tuesday 14th September a meeting was held in honour of Dr. Edward Elkan, the internationally recognised authority on diseases of lower vertebrates and author of two books and many papers.

Although organised by the British Herpetological Society this was an open meeting and the attendance of seventy included many biologists and pathologists as well as both professional and amateur herpetologists. Unfortunately Dr. Elkan himself could not be present on account of ill-health but a number of his family and friends were amongst the audience.

The venue for this gathering was the Royal College of Surgeons of England, Lincoln's Inn Fields and the organiser was Mr. J.E. Cooper, a member of the College's Staff and a collaborator with Dr. Elkan. The chair was taken by the Earl of Cranbrook, President of the British Herpetological Society. The theme of the meeting was the biology and pathology of reptiles and amphibians and there were four speakers.

The first paper, by Dr. J.F.D. Frazer, was "A historical review of British herpetology". Dr. Frazer outlined development of herpetology as a science and emphasised that very little systematic research had been carried out before the Second World War. Since then there had been a great upsurge on interest in both free-living and captive reptiles and amphibians and much valuable work had been done. Dr. Elkan was a pioneer in the field of pathology; others had contributed to our knowledge of ecology, behaviour, physiology and husbandry.

In his paper "Congenital malformations of reptiles", the second speaker, Professor A. Bellairs, described a number of developmental abnormalities and emphasised that in addition to being of interest in their own right, such conditions could also provide useful models in the study of disease.

The next speaker was Dr. R.D. Finlayson who prefaced his paper on "Vascular pathology in reptiles" by describing Dr. Elkan as the "doyen of European comparative pathologists". He went on to describe a number of conditions of reptiles and explained that he and Dr. Elkan had differing opinions about arterial disease in reptiles. In Dr. Finlayson's view the condition commonly seen in these animals was "medial calcification" and did not show the features characteristic of true atherosclerosis. There was, however, room for disagreement and an exciting feature of lower vertebrate pathology was that so many problems remained unsolved.

The final paper, "Advances in the clinical care of reptiles and amphibians" was by Peter Holt who introduced his lecture by admitting that until recently the veterinary profession could offer very little in the way of advice on reptiles or amphibians. That the situation had changed was due in no small way to the pioneer work of Dr. Elkan. He went on to describe a number of clinical cases and concluded with a fascinating series of radiographs of an egg-eating snake ingesting and regurgitating an egg.

Following the formal lectures a number of messages and tributes to Dr. Elkan were read. These came from several different countries and the senders included friends and relatives as well as professional colleagues.

The final part of the meeting consisted of a visit to the College's Hunterian Museum. Material in this famous collection covers many aspects of biology and the visitors were able to see several reptilian and amphibian specimens including preparations depicting John Hunter's studies on tail regeneration in lizards. The meeting closed at approximately 9.30 pm.

Dr. Elkan's research is known to all those who work with reptiles and amphibians and many herpetologists have cause to be grateful to him for his help and advice. He is one of a small number of people who have made lower vertebrate pathology an accepted and *bona fide* discipline. The meeting held on 14th September, in his 88th year, was a fitting tribute.

2) THE ECOLOGY AND BEHAVIOUR OF A POPULATION OF NEWTS IN A SERIES OF GARDEN PONDS

R. A. GRIFFITHS

26th October 1982

Until fairly recently, comparatively little research had been conducted on the ecology and behaviour of the commoner British amphibia. Although certain species have suffered a decline in many parts of the country, garden ponds in built-up areas may provide a comparatively protected habitat for some of our native amphibians, and this study was concerned with an investigation of the daily and seasonal behaviour of the smooth newt *Triturus vulgaris* in relation to environmental parameters. The study area was located in the grounds of a college and comprised five ponds, which also supported a large colony of common frogs *Rana temporaria.* The area was surrounded on all sides by urban development.

Under natural conditions, the diel activity pattern of aquatic *T. vulgaris* was generally two-peaked, with activity maxima occurring in early morning and evening. Activity was related to the light intensity and could be divided into activity concerned with courtship behaviour and activity associated with feeding. In the laboratory, the activity rhythms of both smooth newts and warty newts *T. cristatus* were monitored under controlled environmental regimes. Warty newts were generally more dark-active than smooth newts, which behaved similarly to those observed under natural conditions. During the terrestrial phase the activity rhythm of *T. vulgaris* was much lower in amplitude but a bimodal pattern was retained.

In the study area smooth newts were present under stones situated around the ponds for most of the year, including the spring months, but disappeared (probably into recesses deeper underground) during the winter. Activity in terrestrial newts is influenced by light intensity, temperature and relative humidity, but newts were observed abroad from refugia only occasionally, and then only very short distances (1-4m) from the home refuge, and although some newts moved between ponds during the breeding period, most remained in the pond where originally found (newts were toe-clipped to enable individual classification).

In general, the sex ratio of *T. vulgaris* appears to be variable and the biotic factors regulating it are somewhat speculative. Aquatic populations usually display a ratio close to 1:1, but excesses of both males and females have been observed. In the present study, male newts arrived at the ponds prior to females but numbers later on during the breeding period were approximately equal. On land, however, females outnumbered males by about 3:1 for most of the year. This may partly be accounted for by the shorter period of female newt pond residency, but other factors, such as breeding every second year or attaining sexual maturity at a later age, may also be involved. By the end of September, nearly all newts had left the ponds. There was no evidence of a second pondward migration during the autumn and no newts were observed to overwinter as aquatic adults.

LETTERS TO THE EDITORS

PRECOCIOUS TORTOISES

Dear Sirs,

On May 2nd 1982 I observed the smaller of my two hatchling *Testudo hermanni* (hatched 20.10.81 and 3.11.81), performing what appeared to be a mating display, complete with butting, foot-nipping, and attempted mounting with characteristic noise. At this time their measurements were 150g: 83mm and 125g: 78mm respectively.

Astonished by such precocity, I searched my not very extensive library for any mention of early sexing of tortoises. The only helpful thing I found was in "Reptiles of Northern and Central Europe" by D. Street, where it read: "Abnormal behaviour:— Certain aspects of courtship behaviour have been observed among very young captive specimens, some of which were less than 8 weeks old, and they were seen to mount the carapace of other, similarly young tortoises. The specimens involved were reared from the same batch of eggs. At this stage however it was not possible to identify their sexes."

I saw two subsequent repeat performances by the same tortoise during June, although as I'm out during the day I have no means of knowing how persistent or frequent this behaviour might have been.

On August 28th I introduced into the vivarium a *T. graeca* which was slightly smaller but probably older than my hatchlings which were now 300g: 99mm and 250g: 99mm respectively. No experiment was intended. The weather had turned nasty and it seemed an opportune time to put the small tortoises into winter quarters. The reaction of the two *T. hermanni* was immediate. The smaller hatchling travelled 6" in a stiff-legged, neck stretched run, did one fast circuit of the newcomer with a quick snap at one of its front legs, then attempted to mount, extruding a penis quite as large in proportion as that of an adult. The larger hatchling was also circling, sniffing and attempting to bite the shell of the *T. graeca,* and unfortunately spoiled the other's chance of displaying his prowess any further by knocking him onto his back. The *T. graeca* retreated speedily into the sleeping quarters and was extremely nervous for the following 48 hours. At the time of writing the *T. hermanii* have displayed no further interest.

This proves only that one tortoise has been definitely sexed at the age of 10 months. I would, however, ask what criteria may be used by which early sexual display is deemed "abnormal"? May I suggest that the tortoise has his own wisdom.

F.R.O. Davies,
Mount Pleasant Farm, Carnkie, Redruth, Cornwall TR16 6RX

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THE REPTILES AND AMPHIBIANS OF NORTHERN FRANCE

Dear Sirs,

Prompted by Trevor Beebee's invitation for further information on herpetofauna in northern France (Herpsearching in Northern France, BHS Bulletin June 1982) I would like to offer the following information gained from my own experiences during fairly frequent visits to both Normandy and Brittany.

These areas, I have found, can be very rewarding for the herpetologist, and I am pleased to say that I find new delights at each visit.

The small village of St. Senoux lies about 25km SW of Rennes on the right bank of the Vilaine in central Brittany. On the 25th May 1982, I, accompanied by my wife and young daughter, set out from there to walk the 5km to Bourg-des-Comptes. Immediately behind the railway station, we discovered a small man-made pond (possibly just a handy water-container in the event of fire) wherein, to our surprise, we find both *Triturus helveticus* and *Rana dalmatina.* These appeared to be the only species present, which did not surprise us as the pond was no more than 3m x 2m. The water appeared to be weedless. Continuing along the D84 and crossing the bridge to the left bank

of the Vilaine, we discovered a small colony of *Podarcis muralis* between the bridge exit and the wood behind. I remember finding them very difficult to approach for photography, scuttling away rapidly into the thicket at the road-side.

Taking the road to the left, with the intention of having a picnic at the nearest suitable spot, we very soon found that the walk up the winding, wooded hill was well worth the effort. Here, overlooking the river, is an area of dense, mixed woods where tracts of heather break through to meet the road. Within a few minutes of laying the picnic, my daughter found, to her delight, *Anguis fragilis* sunning itself on a tussock. What was really fascinating about this site however, was that here we discovered that beautifully marked creature *Vipera aspis* apparently sharing the same type of habitat as *V. berus.* I had not expected to find *V. aspis* anywhere in the department of Ile-et-Vilaine, and at this point on the map the animal must surely be nearing its NW limits. I was very pleased to find a partial slough, which I brought home with me.

During the walk back along the heather-bordered road, we counted up to eight specimens of *V. berus* basking at the road-side. This being approximately 3 o'clock in the afternoon.

On the homeward stretch of our journey this year we found numerous tadpoles of *R. dalmatina* in a large pond in the Recreation Park at St Malo. Small colonies of *P. muralis* were noted along rural lanes of a peninsula jutting out at the mouth of the Rance near Dinard.

Mr. Beebee expresses disappointment at not finding that colourful creature *Triturus marmoratus* in Brittany. It is, however, fairly well represented in SE Brittany, notably in the departments Ile-et-Vilaine and Mayenne. I know it to occur in certain stagnant pools between Vitre and Chateau Gontier; usually in the company of *T. cristatus.* In this region a search along high stone walls on mornings in July may be rewarded by the sight of *Elaphe longissima* (although I have only seen one). Do not be fooled by its apparent calmness when discovered — it bites.

Alytes obstetricans has chosen an unusual object in which to deposit tadpoles at Nogent-le-Rotrou between Le Mans and Chartres. In a field alongside the D370 and 2km NE of Nogent, there is a large horse-trough tucked under a bank on the edge of a wood. This is apparently used year after year as a handy 'pond' by local toads, and tadpoles, I am informed, are to be found in the water all year. Judging by the size of some of them in May (50mm) this would appear to be the case.

This same stretch of road is also the haunt of *V. aspis,* and I observed it on two occasions hunting the young of *P. muralis* in bright sunshine. Numerous visits have been made by me to this particular latitude in France (between Alencon and Chartres) for the express purpose of ascertaining the northern-most limits of *Vipera aspis.* As a result of these visits, I am of the opinion that the geographical line described above roughly draws that limit. The countryside north of this becomes gradually less suitable in the way of habitat for the animal. The climate is also slightly cooler with more rainfall, making dry hedgerows (a pre-condition for the occurrence here of *V. aspis*) something of a rarity.

However, I would be very interested to hear from any other members who have knowledge of the reptiles from northern France, also I would welcome any information on *Bombina variegata* north of the river Loire. I have been unable to find it anywhere in the Normandy-Brittany area.

Mr. P. Bryce,
96 Shenstone Avenue, Stourbridge, West Midlands, DY8 3EJ

*****

BREEDING GREEN TOADS

Dear Sirs,

Further to my recent articles on keeping and breeding Green toads *(Bufo viridis)* in captivity (BHS Bulletin Dec 1980 & Dec 1981), I am pleased to report a further spawning in May 1982.

The progeny of the 1981 spawning were overwintered successfully in a vivarium kept in an unheated upstairs room, the low temperature of which kept the toadlets semi-active. They therefore required feeding about once a fortnight only.

The larger of these young toads are now more than 5cm in overall length and already sexually mature.

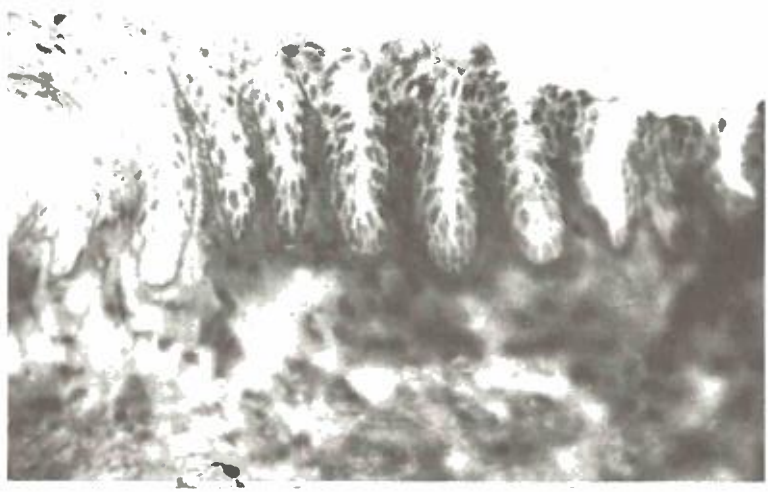
D.R. Billings,
Red House Farm, Brakefield Green, Yaxham, East Dereham, Norfolk

MICROANATOMY OF DWARF CHAMELEON EYELID

Dear Readers,

Allow me to confront you with this microphotograph, hoping that one of you may have seen something like this before and may be able to tell me what it is. It arose in the course of a micro-dissection of a dwarf chameleon *(Microsaurus damarana)* and represents an ordinary section through the eyelid, close to the central aperture. Why should the epithelium, which is smooth everywhere else, here be folded into this comb-like structure? I have not encountered this in other chameleons. I admit, it reminds us of a screen wiper, but *Microsaurus* is, as far as I know, no more exposed to desert dust than many other reptiles nor are its eyelids more than normally moveable as far as we know. No special glandular cells have so far been demonstrated in this structure, but my material is limited. Hence this "flight into publicity" and my appeal to herpeto-microscopists who may have the right material on their doorstep. Alas, there may not be many in the deserts of South Africa which are the home of the various races of dwarf chameleons.

Dr. E. Elkan,
62 Woodhall Gate, Pinner, Middlesex, HA5 4LT



Microsaurus damarana. Conjunctiva with filiform papillae v. Gieson.

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TORTOISES IN ANTALYA, SW TURKEY

Letter to the BHS Chairman

21.9.82

Dear Dr. Lambert,

We had to send you this letter from Turkey as we know that *Testudo graeca* biology is one of your main interests. We have spent a few weeks now doing herpetological field work in the lowlands and up in the mountains. *Testudo graeca* is common all-over, but especially in the lowland cultivated areas. We have seen the species up to about 2000m in the Taurus mountains. Yesterday we spent one day in the old ruined town Perge where the *Testudo* seems to be a mixture of *T. g. ibera/terrestris.* During 6 hours, we saw about 50 adult specimens or heard them from long distances. It is now the mating period and all over you hear the loud noise of shell-butting; we noted at least twenty occasions. The males seem very excited butting not only females, but

small rocks and other males as well. Males were biting other males in the legs and in the throat. The fighting and courtship took place on very rocky ground and down between large rocks from the morning to late afternoon. We observed them 10.00-13.00 and 15.00-18.00 hours. Air temperature in the shade near the ground was 28° C at 10.00 hours and 33° C at 13.00 hours. It was really an exciting experience to hear the loud shell-butting noise from a far distance. Sometimes the males jumped quickly towards the females over a distance of 10-15cm. We think you should now be here in Perge instead of Great Britain!

Claes Andrén and Göran Nilson,
Antalya, South Turkey

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Dear Dr. Lambert,

Being glad you appreciated our information on *Testudo graeca,* we observed very similar behaviour from 22nd to 25th September in the Adapazari-Sapanca region in northern Turkey, where the temperature was about 5° C lower. This is a comparatively wet area with rains in early autumn and even in summer. The hilly landscape has secondary scrub forests grazed by cows and sheep giving rise to open grassy areas interspersed with bushes. I hope you will find this further information useful.

Claes Andrén,
Department of Zoology, University of Göteborg, Box 25059, S-40031 Göteborg, Sweden

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- **Giant tortoises.** Unwanted specimens of *Geochelone sulcata, G. gigantea* and *G. elephantopus* will be purchased by Dr. Kan Scheller in Athens working on the connections between flora and fauna and modern environmental problems. Please contact Ms. Valerie Ferris, 11 Dapdune Road, Guildford, Surrey, GU1 4NY.
- **Home wanted** for adult pair of Black Rat Snakes.
  Mrs. D.F. Randell, 157 Colwyn Road, Northampton, NN1 3PU.
- I have 5 *Lacerta (=Gallotia) galloti* and wish to correspond with any member who keeps and/or breeds this species; also *L. stehlini* and *L. atlantica.*
  Andrew Quayle, 54 Joyce Street, Moston, Manchester, M10 8HA.
  Tel: 061-681 7500.
- Zoology graduate (University of London) seeks herpetological work in Britain or abroad, particularly with poisonous snakes.
  Paul Edgar, 21 Heathlawns, Catisfield, Fareham, Hants., PO15 5QB.
- **For Sale:** Captive bred Whites Tree Frogs *(Litoria caerulea),* 2cm and over, growing fast, feeding well on crickets, etc.
  Kevin Healey, 59 Aldwyn Park Road, Andershaw, Manchester, M34 5NZ.
- Mice available occasionally for members in Cambridge area, live, various sizes.
  David Palmer. Tel: Histon (022-023) 3568.
- **Wanted:** Adult captive bred *Pleurodeles watl* and *Pelobates fuscus* in exchange for captive bred *Triturus marmoratus* and *Bufo viridis.*
  Dave R. Billings, Red House Farm, Brakefield Green, Yaxham, East Dereham, Norfolk, NR19 1SB. Tel: East Dereham 850155.
- **Wanted:** Green Lizard, preferably male.
  F. Casey, 12 Manor House Road, Glastonbury, Somerset.
  Tel: Glastonbury 31726.
- **Wanted:** Specialist breeder of urodeles requires pairs of *Triturus montandoris,* preferably captive bred. Also information on a speciation within the genera *Cynops* and *Paramesotriton.*
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- **For Sale:** 2nd generation juvenile Grey Rat Snakes *(Elaphe obsoleta spiloides)* and Yellow Rat Snakes *(E. obsoleta quadrivittata).*
  Alan Jayes. Tel: Leeds 786587 or
  Roger Meek, 561 Coal Road, Leeds 14. Tel: Leeds 733589.
- **For Sale:** Mice of all ages.
  Simon Townson, tel: 01-989 9570.

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Articles, news items, notes and letters on any aspect of herpetology are needed for the Bulletin. Contributions should, if possible, be typed. Handwritten items should be clear and legible. All contributions should be double spaced and on one side of the paper only. They should be sufficiently presentable to be given directly to the printer. Contributors are urged wherever possible to follow the "Instructions to Authors" printed on the inside back cover of the British Journal of Herpetology. Photographs can be reproduced only from good quality black and white prints. Reprints of articles can be supplied to authors. These must be ordered from the Editors before the Bulletin goes to press.

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