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THE BRITISH HERPETOLOGICAL SOCIETY

BULLETIN

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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 advises on aspects of national and international legislation affecting the keeping, breeding, farming and substainable utilisation of reptiles and amphibians. Special meetings are held and publications produced to fulfil these aims.

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

The Education Committee promotes all aspects of the Society through the Media, schools, lectures, field trips and displays. It also runs the junior section of the Society - THE YOUNG HERPETOLOGISTS CLUB (YHC). YHC Members receive their own newsletter 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	£6	
Bulletin Membership	£12	(Receive YHC Newsletter)
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
Simon Townson and John Spence.
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FRONT COVER
Captive bred baby Boa Constrictors. See article on page 5 by C. Wallace and S. Townson

BRITISH HERPETOLOGICAL SOCIETY REMAINING MEETINGS FOR 1995

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

July 29th — Paul Eversfield and Mark Hollowell, "Chelonians in captivity". Birkbeck College, 5-7 pm.

August — Family Reptile Holidays in Dorset. Combine your family holiday with field Herpetology and socialize with other members staying at a Field Centre. Events for all the family. Outdoor vivariums on site.

For full details of this BHS event please send a large S.A.E. to the BHS Education Officer, address on inside back cover. Deadline for booking 1st July.

October 7th — Joint BHS/IHS meeting. Dr. Wolfgang Böhme (eminent German herpetologist) and Ernie Wagner (American herp breeder). Woolaton Hall Nature Centre, Nottingham. Tickets (£5) from J. Coote (0115 972 9273).

October 14th — October General Meeting. Stephen Divers, "Mortality and disease of imported Royal Pythons"; Rob Quest, "Reptile imports"; Mary Swan, "Results from the National Amphibian Survey". Birkbeck College, 1-5 pm.

November 11th — Annual BHS Captive Breeding Committee open day and stock sale. New Denham Community Centre, Bucks (off M40, J1), 2-6 pm.

Birkbeck College is situated in Malet Street, London, WC1. Nearest tubes are Goodge Street, Russell Square, Tottenham Court Road and Euston Square. Limited free parking in the University of London car park, entrance in Malet Street.

BHS NORTH WEST REMAINING MEETINGS 1995

August 5/6th — Reptile Rally. From 10.30 until 5.00 pm. Exhibition of native and exotic species.

October 10th — Yet to be decided.

December 5th — Yet to be decided.

All meetings commence at 8.00 pm except where stated and are all held at Wildfowl and Wetlands Centre, Martin Mere, Burscough, Lancs. Tel: 01704 895181.

PROVISIONAL MINUTES OF THE 48TH ANNUAL GENERAL MEETING OF THE BRITISH HERPETOLOGICAL SOCIETY, HELD AT 11.30 AM, SATURDAY MARCH 18th 1995 IN BIRKBECK COLLEGE, LONDON

The meeting was chaired by Dr T.J.C. Beebee. There were twenty-five attendees and apologies for absence were received from D. Bird, A. Darby & M. Swan.

1. MINUTES OF THE PREVIOUS AGM (19.3.94).
These were accepted nem. con.

2. MATTERS ARISING.
There were none.

3. ANNUAL REPORT
This was circulated prior to the meeting, together with audited accounts and an inventory of capital assets.

(1) Membership
Both Adult and YHC Membership, particularly the latter, increased during 1994 giving the Society its largest overall membership since its inception. This was welcomed.

(2) Finance
The Society finances were healthy. Bank charges were fairly high, mostly because of standing order arrangements, and although BHS is a charity it is not exempt from these charges. The main account showed a profit of over £5,000 for 1994, and all the ancillary accounts were also very satisfactory with positive balances. That of the Captive Breeding Committee showed a substantial reduction compared with 1993, but this was for a planned expenditure on book production. The Society's capital assets increased, mainly by computer purchases, during 1994.

(3) Meetings
Meetings followed the usual pattern during 1994. The May event at Beam Brook proved particularly attractive to members, and will be repeated in 1995. There are no plans to change the overall pattern of Society meetings at present.

(4) Regional Groups
Regional Groups continued their normal activities, including meetings in the north-west and in Scotland, during 1994.

(5) Publications
The editors of all three BHS publications were congratulated on the high quality of their productions, which all appeared promptly during 1994. Neil Clark is standing down as co-editor of the Bulletin, and was thanked for his contribution.

(5) Library
Dave Bird was thanked for his continued work in resurrecting the BHS library. It was suggested that lists of journals and reprints held by the Library would be useful as soon as

they could be made available, and that all library lists would be improved by a larger typeface.

(6) Committees

All four of the Society's committees continued their specialised works during 1994. The Captive Breeding Committee Open Day in November passed without incident despite a visit from the Reptile Protection Trust, and the local authority has made it clear that it is now happy with the arrangements for these sessions. 14 care sheets are now available from the CBC. Jan Clemons, as Chair of the Conservation Committee, now also sits on behalf of BHS on the steering group of the Common Species Officer who came into post during 1994. A plea was made for more members to join the CC. A highlight of 1994 was the grant from the Esmée Fairbairn Trust for a salary (for 3 years) of an Education Officer, a post filled by Colin Fitzsimmons since last October. Two YHC members, Paul Morton (12) and Matthew Sharpe (11), gave an excellent short talk on some of their activities in aid of herpetofauna conservation which was very well received.

(7) Miscellaneous

The Chairman highlighted the confusion that had arisen between the British Herpetological Society and British Herpetological Supplies, a totally separate organisation but with the same acronym as the Society's, during 1994. Efforts will continue to minimise the difficulties posed by this situation, which unfortunately is not amenable to legal redress.

4. ELECTION OF COUNCIL FOR 1995-96

The proposals listed in the Annual Report for a new Bulletin Co-editor, a new Captive Breeding Committee Chairman, a new Research Committee Chairman and two new Ordinary Members were approved nem. con. Previous Chairs (Terry Thatcher and Tim Halliday) were thanked for their substantial contributions to the Society's business.

5. ANY OTHER BUSINESS

There was none.

The meeting closed at 12.15 pm and was followed by the "Herp Quiz" and three separate talks during the afternoon.

HERPETOLOGICAL JOURNAL REPORT 1994

During 1994 forty-two papers were submitted to the Herpetological Journal, one more than the all-time high reached in 1993. Twenty-eight of these were eventually accepted for publication, giving an acceptance rate of 67%. Time to publication varied between five and ten months, but fell slightly during the year. The faster publication rate is an encouraging trend that should be maintained in the future. However, the time taken by referees to review papers increased slightly. This pattern seems to be a general feature of scientific journals and is probably symptomatic of increased workloads within the scientific community.

Once again, the journal is indebted to the many referees who devote much time to ensuring that the papers to be published are of a high scientific standard. The journal now has two associate editors; Siobhan Keeling who oversees the desktop publishing process, and Leigh Gillett who proof reads all papers. All four issues were published on time.

Richard Griffiths
Editor

BHSCC SUNDAY CONSERVATION TASKS – WINTER 1995/6

During the 1994/95 management season BHS volunteers cleared a total of 7.6 hectares of invasive scrub off 20 heathland sites in Dorset, Surrey & Hampshire representing a total of 292 volunteer days. This is clearly a large amount of clearance but there is still plenty of habitat management outstanding and we would like to aim for a target of 10 hectares for the coming season. This we cannot achieve without more volunteers. The Conservation Committee have arranged four tasks over the coming season at sites of herpetological value where help from Society members would be appreciated. You will need to bring warm, waterproof clothing and a packed lunch. Details of these tasks are outlined below and members are asked to contact the task leader for further information.

September 10th – Woolmer, Hampshire
Task leaders – J Webster (01903 691362) and M Preston (01483 571416)

November 19th – Slepe Pit, Dorset.
February 18th – Town Common, Dorset
March 31st – Creech Heath, Dorset
Task leaders – C Parker, HCT Reserves Warden (01202 691466) and J Webster.

APOLOGY

In an article entitled "Meaningless Species Protection of European Herpetofauna under the Berne Convention and the new E.C. Directive" by H. Brinsøe and H.A.J. in den Bosch *(British Herpetological Society Bulletin* 47, 12-15, 1994), the assertion was made that "scheming behind the scenes" prevented publication of this paper in *Herpetofauna News*. We have subsequently received a complaint from the editor of *Herpetofauna News* that this assertion is untrue. The Society would like to apologise for any offence caused by this assertion, and take this opportunity to remind readers of the disclaimer which appears in the inside front cover of each Bulletin, "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".

OBSERVATIONS ON THE INTERBREEDING OF *BOA CONSTRICTOR CONSTRICTOR* AND *BOA CONSTRICTOR IMPERATOR*

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INTRODUCTION AND BACKGROUND

The Boa Constrictor (*Boa constrictor*) is a large and generally attractively marked boid which is becoming increasingly popular with amateur herpetologists. This species never really gets too large, as with some *Python* species and the Green Anaconda, rarely exceeding 3 m in length with an average adult size usually in the range of 1.8 - 2.5 m.

Boa Constrictors are impressive-looking, slow moving snakes, generally with a good temperament, which adapt well to captivity. There are currently about 9 different subspecies recognised, with an enormous overall range from Mexico, through Central and South America as far south as Argentina. This is a highly variable snake, with many different colour patterns and other physical differences seen even within a sub-species, and many herpetologists believe the group is in urgent need of taxonomic revision. For example, *Boa constrictor imperator* from Central America tends to be a relatively small, dark, iridescent snake and is quite different to the larger more boldly marked Colombian *imperator,* which is the taxon most commonly seen in captivity. Within the subspecies *Boa constrictor constrictor,* generally known as the 'Red-Tail Boa', there are distinct regional forms seen in Surinam, Guyana and Colombia (Amazonas). This variability combined with the misuse of common names has led to considerable confusion over the identity and origin of some captive boas. For a full description of the *Boa constrictor* subspecies, readers are referred to Peters and Denoso-Barros (1986). A more popular account, with some useful photographs, can be found in De Vosjoli (1990).

In the majority of both private and public collections, in the UK and abroad, the discovery of a formulated and reliable captive husbandry regimen for the breeding of the Boa Constrictor has yet to be made. In particular, a formula for the successful breeding of the so-called 'Red-Tail' subspecies *(constrictor)* remains elusive. This was once the case for several of the now commonly bred snakes, including, for example, the *Python molurus* group. As not all of the parameters for the consistent captive breeding of the Boa Constrictor subspecies have yet been ascertained there remains the need to properly and accurately record and publish any breeding data which becomes available. It is surprising that this extremely attractive and widely kept snake is bred in captivity by relatively few herpetologists.

This account is a record of the recent successful captive breeding of the two subspecies, *Boa constrictor constrictor* and *Boa constrictor imperator* in a private collection, and this is believed to be the first documented record of such a breeding, at least in the UK.

ORIGIN AND DESCRIPTION OF ADULTS

The female *Boa constrictor constrictor* was wild caught in Surinam and was obtained newly imported from a dealer in 1983, when it was estimated to be 3-5 years old. This specimen is exceptionally well marked, even for a 'Surinam Red-Tail', having a very light

fawn background colouration on the dorsal and lateral aspects, contrasting with small crisp, almost black, dorsal saddles which become chestnut coloured blotches towards the caudal region. At the time of the breeding trial the specimen was approximately 2.52 m in length and very heavily built, being a good feeder but of unpredictable temperament. During previous breeding trials it had never been receptive to a male's mating attempts.

The male *Boa constrictor imperator* was a captive bred Colombian specimen obtained in early 1993. This specimen was, reputedly, bred at the Warsaw Zoo in Poland 2 years previously, and was approximately 3 years old at the start of the breeding trial. At this time its length was in the region of 1.83 m. The colouration and markings of this specimen are generally typical of a Colombian Boa, although the background colouration is a little lighter than usual and the dorsal caudal blotches are a particularly attractive deep orange. This specimen had not previously been involved in any breeding trials.

As a suitable and sexually mature male *Boa constrictor constrictor* was not available, the authors decided to collaborate on a breeding project using the two specimens described above. Accordingly, on 7th February 1994 the female was introduced into the vivarium housing the male in a snake-room, which also houses 14 other Common Boas of both subspecies.

VIVARIUM DESIGN, HEATING AND LIGHTING

The melamine vivarium used to house both specimens measured 1.8 x 0.6 x 0.6 m with adequate ventilation panels at each end and a newspaper substrate. Heating was accomplished by taping to the floor at one end a 119 x 28 cm Ultratherm heat mat (that is beneath the newspaper substrate) and connected to a Microclimate DL2 pulse proportional thermostat. Additionally, a well-screened 60 watt tungsten electric light bulb, connected to a mechanical time switch on a 12 h/12 h day/night cycle, was fitted to the ceiling of the vivarium, above the heat mat and towards one end. A standard alcohol thermometer was attached to the back wall - one at each end of the thermal gradient, and a third thermometer was simply laid on the substrate to monitor the surface temperature.

Full and specific details of the type of set-up used, including construction and materials used, were reported previously (see Wallace, 1994). At the time of introduction the daytime air temperature gradient was 27 - 30°C and the substrate surface temperature over the heat mat was 31°C, whilst the night-time air temperature gradient was, during the cooling-off period, 18 - 20°C and the substrate surface temperature over the heat mat was 22°C. This low night-time temperature regimen extended only from 7th February to 13th February (i.e. only one week), although the ambient room temperature of the snake room at this time of year would also have been lower than normal in any event. At the end of the cooling-off period the daytime air temperature gradient was increased to 27 - 32°C and the substrate surface temperature to 35°C over the heat mat, and the night-time air temperature gradient to 24 - 27°C and the substrate surface temperature to 35°C.

COURTSHIP AND BEHAVIOUR

The first mating attempts by the male were witnessed from 17th February and continued for several hours at a time until the end of the following day. The female snake was not obviously receptive or resistant towards the approaches of the male and could be described as generally passive in its behaviour; in addition, the female was not observed to raise its tail or exhibit cloacal gaping, which has been described in this and other species of boid.

The male was subsequently and periodically separated from the female in order to promote further mating behaviour, which was usually regenerated upon reintroduction to the female. The temporary introduction of a second, sexually mature young male did not appear to increase or diminish the original male's interest in the female.

On the 9th March the female sloughed and, predictably, the male recommenced courtship and mating, presumably having been stimulated by pheromones released during the sloughing process.

On 12th April it was believed that the female was gravid, and it was therefore decided to add to the vivarium a 60 watt (30 cm) tubular greenhouse heater (enclosed within a wire mesh box) at one end and at floor level. This boosted the air temperature gradient to 28-35°C followed by a slight reduction in temperature at night. At this stage there was no marked basking response from the female, and intermittent courtship and mating behaviour was still taking place at this time.

By 21st April the female was still not basking, although all mating behaviour had now ceased and a pronounced mid-body swelling was evident.

On 26th May the female sloughed again and as this failed to precipitate any further mating behaviour, the male was transferred to a separate vivarium, in which it fed readily within a couple of days. The female refused all food items offered from the time that mating activity was first observed until after parturition.

By 22nd July the female's mid-body section was very distended and this specimen had established an increasingly regular basking pattern. However, because of the hot summer weather and associated high ambient room temperatures the tubular heater was switched off for much of the time from June onwards. In retrospect we consider that even without the benefit of the tubular heater the female would have been able to closely and accurately regulate the temperature of the developing embryos for most, if not all, of the gestation period. At no time was the frequently reported 'upside-down' basking position of many gravid boas and pythons (Townson, 1980) ever observed.

During August there was some anxiety regarding the female's thermoregulatory behaviour, since it was spending long periods at the cool end of the vivarium where we believed that the temperature (approximately 27°C) was below the optimum for a gravid boa; nevertheless, these fears proved to be unfounded.

PARTURITION AND CARE OF THE YOUNG

During the several days leading up to the day when parturition actually occurred, the female was looking decidedly slim, and there was some concern that the embryos may have been reabsorbed, or alternatively that some other problem had developed. On the evening of 20th September the female voided a small quantity of uric acid (as had occurred on a regular basis throughout the gestation period) and became increasingly restless.

On the morning of 21st September, at 06.45 h, after a gestation period of about 7.5 months about half a dozen new-born boas were seen actively exploring the cool end of the vivarium close to the female. Upon close examination it became obvious that there was another mass of less active and more recently born baby boas within the female's coils, which she appeared to be vigorously defending. As there was some concern that the female might inadvertently crush these babies, the parent was removed (under protest) to another vivarium, where it immediately drank copious amounts of fresh water. This snake remained very aggressive, and appeared to actively seek for the brood for several hours thereafter. Later the following day a defrosted rat was offered and was readily accepted.

When all of the 29 new-born boas had been removed from the vivarium 3 unfertilised ova were discovered. There were no stillborn babies or any individuals exhibiting physical defects. Although quite variable, their overall pattern and colour was more akin to the female than to the male.

Plate 1. Room for housing Boa Constrictor collection, with cages for housing babies in the top left of the picture

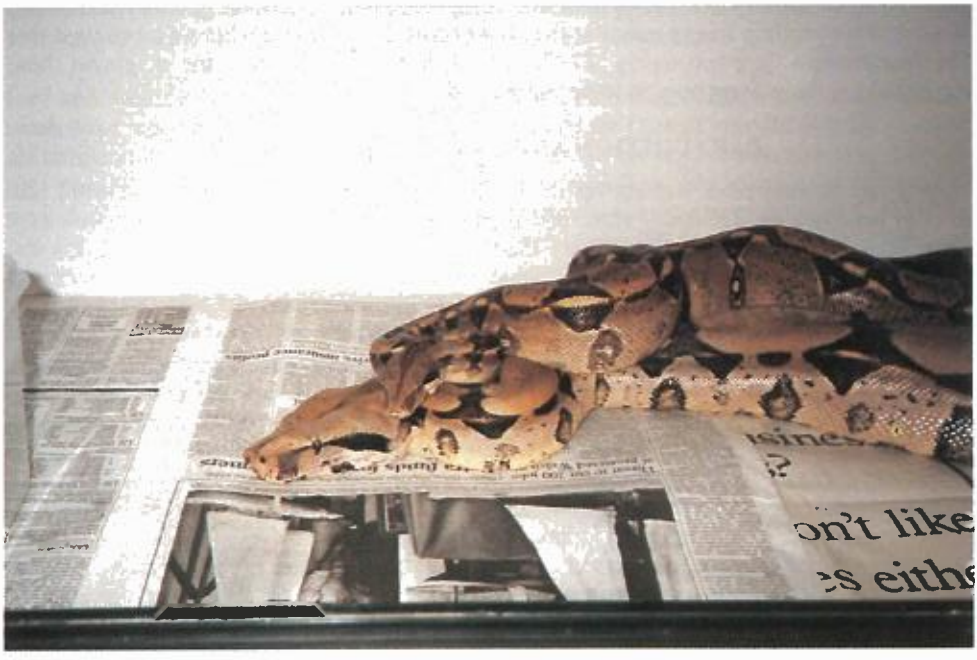

Plate 2. Adult Boas courting on 17th February 1994

Plate 3. Adult female Surinam Boa late in gestation, showing bulge of babies in latter part of body

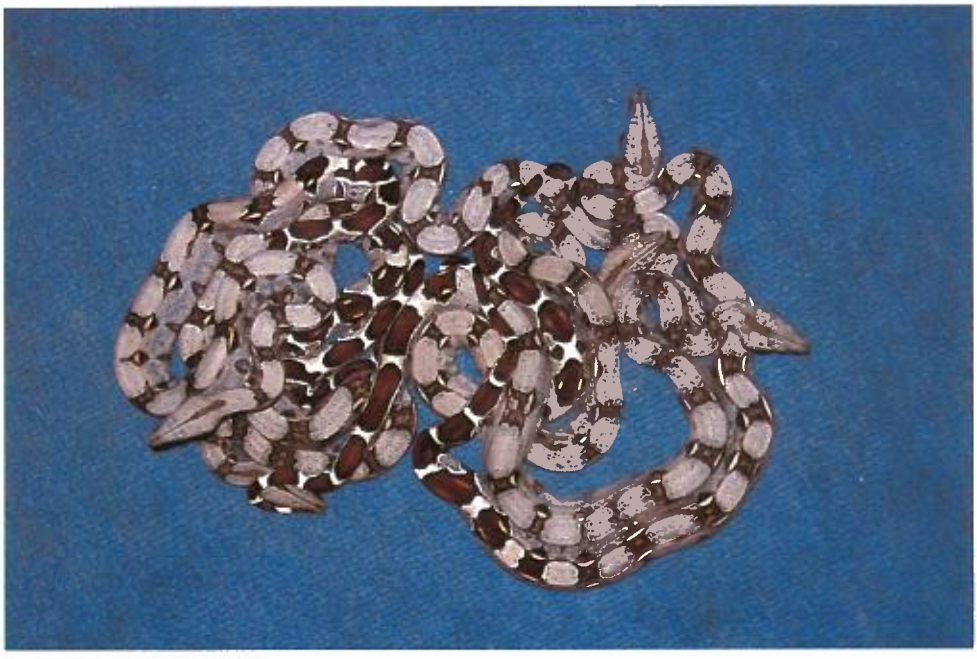

Plate 4. A group of babies shortly after their first slough

As several of the young had relatively large umbilical cords, upon the evening of 21st September it was decided to ligature the cords with thread, after which the cords dried up very rapidly and dropped off within 24 hours. The specimens were then placed in groups of 3 or 4 in separate small flat plastic "Hagen" boxes, with a substrate of moistened white paper towels and with a small water dish. Each box was placed within a large 1.8 x 0.6 x 0.6 m vivarium, so that the heat mat in the larger tank produced a surface temperature gradient of 27-31°C in the smaller boxes from one end to the other. This was achieved by raising the boxes on 1 cm high battens above the floor of the larger vivarium. It appeared to take the neonates 2-3 days to 'learn' how to thermoregulate by shuttling from one end of the "Hagen" box to the other. The paper towel substrate was sprayed 3-4 times daily, until the first slough had been completed and the snakes were less susceptible to dehydration.

The neonates were sexed by probing on 25th September, and this revealed that there were 17 females and 12 males. On 10th October a sample of 14 baby boas (9 female, 5 male) were measured and found to average approximately 58 cm (23 inches) in length, with the average weight for the females at 99.7 g, and 99.4 g for the males. All the babies subsequently fed on half-grown mice and have progressed well.

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AN HERPETOLOGICAL INTERLUDE IN EX-SOVIET CENTRAL ASIA (PART I)

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SUMMARY

A visit during May 1994 was made to the former Soviet Central Asian Republics of Uzbekistan, Kyrgyzstan, Kazakhstan and Turkmenistan. Contact was made with herpetologists in Institutes of Zoology of National Academies of Sciences in respectively Tashkent, Bishkek, Almaty and Ashgabat. Road journeys to Samarkand and Bukhara enabled inspection of the agriculturally developed Syr-Daria (Jaxartes) River plain and southern Uzbek steppe. Site visits included the Aksu River plain and northern Kyrgyz steppe, the Kyrgyz Range, the Central Kazakh steppe, where tortoises *Agrionemys horsfieldi* were measured, the Kara-Kum Desert and Canal, and the Central Kopet-Dagh range bordering Iran. Projects were proposed, and publications relating to herpetology were received. Appropriate funding sources were approached for support to complete publication of *Selevinia* vol. 1, and to cover the cost of paper for printing a book on reptiles of Kazakhstan.

PROLOGUE

Completely rebuilt after the earthquake in 1966, Tashkent represented a success story of Soviet achievement. Departing my formerly named Hotel Leningrad (now Mekhmonkhonasi Turon), the taxi joined a disorderly line of dusty Zhiguli, Moskvich, Volga and Lada motorcars proceeding along the wide double-laned Prospekt Navoiy. I was bound for the main bus station with ahead an eleven and a half hour overnight journey (545 km) through Kazakhstan and over the Karatau Range to Bishkek, the perestroika-renamed capital of the Republic of Kyrgyzstan. Picking a way over the cobble-set network of tram lines, my taxi turned left down Prospekt Lenina, another great boulevard of this spread-out capital surrounded by extensive suburbs of workers' flats. Coming to a red light, the driver barely slowed down, muttered some epithet in Uzbek, and drove straight through. He then cut a swathe through a thin gathering of Tashkent citizens and came to a jerky halt by a row of well used long-distance Hungarian Ikarus coaches awaiting departure at the rear of the Bus Station. My own travelworn Globetrotter joined the pile of Soviet-made suitcases and Cyrillic-labelled sacks and rope-tied cardboard boxes ready for loading. Apart from a few ethnic Russians, I was the only foreigner amongst the rows of smiling mongoloid faces of weather-beaten Uzbeks and Kazakhs already on the bus. With some negotiation in disjointed Russian and adjustment of booked seat numbers, I found the last place and room for my legs in the aisle amongst soft bags and passengers' already opened bottles of Stolichnya vodka placed by their seats on the floor.

BACKGROUND

Arranged by Dr Leo Borkin (Herpetological Section, Zoological Institute, Russian Academy of Sciences, St Petersburg), I received an official invitation from the Institute of Biology of the Kyrgyz Academy of Sciences to visit Bishkek and discuss possibilities for collaborative ecological research. Also able to attend the NATO Advanced Research Workshop on problems of the Aral Sea Basin held in Tashkent (Uzbekistan) 2-5 May 1994

at the Main Administration of Hydrometeorology (Glavgidromet), I could visit the Institute of Zoology of the Uzbek Academy of Sciences while there. Invitations were also subsequently received from the Institutes of Zoology in Almaty and Ashgabat. As the fortunate recipient of a Royal Society travel grant for the programme of Exchanges with the Former Soviet Union, my objectives were to make contact with specialists in the Institutes of Zoology and discuss possibilities for future collaborative environmental research. My itinerary from 29 April to 30 May 1994 covered in chronological order Uzbekistan, Kyrgyzstan, Kazakhstan and Turkmenistan. Any specimens of amphibians and reptiles collected have been deposited in the Natural History Museum, London, with accession numbers given below. Full lists of specialists in all fields at Institutes visited are appended to a report for the Royal Society (Lambert, 1994).

This account describes aspects particularly relating to herpetology in Central Asia made during this cursory visit to the area. They are presented here as a matter of information, and as a basis for future cooperation, in relation to harmonization of experience and integration of expertise.

UZBEKISTAN

A visit to the Institute of Zoology (address: 1, A. Niyazov Street, 700095 Tashkent; tel.: (+7 3712) 46.07.18, 46.09.00; fax: (+7 3712) 41.33.05), Uzbek Academy of Sciences, was made on 5 May 1994. The Director was Prof. Dzhaloliddin A. Azimov, an helminthologist, and Institute interpreter: Mr Dzhavkhar T. Khodzhaev, Head, Information Department. I had originally written to Dr Yake Davlyatov, an herpetologist, whose name I knew through addresses of participants at the European Herpetological Meeting in Prague, Czech Republic, 1985 (Rocek, 1976), which I had also attended (Lambert, 1985), and through whom I had arranged to visit the Institute of Zoology where he was based. He passed me a number of reprints, and after a meeting with the Director, introduced me to other Institute herpetologists: Mr Anvar F. Khodzhaev, a breeder in the Serpentary; Dr Yuri A. Chikin, an ophidologist, and Dr Emiliya V. Vashetko, specialist in the use of amphibians as bioindicators among other amphibian and reptile ecological interests. While talking with Dr Vashetko, a glass jar containing a number of green toads *Bufo viridis* jumping up and down, collected from near the Chirchik Dam (some 75 km N.E. of Tashkent), was brought into her office.

Serpentary: The snake breeder, Anvar Khodzhaev, was breeding Asian cobras *Naja oxiana*, but *Vipera lebetina turanica* was the taxon mostly bred for the Institute of Venom Studies. He also wants to start a trade outlet for excess captive bred stock and develop a link with commercial interests in the West. Both the species bred are listed in Bogdanov's (1992) book on rare animals of Kazakhstan. There was also a large very lively specimen of *Varanus griseus* in the Serpentary.

COLLABORATIVE RESEARCH PROJECT PROPOSAL

A project was proposed by the Institute of Zoology, Uzbek Academy of Sciences, Tashkent: Impact of pesticides on terrestrial vertebrates (amphibians, reptiles, and mammalian insectivores and rodents) in Uzbekistan. Originator: Prof. Dzhaloliddin A. Azimov, Director, Emiliya Vashetko and Yuri Chikin were to be counterpart herpetologists. At the background of the project was agricultural development and associated increase in the use of pesticides and other chemicals, which had inevitably resulted in their entering the environment and deleteriously affecting the wildlife in Uzbekistan. The need to increase crop yield on one hand was thus in conflict with protection of the environment on the other. DDT, until 1983, and HCCH (hexachlorane cyclohexane) have been the most commonly used pesticides in Uzbekistan. DDT was still present in the soil in 1990. By

investigating the effects of agrochemicals on certain vertebrate groups, it was intended to provide a scientific basis for controlling levels of pesticide application. Indicator species will be selected to monitor habitat contamination. Potential candidates among the herpetofauna were common species such as *Bufo viridis, Rana ridibunda, Ablepharus deserti, Eremias velox, Natrix tessellata, Coluber ravergieri* and *Elaphe dione.*

HERPETOLOGY IN UZBEKISTAN

One of the earliest works on the herpetofauna of Uzbekistan was Bogdanov (1960). Information from Yagarov (1964) and Persiyanova (1972) are included with the field guide of Bannikov, Darevskiy, Ishchenko, Rustamov & Shcherbak (1974), which covered the whole of the former Soviet Union.

Publications received: Received at the Institute were copies of several works: Bogdanov (1992); Davlyatov (1985a, 1985b, 1990); Nigmatov, Davlyatov & Makhmudov (1991); Nigmatov, Davlyatov, Yakubov & Chan-Kien (1990), and Turakulov & Davlyatov (1975).

RED DATA BOOK HERPETOFAUNA

No amphibians are included with Bogdanov's (1992) book on rare animals of Uzbekistan. Of reptiles, rare species among the saurians are *Alsophylax laevis, A. loricatus, Phrynocephalus rossikowi, P. strauchi, Varanus griseus, Ophisaurus apodus, Eumeces schneideri* and *Eremias scripta pherganensis,* and snakes *Eryx tataricus, Lycodon striatus, Coluber rhodorhachis, Lytorhynchus ridgewayi, Elaphe quatuorlineata, Boiga trigonatum, Vipera ursinii, Echis carinatus* and *Agkistrodon halys.* Several of the names will ring a bell with those familiar with the European herpetofauna.

HERPETOFAUNA RECORDED

I had little opportunity to visit natural habitats and record the herpetofauna in Uzbekistan, but near the Old Market in Tashkent behind the Kulkeldesh Madrasa, there was an area of rough ground surrounded by workers' flats with large pools. Some of these contained amphibians; several pairs of *Bufo viridis* were observed in amplexus during the afternoon on 30 April and I heard calling at 14.08 h LMT (20°C). A pair was photographed the following day, and a male collected (BMNH 1994.143) from a separate nearby pool. Tadpoles were observed in other pools, and also in one formed by a slow moving stream and part-filled with paper litter at the edge of the Prospekt Navoiy. In a flooded area around a tree of a large vegetated traffic island, several further males were heard calling. The species seemed well adapted to surviving in temporary water bodies of built-up areas, for it was also seen later in other towns of Central Asia.

A southward journey along the Old Silk Route from Tashkent to Samarkand, and then beyond to Bukhara, was made by bus on 6 May at the start of the National Holiday Weekend commemorating the end of the Great Patriotic War ("defeat of the Nazi fascists") when public institutions were closed. The road passed through agriculturally developed land, interspersed with scattered buildings, north and south of the Syr-Daria (Jaxartes) River. There was little natural habitat, and most of the cultivated area was taken up with almond and peach orchards, and vineyards, with occasional fields of corn. This Golden Road to Samarkand finally crossed the Nuraian range before descending to the city. From Samarkand, the route followed the Zerafshan valley for 200 km, and then crossed open steppe country with grass tussocks and low shrubs in which the road veered south-west to Bukhara with its famous bazaars, tawny-brick madrasas, mosques and mausolea, and 47 m high Kalyan minaret. Built by the Karakhans, and saved by Genghis Khan, he and subsequent khans would have struggling prisoners hauled up the spiral staircase, and, tied-up in sacks, hurled from the top of the minaret for execution. The last death by jaculation

recorded in the official Soviet guidebook being in 1884, but deaths were also known as recently as 1920/21 during the troubled years in this part of former Russian Turkestan following the Soviet Revolution. An entertaining description of his unofficial visit to Bukhara in 1938 is given by Sir Fitzroy Maclean in his book *Eastern approaches* (1949). Not unexpectedly, his account included nothing herpetological!

One evening after rain in Samarkand (7 May), frogs could be heard croaking in the park behind the 19th century Hotel Zerafshan - with splendid Uzbek sculpted door and entrance hall. Before visiting the famous Registan, with turquoise-blue-domed Golden Mosque and Madrasas, a quick inspection of a large pool in the Maxim Gorky park adjacent to the hotel did indeed yield some calling *Rana ridibunda* at the edge amongst leaves that had fallen into the water. The monuments of Tamburlaine the Great are vividly described, and a potted history of Samarkand given by the Thomas Cook award-winning travel writer, Geoffrey Moorhouse, in his book *Apples in the Snow* (1990). Echoing the same sentiment, he had responded to the words of the improbable James Elroy Flecker, a former British vice-consul (originating from Lewisham and ending-up in Cheltenham, and never posted nearer than Beirut), who wrote that "Every journey through Central Asia is a quest for Samarkand"!

KYRGYZSTAN

By the break of dawn (10 May), the bus from Tashkent had crossed without any border controls from Kazakhstan into Kyrgyzstan, and proceeded east across a flat plain (600 m) through a series of villages with a chain of snow-capped mountains (peaks up to 4743 m) of the Kyrgyz range bordering the south. The fields with new season's growth were brilliant green - heavy rain overnight - Spring was later than in Tashkent.

The Institute of Biology, Kyrgyz Academy of Sciences (KAS), Bishkek, was visited 10-15 May 1994 (address: 265 Lenin Avenue, 720071 Bishkek; tel.: (+8 3312) 25.12.73; e-mail: ROOT ACADEM.BISHKEK.SU). The new Director was Dr Emil Shukorov (elected 10 May) (former director: Prof. M. Tokobaev (helminthologist)); the Directorship changed while I was visiting the Institute. The Institute Secretary, Dr Valentina Toropova (an ornithologist), wife of the Institute herpetologist, Dr Valery Eremtchenko, was my hostess. Unfortunately, I was unable to meet Drs Eremtchenko and Borkin (who was also in Kyrgyzstan at the time), for they were on an expedition in the east of the country. While in Kyrgyzstan, I also met Dr Baktybek D. Abrisaev, Chief of the International Department, Kyrgyz Republic Presidential Staff, Government House, Bishkek.

For their expedition to the east of Kyrgyzstan, Leo Borkin and Valery Eremtchenko had teamed up for an Earthwatch project to survey the little-known assemblage of amphibians and reptiles in the Tien Shan (Celestial Mountains) of Kyrgyzstan, with the aim of answering a number of basic questions concerning distribution of species and factors influencing it. They and two Earth Corps teams in 1994 were to sex, age and measure all species found in hectare-square grids in desert, steppe (Chu Valley) and montane desert-steppe (Izzyk Kul Lake) life zones. The teams would also look out for herpetofauna more broadly (including night searches), analyse soil and vegetation, and collect some specimens for DNA and chromosome analysis. Since Yakovleva (1964), eight more reptile species had been added to the list for Kyrgyzstan; one more amphibian had also been recorded. The purpose of their expedition had been outlined in the *Earthwatch* magazine, vol. 13 (1), January/February 1994 (page 64).

Serpentary: The Institute's Serpentary was situated in another part of the town, and a visit on 11 May was made to meet the Superintendent, Mr Micael Vorobief. Valentina Toropova had worked in the Serpentary some years previously. Ten to twelve years before, the

Serpentary had maintained some 20,000 snakes for the extraction of venom; since perestroika, the collection was much reduced: 1000 in 1993. Specimens of *Vipera berus* with hardly any dorsal markings and near-uniform grey colour were kept in glass-fronted cages. *Vipera lebentina turanica* and *Naja oxiana* also used to be kept in the Serpentary. The former head was Mr Yuri Suderev.

COLLABORATIVE RESEARCH PROJECT PROPOSAL

A project was proposed by the Institute of Biology, Kyrgyz Academy of Sciences, Bishkek: Effect of contaminants on faunal ecosystems in southern Kyrgyzstan, with Dr Emil Sochurov, Director, as the official originator. The purpose of the project was to establish the effects of agrochemicals from cotton pest control and heavy metals due to mining activities on populations of terrestrial and aquatic wildlife, especially ectothermic amphibians and reptiles, in the lower mountain slopes of the Fergana Range, the eastern Basin in particular. The project would also assist the Republics of Uzbekistan and Tajikistan, whose territories are included with the Fergana Basin through which the Syr-Daria River flows. A laboratory field base would be provided by an Academy of Sciences station used regularly by staff of the Institute of Forestry, and situated at Djalal-Abad. Pesticide residue analyses of samples would be carried out either in Britain at the Natural Resources Institute, or at the Institute of Chemistry of the Academy of Sciences in Kyrgyzstan.

ZOOLOGICAL MUSEUM

A visit on May 14 was made to the Institute's Zoological Museum in Duboviy Park, Bishkek. The Institute herpetologist, Valery Eremtchenko, was head of the Museum. Although in some need of renovation, the Museum was a pleasant building situated amongst bushes and trees in the middle of the Park. The collection consisted primarily of representative vertebrate species of Kyrgyzstan, both preserved and living. In the absence of a zoological garden in Bishkek, the museum had a general educational function for Kyrgyz schoolchildren. A catalogue of the museum specimens of amphibians and reptiles is included with Eremtchenko, Panphilov & Tsarnienko (1992).

A number of amphibians and reptiles were on display in the Museum. Many of the species came from elsewhere in the former Soviet Union, or from outside probably from captive bred stock. The nomenclature for the following species is based mostly on the field guide of Bannikov et al. (1977).

Preserved specimens: Preserved material consisted of dry mounted and pickled specimens. Native Kyrgyz dry mounted species included the amphibian *R. ridibunda*, and reptiles *Varanus griseus*, *Agrionemys horsfieldi* and *Eryx tataricus*. From elsewhere in the former Soviet Union, *Mauremys caspica*, and from outside were the amphibians *Bufo danatensis* and *Rana asiatica*, and reptile *Alligator mississippiensis*.

Of the pickled specimens on display, native amphibians included *Bufo viridis*, *Rana amurensis*, *R. semiplicata* and *R. ridibunda*; most of the other species came from elsewhere in the former Soviet Union: *Hynobius keyserlingii*, *Triturus vulgaris* (male and female), *T. cristatus*, *Salamandra salamandra*, *Pelobates fuscus*, *Hyla arborea*, *Rana arvalis*, or from outside: *Bufo danatensis*. Native lizards comprised *Agama sanguinolenta*, *A. himalayana*, *A. lehmani*, *Ophisaurus apodus*, *Ablepharus deserti*, *Asymblepharus alaicus*, *Eremias multiocellata*, *E. velox*, *E. nikolskii*, *E. arguta*, *Lacerta agilis*, *Gymnodactylus russowi* and *G. fedtschenkoi*; most other species came from elsewhere in the former Soviet Union: *Alsophylax tokobajevia*, *Teratoscincus scincus*, *Crossobamon eversmanni*, *Agama caucasica*, *Anguis fragilis*, *Gymnodactylus caspius*, *Eremias scripta* and *Lacerta taurica*, or from outside *Eremias buechneri*. There was also non-Kyrgyz *Trionyx sinensis*. Snake

representatives of native species were *Eryx tataricus, Natrix tessellata, Coluber rhodorhachis, C. ravergieri, Elaphe dione* (also a bicephalic immature specimen), *Psammophis lineolatum, Vipera ursinii* and *Agkistrodon halys.*

Live specimens: There was also a miscellaneous collection of live specimens on display in glass-fronted cages. A native amphibian *Bufo viridis* (common in static water bodies of the Bishkek area) was represented, and from elsewhere in the former Soviet Union *Hynobius keyserlingi*; from outside: *Rana adspersa* and *Xenopus laevis* (one albino). Kyrgyz reptiles included *Agrionemys horsfieldi, Varanus griseus, Ophisaurus apodus, Elaphe dione, Eryx tataricus* and *Vipera lebetina turanica*, and from elsewhere in the former Soviet Union *Emys orbicularis, Stellio caucasica* and *Sphalerosophis diadema*; from outside: *Eublepharis macularius, Python molurus* and *Eunectes notaeus.*

HERPETOLOGY IN KYRGYZSTAN

The basic text on reptiles is provided by Yakovleva (1964). For amphibians, the general field guide for the former Soviet Union by Bannikov et al (1977) covers species in Kyrgyzstan.

Publications received: The following works were received at the Institute: Gosudarstvennay Komitet Kirgizskoy SSR po lesnomu Khozyaystbu (1985); Eremtchenko et al. (1992); Eremtchenko & Shcherbak (1986), and Yakovleva (1964).

RED DATA BOOK HERPETOFAUNA

There are no amphibians included with Gosudarstvennay Komitet Kirgizskoy SSR po lesnomu Khozyaystbu (1985). Of reptiles, red data books species are *Varanus griseus, Coluber karelini* and *C. rhodorhachis.*

Plate 1. Snow-capped peaks (> 3800 m) of the Kyrgyz range with Kara-Balma River, 27 km on Osh road south from Sosnovka, Kyrgyzstan (12 May 1994). The small skink, renamed *Asymblepharus alaicus* by Eremtchenko & Shcherbak (1986), was found under a large rock (23°C, 16.25 h) at this locality (ca. 2000 m).

Plate 2. A female *Agrionemys horsfieldi* (carapace length 157 mm) resting in morning sunshine (24°C, 11.30 h) by vegetation clump in a gully of sheep-grazed steppe country in northern Kyrgyzstan, 55 km N.W. of Bishkek (12 May 1994). *Eremias arguta* and *Ablepharus deserti* were also recorded here.

HERPETOFAUNA RECORDED

While walking through the town to visit the Institute Serpentary on 11 May, a path took one through the campus of the Kyrgyz State University. Several large concrete pools containing 10-20 cm of water supported many tadpoles of *Bufo viridis*. Two males and a female toad were observed dead in the water, tadpoles in a late stage of development with hindlegs were feeding on the corpses of these and dead tadpoles. About to metamorphose within a day or so, the emergent toadlets would have had difficulty in climbing up the vertical metre-high sides of the pools. I was also hoping, but failed, to see such skink species as *Ablepharus deserti* amongst grass basking at the edge of the road leading away from the town, but too many semi-feral cats had probably put paid to that!

Site visits in the general area of Bishkek were made on 12 May. The large Volga motorcar with hired driver proceeded west from Bishkek, and, after a petrol fill-up from a tanker hailed to halt at the side of the road (private enterprise in Bishkek!), a turn was made to the north at Alexandrovka. A further 26 km and the vehicle halted by the Aksu River (40 km N.W. of Bishkek). Apart from a small mustelid taking refuge in a hole on the side of a canal bank, I collected at between 10.00 and 10.30 h (22-22.5°C) an immature snake *Natrix tessellata* (BMNH 1994.151), disturbed while basking on a bank above a marshy area and caught as it slid through thick grass down a slope. Several frogs *Rana ridibunda* were basking in the full sunshine on grass at the edge of a concrete lined canal overgrown with reed vegetation, one pair in amplexus.

Continuing along the earth track to low hilly, open steppe habitat grazed by sheep between Telek and Stepnoye (55 km N.W. of Bishkek), many burrows and a few marmots *Citellus* sp. were observed. With full sunshine between 11.00 and 12.30 h (24-26°C), a tortoise

Agrionemys horsfieldi was sighted part-shaded by a vegetation clump in a hillside gully, whose sides were green from a sward of annual Spring plants and occasional dead wind-blown bushes overgrown with grass. The animal was collected by Valentina Toropova for live display in the Museum. She also caught in the vicinity a small lacertid *Eremias arguta* (BMNH 1994.148) and skink *Ablepharus deserti* (BMNH 1994.149), which was orange ventrally. *Rana ridibunda* was heard croaking by the side of an Aksu rivulet.

Returning to the main road, we continued south in the afternoon (15.30-16.30 h) by the River Kara-Balma on the Ush road through the foothills of the Kyrgyz range (23° C).With a backdrop of snow-capped peaks, a small skink *Asymblepharus alaicus* was found under a rock (BMNH 1994.150) 25 km south of Sosnovka (1830m). The generic name of this species had quite recently been revised by Valery Eremtchenko (Eremtchenko & Shcherbak, 1976).

KAZAKHSTAN

The bus from Bishkek crossed the hills north of the town into Kazakhstan (15 May), again without border controls, and continued east to Almaty with a backdrop of a range of hills (Ala-Too range) to the south. The flat steppe country was occasionally interrupted by groups of horses grazing on the short new season's grass. The Institute of Zoology, Kazakh Academy of Sciences (KazAS), Almaty, was visited from 16 to 20 May (address: Akademgorodok, Almaty 480032; tel: (+8 3272) 48.19.32/48.18.68/62.11.54; fax: (+8 3272) 48.19.58). The Director was Prof. Turqanbai N. Doszhanov, a hippoboscidist (former director: Prof. Anatoliy M. Dubitskij, dipterist). A special hard-bound booklet on the Institute of Zoology had been published for the 50th anniversary in 1992. Dr Zalina K. Brushko had now retired, and Dr Rudolf A. Kubykin, my host, was now the Institute herpetologist with a specialist interest in the steppe tortoise *Agrionemys horsfieldi*. Dr Brushko and I had previously exchanged reprints. I stayed with Rudolf Kubykin and his wife in their state-owned flat off the top end of Furmanova Street. The Head of the Laboratory for the Protection of Animals, with which Rudolf Kubykin was associated in the Institute, was Prof. Anatoliy F. Kovshar (an ornithologist), President of the Kazakhstan Zoologists' Society and Editor-in-Chief, *Selevinia* - the zoological journal of Kazakhstan. The Head of the Laboratory of Anthropogenic Monitoring, which included herpetofauna in its remit, and with whom I also discussed future research proposals, was Dr V. Nilov (a limnologist). Mr Kanat Turebaev, a biomonitoring specialist, acted as translator/interpreter.

COLLABORATIVE RESEARCH PROJECT PROPOSALS

Proposals for collaborative research were made by the Institute of Zoology, Kazakh Academy of Sciences, Almaty:-

1. Pollution by organochlorine pesticides and heavy metals of aquatic and land biota of the Syr-Daria River Basin on the territory of Kazakhstan. Originator: Prof. Turqanbai N. Doszhanov, Director, and Dr V. Nilov, as Head, Laboratory of Anthropogenic Monitoring of Animals.

2. Rare species of animals inhabitating the Tien Shan Mountains, Kazakhstan: an amphibian (*Ranodon sibiricus*), a bird and mammal (*Marmota menzbieri*). Further information on the status and distribution for conservation of these three rare vertebrate species was required. Originator: Prof. Anatoliy F. Kovshar, Head, Laboratory for the Protection of Animals.

3. During a discussion with Prof. A.M. Dubitskiy, the former KazAS Institute Director

and subsequently the Minister of Nature and then of Ecology with the Kazakh Government, who had also worked for WHO (Geneva), he said that he foresaw Lake Balkhash suffering from the same problem that the Aral Sea was experiencing at present. The lake is half saline and half salt. The lake suffers from pollution from China, and from water extraction and agrochemical run-off due to rice irrigation from the south. Resolving the situation could be the basis for another project in the future.

PUBLICATION PROJECTS

During the course of discussions with specialists in the Institute of Zoology, funds for publication projects were also requested, and forwarded to appropriate funding sources:-

1. Funds for the publication of volume 1, nos 1-4 (1993/94), of *Selevinia* - the zoological journal of Kazakhstan. The Editor-in-Chief, Anatoliy Kovshar, had used personal funds to finance publication of issue 1 of the journal in 1993. The journal publishes papers in English, Russian and Kazakh, with abstracts also provided in the other two languages. Unfortunately, although manuscripts have been prepared and accepted, there were no further funds available to continue with the next issue. Anatoliy Kovshar, the originator of the project, then requested funds for publication of all four issues of Volume 1, a total of US$ 4000 (approx. £2667). He was confident that the journal would be self-supporting after volume 1. The immediate sum of US$ 1500 (ca. £1000) would allow issue 2 to go to press. Volume 1(1) included an article on reptiles (Brushko, 1993).

2. Funds for basic quality paper to complete publication of a book *Udivitelny mir reptilii* (The astonishing world of reptiles). Proofs have been prepared and corrected (248 pages), but since the independence of Kazakhstan, the publisher has run out of funds to purchase paper required for a print-run of 5000 copies. A total of 110 600 Kazakh tenge had been requested (approx. US$ 2765 or £1843) for paper of basic quality. The project originator is Rudolf Kubykin, editor of the volume. Beside Rudolf Kubykin himself, contributors included Shcherbak, Bogdanov, Brushko and Semenov.

HERPETOLOGY IN KAZAKHSTAN

The amphibians and reptiles of Kazakhstan are described in two basic texts (Paraskiv, 1956; Iskakova, 1959), and included in others for the Soviet Union generally (Terentev & Chernov, 1949; Bannikov, Darevskiy & Rustamov, 1971).

Publications received: Among other publications received at the Zoological Institute, the following included herpetological subjects: Bachkova (1988), Kovshar (1990, 1993) and Sludskiy (1978). I had previously received reprints of work on *Agrionemys horsfieldi* by Brushko (1981a, 1981b), Brushko & Kubykin (1980, 1982), and Kubykin (1988).

RED DATA BOOK HERPETOFAUNA

The only amphibian included with the red data book for Kazakhstan (Sludskiy, 1978) is *Ranodon sibiricus*. Of reptiles, rare species among the saurians are *Phrynocephalus versicolor, Varanus griseus* and *Ophisaurus apodus*, and snakes *Coluber jugularis, C. rhodorhachis, C. spinalis, Elaphe quatuorlineata* and *Vipera lebetina*. Four of the names will be familiar to those with knowledge of the European herpetofauna. Brushko & Kubykin (1983) subsequently worked on *Phrynocephalus versicolor.*

HERPETOFAUNA RECORDED

During my overnight bus journey from Tashkent to Bishkek through Kazakhstan, a brief stop was made at a parking area with roadside stalls in the Karatau Range, some 25 km

W.S.W. of Dzhambul, at ca. 675 m. Emerging into fresh air at 1.30 in the morning (10 May), a number of male passengers bought bottles of beer with their Kazakh tenge to hand (apart from a few dollar bills, I still only had Uzbek sum). The call of a solitary *Rana ridibunda* could be heard in the cool still air from the valley below.

Site visits in the Central Kazakh steppe were made on 19 May. In the company of Rudolf Kubykin, a female interpreter and a Nature Reserves field warden, Vitaly Fyodorovich, departure from Almaty in a new Japanese Nissan Trooper was made at 05.30 h. Proceeding north along a tarmac road under an overcast sky, the most undistinguished looking town of Kapchagay, with the skeleta of incomplete workers' flats, situated at the head of a large reservoir of that name was passed by 07.15. Rather poor *datchas* were scattered on land around the town. A track to the left at 08.15 h led us to a point (rain started at 08.30 h) 40 km west of Aynabulak Station (156 km N.N.E. of Almaty). In the middle of steppe country with grass and scattered low shrubs, eight tortoises *Agrionemys horsfieldi* were found between 10.45 and 12.30 h (15.5-18.5°C), inactive in overcast conditions and rain by vegetation clumps or part-hidden in shallow burrows, and were measured with steel vernier calipers. A complete skeleton, and an adult female with unusually distinct, unabraded carapacial annuli, were collected (BMNH 1994.146 and 144, respectively). I marvelled that tortoises could survive in such exposed habitat with mean temperatures in winter (20 cm deep snow) and summer ranging from -42°C to 43°C. The eight living animals were sighted at the rate of 4.9 man-hour, and carapace straight length ranged from 78.5 to 166.0 mm. The head of a small lizard *Eremias arguta* placed on the end of a stick by a bird was also collected. Departing from the site, the opportunity to take refuge from the rain was provided by a *yurt*, a wooden frame, compacted wool-lined dwelling of local Kazakh steppe inhabitants, originally brought to Central Asia from eastern Mongolia by Genghis Khan's marauding hordes in the 12th century. The occupants slaughtered a sheep, and, on a table in the shelter of the *yurt* while rain poured down outside, skillfully skinned and butchered it in front of us. My companions purchased some of the resultant mutton joints. We passed two large galloping herds of horses as we slithered our way back in 4-wheel drive along the now wet and muddy track towards the tarmac road at Aynabulak. By 16.00 h, the rain had stopped, and allowed us to settle on a canvas sheet under a still grey sky to consume a picnic consisting of vegetable soup, rough-hewn slabs of brown bread, hard-boiled eggs, cold venison chunks, spring onions, huge radishes, apples and Russian black tea in a large Soviet-made thermos flask.

Back on the tarmac road and a diesel fill-up from the less expensive state-controlled pump, the second site visited was the proposed site of Kapchagay's new airport (20 km north of the town) in the Kerbulog Massif (up to 800 m), 88 km N. of Almaty. The only vegetation making up this completely flat plain was short grass. A study area of Rudolf Kubykin since 1975, it had the densest population of *Agrionemys horsfieldi* that he knew. He was now involved with tortoise relocation. Again, I marvelled that reptiles such as tortoises, the predominant species, could survive in a habitat and climate of this kind. In weak sunshine between 19.00 and 19.30 h (18.5°C), nine tortoises at the rate of 6.1 man-hour were found part-hidden in burrows and measured. Carapace straight length ranged from 63.5 to 153.2 mm, four were in the 150-159 mm range. The broken skeleton of a specimen was collected (BMNH 1994.145), and the carapace later pieced together with super glue for measurement (length: 151 mm). Three Kazakhs on horseback visited us; scattered herds of grazing horses could be sighted into the distance of this steppe country.

We halted on the return journey by the side of the Kaskelem River, 16 km south of Kapchagay, to remove the worst of the mud off the vehicle (mud-covered vehicles are not allowed into Almaty). Rudolf Kubykin in exuberant mood emitted a strikingly accurate imitation of the call of *Rana ridibunda*, which could be heard croaking among reeds at the

river's edge. As darkness closed in (19.15 h), I also heard the pong - pong - pong of some other amphibian species, but could not identify the call: it was not *Bufo viridis*!

During a walk through Almaty, the tadpoles of the ubiquitous *Bufo viridis* were observed (21 May) in a pool by the Hotel Kazakhstan and again in a slow-flowing stream by the Panfilov Park. In another park behind the former headquarters of the Communist Party off the top of ulitza Furmonova on my last evening in Almaty (22 May), yet again there was *Bufo viridis*, whose distinct call could be heard after darkness.

Before finally departing Almaty, I also received from Rudolf Kubykin a dried-out egg of *Agrionemys horsefieldi* that had been laid in captivity (BMNH.1994.147).

Part 2 will appear in Bulletin 53.

AMPHIBIAN OBSERVATIONS IN YEMEN, MARCH-MAY 1993

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INTRODUCTION

The amphibian fauna of the Arabian Peninsula consists of nine anuran (frog and toad) species, six of which are endemics. The six endemic species *Bufo arabicus, Bufo dhufarensis, Bufo hadramautinus, Bufo scorteccii, Bufo tihamicus* and *Euphlyctis ehrenbergii* all occur in Yemen. Of the other three essentially palearctic species, *Bufo viridis, Rana ridibunda* and *Hyla savignyi*, only the latter is known to occur in Yemen where it is restricted to the western highlands.

In the Spring of 1993 from 16th March to 10th May, the Ornithological Society of the Middle East (OSME) mounted an expedition to survey some lesser known areas of mostly southern and eastern Yemen. During this period as the expedition herpetologist I was able to make some observations of the amphibians that were encountered.

SPECIES ACCOUNTS

During the OSME survey five species of amphibian, four of which are endemic to the Arabian Peninsula (indicated below with an asterix), were observed:

****Bufo arabicus*** - Arabian Toad

1. 17.3.93, Kawkaban, 43°52'E 15°31N, 2500m.
Newly hatched *Bufo* tadpoles (approx. 200) still with external gills, were observed in a shallow drying pool. These were assumed to be *B.arabicus* but a positive identification was not made.
2. 22.3.93, Jebel Iraf, 44°15.31'E 13°07.02N, 1400m.
Four spot-lighted after dark (22.00hrs.) in livestock watering pool, where *Bufo dhufarensis* was also present.
3. 26.3.93, Wadi al-Jahr, 46°23.50'E 13°58.20'N, 600m.
Over 200 calling after dark in flowing water of wadi bed with *Euphylctis ehrenbergii*.
4. 28.3.93, Yashbum/Wadi Habban, 46°23.50'E 13°58.20'N, 600m.
At least 300 fully grown tadpoles in slow flowing sections of stream. Approx. 25% with hind limbs and some with forelimbs, plus 10 recently metamorphosed toadlets.
5. 9.4.93, al-Mardam, 45°34'E 14°03'N, 2000m.
One male in sandy area with *Lavendula* and *Tamarix* scrub, close to small arable fields.
6. 13.4.93, Iush wadi E. of Mahwit, 43°36'E 15°33'N, 750m.
One male in permanent pool amongst emergent *Juncus*. Found in association with *E.ehrenbergii* and *Hyla savignyi*.
7. 15.4.93, Salah al-Din, 44°12'E 14°40'N, approx. 2000m.
Two pairs in amplexus, 30+ others calling from flooded qat *Catha edulis* field in late-morning during heavy rain. Found in association with *H.savignyi*.

Status & Distribution:

B.arabicus is endemic to the Arabian Peninsula south of 28° north with many populations in the Asir of south-west Saudi Arabia and the Yemen highlands. This species occupies a

wide range of habitats although is generally most common in areas with some annual precipitation and associated flooding providing breeding pools. *B.arabicus* will aestivate, sometimes up to two years or more, in times of drought. The seven expedition records fall more or less within its known range. The locality at Yashbum represents a slight easterly range extension and is possibly the most easterly known site in Yemen for this species.

* ***Bufo dhufarensis*** - Dhofar Toad

1. 22.3.93, Jebel Iraf, 44°15.31'E 13°07.02'N, 1400m.

Two spot-lighted after dark (22.00hrs.) in a permanent livestock watering pool (approx. 5m x 5m, 0.6m deep) on a steep hillside in association with *B.arabicus*. No aquatic vegetation was present, numerous large water-scorpions (Fam: Nepidae) were noted. The pool was semi-manmade, part of one side being built-up with rocks and concrete. One female toad was observed rapidly walking up an almost vertical rock face and into a fissure used as a daytime refuge. Surrounding vegetation consisted of low open *Juniperus* and *Acacia* woodland with a herbaceous understorey.

2. 28.3.93, Wadi Hajr, 48°41.33'E 14°41.33'N, 30m.

Twenty plus spot-lighted after dark (19.00hrs.), amongst boulders in water of flowing wadi, in association with *E.ehrenbergii*. Surrounding area of sand dunes with dense stands of introduced *Prosopis juliflora* with *Tamarix nilotica* and *Salvadoria persica* scrub.

3. 7.4.93, Wadi Himarah, 46°53'E 14°03'N, 625m.

Thirty males calling after dark (20.00hrs.), from a temporary shallow pool (max. depth 30cm) in a sand hollow filled with floodwater from a recent storm. The calls were audible up to at least 1km from the pool. During daylight hours almost all toads had retreated to daytime refuges, either burrows in the sand or in nearby *Tamarix nilotica/Palmetto* scrub. The surrounding terrain consisted of gently undulating bare sand and gravel with occasional cushions of xerophytic vegetation.

4. 3.5.93, Tarim (grounds of Palace Hotel), 49°00'E 16°03'N, 790m.

Four after dark in watered hotel gardens and one inside the hotel itself.

5. 4.5.93, 5km west of Tarim, 48°57E 16°03N, 830m.

Fifteen plus calling in mid-morning from pool created by recent wadi flood waters. Most animals were hidden in dense marginal vegetation of *Juncus* and various grasses.
The call was a rapidly repeated guttural croaking 'chur-chur-chur.....'.

6. 4.5.93, 5km east of Sayun, 48°50'E 15°56N, 830m.

One under date palm *Phoenix dactylifera* log at edge of small onion field with numerous other small, dry arable fields with scattered date palms, in vicinity.

Status & Distribution:

B. dhufarensis is endemic to the Arabian Peninsula south of 27° N. It has a wide altitudinal range occurring from just above sea level to at least 1900m. It is found in arid environments and aestivates during periods of drought often only emerging for short periods to breed after rain. The six expedition records lie within its known geographical range but most are new localities for this species in Yemen.

* ***Bufo tihamicus*** - Tihama Toad

1. 23.3.94. Wadi El Kubt, 44°23.80E 13°03.47'N, 460m.

One spot-lighted after dark (21.00 hrs.) hopping rapidly across bare, loose sand. It partially buried itself by shuffling backwards and down into the substrate. The surrounding habitat was a plain of gently undulating sand with approx. 20% vegetation cover consisting of patches of *Tamarix nilotica, Salvadoria persica, Lycium shorei* scrub with other interspersed smaller xerophytes including *Tribulus arabicus, Heliotroplium sp., Euphorbia sp.* and spiny grasses. Occasional *Acacia* and *Zizyphus spina-christi* trees were also present.

Status & Distribution:
B.tihamicus is endemic to south-western Arabia. It is found along the coastal littoral from 20°N, south along the Tihama coastal plain to the southern most tip of the Peninsula and eastwards to the vicinity of Aden. The one expedition record is within the species known geographical range but represents an increase in its altitudanal distribution. The locality at Wadi El Kubt lies at an altitude of 460m. The previous highest known locality was at Sukhnah in northwest Yemen where the holotype was collected at an altitude of 350m.

Hyla savignyi - Savigny's Tree Frog
1. 13/14.4.93, Iush wadi E. of Mahwit, 43°36'E 15°33'N, 750m.
Two calling (> <13.00-14.00hrs.) on 13.4.93 during intermittent rain. One seen on 14.4.93 in well vegetated waterfilled ditch in association with *B.arabicus* and *E.ehrenbergii*. Habitat well vegetated with permanent flowing water and several still pools. Aquatic vegetation including *Potamogeton pussillus & P.nodosus* and much emergent *Juncus* and other marginal herbaceous vegetation. Partial shade was provided by trees, particularly in northern end of wadi.
2. 15.4.93, Salal al-Din, 44°12'E 14°40'N, approx. 2000m.
Three plus calling from flooded qat *Catha edulis* field in late morning during heavy rain. They were found in association with *B. arabicus*.

Status & Distribution:
H.savignyi is considered to be a palearctic relict species occurring in the south-west Arabian peninsula from about 22°N, south to 14°N in the Yemen highlands. In Arabia they have a fairly restricted distribution usually found above 1400m in relatively well vegetated areas with permanent or semi-permanent water. The two expedition records are both new localities for this species but in the general vicinity of previously recorded sites. The first locality represents a slight westward extension and the second a southward extension to their range in Yemen. Elsewhere this species is found in Syria, southern Turkey, west and north Iran, southern Armenia and Azerbaijan.

Euphlyctis ehrenbergii - Ehrenberg's Frog
1. 19.3.93. Taizz Sewage Lagoons, approx. 44°01'E 13°34'N, 1150m.
Two in water filled ditch in *Juncus* dominated rough grazing meadow.
2. 19.3.93, Taizz marsh, approx. 44°01'E 13°34'N, 1150m.
Ten plus in pool under date palms *P.dactylifera*, ten in well (water level approx. 3m below ground surface), one in second nearby well in wet cattle-grazed meadow.
3. 26.3.93, Wadi al-Jahr, 46°23.50'E 13°58.20'N, 600m.
Fifty plus spot-lighted after dark in flowing water in wadi. They were calling intermittently and found in association with *B.arabicus*.
4. 28.3.93, Wadi Hajr (1km N. of road), 48°41.33'E 14°05.66N, 30m.
Five plus spot-lighted after dark amongst boulders in flowing water of wadi bed.
5. 7.4.93. Wadi Hajr (4km N. of road), 48°42'E 14°07'N, 30m.
Ten plus in slow flowing irrigation ditches around small arable fields.
6. 13.4.93, Iush wadi E. of Mahwit, 43°36'E 15°33'N, 750m.
Five in small pools in association with *B.arabicus & H.savignyi*. (For habitat see *H.savignyi* locality 1 above).
7. 22.4.93. Wadi al-Masilah, 51°08'E 15°14'N, 95m.
Three adults in flowing water in wadi.
8. 3.5.93, al-Sawm, 49°18'E 16°08'N, 800m.
Ten in flowing water in wadi.
9. 3.5.93, west of al-Sawm, approx. 49°14'E 16°08'N, 800m.
One observed, two plus calling.
10. 6.5.93, Marib Dam, approx. 45°20'E 15°28'N, approx. 1150m.

Large numbers calling, one recently metamorphosed froglet and one tadpole with hind limbs in marsh habitat behind dam with dense stands of *Phragmites australis, Typha sp.* and *Juncus spp.*

Status & Distribution:

E.ehrenbergii is endemic to the south-western Arabian Peninsula with an introduced population in the vicinity of Riyadh, central Saudi Arabia. They have a wide altitudinal range and are most common around permanent water but are capable of aestivating for periods of about two years in times of drought. The expedition record from close to the mouth of Wadi al-Masilah represents an eastward range extension for this species although it has been recorded before in this wadi system about 150km to the north-west.

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THE GOOD OLD/BAD OLD DAYS
A survey of reptile and amphibian species traded during the period 1948-1957

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INTRODUCTION

This is the third and final part of an article that has dealt with the trade in reptiles and amphibians in the immediate post-war period. Part I (Bulletin No. 48) looked at the lizards, while in Part 2 (Bulletin No. 49) I reviewed the snakes. Here I shall consider together the remaining reptilian orders: the chelonians and crocodilians, as well as all the amphibians.

OBSERVATIONS

Once again it is noticeable that captive-breeding for the trade was not apparently occurring at a significant level, with the tree frog *Gastrotheca marsupiata* being an exception. The geographical trends also continue, with Western Europe and the Americas (particularly the United States) contributing many species to the lists. There are several southern Asian Countries mentioned, however, and a rather larger number from Africa. There is very little mention of Australia.

In this period (and, indeed, for a further two decades), Mediterranean tortoises were being imported in large numbers to be sold as household pets. Rates such as the £7 per 100 quoted for Hermann's tortoise *Testudo hermanni* give an indication of the scale of the trade. Note also the prices for similarly large numbers of other species of reptile and amphibian, and even for 1000 European tree frogs *Hyla arborea*. The mere presence in dealers' lists of many of the species would be unthinkable today. The Cape clawed toad *Xenopus gilli* is an example, and is actually described as rare in the list, an enormous understatement.

SPECIES LIST

PART 3: CHELONIANS, CROCODILIANS & AMPHIBIANS

Alligator mississippiensis	American alligator	South-Eastern USA	£2
Amyda ferox	Southern soft-shelled turtle	USA	£3
Caiman latirostris	Broad-nosed caiman	South America	£10
Chelodina longicollis	Snake-neck turtle	Eastern Australia	£2/10/-
Chelydra serpentina	Snapping terrapin	Eastern North America	10/-
Chrysemys picta bellii	Painted terrapin	North America	£1
Chrysemys picta dorsalis	Southern painted terrapin	North America	15/-
Chrysemys picta marginata	Painted terrapin	North America	£1
Chrysemys picta ornatus	Eastern painted terrapin	North America	15/-
Chrysemys picta picta	Painted terrapin	North America	£1
Cinosetum integrum	Brazilian snapping turtle	Brazil	£1/15/-
Clemmys sp.	Terrapin	Mexico	£1/15/-
Clemmys caspica rivulata	Israeli terrapin	Tel Aviv	3/6

Clemmys leporsa	Spanish terrapin	Algeria	13/-
Crocodilus niloticus	Nile crocodile	Africa	
Cuora trifasciata	Box turtle	Southern China	£3/15/-
Deirochelys reticularia	Chicken terrapin		15/-
Emydura maquarii	Side-necked turtle		£7
Emys orbicularis	European pond tortoise	Italy	£2/19/- per 100
Geoemyda trijuga	Ceylon terrapin	India	£2/10/-
Graptemys pseudo-geographica	Mississippi map terrapin	USA	8/-
Kachuga tectum	Roofed terrapin	India	£1/5/-
Kinosternon baurii	3-striped mud terrapin		£1
Kinosternon subrubrum hippocrepis	Mud terrapin		15/-
Kinyxys erosa	Chelonian	Spanish Guinea	£3/10/-
Macrochelys temmincki	Alligator snapping terrapin	USA	10/-
Malaclemmys pileata macrospilota	Diamond-backed terrapin		£1/5/-
Malaclemmys terrapin c.	Diamond-backed terrapin	South-Eastern USA	£1/5/-
Melanochelys thermalis thermalis	Lake turtle	Ceylon	£1/10/-
Osteolaemus tetraspis	Broad-nosed crocodile	West Africa	
Pelusios derbianus	African mud turtle	Africa	£2/10/-
Pseudemys floridana heiroglyphica	Terrapin	USA	15/-
Pseudemys floridana hoyi	Florida painted terrapin	Florida	15/-
Pseudemys scripta elegans	Red-eared terrapin	USA	7/6
Sternaetherus sp.	Hinged terrapin	Sudan	£1/10/-
Sternotherus carinatus	Musk turtle	USA	15/-
Sternotherus odoratus	Stinkpot turtle	USA	10/-
Terrapene carolina baurii	Box tortoise	USA	£1/10/-
Terrapene ornata	Box tortoise	Texas	£1/10/-
Testudo angulata	Bowsprit tortoise	South Africa	£1/5/-
Testudo denticulata	Red-footed tortoise	South America	£2
Testudo graeca graeca	Greek tortoise	Algeria	5/6
Testudo hermanni	Hermann's tortoise	Italy	£7 per 100

AMPHIBIANS

Alytes obstetricians boscai	Midwife toad	Spain	5/-
Alytes obstetricians obstetricians	Midwife toad	Belgium	
Ambystoma opacum	Cream and black salamander	USA	12/6
Ambystoma tigrinum mavortium	Tiger salamander	Central America	£2/10/-
Aneides lugubris	Arboreal salamander	North & Central America	12/6
Atelopus	Tree frog	Central America	
Bombina bombina	Fire-bellied toad	Europe	3/6
Bombina variegata variegata	Yellow-bellied toad	Belgium	7/6
Bufo americana	American toad	USA	10/-
Bufo bufo	Common toad	Belgium, Italy	£1/15/- per 100
Bufo bufo spinozus	South European common toad	Italy	3/6

Bufo calamita	Natterjack toad	Belgium	2/6
Bufo cognatus	Toad	USA	16/-
Bufo marinus	Giant toad	South America	£1
Bufo mauritanicus	North African toad	North-West Africa	3/-
Bufo melanostictus	Common Indian toad	India	4/-
Bufo regularis	African toad	Belgian Congo	£3/6/8 per 200
Bufo valiceps	Mexican toad	Mexico	£1/10/-
Bufo viridis	Green toad	Algeria, Tel Aviv	2/6
Desmognathus fuscus b.	Ozark dusky salamander	USA	7/6
Discoglossus pictus	Painted frog	Algeria, Spain	4/-
Eleutherodactylus unistrigiatus	Mottled tree frog		5/-
Euproctus platycephalus	Sardinian mountain salamander	Sardinia	
Gastrotheca marsupiata	Pouched tree frog	Captive-bred	15/-
Hyla arborea	European tree frog	Belgium, Italy	£7/4/- per 100
Hyla baudinii	Tree frog		
Hyla crucifer	Spring peeper tree frog	USA	7/6
Hyla regilla	Pacific tree frog	USA	10/-
Hyla savignyi	Savignyi's tree frog	Tel Aviv	2/-
Leptodactylus spp.	Frog	Central & South America	10/-
Microhyla olivacea	Narrow-mouthed toad		
Pelobates cultripes	Iberian spadefoot toad	Spain	4/-
Pelobates fuscus fuscus	Common spadefoot toad	Belgium	
Pipa pipa	Surinam toad	Surinam	£2/10/-
Pleurodeles waltl	Pleurodele newt	Spain	6/-
Rana arvalis arvalis	Moor frog	Belgium	
Rana aurora aurora	Red-legged frog		15/-
Rana catesbiana	American bullfrog	USA	
Rana "esculenta'	Edible frog	Belgium	£1/15/- per 100
Rana pipiens	Leopard frog	USA	10/-
Rana tigrina	Indian frog	India	2/9
Salamandra atra	Alpine salamander	Europe	6/6
Salamandra salamandra salamandra	Fire salamander	Europe	6/6
Salamandra salamandra terrestris	Striped salamander	Belgium	2/6
Scaphiopus holbrooki	Spade-foot toad	USA	12/6
Speleomantes genei	Sardinian cave salamander	Sardinia	
Taricha granulosa	Oregon brown newt	USA	15/-
Taricha torosa	Californian newt	USA	15/-
Triturus alpestris alpestris	Alpine newt	Belgium	
Triturus carnifex	Italian crested newt	Italy	24/- per 100
Triturus cristatus	Crested newt	Belgium	
Triturus helveticus helveticus	Palmate newt	Belgium	
Triturus marmoratus marmoratus	Marbled newt	Spain	6/-
Triturus vulgaris vulgaris	Smooth newt	Belgium	8/-
Xenopus gilli	Rare clawed toad	South Africa	7/6
Xenopus laevis	Clawed toad	Belgian Congo	

THE DEALERS

Lists issued by the following dealers were used in compiling this series of articles.

Ancock & Woods
Barilli & Biagi
Robert Bustard
Commerce d'Animaux Vivants
L. Haig & Co. Ltd.
Robert Jackson (Naturalists) Ltd.
Patterson & Lonsdale
Alan Robertson
Drs. W.de Rover
South Yorkshire Biological Supplies
Vandevelde
N.D. Walker
Zoologico

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ON THE DISCOVERY OF *MESALINA PASTEURI* (BONS 1960) IN THE EGYPTIAN WESTERN DESERT

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INTRODUCTION

The Western Desert of Egypt is, herpetologically, one of the least known and explored regions in the Sahara. This is particularly obvious when compared with knowledge of the Algerian Sahara herpetofauna. The finding in Egypt of *Philochortus intermedius* (Kamal *et al.* 1966, Marx 1968), *Acanthodactylus longipes* (Baha El Din 1994) and *Mesalina pasteuri* (this author); suggest that many species typically regarded as western and central Saharan (*cf.* Lambert 1984) may in fact have a more uniform distribution throughout the Sahara than previously thought. The apparent discontinuity in the distribution of some of these species is most likely to be a result of the lack of herpetological coverage.

The Western Desert is one of the driest deserts on earth. With the exception of a narrow band of between 50-100 km along the Mediterranean, where meagre winter rains fall regularly; the rest of the Western Desert is virtually rainless and vegetation is restricted to oases and depressions. Siwa Oasis (*c.* 29°12'N 25°31'E), where *M. pasteuri* was recently found, is one of the five main oases of the Western Desert. It is situated in a depression about 15 m below sea level. Bounded from the north by an escarpment which rises 100 m from the floor of the depression, and from the south by the dunes of the Great Sand Sea, it is tenuously connected with Jaghbub Oasis (Libya) to the west and the Qattara Depression to the east.

Plate 1. *Mesalina pasteuri* from Siwa Oasis, Egypt

THE OCCURRENCE OF *MESALINA PASTEURI* IN EGYPT

Mesalina pasteuri is a rare Saharan lizard known only from a little over a dozen localities scattered throughout the central and western Sahara. Bons (1960) initially reported the species from southern Morocco, southern Algeria and northern Niger. Gauthier (1965) recorded it in the north western Algerian Sahara. Most recently Geniez & Geniez (in press) recorded it in the Western Sahara of Morocco and Joger & Lambert (in press) in Mali. On 17 March 1994 the author found a single example of *M. pasteuri* at 29°12'N 25°40'E near Ain Zaitun, Siwa Oasis (SMB 0056, in private collection). This represents the first record of this species in Egypt, and an extension in its range of some 1,800 km north east of Bilma (18°50'N 13°30'E), northern Niger, the nearest locality from which the species was previously recorded. The species has apparently not been reported from Libya yet, but will undoubtedly be found there in the future.

The Siwa animal fits perfectly the type description of *Mesalina pasteuri*, except for having fewer dorsals, which are slightly carinated (see Plate 1). It differs from the nearest populations of *M. olivieri*, from the vicinity of Marsa Matruh (31°21'N 27°14'E), in the same features Bons (1960) had outlined for *M. pasteuri*, i.e. in having a striated dorsum lacking white ocelli and 5 instead of 4 upper labials anterior to the subocular (also see Table 1). The *M. pasteuri* from Siwa also differs from *M. olivieri* in having the lower eyelid window made up of two large transparent scales (not edged with black as in sympatric *M. guttulata*). In *M. olivieri* this is made up of 4 or more semi-transparent scales.

ECOLOGY

Mesalina pasteuri is a species of soft sand biotopes (Gauthier 1965 & 1967, Lambert 1984 and Philippe Geniez in lit.). The Siwa specimen was found active at midday at the edge of the Great Sand Sea, in an area of small undulating sand dunes with sparse cover of *Alhagi maurorum* and *Zygophyllum album*. *Mesalina olivieri*, which occurs commonly along the Mediterranean coast of Egypt, inhabits fairly mesic stony hamada and does not penetrate far into the arid desert. The furthest inland example of *M. olivieri* in this region was found at 31°09'N 27°00'E, about 50 km south of the coast, and about 230 km to the north of Siwa.

In Siwa *M. pasteuri* was found in sympatry with *Acanthodactylus longipes*, *A. scutellatus*, as well as with typical *M. guttulata*. The latter was numerous on adjacent salt encrusted sabkha at the margins of salt marshes and cultivated land.

Table 1. Comparison with nearest *M. olivieri* populations from the vicinity of Marsa Matruh 31°21'N 27°14'E) and with *M. pasteuri* from the central Sahara and southern Morocco (based on Bons 1960).

Species / population	*M. pasteuri* (Siwa)	*M. pasteuri* based on Bons (1960)	*M. olivieri* from vicinity of Marsa Matruh
N	1	5	5
Dorsals	32	$\bar{x}$ 37.4 (34-41)	$\bar{x}$ 46.2 (42-50)
Ventrals	10	10	10
Upper labials anterior to subocular	5	$\bar{x}$ 4.9 (4-5)	$\bar{x}$ 4.1 (4-5)
Femoral pores	11	$\bar{x}$ 11.6 (10-14)	$\bar{x}$ 12.3 (10-15)
Lamellae under 4th digit	22	$\bar{x}$ 20.4 (20-21)	$\bar{x}$ 22.2 (22-23)

CONCLUSIONS

Mesalina pasteuri is a new addition to the Egyptian herpetofauna, which will probably be found elsewhere in the Western Desert of Egypt, particularly in the large oases of this region.

ACKNOWLEDGEMENTS

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HERPETOLOGICAL NOTES ON THE DODECANESE ISLANDS OF CHALKI AND SYMI, GREECE

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INTRODUCTION

The following article is an account of the reptiles observed during visits carried out in 1994 to the Greek Dodecanese islands of Chalki and Symi. Five days, 5th-9th May, were spent on Chalki, a further six days, 12-17th May, on Symi. With an area of 58km^2, Symi lies approximately 25km to the north of Rhodes and just 5km off the southwest mainland of Turkey. Chalki, with an area of 28km^2, is situated 10km off the west coast of Rhodes and some 40km from southwest Turkey. Both islands can be generally described as hilly, rocky and dry. Vegetation consists predominantly of xerophilous phrygana, with some limited areas of cultivated land in small valleys, mainly small wheat fields and olives.

Early references to the reptiles on Symi can be found in Werner (1935), though the islands herpetofaunal content was but poorly known until Clark's visit in 1970 which resulted in several significant new records, included in a short note (Clark, 1972). A more detailed account of Clark's research on Symi has been recently published (Clark, 1992). Chalki has received very little attention from herpetologists, prior to my short visit the only species definitely recorded on this small island were *Agama stellio* and *Ablepharus kitaibelii* (Boettger, 1888 and Werner, 1935).

SPECIES ACCOUNT

BUFONIDAE

Bufo viridis Laurenti, 1768

Though none were found, from local information from several sources, this species can confidently be included among the herpetofauna on Symi. Not previously listed for either island (Lanza & Vanni, 1988).

TESTUDINIDAE

Testudo graeca ibera Pallas, 1814

On Symi two adults of 20 and 22 cm straight carapace length found active, one in a grassy terraced field, the other on a phrygana covered rocky hillside. A further adult was found dead with a smashed carapace. Clark (1992) reported just a single specimen found, and its apparent scarcity may be partly due to it being killed by locals when seen in the island's limited areas of cultivation.

GEKKONIDAE

Hemidactylus turcicus turcicus Linnaeus, 1758

Several found on Chalki, where previously unrecorded (Chondropoulos, 1986). On Symi a few specimens found in rock screes and dry stone walls.

Cyrtodactylus kotschyi Steindachner, 1870

Not previously recorded on Chalki, (Chondropoulos, 1986) where several were found in dry stone walls near the port, only one specimen being found elsewhere on the island. On Symi fairly common and widespread.

AGAMIDAE

Agama stellio daani Beutler & Frör, 1980

Found to be common in rocky habitats on both Chalki and Symi. A gravid female was caught on Symi (15th May) while it was digging a hole under a large flat rock at the edge of a wheat field.

LACERTIDAE

Lacerta oertzeni pelasgiana Mertens, 1959

On Symi fairly widespread though not occurring anywhere in great numbers. Usually seen on the lower parts of dry stone walls in cultivated areas. Dorsal colour fawn, greenish in sunlight, with indistinct light dorsolateral stripes.

Ophisops elegans ehrenbergii Wiegmann, 1835

Widespread on Symi, though like the above species also occurring in fairly small population densities. Often found sympatric with *L. oertzeni* but occupying a different habitat niche being more of a ground dwelling species. No lacertid lizards were observed anywhere on Chalki.

SCINCIDAE

Ablepharus kitaibelii kitaibelii Bibron & Bory, 1833

Found to be common on Chalki, less so on Symi. Often seen in leaf litter in shady areas with diffuse sunlight, especially active in warm, cloudy, hazy conditions and following rain.

Mabuya aurata Linnaeus, 1758

In Greece, this predominantly middle eastern species, has been recorded only from Samos (Beutler, 1979), Rhodes (Wettstein, 1953) and on Symi (Clark, 1972). None were seen by the author, though while I was on Symi it was recorded there by Wingerde (pers. comm. 1994). Five specimens were reported seen by Clark (1992) in rocky habitats, though none were seen by Clark (pers. comm. 1995) during a subsequent visit to the island. Clearly not particularly common on Symi.

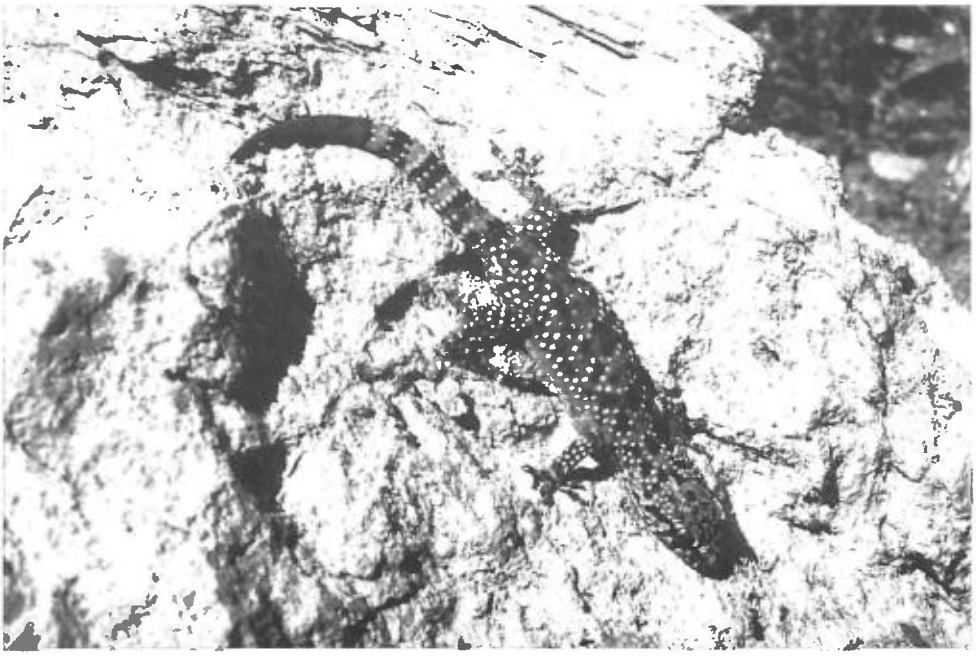

Plate 1. - *Hemidactylus turcicus turcicus*. A widespread species in Greece.

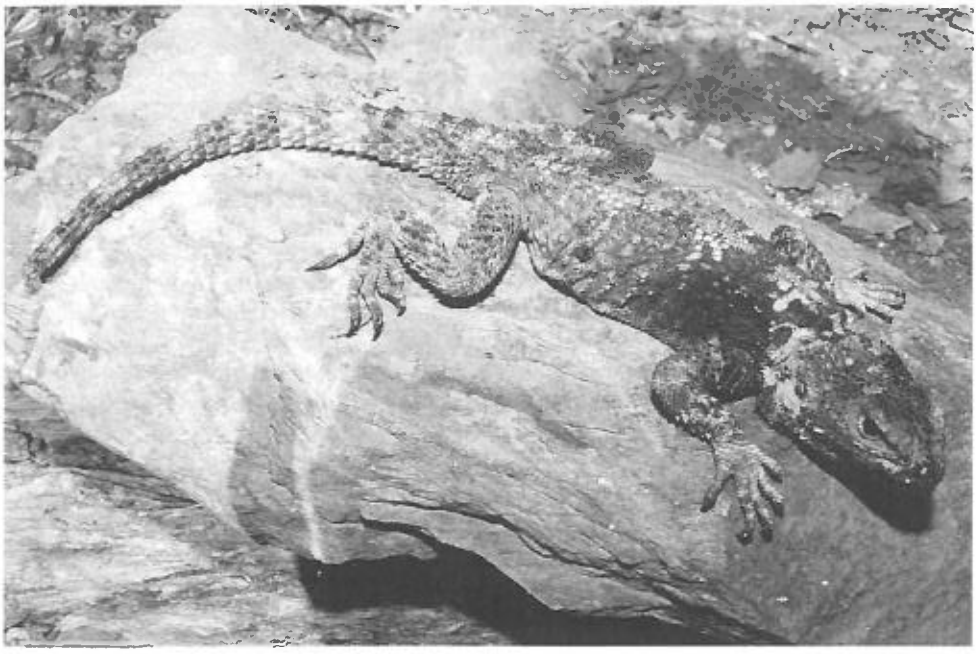

Plate 2. - *Agama stellio daani*. A familiar sight on many Dodecanese islands.

AMPHISBAENIDAE

Blanus strauchi Bedriaga, 1884

As a result of heavy rainfall just prior to my arrival on Symi, eight adults of this fossorial species were found when turning rocks. In Greece now known from six east Aegean islands, i.e. Samos, Leros, Kos, Symi, Rhodes and Kastellorizo (for references see Buttle, 1990). Those found on Symi, largest 21cm total length, consistent in appearance and resembling those from western Turkey depicted (plate 12c) in Leviton et al. (1992).

COLUBRIDAE

Coluber jugularis jugularis Linnaeus, 1758

Three specimens found on Chalki where previously unrecorded (Chondropoulos, 1989), and four on Symi. Six seen in cultivated areas, one on a phrygana covered hillside. Ophiophagy in this species is well known, on two occasions adults caught on Symi have regurgitated a *Vipera xanthina* (Markoytsas pers. comm. 1994). True cannibalism is also known, an adult on Leros having been found ingesting a larger snake of the same species (Dimitropoulos pers. comm. 1994). One of the most common snakes of the east Aegean islands.

Coluber nummifer Reuss, 1834

On Symi, a single adult of 120cm approx. was found active at 17.30 hours on a tree shaded rock scree in a terraced grassy field. Light brown ground colour with prominent dark brown dorsal blotches, similar to that shown on p.83, upper plate, in Gruber (1989). This snake exhibits an extreme degree of polymorphism. Two specimens found and described by Clark (1992) were very different in appearance to the one I observed on the same island, Clark's having a grey ground colour with dark grey cross bars. Twelve *C. nummifer* found by Dimitropoulos, mainly on Leros and Kastellorizo, are described (pers. comm. 1994) as being either uniform pale grey, or grey with large rhomboid black blotches. A similar specimen to my Symi example has been observed by Nilson (pers. comm. 1994) which originated from nearby Rhodes. A robust snake which may exceed 150cm in length (Clark, 1992).

Eirenis modestus Martin, 1838
On Symi, a single 16cm juvenile found under flat rock in rock scree on terraced field. Ground colour dull grey, small dark spots on anterior body (var. semimaculata), very bright yellow head markings. Unusually in my experience this small specimen bit readily when handled.

VIPERIDAE
Vipera xanthina Gray, 1849
On Symi, a 65cm male specimen was caught when seen active at 19.20 hours, weather clear and sunny, at base of dry stone wall between small wheat fields. Light greyish white ground colour with very dark brown, black edged zig-zag pattern, breaking into blotches at mid body, on dorsum, with small dark brown blotches on flanks. On Symi found mainly in rocky habitats in both cultivated land and areas with trees (Markoytsas pers. comm. 1994). This viper was assumed to be present on Chalki by Boettger (1888) based on observations of 'vipers' by Oertzen. However, although listed for Chalki by Chondropoulos (1989) the presence of *V. xanthina* on this island has not been confirmed and was omitted from previous works (Werner 1938, Wettstein 1953, Ondrias 1968). Local information favours the presence of *Coluber nummifer* rather than *V. xanthina* on Chalki, the former having often been confused with large vipers (Clark pers. comm. 1995; see also Nilson and Andrén, 1986).

SUMMARY

Thirteen reptile species (7 lizard, 4 snake, 1 amphisbaenian, 1 tortoise) and, almost certainly one amphibian species are now known to occur on Symi. Five reptile species (4 lizard, 1 snake) are now recorded on Chalki. *Blanus strauchi* is recorded from Symi for the first time. New records for Chalki being *Hemidactylus turcicus*, *Cyrtodactylus kotschyi* and *Coluber j. jugularis*. A list of species for these islands is given in Table 1. Somewhat surprisingly, lacertid lizards would appear to be absent on Chalki. The suspected occurrence of *Coluber nummifer* on Chalki, rather than *Vipera xanthina* (as has previously been supposed), requires further investigation. Further research is recommended as other species, e.g. *Coluber najadum*, *Telescopus fallax*, *Elaphe situla*, known from nearby islands and S.W. Turkey may be present, especially on Symi, though it is doubtful, due to its small size and limited habitats, if Chalki will be found to have a much richer herpetofauna than that now recorded.

Table 1. List of Species known to occur in Symi and Chalki

SYMI		CHALKI
Bufo viridis	*Ophisops elegans*	*Agama stellio*
Agama stellio	*Blanus strauchi*	*Hemidactylus turicicus*
Hemidactylus turcicus	*Testudo graeca*	*Cyrtodactylus kotschyi*
Cyrtodactylus kotschyi	*Coluber jugularis*	*Ablepharus kitaibelii*
Ablepharus kitaibelii	*Coluber nummifer*	*Coluber jugularis*
Mabuya aurata	*Eirenis modestus*	
Lacerta oertzeni	*Vipera xanthina*	

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ADDITIONAL AMPHIBIANS FROM A PLEISTOCENE INTERGLACIAL DEPOSIT AT PURFLEET, ESSEX

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Pleistocene deposits in the Thames Valley at Purfleet, Essex, (TQ 568785) are considered to represent the Ipswichian Temperate Stage of the Pleistocene (Hollin, 1977; Jones and Keen, 1993). Holman and Clayden (1988) published on the first fossil amphibians and reptiles from Purfleet from sediments sieved at the Greenlands Pit by J.D. Clayden. In 1993, Simon Parfitt of the Field Archaeology Unit of University College London, collected additional herptile material from a new locality at Purfleet. The Parfitt locality is at Stonehouse Lane, Essex, and consists of fluviatile deposits at the edge of Purfleet Channel between the Bluelands and Greenlands Pits.

Sediments sieved by S. Parfitt at the new Purfleet locality yielded some very fragmentary colubrid snake remains that could not be identified to the generic level as well as some amphibian fossils that were identified to the generic and in one case the specific level. These new amphibian remains form the subject of the present paper.

THE NEW MATERIAL

Triturus cristatus (Laurenti) - Warty newt

Material: Three vertebrae from Parfitt Locality, Sample 54. The trunk vertebrae of *Triturus cristatus* are larger and have a lower neural spine than those of *T. helveticus* and *T. vulgaris*. Moreover, in *T. cristatus* the posterior end of the neural arch extends posterior to the posterior end of the postzygapophyses, whereas in the other two species the posterior end of the neural arch ends anterior to the posterior end of the postzygapophyses.

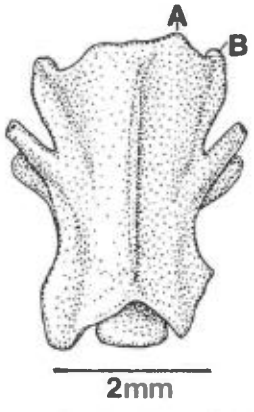

Fig. 1. Trunk vertebra of *Triturus cristatus* (Sample 54) from the Pleistocene Temperate Stage at Purfleet, Essex. A, posterior end of the right side of the neural arch (the left side of the neural arch has been worn away). B, posterior end of the right postzygapophysis.

Triturus sp. - Newt
Material: One fragmentary vertebra from Parfitt Locality, Sample 11 and four fragmentary vertebrae from Parfitt Locality, Sample 54. These vertebrae are too fragmentary to identify to the specific level.

Bufo sp. - Toad
Material: One very large trunk vertebrae represents the genus *Bufo*, but I have not been able to identify *Bufo* trunk vertebrae to the specific level.

Rana sp. - Frog
Material: Eight left and three right fragmentary ilia. These ilia are too fragmentary to identify specifically.

COMMENT

The following herpetological species are now known from the Ipswichian Temperate Stage of the Pleistocene at Purfleet, Essex.

Triturus cristatus
Triturus sp.
Bufo bufo
Bufo sp.
Rana arvalis arvalis
Rana temporaria
Rana sp.
Anguis fragilis
Natrix cf. *Natrix natrix*

The most significant find at the new Purfleet deposit is *Triturus cristatus* which is reported from the Ipswichian Temperate Stage of the Pleistocene for the first time. Although not surprising, the record is noteworthy because the only other Pleistocene records of *T. cristatus* are from the Middle Pleistocene sites at Cudmore Grove, Essex (Holman, 1993) and East Barnham Farm, Suffolk (Ashton et al., 1994).

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STOMATITIS (MOUTH ROT) IN SNAKES

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INTRODUCTION

Necrotic or ulcerative stomatitis (mouth rot) remains a major problem in captive reptile populations. Mouth rot can affect all major reptile groups (Table 1), including the crocodylia, chelonia, sauria (lizards), serpentes (snakes), however the snakes are most often affected and therefore this article will concentrate on this group. Nevertheless, any reptile exhibiting signs of dysphagia (difficulty eating), buccal/mandibular (mouth/jaw) swelling and anorexia should be examined for stomatitis.

Stomatitis is infectious in nature being caused by a variety of gram-negative (and uncommonly gram-positive) bacteria, viruses, fungi and parasites. Stomatitis is essentially an inflammation of the mucous membranes of the mouth (gums, throat etc) but is seldom a primary infection. Most cases are secondary to stress, mouth damage, weakness, malnutrition and poor husbandry (for example, bad vivarium design, inappropriate temperatures). The successful diagnosis and treatment of mouth rot requires a compliant owner who is willing to permit the veterinary surgeon to carry out essential laboratory and ancillary diagnostic tests. This article aims to increase owner awareness of this potentially fatal condition which will maximise the chances of early detection and a successful outcome.

FACTORS PREDISPOSING TO STOMATITIS

The major predisposing cause of mouth rot in snakes is damage to the mouth. Active or nervous snakes not provided with a hide box may relentlessly cruise around the vivarium and make repeated attempts to escape by rubbing their snouts against edges and corners. Such specimens will often rub and damage their mouths which can subsequently become infected. In these circumstances, greater seclusion is required by covering the glass with paper. Even calm specimens may succumb to mouth damage if maintained in badly designed (sharp or rough edges), unhygienic vivaria without hide boxes. Floor substrate, such as corn cob, can also cause an acute stomatitis if it becomes trapped within the mouth.

Snakes that are force-fed in a rough manner will also incur mouth damage, as can snakes fed live prey which have been inadequately constricted or stunned. Force feeding should only be carried out by experienced persons using well lubricated prey. If feeding forceps are used the prey must be gripped behind the head to ensure that the points of the forceps do not protrude in front of the prey and perforate the mouth or oesophagus. Frozen rodents should always be considered ahead of live prey due to the potential problems of parasitism and the risk of the prey animal biting the snake. There are also welfare issues that need addressing when feeding live prey.

The immune system of any reptile is temperature dependent and their sub-optimal temperatures will lead to immunosuppression and opportunistic infections. Temperatures exceeding the preferred optimum temperature zone for a particular species will result in attempts to escape from the vivarium, again resulting in rostral mouth damage. Recently imported snakes may have parasites that can cause stomatitis (for example, *Kalicephalus* spp) and therefore worming would be an essential part of any treatment plan if recurrence is to be avoided. There has also been some evidence to suggest that a deficiency of vitamin C may predispose to stomatitis, and although not conclusively proven this may represent another reason for routinely using a multi-vitamin supplement (Ark-Vits, Vetark).
Husbandry, nutrition and captive status must all be addressed and corrected if there is to be any hope of preventing disease or achieving a permanent cure. When stomatitis is noticed it is important to take the snake to a veterinary surgeon as soon as possible. Any home treatment, such as cleaning the mouth with an antiseptic, can adversely affect any bacteriological tests, and although an important part of treatment it should not be started until after a veterinary consultation.

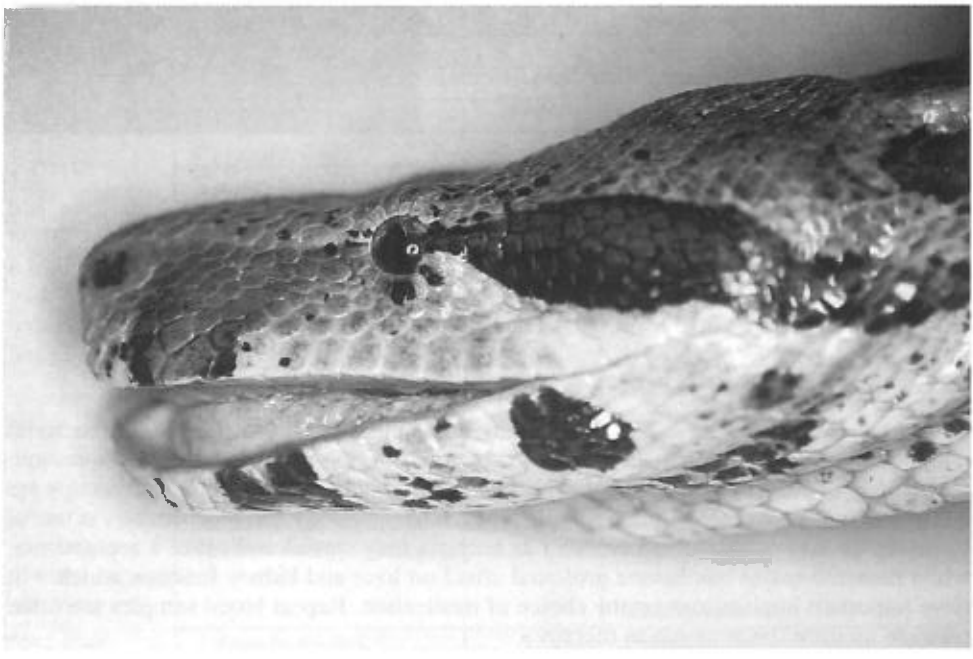

Plate 1. The untreated stomatitis in this Boa Constrictor *(Boa constrictor)* has progressed to a chronic infection which has invaded the bones of the head to cause deformity of the normal anatomy of the head. This animal had to be euthanased on humane grounds.

VETERINARY INVESTIGATION

Upon presentation, the owner's records are scrutinised and a detailed history is obtained on the snake and its environment (husbandry and nutrition). The snake can then be examined from head to tail to obtain a general overview before examining the mouth in detail and employing diagnostic aids.

Clinical Examination: Severe cases of mouth rot will often be visible externally as the snake may not be able to close its mouth due to the swelling. Swelling may also interfere

Plate 2. Boa Constrictor *(Boa constrictor)* presented with a severe nectrotic stomatitis.

with breathing and cause respiratory noise. The mouth of a snake is a delicate and complicated structure which is opened gently to permit visualisation of any lesions. Blunt instruments can be used to keep the mouth open, but in very large or poisonous snakes a sedative or anaèsthetic may be required before examination. If presented early there may only be inflammation of the mouth, either diffuse or focal. However, if left untreated infection will become established resulting in a build up of necrotic (devitalised) tissue and caseous pus.

Laboratory Tests: In mild cases, all that may be required is a swab for culture (bacterial and fungal) and antibiotic sensitivity. However, if the snake's parasite status is in question, particularly in the case of wild caught specimens, then buccal scrapings for microscopy are advisable. In severe cases, a blood sample for both haematology and biochemistry is useful to determine any systemic involvement as bacteria may spread and cause a septicaemia, while bacterial toxins can have a profound affect on liver and kidney function which will have important implications on the choice of medication. Repeat blood samples are often taken to monitor the response to therapy.

Ancillary Diagnostics: In severe or long term cases of stomatitis it is important to evaluate any bony involvement of the mouth as osteomyelitis (bone infection) carries a much poorer prognosis than infection of the soft tissues alone. Radiography is used routinely to examine the bones of the head and, if diseased, great care is required to prevent any fractures during handling and cleaning of the mouth.

In some cases stomatitis may merely be a reflection of a much greater problem involving the oesophagus and perhaps even the stomach. Therefore, where the lesions extend down the throat the use of endoscopy (fibre-optics) to examine the oesophagus is warranted.

Table 1. Cases of Stomatitis Recorded by the Author
Between 1 December 1994 - 31 March 1995

Reptile Order	Species	Number of cases	Microbiological Investigation
Crocodylia	*Caiman crocodilus*	2	*Pseudomonas aeruginosa, Aeromonas hydrophila*
	Sub-Total	2	
Chelonia	*Testudo graeca*	5	*Pseudomonas (2), Aeromonas (2), Proteus (1), Herpesvirus*
	Trachemys scripta elegans	1	*Aeromonas hydrophila*
	Terrapene carolina	1	*Aeromonas hydrophila*
	Trionyx spiniferus	1	*Aeromonas aerophila*
	Geochelone pardalis	1	*Neisseria*
	Sub-Total	12	
Squamata Sauria	*Iguana iguana*	2	*Pseudomonas aeruginosa*
	Eublepharis macularius	2	*Pseudomonas aeruginosa, Proteus*
	Physignathus cocincinus	1	*Pasturella*
	Chamaeleo calyptratus	1	*Pseudomonas aeruginosa*
	Chamaeleo parsoni	1	*Proteus*
	Corucia zebrata	1	*Pseudomonas aeruginosa*
	Varanus exanthematicus	1	*Aeromonas hydrophila*
	Sub-Total	10	
Squamata Serpentes	*Boa constrictor*	9	*Pseudomonas aeruginosa (4), Aeromonas hydrophila (3) Haemophilus (1), Proteus vulgaris (1), Herpesvirus*
	Python molurus bivittatus	7	*Pseudomonas aeruginosa (4), Aeromonas hydrophila (3)*
	Elaphe spp	6	*Pseudomonas aeruginosa (3), Aeromonas aerophila (2), Candida albicans (1)*
	Python regius	5	*Pseudomonas aeruginosa (2), Aeromonas hydrophila and Kalicephalus (3)*
	Lampropeltis spp	5	*Pseudomonas aeruginosa (2), Aeromonas hydrophila (2), Streptococcus (1)*
	Epicrates cenchria	3	*Pseudomonas aeruginosa*
	Drymarchon corais	2	*Pseudomonas aeruginosa, Aeromonas hydrophila*
	Thamnophis spp	2	*Aeromonas hydrophila*
	Chondropython viridis	1	*Pseudomonas aeruginosa*
	Python curtus	1	*Pseudomonas aeruginosa*
	Heterodon nasicus	1	*Staphylococcus epidermis*
	Crotalus atrox	*1*	*Aeromonas hydrophila*
	Sub-Total	44	

Surgical Debridement: Once all necessary laboratory and diagnostic tests have been carried out the snake is sedated or anaesthetised and the mouth lesions thoroughly debrided. The mouth is then washed and cleaned using a povidone-iodine antiseptic, such as Tamodine (Vetark). Once the mouth has been debrided it is important that the mouth is cleaned once or twice daily at the direction of the veterinary surgeon to prevent the future accumulation of pus.

Medication: The choice of treatment will depend upon the cause of the stomatitis (bacteria, viruses, fungi, parasites), the severity of the disease and the snake's systemic health status. Antibacterials such as enrofloxacin, ceftazidime and amikacin may be employed initially but the antibiotic choice may change once a bacterial culture and sensitivity is obtained. Anti-viral drugs such as acyclovir and anti-fungal drugs such as ketoconazole have been used where indicated. Various other medications including non-steroidal anti-inflammatory drugs and vitamin C may also be used at the veterinary surgeon's discretion. An essential part of any treatment is the identification of the underlying cause, which must be corrected if recurrence is to be avoided.

Prognosis: If a case of stomatitis is presented early and a thorough veterinary investigation permitted the chances of a complete recovery are excellent. Chronic, severe infections, particularly fungal and viral in origin can be difficult and time consuming to treat, while those involving the bones of the mouth carry the worst prognosis.

Table 2. Stomatitis (Mouth Rot) In Snakes: Summary

Prevention	Owner Detection	Veterinary Diagnosis	Veterinary Treatment	Prognosis
Vivarium design, materials and furnishings	Focal or diffuse inflammation	Detailed history and clinical examination	Surgical debridement	Varies from excellent (simple infection and cause identified) to poor (chronic bone infection).
Nutrition	Swelling of jaw	Microbiology	Regular cleaning	
Temperature, lighting and humidity	Anorexia	Radiography and endoscopy	Antibiotics	Viral and fungal diseases are particularly difficult to treat.
Regular inspection	Caseous pus in mouth	Microsopy	Anti-fungals	
Captive status			Anti-virals	
			Anti-inflammatories	
			Vitamin C	
			Identification and correction of predisposing factors	

SUMMARY

Stomatitis remains one of the most commonly presented diseases of snakes today, but with proper veterinary and owner care this disease can be treated and prevented. Snakes are a fascinating and increasingly popular pet, and both owners and vets owe it to these animals to provide the best possible captive care and veterinary treatment.

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