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**THE BRITISH
HERPETOLOGICAL SOCIETY
BULLETIN**



**No. 40
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THE BRITISH HERPETOLOGICAL SOCIETY

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

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

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

The Education Committee promotes all aspects of the Society through the Media, schools, lectures, field trips and displays. It also runs the junior section of the Society - THE YOUNG HERPETOLOGISTS CLUB (YHC). YHC Members receive their own newsletter and, among other activities, are invited to participate in an annual "camp" arranged in an area of outstanding herpetological interest.

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

Meetings

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

Publications

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

Subscriptions

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

Ordinary Members	£20	(Receive Bulletin only)
Full Members	£25	(Receive Bulletin and Journal)
Family Members	£30/£37.50	(Without/with Journal) Family members with children also receive the YHC Newsletter
Student Members	£18	(Receive Bulletin and Journal)
Institutional rates	£36	(Receive Bulletin and Journal)
YHC (Age 9-18):		
Basic Membership	£5	(Receive YHC Newsletter)
Bulletin Membership	£10	(Receive Newsletter and Bulletin)
Group Membership	-	For Schools, Youth Groups etc. Contact Education Officer (Address on inside of back cover) for details)

Correspondence, Membership applications, subscription renewals and purchase orders for publications should be addressed to the Secretary (address as at page top) EXCEPT for YHC matters. YHC Membership and renewal details are available from the Education Officer (address on inside of back cover). PLEASE INCLUDE A STAMP-ADDRESSED ENVELOPE WHEN WRITING TO THE SOCIETY.

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

The Bulletin is edited and produced by

John Pickett and Simon Townson.

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

FRONT COVER John Pickett, 84 Pyrles Lane, Loughton, Essex IG10 2NW

Adult male North African Spiny Tailed Lizard, *Uromastyx acanthinurus*. See The Reproduction in Captivity of the North African Spiny Tailed Lizard, *Uromastyx acanthinurus*, by Terry Thatcher. p.11.

REMAINING MEETINGS FOR 1992

- OCTOBER 17th (Saturday) There will be an Autumn meeting in the College Lecture Theatre of Birbeck College, Malet Street, London WC1 on the afternoon of Saturday October 17th. Members of all ages are encouraged to attend; there will be a programme of three talks, as shown below:
- (1) 2.00 pm: **IN SEARCH OF REPTILES IN WESTERN NEPAL**, by Mark O'Shea (Wolverhampton)
- (2) 3.00 pm: **BREEDING AMPHIBIANS IN CONFINEMENT**, by Dave Billings (Norfolk)
- (3) 4.00 pm: **STUDIES OF THE LIFE HISTORY AND ECOLOGY OF SNAPPING TURTLES: SEX, DEATH AND OTHER DIVERSIONS**, by Dave Galbraith (University of Kent).
- Each talk will last approximately 45 minutes, followed by 10 minutes or so for questions and discussion.
- NOVEMBER 8th (Sunday) Captive Breeding open meeting (2pm-6pm) to be held at the New Denham Community Centre, Oxford Road, New Denham, Uxbridge (nearest tube Uxbridge, approx. 10 min walk). There will be the opportunity for the sale and exchange of captive-bred stock. Members requiring table-space or more information should contact Terry Thatcher on 0865 739396.
- DECEMBER 5th (Saturday) Special Saturday Meeting organised by the Captive Breeding Committee 2 p.m. to 5.30 p.m. at Birkbeck College, Malet Street, London WC1. Mr. Bert Langerwerf (Alabama, USA) will be speaking on farming reptiles in outdoor vivaria.

PROVISIONAL REGISTRATION SECOND WORLD CONGRESS OF HERPETOLOGY

The Second World Congress of Herpetology will take place in Adelaide - Australia. December 29th, 1993 to January 6th, 1994.

The organisers need to have completed green Provisional Registration Forms back so that potential participants are on the mailing list for the Registration Brochure (to be distributed in late 1992). Accommodation booking and charter flight reservations require accurate estimates of numbers.

Please apply for a green pre-registration form, and complete and return this as soon as possible to:-

Second World Congress of Herpetology
c/o Department of Zoology
GPO Box 498
Adelaide 5001
Australia

FAX to: 010 61 8223 5817 (International)

REPORT ON THE REPATRIATION OF TORTOISES TO GREECE BY THE CARAPAX CENTRE (ITALY)

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INTRODUCTION

Between 26 September and 5 October 1991, 275 tortoises *Testudo hermanni boettgeri*) were repatriated to Greece by Centro CARAPAX, the Italian Centre for Conservation, Scientific Research and Repopulation of Mediterranean Chelonians.

The operation was co-funded by the Tuscan delegation of WWF (Florence), TRAFFIC Europe (Brussels), WWF Italy (Rome) and the CARAPAX Centre itself. The whole operation was made possible through the help and confidence of the Belgian and Greek Ministries of Agriculture, the inspection service (AID) of the Dutch Ministry of Agriculture, and the Greek company, Olympic Airways, especially its office in Rome and the airfreight manager, Mr B. Magnani. Co-operation and assistance was also received from the Forestry Department of Thessaloniki and members of the Greek Ornithological Society (Thessaloniki), CARAPAX and the RANA Group, who manage the CARAPAX Centre, would like to thank all those who helped in this operation.

WHY THE REPATRIATION?

Since 1984, Mediterranean tortoises have been protected by two European directives, CITES Annex C1 and the Bern Convention Annex 1, as well as by national and regional legislation throughout Europe. Nevertheless, an illegal trade from Mediterranean to Northern European countries still continues. In Italy, *T. h. boettgeri* on the black market now replaces the indigenous *Testudo hermanni hermanni*, which has become very rare and thus its collection for commercial purposes as pets is of no interest from an economic point of view. Yugoslav and Greek *T. h. boettgeri* are liberated or escape into natural areas where *T. h. hermanni* still survives are a danger, for interbreeding will destroy the Italian genetic makeup of the subspecies. For this reason, it is therefore important to point out to the authorities and the public at large that two forms of the "common" tortoise exist and the danger that interbreeding represents.

In 1991 several hundreds of illegally imported tortoises, consisting mostly *T. h. boettgeri*, were confiscated in Italy, France, Belgium and the Netherlands. They were sent to the CARAPAX Centre in Italy and the Village des Tortues (SOPTOM) in southern France. A solution had to be found for these animals' future. A further difficulty was that neither the CARAPAX Centre nor the Village des Tortues consider *T. h. boettgeri* to be a high priority in their breeding programmes (the priority for the Village des Tortues is French and Corsican *T. h. hermanni*; while for CARAPAX, the priority species are Italian *T. h. hermanni*, *Testudo graeca* from Sardinia, *Testudo marginata* of Sardinian and Tuscan origin, Italian *orbicularis* and Italian coastal *Caretta caretta*).

ORGANIZATION OF THE REPATRIATION

The first decision made was to bring to the CARAPAX Centre, after a period of quarantine, all confiscated *T. h. boettgeri* which had been sent to SOPTOM by the French and Belgian authorities. They were kept at the CARAPAX Centre in quarantine for at least a further month, for the Centre is more comprehensively equipped and about forty times the size, with about ten times the number of enclosures, of its French sister organization. The tortoises had all originated from southern Yugoslavia (Macedonia). The transfer of 177 animals by CARAPAX from SOPTOM in May 1991 faced a further difficulty because the original Belgian CITES papers had been lost at the French centre, and the veterinary papers were not the official ones because many of the animals sent from Belgium were missing. The repatriation had therefore to be delayed for several months, firstly in order to obtain duplicate CITES papers from Belgium, and secondly because the temperatures of summer were too high.

At the same time, another group of *T. h. boettgeri* at the CARAPAX Centre was also selected for repatriation to Greece. The chosen animals were clearly of Macedonian origin; they were in good health, not too old and were more than 50 millimetres in length. The animals had not been mixed with other tortoises or reptiles, and also had appeared to have readapted to the Mediterranean climate after at least a year's stay at the CARAPAX Centre.

A third group of *T. h. boettgeri*, donated to the CARAPAX Centre by people in Italy, could not be repatriated because the Italian CITES authorities had not been able to make a certificate within a month.

A fourth group of *T. h. boettgeri* came from the Netherlands. All were baby tortoises, hybrids or specimens reared in captivity, and had not therefore adapted to the Mediterranean climate. They also had not been through a period of quarantine. The tortoises were put into quarantine at the CARAPAX Centre and will be kept for exhibition, observation and for purposes of training and instruction. Animals that showed the morphology of southern Greek and island populations were also separated in a fenced-off area in the CARAPAX Centre. It was thus the newly and illegally imported, and therefore still wild, *T. h. boettgeri* from northern Greece and southern Yugoslavia that CARAPAX repatriated to Greece.

It has to be said here that one of those responsible for the Netherlands, a member of the Scientific Committee of CITES, suggested that all these animals should simply be destroyed, presumably on the basis that their origin was unknown. This proposal was regrettable, for it completely discounted the work of the chelonian centres and perhaps draws attention to the substantial background of experience required to be able to recognise the differences in the morphology of the northern, southern, western and island forms of *T. h. boettgeri*, the geographical varieties of *T. h. hermanni*, and the appearance of hybrids and captive-bred animals. The Dutch authorities unfortunately failed to appreciate or were not in a position to be able to acknowledge the expertise available to them of certain specialists, some with over 20 years of experience in tortoise ecological research, especially in Greece, but also in France and Italy. One might consider this to be lamentable, especially since one of the specialists (Dr. R. Willemens) happens to be Dutch, and had offered his services as an adviser.

It can be recorded here that the attitude of the Greek authorities was quite different. They were found to be polite and cooperative while arrangements were being made for the repatriation.

DEPARTURE OF THE ANIMALS

With the agreement of the Greek authorities, the Italian WWF and the extremely helpful Olympic Airways, the tortoises were finally dispatched on 25 September from Rome to Athens and then on to Thessaloniki. The animals were accompanied by three people from CARAPAX and WWF. Despite all this care and attention, so much time was lost, from 10.30 to 16.30 h, by the authorities at Rome's Fiumicino Airport (customs and CITES representatives, who were absent) that the animals missed the departure of the flight at 15.30 h, causing the Greek authorities and Forestry Department to wait to no avail. Olympic Airways made all the arrangements for postponing the whole operation for 24 hours. The animals finally arrived at Thessaloniki on Friday 26 September at around midnight when, not surprisingly at this late hour, nothing further could be done. The airport services in Thessaloniki unfortunately do not work on Saturday and the message to postpone the operation for 24 hours had been misunderstood at the Greek end. Their interpretation was that everything had been cancelled! By pure chance, the CARAPAX representatives came into contact with members of the Greek Ornithological Society, who alerted the Greek Customs and a veterinary service. All those responsible were kind enough to return to the Airport from their homes and thanks to the personal intervention of the head of the Forestry Department for the prefecture of Thessaloniki (Macedonia), Mr Alexandros Karnadas, transport of this unusual consignment was reorganised.

RELEASE OF THE ANIMALS

The transportation of the animals in Greece proceeded very smoothly and the CARAPAX Centre is most grateful to the Forestry Department for carrying out this service so effectively.

Several areas were chosen for the release of the tortoises. All are protected and close to areas covered by the Ramsar Convention. None is of touristic or agricultural interest. For these two reasons, and because of the negative attitude of the local inhabitants experienced by British biologists after earlier research and conservation proposals in the area, the first idea to set the animals free at Katarini-Alyki was dropped. The areas finally chosen were almost without any human settlement and included an ideal dune system (e.g. Epanomi) or half-open maquis, and scattered oakwood vegetation.

As an experimental operation, the tortoises were released in groups of 20-50. Each was measured and marked, and details included in a register to provide the opportunity for follow-up. A total of 275 animals were released in the following places within the vicinity of Thessaloniki:-

1. Epanomi peninsula (30 km S. of Thessaloniki): 48 tortoises.
2. Area between Ossa and Krioneri, north of Koronia Lake (38 km N.E. of Thessaloniki) in five different places: 163 tortoises.
3. Hortiatis, south of Koronia Lake, at Triadi (16 km E.S.E. of Thessaloniki): 36 tortoises.
4. Private controlled land near Poligiris, Halkidiki (56 km S.E. of Thessaloniki): 28 tortoises.

RANA and CARAPAX would like to take this opportunity to express their gratitude to Mr Gregory Tsunis, Greek colleagues with the Greek Ornithological Society, especially Mr Gareth Trewartha, Stella Dimitriado and Aristoteles. Thanks are also due to staff of the Thessaloniki Forestry Department, especially Mr Alexandros Karnadas (Head of the Department), Mr Panaiotis Kalabalikis, the Greek Ministry of Agriculture, especially Messrs Petamides and Handrinos, and to Mrs Ana Manolopouoy.

In conclusion, CARAPAX staff and their colleagues hope that this operation will play a part in convincing the public that they should not buy illegally imported tortoises. They also hope that the operation demonstrates that good international cooperation between Ministries and NGOs is not only possible, but above all, necessary. In particular, they aim to bring about a halt in illegal trade in herpetofauna which is mainly concentrated in those countries apparently concerned with nature preservation.

An earlier version of this report has been sent to the authorities involved with this repatriation as well as to the Environment Division of the Commission of European Communities, Brussels.



Second World Congress of Herpetology

29 December 1993 – 6 January 1994

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THOUGHTS ON ANIMALS IN CAPTIVITY AND OTHER RELATED MATTERS

TERRY THATCHER

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Joining the B.H.S. as a teenager brings memories of reading with interest articles in the Journal by people such as Dr. Edward Elkan, Alfred Leutscher, and many others. These were the pioneers of Herpetological interest, on a scientific and a layman's level. Those were fascinating times, and those earlier contributors to the Journal the last of the amateur/professional keepers of Reptiles and Amphibians in the old style. As a society I believe we need to retrace our roots and look at the way legislation and animal rights organisations are trying to deny our rights to maintain and study reptiles and amphibians in captivity. Any publicity tends to be bad publicity, further eroding our credibility.

As modern husbandry practices have improved more and more species are being bred each year. There are now some excellent books on the subject as well as back up from specialist equipment and Societies such as our own. Why do people keep reptiles and amphibians? Possibly through an admiration of the natural world or just the sheer involvement of looking after interesting and often beautiful creatures; to be treated to the intimacies of their habits and reproductive cycles, ultimately (nowadays) to produce young over several generations.

If this interest was curtailed through legislation where would the stimulus be for youngsters to get involved in the conservation of all natural things in the future? Many of todays eminent herpetologists gained their early interest in such ways. Gerald Durrell is a classic example of a man who through sheer drive and interest has done so much for many species of endangered animals. How familiar is his early childhood to many of us, pond dipping for newts and frogs or maintaining small reptiles and amphibians in aquaria.

Zoos come in for much criticism these days but many are doing an excellent public relations service for the promotion of interest and awareness of what is happening in the world. Much of the work on species such as the Mountain Gorilla was funded by zoos. The research undertaken by Diane Fossey was started by the New York Zoological Society bringing attention to the vulnerability of this species. Dolphinariums have probably played a part in getting people interested in the plight of Dolphins and Whales. Despite the excellent wildlife films now shown on television, nothing can replace seeing the real thing in life: the texture of skin, body size and even smell.

We cannot afford to fragment ourselves from one another if we have the same basic goal in life, to save these animals and plants from destruction. Herpetologists, whether they be ecologists, conservationists, taxonomists or, to use an American term, Herpetoculturists, all want to see a safe future for reptiles and amphibians. Due to their vulnerability they are excellent indicators of changes in the environment, giving early warnings of problems to come.

CITES was basically a good piece of legislation, but it is not flexible enough, sometimes working against the good of the species. The Costa Rican Golden Toad, *Bufo periglenes*, was given total legal protection, both by CITES and national law. Collection or export of live specimens for any purpose was prohibited. The species lived in pristine Cloud Forest, and was never subject to loss of habitat or collection, yet it now appears to be extinct, for unknown reasons. If small numbers had been allowed to be collected by interested breeders, the toad would probably not now be extinct. The Harlequin Frogs, *Atelopus*, are facing a similar future despite living in remote or well protected reserves. Recently, a bush fire in the Sipaliwini reserve, Surinam, all but destroyed the populations of the Blue Poison Dart Frog, *Dendrobates azureus*. Fortunately this frog is quite widely bred in captivity in North America and Europe, so if the species is extinct in the wild a reintroduction programme can be planned when the vegetation regenerates. In the case of the first two amphibians no one knows why they declined; pollution

and climatic change are theories put forward. Some *Atelopus* species could be bred much as *Dendrobates* are.

The destruction going on in the Amazon Basin is probably the worst ecological disaster yet to happen to the world, yet Brazil does not allow export of species about to be drowned by badly planned hydro-electric dams, poisoned by mineral mining operations, burned for growing unsuitable crops or for cattle ranching. Many species have been helped by private and public herpetological collections. The Puerto Rican Crested Toad, Jamaican Boas, Round Island Geckoes and Skinks, etc. Others in the private sector now being produced regularly are the beautiful Golden Mantella and Tomato Frog, Madagascan Toads, etc. etc. Closer to home our own Society has greatly assisted the Sand Lizard and Natterjack Toad through land management and captive breeding.

Many wild areas could benefit from sustainable commercial collection of such creatures as Butterflies, Reptiles and Amphibians, integrated with more natural forest farming techniques, producing valuable revenue, food, and maintaining a near-to-nature environment. Such schemes could directly help indigenous people who are normally the losers in so many badly managed schemes. Farming Iguanas in South and Central America, Chameleons in Madagascar or some of the Australian Pythons or Monitors, are examples which come to mind.

There is no doubt that the pet trade has often been wasteful and immoral, in its choice of species and the sheer numbers imported. If a better choice of species were made, and in more limited numbers, these could supply specialist breeders, and the more hardy groups the pet trade. The more vulnerable species which need specialist care could eventually end up in the trade when sufficient numbers of unrelated stock were available. Instead of unsuitable animals going to impulse buyers and dying in a short space of time, healthy animals adapted to a captive environment could be offered to individuals with experience in maintaining the easier kinds. The North American Corn Snake, the Leopard Gecko, and Clawed Frogs are good examples of well adapted species for the beginner. Care sheets should be given with these animals as a compulsory service at the point of sale. With more success by keepers of reptiles and amphibians, interest would increase, promoting wider concern for all species, and sound husbandry practices. A good example of a species which is a "prime target" for captive breeding is the Cape Verde Skink, *Macroscincus coeteui*, a large Skink 50 cm in length of the sub family *Tiliquinae*, thought to be on the verge of extinction (if not already extinct!) This lizard was imported many years ago and described as a good vivarium animal. Now certain institutes or individuals with modern facilities could potentially save this species by captive propagation. The Herpetological community needs to close ranks, set high standards and show the public the positive side of studying these varied and exotic creatures. At the same time we should distance ourselves from the idiots who through ignorance and anti-social behaviour give us a negative public image.

The Bulletin has become an excellent mouthpiece for the Society on all types of issues and can only increase the interest of scientist and layman alike. Please send in any articles on successful breeding projects of all groups of Reptiles and Amphibians. Also notes on useful new equipment, conservation projects worldwide, threatened habitats and hopefully, the odd successful reintroduction report. Herpetology has emerged from its infancy: let us promote and, above all, enjoy it.

MEMBERS' ADVERTISEMENTS

Wanted: Midwife Toads (*Alytes obstetricans*), preferably juvenilles.
Laurence Hoy. Tel: 0252 890329.

For Sale: First and second generation captive bred Emerald Tree Boas (*Corallus caninus*) and second generation Boa Constrictors (*Constrictor constrictor*) expected soon.
Simon Townson. Tel: 081-531 1378.

ADDITIONAL RECORDS OF *NATRIX NATRIX* FROM THE BRITISH PLEISTOCENE, INCLUDING THE FIRST RECORD OF A BRITISH COLD-STAGE SNAKE

J. ALAN HOLMAN

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INTRODUCTION

Recently, Holman (1991) summarized the British fossil record of *Natrix natrix*. Since that time, two past fossil records of this species have been brought to my attention and I have identified new material from a Devensian cold-stage pocket at the Shropham Site, Norfolk.

Thus far, the British Pleistocene cold-stages are represented by only three herpetological genera, *Bufo*, *Rana*, and *Lacerta*, amongst which only *Rana temporaria* and *Lacerta vivipara* have been identified to the specific level (Holman, 1990). Therefore, the recent recovery of fossil *Natrix natrix* vertebrae from a Devensian pocket at the Shropham Site, Norfolk, is noteworthy.

CHROMERIAN INTERGLACIAL

Two early Middle Pleistocene records of *Natrix natrix* from the Cromerian Interglacial stage were not included in the Holman (1991) summary.

Sugworth, Berkshire – Stuart (1980) detailed the geology and vertebrate fauna of the Sugworth, Berkshire Site (near Oxford) which he assigned to Cromerian Zone Cr IIb. He identified two fragmentary vertebrae as cf. *Natrix natrix*.

Little Oakley, Essex – Lister, McGlade and Stuart (1990) detailed the geology and vertebrate fauna of the Little Oakley, Essex, Site which they suggest is “. . . of early Middle Pleistocene age in the middle to late part of the ‘Cromerian Complex’ . . .” They believe that the Little Oakley deposit may be somewhat younger than the West Runton Freshwater Bed Site, Norfolk, which has yielded *Natrix natrix* (Holman, 1991) and the Sugworth Site above. The authors assign a caudal vertebra to *Natrix natrix*.

DEVENSIAL GLACIAL

Shropham, Norfolk – Fossiliferous beds yielding small vertebrates occur in the Minn’s Aggregates Company Pit near Shropham, Norfolk, (TM 005938). A preliminary report on the stratigraphy and herpetological fossils of the site was given by Holman and Clayden (1990). Vertebrate fossils at Shropham come from two Pleistocene stages: Ipswichian (temperate) and Devensian (cold). The Ipswichian fauna comes from a detritus mud layer below Devensian gravels and muds at the top of the site.

Fossil herptiles come from two pockets within the Devensian stratum. “Pocket 1” contained detrital sediments that yielded a cache of anuran bones collected by Martin R. Warren of the Cromer Museum, Norfolk, in 1985. These bones were identified as *Rana sp.* and *Rana temporaria* (Holman, 1990). “Pocket 2” contained detrital sediments that yielded *Rana temporaria* bones and two snake bones collected by A.J. Stuart of the Castle Museum, Norfolk, in 1991. Because of the absence of records of snakes from cold-stages in the Pleistocene of Britain, I present the following information.

Natrix natrix (Linnaeus, 1758)

Grass Snake

Locality and Age: Minn’s Aggregates Pit Site near Shropham, Norfolk, (TM 005938); “Pocket 2”, detrital sediments of Devensian glacial age.

Fossil Material: Two trunk vertebrae collected by A.J. Stuart, Castle Museum, Norfolk, and housed in the Shropham fossil collection at the Castle Museum, Norfolk.

Other British Fossil Records: Holman (1991) has recently summarized the fossil records of *Natrix natrix* in Britain where it has previously been recorded only from interglacial sites.

Identification: These vertebrae were identified using the criteria presented in Holman (1991, p. 8 and Fig. 1). The vertebrae were of the elongate variety that typically occupy the middle part of the trunk series of vertebrae in modern *Natrix natrix*.

Comments: This is the first fossil record that I am aware of a British Pleistocene cold-stage snake, although a lizard, *Lacerta vivipara*, has been reported from the Nazeing, Essex, Site (Holman, 1990). The Grass Snake just reaches the Arctic circle in Sweden today (Arnold and Burton, 1978), but occurs well below the Arctic circle in the rest of its European range (Arnold and Burton, 1978; Bannikov et al., 1977). The other two cold-stage species (*Rana temporaria* and *Lacerta vivipara*) identified from Britain occur within the Arctic circle in western and in eastern Europe (Arnold and Burton, 1978; Bannikov et al., 1977).

Stuart (pers. comm. Sept. 4, 1991) mentioned that the Shropshire Devensian "Pocket 2" might represent early Devensian times. But whether the Shropshire *Natrix natrix* fossils indicate warmer climates than occurred at other British herpetological cold-stage sites (Holman, 1990) will only be determined when the entire Devensian fauna at Shropshire is detailed.

ACKNOWLEDGEMENTS

I wish to thank Dr. A.J. Stuart for allowing me to study the Shropshire herpetological fossils recently collected by him. The National Geographic Society provided funds for my palaeoherpetological studies in England in 1991 under NGS Grant 4549-91.

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THE REPRODUCTION IN CAPTIVITY OF THE NORTH AFRICAN SPINY-TAILED LIZARD, *UROMASTYX ACANTHINURUS*

TERRY THATCHER

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This impressive agamid has been kept for many years with very few, if any, successful breeding results in the U.K. During the winter of 1990 the author decided to try once more to "cycle" his animals, which were kept in two separate groups, one consisting of one male and two females, and the other of three males and one female.

From 25 September, 1990, the artificial day length in the lizards' cages was reduced in one hour units, from sixteen to eight hours. The cage (6' x 2' x 2') has a false floor to the front with an area of damp sand and peat immediately behind, into which is placed a drainage pipe at a 45° angle. The drier underfloor area to the front was used more by the lizards as the light periods decreased. At the same time the lizards were sprayed each morning with a hand held water spray. Day temperatures reached a high of 25°C, but were normally about 20°C. Night time lows of 12°C were not unusual. By 3 November 1990, the basking area provided by a Mercury Vapour Lamp, 125w (manufactured by "Sunlight Systems") was turned off, as well as a heater pad. One "Trulite" fluorescent tube (24 inches) was used for 8 hours per day during this period. The ambient room temperature was 14°-20°C. The cage of Group One experienced slightly lower night temperatures due to the cage being in contact with concrete floor of the room.

At this stage the lizards weighed as follows:

GROUP 1

Male	475g
Female	200g
Female	250g

GROUP 2

Male	120g
Male	210g
Male	225g
Female	150g

On 28 December, 1990 all lights and the heat pad were turned back on. The maximum temperature, beneath the Mercury Vapour Lamp, was 52°C. The ambient temperature was 28°C, the night time minimum 16°C.

Food was offered immediately: Spring greens, sprouted seeds, lentils, grated carrot, and apple skins. The food was dusted with "SA 37" vitamin/mineral powder plus calcium carbonate. The lizards were weighed again on 30 December, 1990:

GROUP 1

Male	375g
Female	160g
Female	160g

GROUP 2

Male	70g
Male	130g
Male	220g
Female	85g

These figures show huge weight losses, an average of 76g per animal in Group One and 50g in Group Two.



Plate 1. – Adult male *Uromastyx acanthinurus*. Green colour phase. Compare with red colour phase on front cover, and Plate 4.



Plate 2. – Juvenile captive-bred *Uromastyx acanthinurus*, approximately 6 months of age.

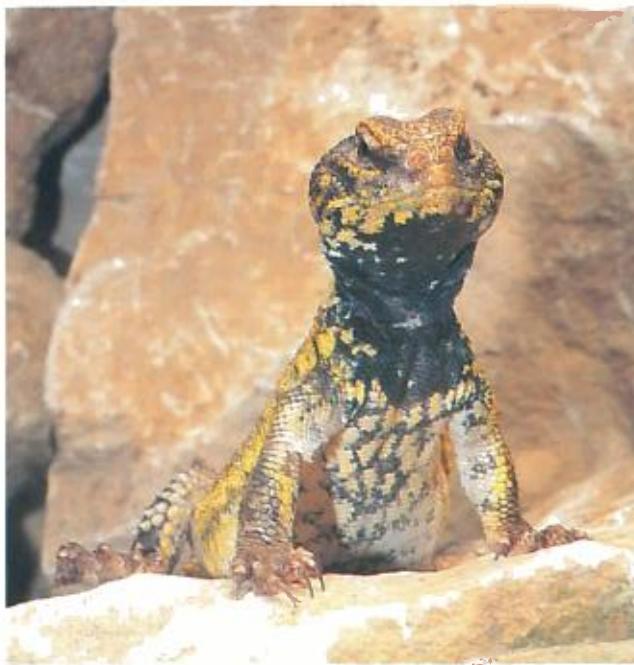


Plate 3. – Adult male *Uromastyx acanthinurus*, yellow colour phase.



Plate 4. – Adult male *Uromastyx acanthinurus*, red colour phase. Father of juvenile shown in Plate 2.

COURTSHIP

By mid-January the male in Group One was chasing the females and biting their flanks. The same male was introduced to Group Two in an attempt to stimulate sexual activity but this proved disastrous as the male attacked another male, biting it viciously on the head and causing a fair amount of bleeding around the ear drum. The Group One male was immediately removed. The victim's wound soon healed.

On return to its our vivarium the male began courting in earnest, performing "press ups" in front of the two females, chasing and biting them. but not aggressively. The females were obviously ready to accept a mate as they would greet the male head-on, tongue licking. The lizards did not touch at this point but it would appear that this was a passive gesture on the part of the females. Actual copulation was not witnessed, but by 21 February 1991, the male had very long waxy deposits exuding from his femoral pores, and the hemipenal bulges were obvious. This characteristic only shows up after a winter cooling period; the males' sexual organs are activated by a lowering of temperature. By mid-March the females were filling out slightly but it was difficult to be sure if they were gravid. During this time, and later in the year after egg laying, the male would dig into the burrow system, spraying sand everywhere.

At the beginning of May one female was obviously gravid, and on 7 May, 1991, 14 eggs were deposited in the sand and peat mixture at the end of the drainage pipe. The eggs were extremely large in relation to the size of the female, being 4.6 cm long x 2.5 cm wide. They were incubated at approximately 30-33°C, 85% humidity. Seven eggs proved infertile after a month, but the remaining seven hatched on 1 August, 1991, following an incubation period of 87 days. The youngsters were perfect replicas of their parents.

Within a very short space of time the juveniles were eating all types of chopped greens, such as friese, spring greens and kale, as well as sprouted seeds, grated carrot, waxmoth larvae and crickets. The latter are a bit fast for the lizards to catch, but are accepted if offered on tweezers. Growth was good and the babies fed until they looked like footballs on legs. "Nutrobal" mineral/vitamin supplement and Calcium Carbonate were added to the food. A shallow dish of water was placed in the cage daily but not seen to be used. The cage was also sprayed with a water spray. The water was also sprayed directly on the lizards' bodies. Lighting consisted of a 40w spot light over a flat rock, plus a Black Light fluorescent tube, which was positioned in such a way that the lizards could actually touch it.

At the time of writing (10 January, 1992), the youngsters are doing well and there appear to be no problems in raising them. Unfortunately, female two did not produce any eggs and the female in the second group did not produce either. This could have been because of the ratio of three males to one female.

After this initial breakthrough it is hoped to reproduce these beautiful and interesting lizards annually.

UPDATE, SPRING 1992

Pre-hibernation weights 6 December, 1991:

GROUP 1

Male	400g
Female (non-breeder)	240g
Female (breeder)	250g

GROUP 2

Male (Green)	330g
Male (Large Yellow)	250g
Male (Small Yellow)	170g
Female (Red/Brown)	180g
Female (?)	175g

Female (Small Red) 85g

The last two animals were reared from wild hatchlings and introduced to the group.

Post hibernation weights, 30 January, 1992:

GROUP 1

Male	405g
Female	235g
Female	235g

GROUP 2

Male (Green)	310g
Male (Large Yellow)	245g
Male (Small Yellow)	165g
Female (Red/brown)	180g
Female (?)	175g
Female (Small Red)	85g

The weight loss in Group 1 was an average of 1.66g per animal, minimal in comparison to the previous year, and in Group 2, 7.5g per animal, average. One animal (Male, Group 1) actually gained 5g. These lower average weight losses were probably due to winter temperatures remaining generally lower in the current year. (Minimum recorded 10°C).

At the time of writing (16 April, 1992), both groups have been extremely active and courtship plus numerous copulations have been observed since 29 February, 1992. The larger red male of Group 1 was seen to chase a female and circle in front of her several times, as if chasing its tail. This was followed by "press ups", eventually resulting in the male gripping the female on the side of the neck, with his tail under hers, both tails and cloacas lined up. Mating followed. The Group 2 males were seen to mate with different females, even the very small 85g animal. Two females are looking very gravid, but are still mating with the males.

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A NOTE ON THE 18.5 ft. BOA CONSTRICCTOR FROM TRINIDAD**HANS E. A. BOOS***Emperor Valley Zoo, Port of Spain, Trinidad*

James A. Oliver started it all, or at least his book "Snakes in Fact and Fiction" published in 1958 carried the account which I think is worthy of a full quote

"The true Boa Constrictor has a wide distribution in the American tropics and subtropics, occurring from northern Mexico to northern Argentina. The species has several races of geographic subspecies that differ from each other in minor details. Members of most of these races rarely reach a length of more than 10 feet. The form occurring in the tropical sections of northern South America occasionally reaches a length of 12 to 14 feet, but the average is much smaller than this. The record for the race - and for the species - is 18 feet 6 inches. This length was obtained from an unusually large individual killed and measured in Trinidad by Colin F. Pittendrigh while he was on the island doing malaria-control work during World War II. He was working with a crew of men in the thick forest of Trinidad's Central Range. To go from their camp to where they were working, the crew had to cross a swampy area by walking along the trunk of a fallen tree. One morning, they saw a huge snake resting on the tree and, believing it was giant Bushmaster, refused to go out until the snake was killed. Pittendrigh got his gun and went to the spot where the snake had been reported. It was gone. He urged them to go on with their work, but they refused to cross the area until the snake was found and killed. After a careful search, the snake was discovered coiled up on the hollow end of the tree trunk. Pittendrigh said it appeared to be a monstrous creature. With long poles it was moved part way out of the log and shot. Then it was dragged out to where its true identity and length could be determined. It was measured in the flesh at 18½ feet, but the skin after being stretched was much longer. This maximum length for the widely framed Boa places it barely above the maximum of 18 feet 4 inches recorded for the longest venomous snake, the King Cobra or Hamadryad."

This 18.5 ft Boa constrictor became to me what the reported 37.5 ft Anaconda is to herpetologists all over the world. Living all my life in Trinidad (except for a 4½ year stint in Australia) I searched in vain for any specimen larger or even approaching the length reported by Pittendrigh.

The biggest I could discover was perhaps a little over 11 feet. One enormous Boa, stretched along a cross-bar in a cage in the Georgetown Zoo, in what was still British Guyana in 1967, even with a stretch of my imagination, could not have been more than 12 feet.

The Pittendrigh/Oliver story has been accepted, and repeated and printed in several publications as the years passed.

Clifford H. Page in 1961 in his "Giant Snakes" quoted the essence of Oliver's story and added:- "After it was shot, Pittendrigh determined its length in the flesh as 18½ feet. This is the kind of field observation which cannot be lightly discredited".

In 1973 Sherman A. Minton Jr. and Madge Rutherford Minton published their "Giant Reptiles" and once more repeated the story ending with, "It measured 18.5 feet and is by far the biggest specimen reliably reported".

As recent as 1987 John M. Mehrtens, in his "Living Snakes of the World" and 1991 Scott Weidensaul in his "Snakes of the World" state that the maximum size of the Boa constrictor is 18.5 feet.

Chris Mattison in his 1986 version of "Snakes of the World" went even one better, rounding off the maximum measurement to "6m (20 ft)".

But how reliable was this original report?

I have had an autographed copy of Oliver's "Snakes in Fact and Fiction" in my library for many years, and every time I read the account it worried me. Then one day in 1980 while going through the index on an ongoing series of publications on the Flora of Trinidad and Tobago I saw a paper on the Bromiliads, written by a Colin F. Pittendrigh. This galvanized me into writing to James Oliver, asking him about the story, and if he knew the present whereabouts of Pittendrigh.

Oliver replied giving me the last known address he had for Pittendrigh and added that he had met him occasionally at the American Museum of Natural History after World War II and that he had repeated his story essentially as it was printed in "Snakes in Fact and Fiction".

A letter to Pittendrigh soon brought a reply dated March 12th, 1980. He was now the Harold A. Millar Professor of Biology and Director of the Hopkins Marine Station of Stanford University in California.

What he wrote was, that on that fateful day, alerted by his field-crew he shot what he describes as a "Boa Constrictor", which was sunning itself on a felled tree trunk. So heavy that it took two men to carry it back to their camp in the Guico/Tamana area of Eastern Trinidad, where, he then stated, he skinned it, so that it stretched completely across the back of their laboratory building which measured 30 feet long. He also said that "The animal was about 18 feet long".

That night the unprotected skin was destroyed and partially eaten by stray dogs and unfortunately no pictures were taken. Apparently, no pieces of skin were preserved either. He ends by saying "However, my memory is clear on it all - it was truly an immense snake!"

In my reply to Pittendrigh I pointed out to him the confusion caused by the common use of the name "Boa Constrictor" to mean both the Anaconda and Boa in South America (which is noted by the Mintons on p 202 of the 1975 paperback - edition of their "Giant Reptiles") and pressed him for more details that he may have remembered about the appearance, colour, pattern and scalation of the snake, and suggested to him that in fact it may have been an Anaconda - *Eunectes murinus* (which is fairly common in the area) that was shot that day in 1944, and not a Boa Constrictor.

His reply was stunning to me. He admitted that "I certainly cannot exclude the possibility that the snake I shot in Tamana was an Anaconda ("Huilla") because I am no herpetologist". He added that he had assumed that since Anacondas were swamp inhabitants and that there were no swamps in the Guico/Tamana area, that it must have been a Boa Constrictor. He ends his letter "However, there is no doubt that I cannot attest, with any scientific authority, that it was *not* an Anaconda. Nevertheless, I seriously doubt that".

Like a blood hound on a trail I found it difficult to accept his negative admission and once more wrote him sending him a map of the area with capture and sighting-locations of Anacondas that I had recorded over the years, and requested that he pinpoint for me the exact location of the camp where the snake was killed.

Back came the map with his location circled in red near the village of Mamon, only a few miles from the edge of the Nariva Swamp and almost equidistant from both coastal and inland locations of the collection-sites I had noted. And to cap it all, is his final admission, in his handwriting, in the margin of the map - "Many thanks for your letter. It does seem reasonable that my snake was an Anaconda. I have marked the location". That map and the letters are in my files.

I felt I was finally home.

But, as ever, there was always a nagging, "What if?"

Several years later, unannounced, and with what prompting I may never discover, Yussuf Khan came to see me. He said he lived at Alfonso St. in the town of Sangre Grande, and had once worked on the malaria-eradication project with Colin F. Pitendrigh. He remembered him well, and he remembered the killing of the huge snake just as vividly. Trying not to 'lead' him I asked him to describe what he remembered of it. He said it was huge, greenish, and shining, and he thought at the time it looked like a "Huille".

'Huille' or 'Huillia' is the local name for the Anaconda. I held my breath as I showed him slide transparencies of both species and asked him if he recognized which one had been killed that day.

He did not hesitate, and simply pointed to the Anaconda and said in perfect Trinidadian "Dat is it".

He left after a while promising to return. That was in the mid-80's and he was not visited me again. I have not gone to search for him, nor have I seriously searched any more for a Boa Constrictor to equal or exceed 18.5 feet. However I do hope, one day I will perhaps see or collect an Anaconda of such a length, or larger, from our fast disappearing wild places.

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NEOTROPICAL ANURANS AND FOAM NESTS WHY BREED ON LAND?

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Tropical rainforests are among the wettest of terrestrial environments: they harbour a rich fauna of frogs and toads, many of which, surprisingly, reproduce on land. The vast rainforests of Central and South America support the greatest diversity of anurans to be found anywhere on earth. Some of these inhabit the canopies of the trees; others live on the forest floor or even burrow underground, but very few of them spend all their lives in water.

Some day-active forms, such as the Arrow-Poison frogs (*Dendrobates* and *Phyllobates* spp.) are extremely poisonous and possess vivid warning (aposematic) coloration. These conspicuous amphibians walk boldly in the open, the males calling loudly from exposed positions. One small species, *P. terribilis*, is said to carry enough toxin in its skin to kill 1000 people if it were to enter the bloodstream: the poison is less lethal when swallowed, but must nevertheless be a powerful deterrent to predators (Forsyth & Miyata, 1984). Most Neotropical frogs and toads, however, are quite edible and so cannot afford to advertise themselves. Instead, they are inconspicuous; their concealing (cryptic) hues resemble the olive, brown or grey coloration of the background. The nocturnal, Panamanian toad illustrated in Plate 1 was photographed at night by flash. It could only be detected through its mating calls, for it was almost invisible, even in moonlight.

Although most brightly coloured species, especially those marked with yellow and red, are highly poisonous, bright colours are not always linked with toxic secretions. For instance, the dull-coloured *Ceratophrys americana* has a virulent poison, while the gaudy *C. dorsata* is innocuous (Noble, 1931). Is there a parallel here with the so-called Mertensian mimicry found among coral snakes?

Nursing habits are very common amongst the Anura, as Gadow (1901) emphasised, and the eggs of tropical species are frequently deposited out of water. In some frogs, they are laid in places from which they can be washed into standing water after the next heavy rain, or on leaves overhanging the water so that, on leaving their eggs, the larvae drop into it. In other species, the eggs are placed in damp situations on leaves, and hatch as tadpoles or immature air-breathing frogs. In many cases, the eggs are carried about during their development by the male or female parents. A classic example is afforded by the Marsupial Frogs (*Gastrotheca* spp.) in which the developing eggs are carried around in pouches on the females' back (Fogden & Fogden, 1988; Frazer, 1973).

The tadpoles of Arrow-Poison frogs develop in bromeliads, or in small holes in tree-trunks containing a few millilitres of water only. They are carried between these reservoirs of water on the backs of the males. In such cases, the tree-frogs remain safely in the higher vegetation of tropical forest, and need never descend to surface waters to breed, while the eggs and tadpoles are kept away from the many predators which might otherwise feast on them. Presumably the latter are less toxic than the adults, otherwise the argument would be paradoxical.

Foam nests (Plate 2) are produced by a number of frogs of the genera *Rhacophorus*, *Leptodactylus*, *Physalaemus*, (= *Engystomops*) etc. They may be found in dry hollows on the ground, along the banks of streams, or even above ground and attached to bushes or the lower branches of trees. The tadpoles remain in them for a while after hatching until the nest liquifies. Downie (1988) has recently analysed the functions of foam nests of the common leptodactylid *Physalaemus pustulosus* (probably the species illustrated here). Unlike Gorzula (1977) and Dobkin & Gettinger (1985), he concluded that the foam has little thermal



Plate 1. – Nocturnal ground-living Panamanian Toad.



Plate 2. – Foam nest

significance. It may, however, help to protect the eggs and hatchlings from desiccation. It is also likely that it may have anti-predator properties.

This brings me to the problem that this article seeks to address. Why do so many tropical, and especially Neotropical, anurans reproduce on land? There are probably a number of adaptive advantages, operating simultaneously.

Rivers and their permanent streams apart, lakes, ponds, and standing water generally, are rare in the rainforest. At the same time, puddles and temporary pools in the tropics speedily acquire a rich fauna of predatory beetles, water-bugs, dragonfly and predaceous dipterous larvae. It may well be that the avoidance of insect predators is a more important selective factor than the lack of standing water. Certainly, insects are often extremely resistant to toxins that have a remarkably harmful effect upon vertebrates.

I would like to suggest, therefore, that the selective advantage to amphibians of reproducing on land rather than in water, in the tropics, may lie in the avoidance of predatory aquatic insects that are resistant to amphibian skin toxins, such as batrachotoxin, which have a paralysing action on, and are so effective as defences against, vertebrate enemies.

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EUROPE PROPOSES PROHIBITION OF POSSESSION OF EUROPEAN AND OTHER SPECIES

The European Commission has published a "proposal for a council regulation laying down provisions with regard to possession of and trade in specimens of wild fauna and flora", published in the Official Journal of the European Communities, 3 February, 1992, No. C26/1. It will apply from 1 January, 1993, throughout the European Community and is intended to regulate trade in wildlife when the Community countries dismantle Customs controls on internal borders, to form a single market. Most existing national laws controlling the international trade in fauna and flora will be repealed.

In essence, the Regulation prohibits not only trade, but also the *possession* of all species listed on CITES Appendix 1, and *nearly all European species of reptile and amphibian*. These species are listed in Appendix A of the proposed Regulation. Specimens already in captivity of these species will have to be registered with the relevant government department when the Regulation comes into effect; evidence of legal origin will have to be provided. A charge, as yet unknown, will be levied. The sale of these species will not be permitted. Nor will they be able to be moved from the registered location without authorisation.

Further provisions include restrictions on importation, holding and movement of species on the grounds that they are "unlikely to survive for a considerable proportion of their potential lifespan", or that they may pose a threat to indigenous wildlife if they escape or are released, or that they may constitute a threat to "human life and health".

The novel, and most serious, feature of this regulation as far as English law is concerned is the prohibition of *possession*. How this will be enforced has not been made known.

No information on the scientific basis, or justification for the listing of almost all European species on Appendix A has been made public.

Comments on the proposed Regulation were invited by the Government from a wide variety of organisations and societies, including the B.H.S. Your Chairman and Legal Officer have made the Society's views known to the Department of the Environment. Any news on the final form of the Regulation, and how it will be administered in the U.K., will be published in the *Bulletin*.

A more detailed account of the Regulation, with commentary, will appear in the Autumn 1992 issue of the *Bulletin*.

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