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THE BRITISH HERPETOLOGICAL SOCIETY

BULLETIN

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BRITISH HERPETOLOGICAL SOCIETY

c/o Zoological Society of London
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Correspondence, membership applications, subscription renewals and purchase orders for the Herpetological Journal and British Herpetological Society Bulletin should be sent to the above address.

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

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

Meetings

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

Subscriptions

Ordinary Members £15. Junior Members £5. (Junior Members do not receive the British Journal of Herpetology). Institution rates £25 (U.S. $40).
All subscriptions become due on the first day of January each year.

The Bulletin is edited and produced by
John Pickett and Simon Townson

Contributions and correspondence arising from the Bulletin should be sent to:
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FRONT COVER
Grass Snake, large adult female (160 cm) from the Abruzzo region, Italy.
Photo: S. Bruno & E. Di Cesare. See *The Herpetofauna of the south-east* Peligna region (Abruzzo, Italy) in the next issue of the Bulletin, Spring 1991.

GENERAL LONDON MEETINGS 1991

Meetings are held in the Lecture Theatre of the Linnean Society of London, Burlington House, Piccadilly, London W1, and start at 7.0 pm, ending at 9.00 pm, unless indicated otherwise.

February 14th	Dr Wolfgang Wüster (Department of Zoology, University of Aberdeen): Cobras and other herps in South-East Asia.
March 23rd	A.G.M. (separate Agenda). A special Saturday all-day event. To be held at Birkbeck College, London (Malet Street, London WC1).
April 17th	Dr Robert Bustard (Isle of Man): Sea turtles on Australia's Great Barrier Reef.
May 23rd	Dr Robert Oldham (Department of Biology, Leicester Polytechnic): Nigerian Amphibia.
June 18th	Mr Geoff Clarke (Bere Regis, Dorset): Experiences in breeding snakes and other reptiles in captivity.
September *(date later)*	*Care and breeding of amphibians and reptiles: an open meeting.* Contributions from members – live animal and photographic display. There will be the opportunity for the sale and exchange of members private home-bred stock and facilities for commercial displays of books and vivarium equipment. A Saturday Afternoon meeting (details to follow).
October 10th	Dr Michael Lambert (BHS Chairman): Some African herpetofauna and the impact of Tsetse control insecticides on lizards in Zimbabwe.
November 20th	Mark Day (Gambian Dwarf Crocodile Rescue Project, University of Bristol): Herpetofaunal wading through West Africa.

ANGUS BELLAIRS (1918-1990)

It is with much regret that I have to announce the death of Prof. Angus d'A. Bellairs (BHS Honorary Life Member, 1982), who at the age of 72 died on September 26th 1990. He was a founding member of the Society and the Editor from 1948-53 of the first eight numbers of the, then, *British Journal of Herpetology*. He was effectively a father of herpetology in Britain and undoubtedly the best known of British herpetologists internationally. Only a year before his death, he was President of the First World Congress of Herpetology in Canterbury (UK) 11-19 September 1989. The funeral service took place on October 4th 1990 at the West Norwood Crematorium and was attended on behalf of the BHS by the Society's Chairman. Addresses of appreciation were given by Prof. Aidan Breathnach (St Mary's Hospital Medical School, Paddington); a relative, Mr Neville Braybrooke, and Dr Ian Swingland (Conference Director, First World Congress of Herpetology). The service was attended by other herpetologists including Dr Garth Underwood, a long-standing colleague of Angus Bellairs, and Dr Nicholas Arnold (Reptile and Amphibian Section, Natural History Museum, London), and the Zoological Society of London was represented by Mr Peter Olney (Curator of Birds/Reptiles). An Obituary also appeared in *the Daily Telegraph* on October 10th 1990. A full Obituary for publication by the Society has been written by Prof Mark Ferguson (University of Manchester), organiser of the Symposium "The structure, development and evolution of reptiles" that was held at the Zoological Society of London on 26 and 27 May 1983 in honour of Angus Bellairs on the occasion of his retirement. The Symposium was held under the auspices of the Zoological Society of London, the Anatomical Society of Great Britain and Ireland and the BHS. The Proceedings, constituting a Festschrift for Angus Bellairs, included an appreciation (by Mark Ferguson) of his contribution to herpetology, and were published in *Symposia of the Zoological Society of London* Number 52 (1984).

M.R.K. Lambert

PROVISIONAL MINUTES OF THE 43rd ANNUAL GENERAL MEETING OF THE BRITISH HERPETOLOGICAL SOCIETY HELD AT 7.30 PM, TUESDAY, MARCH 27TH 1990 IN THE LINNEAN SOCIETY OF LONDON

Thirty members and four guests signed the attendance sheet. Apologies were received from Mr M. O'Shea (abroad).

The meeting was chaired by Dr M. Lambert, who reported that the Earl of Cranbrook had tendered his resignation as President and that a replacement was being sought. As indicated in the Rules, Lord Cranbrook would continue for a year as Vice-President.

1. **Minutes of the previous A.G.M. (**see *BHS Bulletin* no. 29: 1-2, Autumn 1989). These were approved without alteration; proposer: Prof. G. Haslewood, seconder: Dr R. Griffiths.

2. **Matters arising.** None.

3. **Treasurer's report and discussion.** The Accounts had been approved by the Auditors and circulated to members with the Agenda and Annual Report beforehand. Monica Green reported that expenditure on the Bulletin was up on the previous year, but the colour plates causing the increase had pleased members. The sum of £293 for the hire of the stall at the World Congress had been returned from Congress profits. The cost of the Bulletin and Journal, which with the lead-up to the Congress had been bigger than usual, was higher than in the previous year and postage had been raised in November 1989. The hire charge for the Lecture Theatre of the Linnean Society had also increased. Overall membership now exceeded 1000 for the first time in the Society's history. Prof. Haslewood enquired whether the sheet encouraging membership could be less expensive and more like that for the Education Committee produced by Colin Fitzsimmons. The new blue membership sheets had been produced for the World Congress and were more expensive than previous ones, but Brian Banks pointed out that the first printing was expensive and subsequent ones would be less so. Mrs Green also reported that more new members had joined the Society in the first three months of the year than ever before. Mrs Green was thanked by the Chairman and members expressed their appreciation for all her work with loud acclamation.

4. **Rules changes** (see the Rules in *BHS Bulletin*, no. 12: 1-4, June 1985): The following change was approved:–

> 1. Under 5. CATEGORIES OF MEMBERSHIP (b) Honorary Membership, start second sentence with "Apart from Past Presidents," and continue "such ...". *Nem. con.*

After an adjustment in wording proposed by Mr I. Archer (seconder: David Bird), the following change was approved:–

> 2. Under 6. COUNCIL (a) Composition, add the following sentence at the end. "If without due reason or explanation an Officer or Ordinary Member fails to attend three consecutive Council Meetings, he or she will be deemed to have lost interest and resigned if no explanation in response to a written enquiry is received." *Nem. con.*

The Rules were due for reprinting with a relapse of five years since the last.

5. **Election of Officers and Members of Council.** With a small amendment made by the Chairman, the wording of this Agenda item read:–

> Without other proposals, the President and other members of Council nominate for election or re-election the following:

Chairman	D[r] M.R.K. Lambert
Membership Secretary and Treasurer	M[r]s M. Green
Editor, *The Herpetological Journal*	D[r] T.J.C. Beebee
Librarian	M[r] D.R. Bird
Education Officer (Chairman, Education	M[r] V.F. Taylor

Committee – Junior Section)	
Co-Editor (1), *BHS Bulletin*	M[r] J. Pickett
Co-Editor (2), *BHS Bulletin*	D[r] S. Townson
Chairman, Conservation Committee	M[r] W.J. Whitaker
Chairman, Captive Breeding Committee	M[r] M. Linley
Chairman, Research Committee	D[r] T.R. Halliday
Scottish Group Representative	M[r] A.W. Darby
North West England Group Representative	Mr R. Paul
Ordinary Members (total 6)	M[r] B. Banks (1988)
	M[r] D. Stubbs (1988)
	D[r] R.A. Griffiths (1988)
	D[r] S.M. Halpern (1988)
	M[r] M. O'Shea
	M[r] P. Curry

The election of these candidates was confirmed *en bloc. Nem. con.*

6. **Honorary Members.** The Chairman announced that Prof. and Mrs G.A.D. Haslewood, as Family Members, had jointly been created Honorary Life Members of the Society on account of outstanding service, especially to the activities of the Conservation Committee (of which Prof. Haselwood had been Chairman, 1983-87). There was loud acclamation.

7. **Council's report (as circulated herewith) and discussion.** The Chairman invited comments on the 1989 Annual Report. He wished to add that a total of 1368 people from 61 countries (900 delegates) had attended the First World Congress of Herpetology in Canterbury; 153 were from the UK. Apart from a very minor typographical error (the word "on" to be added at the end of line 4 under the Journal report), there were no further comments and the report was accepted *nem. con.*

8. **Report of the Education Officer on the Junior Section.** Vic Taylor announced that the J. Herps totalled just over 100. A Dorset Camp was held in August and a very successful Reptile Afternoon was held with the London Zoo on New Year's day. J. Herps newsletter has continued. With £630 in the account, expenditure on printing and postage was anticipated. Mr Taylor reported that sadly Colin Fitzsimmons had resigned from the Education Committee, and also announced that he himself, after 10 years, would have to retire in about 12 months time due to work pressure (the reason why the newsletter was sometimes late) and requested a deputy to whom he could pass-on the chairmanship. A book for the J. Herps was also being prepared. A report for the Bulletin is to follow. Mr Taylor's report was greeted with acclamation.

Prof. Haslewood proposed (seconder: Bill Whitaker) that J. Herps should have on request (with S.A.E.) copies of the new Conservation Committee booklet illustrated with coloured photographs on British species. This was approved *nem. con.*

9. **Report of the Conservation Committee.** Mr Whitaker apologised for not completing his 1988 report and now had his 1989 one to prepare also. He hoped now to write a biennial one. Mr Whitaker also took the opportunity to thank the Committee members and their partners for all the dedicated hard work they had given to conserving the rare British species during 1989. There were now four subcommittees:–

1. Reptile site monitoring.

2. Sand lizard breeding – decisions made on site releases and monitoring.

3. Natterjack – in charge of all sites for release programme and monitoring of introductions.

4. Publicity – a. money-raising ideas for land fund (presently £15,000; target £100,000) to be used for site acquisition and lease purchasing.

– b. Publications: leaflets, in 1990, "Save our reptiles" by Brian Banks and Geoff and Beth Haslewood.

Bill Whitaker also reported that the Herpetological Conservation Trust (HCT), three of whose Trustees are Conservation Committee members, has put £15,000 into herp. conservation – more than ever before. The profile of herp. conservation was presently high. With funds provided by World Wide Fund for Nature (UK), the Committee is involved in June with a Judicial Review (Dr Trevor Beebee and Bill Whitaker are named on the application) against the Poole Borough Council in connection with their planners granting building permission on protected sites notwithstanding Part 1 of the 1981 Wildlife & Countryside Act. Dorset people seemed to be slow to recognize their heritage, but with Colin Fitzsimmons now in Dorset, it was hoped that this situation would soon be rectified! The report was greeted with acclamation.

10. **Report of the Captive Breeding Committee.** In the absence of the Chairman, Mike Linley, there was no report given. Monica Green spoke on his behalf. She apologized for the delay in responding to requests for the Committee's publications, which included four successful books that were also in great demand by Society members. Another captive breeding symposium was to be held later in the year or in 1991. John Pickett also announced that he intended to re-start the crested newt breeding project and Prof. Haslewood added his support of this.

Mr Steve Derham enquired why there was no report by the Committee for 1989, nor an outline of future intentions for 1990 and beyond. He added that his comments at the AGM in 1989 had not referred to articles on captive breeding in the Bulletin, but to the activities of the Committee. Mr Derham proposed that experienced breeders should be canvassed for articles on their successes and methods used, although Monica Green pointed out that there could be a security risk to the authors' collections if articles included their names and addresses. Steve Derham added, upon enquiry by Michael Lambert, that he would on behalf of the Captive Breeding Committee be willing to take on the responsibility for initiating contributions by authors if requested to do so.

11. **Report of the Research Committee.** In the absence of the Chairman, Dr T. Halliday, Richard Griffiths reported that in 1989, all members' efforts had concentrated on the World Congress. It was intended that a seminar would be held at the Open University in late 1990. A meeting at the Zoological Society of London on amphibian behaviour was also being held on June 12th, and would include a speaker from the Netherlands. (This was subsequently arranged as a joint meeting with the Zoological Society of London). One of the aims of the Committee was to increase foreign membership by strengthening the Society's scientific activities.

12. **Any other business.** Anne Seabright enquired whether an Index was to be prepared for the Bulletin. Monica Green replied that she had prepared an index for answering enquiries which could be adapted for publication.

Prof. Haslewood drew members' attention to an entertaining herpetological novel written by one of the Society's Honorary Members, Prof. Angus Bellairs, entitled "Isle of sea lizards" (available at £6.00). This had been on sale at the World Congress and is presently being reviewed. Dr Lambert added that the novel was an excellent read!

At the start of the meeting, Richard Griffiths displayed some Society T- and sweat-shirts which were available for sale. Some books were also on display.

A talk was then given by David Bird entitled "Herpetofauna of Yugoslavia, especially Dalmatia", which was much appreciated by the audience.

THE MYSTERY OF THE MARIE CELESTE OR EDUCATION COMMITTEE CRISES

Over the last ten years the workload of the BHS Education Committee has steadily increased thus proving that there is a very real demand for basic help and information in the dual areas of "field" and "home" herpetology. For convenience the main areas of this workload can be divided under four distinct headings:

1) **The organisation and running of the Junior Section of BHS**

It is my own personal belief that of the four areas of work this has the most potential value both for herptiles and herpetologists alike. It is also worth noting that this is the only one of the four areas of work which is unique to the Ed.Com. As will be seen each of the other areas overlaps with the work of either the Conservation or Captive Breeding Committees. The "J. Herps" are certainly an important bonus for the national and international reputation of the BHS and it is not beyond the bounds of possibility that Junior membership will one day exceed ordinary adult membership.

The running of the Junior Section can itself be subdivided into four areas:

a) **Administration:** Without an effective administrative system the J. Herps would be a non starter. Janet Pracy has evolved a set of procedures which until recently worked very well and the current, temporary breakdown in the system is not the fault of either Janet or the system...the buck stops here.

b) **Publications:** The ten page Junior Newsletter is at present produced termly and the Education Officer is responsible for the whole production and distribution process. The Newsletter is very much appreciated by Juniors and their parents alike and until recently most issues were produced more or less on time. Juniors are also entitled to copies of the quarterly Bulletin the collecting and dispatch of which poses additional logistical problems for the E.O.

c) **Special Activities:** Each year we have run a number of one day childrens' events together with a residential camp in Dorset. Included in the one day events have been two joint meetings with the Young Friends of London Zoo at Regents Park. In some ways these joint events could point the way forward and I know from having given many talks to other youth groups that organisations such as WATCH, YOC and the Scout movement would be more than interested in exploring the possibilities of co-operative ventures. To be organised properly however special activities need the undivided attention of a nominated member of the Education Committee.

d) **Advisory Services:** I receive numerous letters and telephone calls from youngsters wanting advice more often than not on matters of husbandry. In order to provide an effective, efficient service I encourage youngsters to phone rather than write and have established a regular weekly "telephone surgery" which has proved very useful when I can staff it. Not only does the surgery allow me to give a better advisory service than is possible by letter but it also in theory helps to prevent the build up of mail back-logs.

2) **The organisation of an annual programme of exhibition work**

The key to running a successful summer exhibition season is advance planning. As an objective by the start of the season a full list of exhibition commitments should be available together with a list of volunteers able to attend each event. A system for such advanced planning was set up by Colin Fitzsimmons in 1989 and worked well in the 1990 season.

Resource provision is another pre-requisite of exhibition work. We have produced a very good basic display which needs maintenance and it is also important that we always carry stocks of all current BHS leaflets etc. Storage and transportation are other potential problem areas. The demand is such that we could be at an event every weekend during the season from mid July to mid September and the running of such a season merits the individual attention of at least one Committee member throughout the year and requires the seasonal assistance of a large team of experienced volunteers.

3) **The delivery of talks and lectures**

At present most members of the Education Committee give evening talks to a wide variety of organisations. In the past concern has been expressed in some quarters that there is no form of quality control on these talks which – if being given in the name of the Society – should reflect official BHS policies etc. It should be possible to offer advice and resources to those wishing to speak on behalf of the Society; it should also be possible to establish a central register of speakers and to standardise objectives whilst allowing for individual freedom of style and method of delivery in achieving the agreed objectives. Yet again another area of work which needs co-ordinating by someone unfettered by other Education Committee responsibilities.

4) **Responding to requests for help received by mail or telephone**

For response to be effective it needs to be accurately and speedily executed and once again the volume of work in this area more than justifies the sole attention of a nominated person who would need to establish a very good working relationship with both the Captive Breeding and Conservation Committees whose various brains will often need to be picked and whose leaflets are a godsend to us.

As can be seen the future work of the Education Committee poses many exciting challenges and promises to reap many rewards. The Committee is like a ship engaged on a crucial educational mission; the ship has been especially designed to carry out its' mission the objectives of which are clear. It is a good ship, the only thing it lacks being a full crew and if a crew cannot be found it will flounder on the rocks of its own success. All of the Committee devote as much time to the work of the Committee as they can but, without wishing to belittle the work of the others, it must be admitted that most of the load has been taken by the trio of Colin Fitzsimmons, Janet Pracy and myself.

As many of you may know Colins' work has taken him down to Dorset so that he has been effectively removed from the scene for the last year while he settles into his new situation. Janet is at present still active as administrative assistant but is dependent on me for communications if the system is to function and I have been increasingly unable to fulfil my role which has had a knock-on effect on her normal efficiency.

At the last AGM I reported that I felt obliged to stand down as Education Officer as soon as a replacement could be found. I stated that I would be happy to serve on the Education Committee if required and would be willing to undertake any one specific area of responsibility but that other commitments both at work and at home meant that I could no longer cope with trying to deal with all correspondence
trying to produce and distribute Newsletters
trying to collect and distribute Bulletins
trying to organise and staff our exhibitions
trying to organise and run activity days etc
trying to represent the Committee on Council.

At one time the Society employed a full time Conservation Officer financed through the WWF. If funding could be found the right person employed as a full time Education Officer could perform miracles for the Society and would more than earn his or her keep.

NOW the good news – all is not lost

At a meeting of the Education Committee held earlier this month a new structure was devised which should enable us to return to the relatively efficient running that we enjoyed for the first nine years of our activities. As of 1st January 1991 the following structure will come into operation:

Acting Education Officer : Colin Fitzsimmons – this appointment was approved at the last meeting of the BHS Council but will need to be ratified by the membership at the next AGM. Since the last AGM nobody, other than Colin, has expressed any interest in this post, however if anybody out there is interested they are very welcome to put their names forward for possible election.

Membership Secretary . Vic Taylor – regrettably Janet Pracy has given notice that she must resign from the Education Committee in the New Year. For nearly nine years she has been the key behind-the-scenes admin person whose contribution over the years cannot be over-estimated. She has also been a regular helper at exhibitions and other events and in these roles we hope that she will still be able to follow her herpetological interests.

J. Herp Newsletter Editor: John Baker

Advisory Services & Stop Press distribution: Don Freeman

Other members of the Education Committee are Janet Potter, Kath Draper and Paul Edgar, who acts as liason with the Conservation Committee. We would very much value a liason member from the Captive Breeding Committee and also to hear from any other members of the Society who are willing and able to play an active role on the Education Committee. The ship is under way again.

Vic Taylor – 15/10/90

BRITISH DENDROBATID GROUP

BRITISH DENDROBATID GROUP

The British Dendrobatid Group was formed in 1989 by a group of amateur and professional herpetologists who keep and breed poison-arrow frogs.

WHY WAS THE GROUP FORMED ?

If populations of species are to be maintained in captivity successfully in the long-term, it is essential that the size and genetic diversity of those populations are kept high. Since the free exchange of animals across national borders is increasingly more difficult, national organisations promoting the management of captive populations within a country are needed.

HOW THE GROUP OPERATES

A *Newsletter* is circulated regularly showing a list of members together with a list of the species they keep. The *Newsletter* also contains lists of people who want to start breeding dendrobatids, details of recent publications and national and international news items.

MANTELLAS

Though the main emphasis of the group is on dendrobatids, a number of members also keep mantellas; databases are maintained on these species.

AIMS

- To assist in maintaining viable captive stocks of dendrobatid frogs in Britain by enabling breeders to exchange information on the size of captive populations and the genetic backgrounds of individual animals.
- To serve as the focus for contact with groups in other countries for the exchange both of information and of captive-bred stock.
- To enable the exchange of information on the biology and husbandry of dendrobatids.
- To maintain databases on the location of dendrobatid frogs in Britain and on published research on their biology and husbandry.
- To assist zoos exhibit dendrobatids and their habitats by providing advice and animals on deposit.

HOW TO JOIN

If you have denrobatid frogs and support the aims of the group, please write, enclosing a S.A.E., to: Prof. Malcolm Peaker, Hannah Research Institute, Ayr KA6 5HL.

REPORT ON
THE FIRST WORLD CONGRESS OF HERPETOLOGY, CANTERBURY (UK), 1989

Co-Hosted by the British Herpetological Society (BHS), Fauna & Flora Preservation Society, Societas Europaea Herpetologica (SEH) and Zoological Society of London, and held at the University of Kent at Canterbury (United Kingdom), 11-19 September 1989, the First World Congress of Herpetology was attended by 1368 people (900 delegates) from 61 countries – 153 were from the UK alone – and was the largest and most geographically diverse meeting of herpetologists ever held. The Honorary President was Prof. Angus d'A. Bellairs (UK) – a BHS Honorary Life Member since 1982 – and the Secretary-General was Prof. Kraig Adler (USA) – co-founder of the Society for the Study of Amphibians and Reptiles (SSAR) and long-standing BHS member (since 1956). With His Royal Highness the Duke of Edinburgh, President of the Worldwide Fund for Nature (WWF) International and Vice-President of the International Union for the Conservation of Nature and Natural Resources (IUCN) as Patron, and with all four of the co-hosting societies members of IUCN, conservation of amphibians and reptiles was a strong underlying theme. The Conference Director was Dr Ian Swingland of the University of Kent and the BHS's President, the Earl of Cranbrook, was Convener of the Vice-Presidents.

Ten formal Plenary Lectures were presented at the Congress. The Executive Committee of the World Congress of Herpetology have decided that in view of the high standard of these lectures, a separate volume should be published. Such a volume would represent a benchmark against which to measure progress in the discipline of herpetology, as well as drawing attention to the important contributions of herpetologists to biology generally.

A full account of the Congress has already appeared in SSAR's *Herpetological Review*, vol. 21 (1): 1-10, March 1990, for SSAR and the Herpetologists' League, together with the pan-European SEH, also made the Congress their official meetings. The SSAR's account is formal, while an amusing personal record, somewhat more anecdotal (!) entitled "HerPET-POURRI", probably the first account to be published after the Congress, was prepared by Ellin Beltz for the *Bulletin of the Chicago Herpetological Society*, vol. 24(10): 194-198. Another short, factual report by the BHS Chairman has also appeared in *Environmental Conservation*, vol. 17(1): 85-86, Spring 1990, which stresses the environmental aspects. The account that follows is based on the personal view of the BHS Librarian, David Bird, who works with reptiles at Natural World, Poole in Dorset. Since the range of topics covered by the Congress was so diverse, it is almost impossible for any two people's views to be alike. Furthermore, personal opinions and a subjective impression are often more fun to read! David's virtually unadulterated account, then:–

"Before I went to the Congress, I had no idea what the titles of the talks were going to be. A list of titles of Symposia, Workshops and Roundtables had been published previously, together with the fact that there would be a display of posters. There had also been a provisional list of speakers and organisers of particular events. In fact it turned out that there were over 300 lectures and over 300 posters. Obviously a list of talks would be far too lengthy to include, but those I attended ranged from "The feeding of *Bombyx mori* as prey for captive lizards" to "Social behaviour and lizard systematics" and "Molecular investigations on the phylogeny of pipoid frogs". At Registration, a pack was given out which included a programme running to 102 pages. One had to go through this each night, or usually by the time I got to my room very early in the morning, for about half-an-hour to decide which lectures one could go to the following day. If one has a wide interest in herpetology, as I have, there were often two or three lectures one had to miss all the time because of the clashes that inevitably occurred. In this respect, I think the organisers were too ambitious and should have had only half as many lectures going-on simultaneously. Of the 1368 people attending, there was unfortunately no-one from Yugoslavia, which is my special interest. Also in the Registration Pack was a book of abstracts in alphabetical order on 332 unnumbered pages which gave synopses of the lectures and posters; this was useful to go through, if one had the time, to see which talks would be the most useful to attend as some titles did not describe the talk perfectly. It is probable that the Abstracts Volume will be the only publication to be produced as a Congress Proceedings would be far too large. The papers in some of the Symposia will probably

be published together, or separately, in normal journals. Everyone had a name badge; the print on these could have been larger and clearer as it was commonplace to see people peering at each others' badges to identify each other. It was very interesting to put faces to the names of people who had written the books and papers one owned or had read. The screen at the Marlowe Theatre in the centre of Canterbury where the ten plenary lectures of one-hour duration were held was far too small, with many slides and especially the tables being unrecognizeable if one ws more than quarter of the way back from the front. The Edward Elkan Memorial Lecture ws given by Dr Frederick Frye (California, USA) and was widely publicised outside the normal congress advertising amongst veterinarians, and several times in local herpetological societies. This was a good, very thorough lecture which was not as well attended as I had expected, no doubt through other competing events at the Congress. There was a lot of organization and hard work by many people to see that things ran as smoothly as possible. There were books for sale in the drama centre and also in odd corners of the campus where different societies put up tables at odd times. It was a pity that the different societies did not have a time and place where all had stands together where you could join using Sterling instead of just picking up odd membership forms off tables around the university. A good place to meet people was one of the bars in the evening, but one seemed to meet the same people night after night; some people were staying off campus or found somewhere else to go in the evenings. It took me seven days to meet up with a German herpetologist I was looking for. I did meet-up with a lot of friends and acquaintances and made a lot of new contacts which hopefully will prove useful in the future. It was a pity that there was no live display of British species for foreign (non-European) herpetologists to see and photograph, which quite a few of the Americans wanted to do. Some of the talks were very technical and specialised, whilst others dealing with conservation or with maintenance in captivity were easy to understand. The ten days were very enjoyable and the Second Congress is to be held in about four years time in Adelaide, Singapore or Costa Rica. The one sour point in my mind was the fact that the Business Meeting did not ratify a proposal that the Congress should recognise the work done by amateur herpetologists and encourage captive breeding. Unfortunately other meetings were being held at the same time so that a vociferous minority against the personal keeping of herptiles for pleasure and other non-specific purposes had their way."

David Bird's account brings up several points which the organisers may well like to take on board in making arrangements for the next congress in Adelaide, South Ausralia (29 December 1993 to 5 January 1994). David also mentions the problem of clashing lectures; the choice of lectures at the Congress was mind-blowing and inevitably difficult decisions had to be made by participants for simultaneous talks on topics within an individual's range of interest. For a meeting of this complexity, clashes are sadly inevitable. But how otherwise in six days of lectures could all the various aspects of a fairly advanced and sophisticated discipline as herpetology be covered?

The sour note mentioned by David at the end of his article is also regrettable, but this resolution, intended to recognize the important contributions of amateur herpetologists to captive husbandry was only defeated after lengthy discussion. Although there was a vociferous minority, the overwhelming majority of delegates was sympathetic with the intention. The resolution was only not carried because it was felt that such a statement could be misused by some dealers and unscrupulous amateurs.

Since conservation was a strong underlying theme of the Congress, it is as well to mention the lectures that addressed this important subject. Two of the eleven Plenary Lectures related to conservation. Russell Mitermeier (USA), introduced by Lord Cranbrook, presented a paper (co-authored with Ian Swingland) entitled "International conservation". He indicated that although 25% of the world's vertebrates are amphibians and reptiles, which also comprise the highest proportion of endangered species, the average expenditure on their conservation is only 1% of the annual total on wildlife conservation; the exception is the Jersey Wildlife Preservation Trust, which spends 50% of its budget on herpetofauna. The other lecture was given by Gerald Durrell, OBE, founder and Honorary Director of the Jersey Wildlife Preservation Trust, who spoke as a Distinguished Guest on "Conservation and captivity". Of the remainder of the programme, a significant proportion of the Symposia (27), Workshops (6) and Roundtables

(11) addressed conservation/environmental topics; and 350 posters were also contributed, many on aspects relating to conservation and the environment.

The BHS, like the American Society of Ichthyologists and Herpetologists in the USA and other societies mentioned at the beginning, is a member of IUCN as a non-governmental organization. The Congress also provided the opportunity for meetings of the IUCN Species Survival Commission (SSC) Specialist Groups covering amphibians and reptiles which included the Tortoise and Freshwater Turtle Group, the Marine Turtle Group and the Crocodile and Alligator Group. IUCN/SSC's first Regional Group, for Europe, the European Reptile and Amphibian Group, was also inaugurated. The Durrell Institute of Conservation and Ecology, based at the University of Kent, held a reception, and another was held to launch (by Gerald Durrell) the Herpetological Conservation Trust, both of which Ian Swingland, the Conference Director, is connected with.

Symposia on specifically conservation-orientated topics were:–

- Conservation and management of species (seventeen papers, ten posters)
- Effects of environmental pollution on herpetofauna (seven posters):

  Part 1. Acid conditions and amphibians (four papers)

  Part 2. Other pollutants and herpetofauna (four papers)
- Captive management of amphibians and reptiles (eleven papers, seven posters)
- Environmental sex determination (six papers, seven posters)

Roundtable titles relating to conservation included:–

- Conservation needs achieved
- Conservation biology – the new "modern synthesis" and its relation to herpetology
- Ecology and conservation of the tuatara (the discovery of a new species was reported at the Congress)
- Laws, research and conservation: a conundrum
- Amateur contributions to herpetology

Two Resolutions were tabled at the Congress. One to the European Parliament urged the provision of resources for the conservation of European amphibians and reptiles as an important facet of the wildlife heritage, and the other to the President of the USA urged regulations to ensure that commercial shrimp trawlers off the south-east coast of the United States used turtle excluder devices (strainer bars) on their nets, primarily to protect the endangered Kemp's Ridley *(Lepidochelys kempi).*

It might be of interest to members to see some of the participants' comments in letters received by Kraig Adler and Ian Swingland after the Congress which were given in Kraig Adler's final (as Secretary-General) Memorandum to the Executive Committee for the First World Congress of Herpetology:–

"It certainly was the best set of meetings in which I have been involved...an incredible success."

"You have clearly set a very high standard for all future herpetology congresses to follow!...certainly made a major impact on the future development of this field."

"It was a magnificant event, and truly fulfilled its goal of bringing together herpetologists from all over the world."

"It will set a difficult standard for future World Congress of Herpetology organizers to match."

"It is the first scientific meeting I have attended in which the most prestigious researchers in the field were noted for their presence rather than their absence. Virtually all of the best known investigators in herpetology were present."

'The whole ten days was a resounding success and many people I have spoken to afterwards, who were *not* even there, have said that they have heard the same..."

"I have never had a more exciting time."

"It was certainly the best meeting that I have ever attended, and the most fun. What I liked most about the meeting was its length: the span of time allowed in-depth conversations with numerous persons."

"Having come from a small and rather distant country where, until recently, there has been only limited interest in herps, it was quite an event to mingle with so many who share similar concerns."

"The World Congress was absolutely stupendous!"

Perhaps these enthusiastic comments are in response to something that we herpetologists in Britain can be proud of and an encouraging note to end on. One awaits the Second Congress in Adelaide with impatience!

Michael Lambert

MEMORABILIA OF THE FIRST WORLD CONGRESS OF HERPETOLOGY, UK, 1989

For archive and public record purposes, photographs of events, people, speakers, posters and anything which occurred at and was related to the meeting are required. Attendees are requested to send "seconds" or duplicate photographs and slides, which should be labelled or captioned and dated, and include the name of the photographer. The World Congress or Herpetology particularly requires video (VCR) records. Please indicate whether materials are for donation or for copying and return.

Materials should preferably be sent direct to Kraig Adler (Section of Neurobiology and Behavior, Seeley G. Mudd Hall, Cornell University, Ithaca, New York 14853-2702, USA) or to Michael Lambert (Flat 2, 34 Queen's Gate Terrace, London SW7 5PH, UK) for forwarding.

SEH 6TH ORDINARY GENERAL MEETING, BUDAPEST, 1991

The 5th SEH OGM was coincident with the First World Congress of Herpetology in Canterbury (UK), 1989. The **6th Ordinary General Meeting of Societas Europaea Herpetologica wil be held in Budapest, Hungary, 19-23 August 1991.** The programme of activities will take place in the House of Agricultural Cooperatives ("Hotel Agro"), Budapest. Those wishing to attend are asked to inform the Organiser, **Dr Zoltan Korsos (Zoological Department, Hungarian Natural History Museum, H-1088 Budapest, Baross utca 13, Hungary),** as soon as possible.

The World Congress of Herpetology announces the SECOND WORLD CONGRESS OF HERPETOLOGY

December 29, 1993 – January 5, 1994
at the University of Adelaide, Adelaide, South Australia

The Executive Committee of WCH has considered the venues proposed during FWCH in Canterbury and after voting decided on Adelaide as the venue for the SWCH. This international congress is the second of a series that started in 1989 in Canterbury. This meeting will enable all persons interested in herpetology to meet and exchange information to promote the advance of knowledge and the conservation of the world's amphibians and reptiles. The congress will consist of topical symposia, plenary speakers, poster sessions, workshops, displays, excursions, and meetings of ancillary groups. Subjects and moderators will be announced well in advance so that potential participants can volunteer. The meeting will be open to all persons. Registration will begin 1 January 1992.

Further announcements about registration, travelling arrangements, accommodation and program will be made in herpetological journals as soon as available.

The congress will offer you the opportunity to get acquainted with the unique and diverse Australian herpetofauna.

For further details and mail listing, write: Dr. M.J. Tyler, The University of Adelaide, Dept. Zoology, Box 498, GPO, Adelaide, South Australia 5001, Australia.

A GREEN SUCCESS

Bulletin readers may recall a story appearing in the Summer 1987 issue (p. 3) about the discovery of Great Crested Newts on a site in Dorset during an October 1986 clearance task by the Conservation Committee. As a result of this discovery the Company owning the site agreed not to continue with its proposal to reclaim the pond area in order to stopy fly-tipping of rubbish.

The Company concerned is ECC Group plc (ECC) and the site, from which minerals were removed by its predecessor many years ago, is known locally as "The Green Pond". Members of the Conservation Committee soon found that as well as the newts and Sand Lizards, all three British snake species were present. When ECC heard this the Company agreed to sell the whole site to the BHS at a price considered reasonable by the District Valuer, an important concession since the Nature Conservancy Council cannot offer purchase grants towards higher costs. Negotiations between BHS and ECC have been prolonged, mainly for legal reasons, but members will be pleased to hear that they were finally concluded on 31st August 1990 and that the BHS, in the names of three Trustees, now owns "The Green Pond" to be renamed "The Green Pool". The Conservation Committee will manage the new Reserve with consideration for all the native animals and plants it shelters, but especially for the needs of the amphibians and reptiles. The environment is unfriendly (even quite dangerous) to intruders and this, too, will give protection.

The purchase price was found as follows: Conservation Committee members, 77%; Nature Conservancy Council, 13%; Co-op Wildlife Families Fund via The Conservation Foundation, 10%. The BHS will be grateful to these donors, but especially to Mike Preston and his Firm of Burchell & Ruston for the skill, patience and devotion to detail needed for final success: they recovered only minimal costs. The BHS and conservationists in general will also be grateful to ECC for their agreement to devote this important small (10 acre) area to wildlife protection. This large Company has extracted minerals from considerable regions of Dorset inhabited by the Sand Lizard and Smooth Snake: however the reptiles have survived in many instances. In these so depressing times for the lowland southern dry heathland, it is heartening to find that one major enterprise exploiting its resources is so sensitive to the needs of rare wildlife wholly or partially dependent on it.

G.A.D. Haslewood
28 Old Fort Road
Shoreham-by-Sea
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APPEAL FOR ARTICLES ON GRASS SNAKES

For many years both the *BHS Bulletin* and *Journal* have published a large number of papers on British herps, with an emphasis on all of the native amphibians and to a lesser extent the rare reptiles (Sand Lizard and Smooth Snake). However, there seems to have been very little research or interest in the remaining more common reptiles, particularly the Grass Snake. Perhaps this is because the Grass Snake is relatively difficult to study in the wild and more difficult to maintain in the laboratory for experimental studies, at least when compared with the amphibians. Nevertheless, the Editors would like to encourage members to submit contributions to the *Bulletin* on any aspects of Grass Snake biology.

S.T.

INCUBATION OF GRASS SNAKE *(NATRIX NATRIX HELVETICA)* EGGS

SIMON TOWNSON

96 The Avenue, Highams Park, London E4 9RB

Despite the often repeated account that Grass Snakes mate in April and May, lay their eggs in June or July in compost and dung heaps with hatching taking place 6-10 weeks later, a cursory look at the literature suggests that there remains a great deal to be discovered about the reproductive biology of the Grass Snake. Of particular interest to me is where do they "normally" lay their eggs and under what conditions will they successfully develop? Certainly there is extensive evidence that Grass Snakes do use artificial compost and dung heaps for egglaying, where microbial fermentation may produce an enormous amount of heat with temperatures rising to as much as 40-70° C. Stebbings (pers. Comm.) has observed that a population of Grass Snakes in Dorset migrated over considerable distances to lay their eggs in piles of saw-dust where he recorded temperatures of over 40° C. But where do they lay their eggs when man has not provided a convenient incubation chamber and what extremes of temperature can be tolerated? Perhaps they use natural compost heaps consisting of decaying vegetation at the bottom of a sunny bank, or even occasionally lay their eggs in open patches of sand to be warmed by the sun? Or are the eggs able to develop successfully at relatively cool temperatures, i.e. at ambient shade temperatures; certainly I known of areas with Grass Snake populations where there are no obvious artificial egglaying sites. If eggs are able to hatch successfully under the great thermal range likely to exist under the different situations outlined above, then this species will have developed a great flexibility not seen in many other snakes.

My own, rather limited observations on this subject were made this year when I divided a clutch of eggs and artificially incubated them at three different temperatures. A gravid female snake, approximately 1 m in length was found basking on an old pig-slurry heap on an Essex farm in June. I was informed that several snakes appear at the site at about the same time each year to lay their eggs, despite the fact that the piggery closed some 15 years earlier, which I assume results in the dung-heap no longer being "active". The snake was maintained in captivity for 13 days when it laid a total of 28 good eggs, after which it was fed twice on Common Frogs and released to the wild. The eggs were divided into three groups and placed on vermiculite in small plastic containers, relative humidity approximately 90%. The main group of 17 eggs was maintained at 27-28°C and a smaller group of 4 eggs at 34-35°C in laboratory incubators (Gallenkamp), while a further group of 7 were placed in an unheated room with naturally fluctuating temperature; maximum and minimum temperatures were recorded on a weekly basis. Incubation period and hatching success rate are illustrated in the Table.

Of course we have to be careful about drawing conclusions from only one clutch of eggs. However, the results clearly show that a constant temperature of 27-28°C (which is the temperature at which I usually incubate temperate colubrid eggs) produced a very good hatch rate of 94%, with only one egg failing to hatch. In the group of 4 eggs maintained at 34-35°C, three failed to hatch and when examined were found to have "corkscrew" tails, a deformity associated with high incubation temperatures in other species; this result indicates that 34-35°C is on the limit of their tolerance. The hatch rate in the final group (fluctuating temperature, range 17-30°C) was equally poor (29%); in this situation the eggs were protected from the extremes of temperatures which might be experienced outside if not laid in a heat-generating (i.e. compost heap) site, but more akin to ambient temperatures. There was a noticeable growth of mould on all the eggs in this group during the latter part of the incubation period, but based on experience with other species I do not think this would have affected their viability. This low hatch rate, therefore, is somewhat surprising, although the very small sample size must be considered. Finally, there was an obvious size difference in babies between each of the three groups, with those from the 34-35°C group being quite small, those from the 27-28°C group "medium" size, and those from the fluctuating temperature group the largest.

No. eggs	Incubation temperature	Incubation period	No. hatched (%)	Comments
17	27-28°C	42 days	16 (94)	All hatched babies perfect. One apparently normal baby dead in shell
4	34-35°C	31 days	1 (25)	Hatched baby perfect. Remaining 3 babies dead in shell with "cork-screw" tails.
7	17-30°C Weekly Max. Min 26 24 25 21 30 22 25 21 27 19 24 20 24 17 24 17	62-63 days	2 (29)	Hatched babies perfect. One egg died after 17 days and removed. Remaining eggs contained apparently normal babies dead in shell. All eggs covered in a light mould.

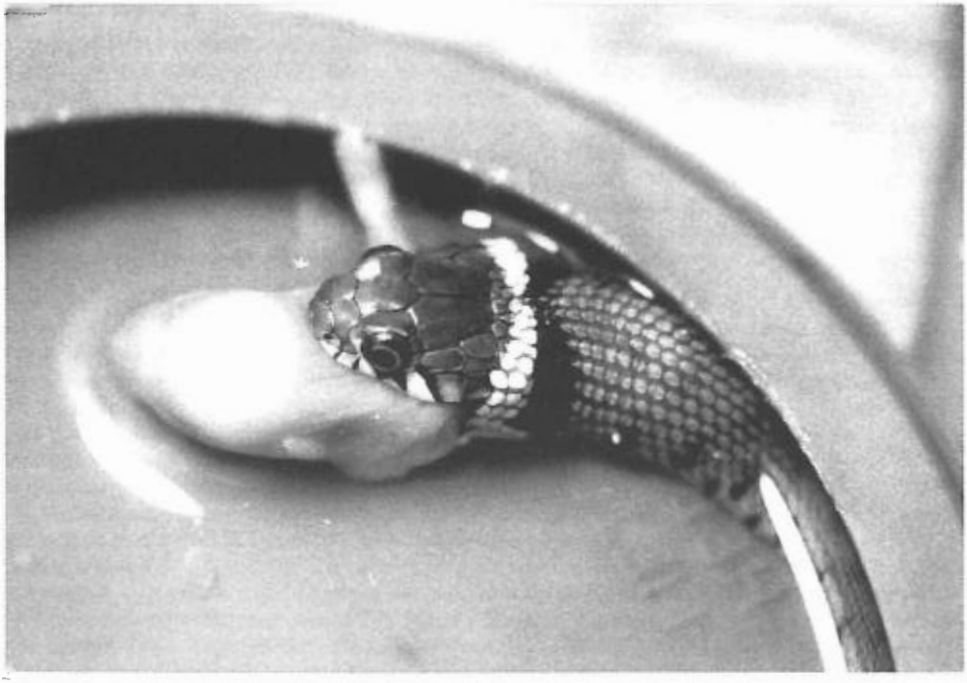

Plate 1. Baby Grass Snake feeding on a pre-killed newborn mouse

All the baby snakes fed voraciously on Common Frog tadpoles placed in approximately 0.5 cm of water in a shallow dish. Thankfully, my somewhat overcrowded garden pond produced a good supply of tadpoles until late September when all but 2 of the babies were released into the wild – a site chosen for its abundance of toadlets, solitude and plenty of cover for hibernation. The remaining two babies are being reared overwinter in a 30 x 15 cm plastic box with a thermal gradient of approximately 24-32°C in the daytime and a nightime temperature between 17 and 22°C. Both are growing rapidly; with the final disappearance of tadpoles in my pond, the two snakes have readily adapted to feeding on pieces of frozen/thawed Plaice, Trout and smoked Salmon which are simply placed in the water dish, with calcium and vitamin supplements ("Reptilin"; Sera) added to each feed. More recently they have been offered live baby mice which were refused. However, dead baby mice placed in the water dish which had been 'scented' with fish were readily taken (Plate 1). While it is well known that although the main diet of adult Grass Snakes consists of amphibians, they may also feed on fish, small birds and mammals. Indeed, I know of a snake which when picked up, promptly regurgitated a bird's wing – presumably the remains of some other predator's kill. However, little is known about the diet of baby Grass Snakes apart from the fact that they will readily accept amphibians. In captivity, I suspect they can be persuaded to eat all kinds of things they would not normally take, particularly if the new food item is 'scented' with acceptable food and the snakes are habituated to a feeding routine. In the excitement at a recent feeding session when Plaice was offered, one of the babies attempted to eat the other and had swallowed more than half if it from the rear end when discovered. However, it is not clear to what extent they prey on other animals such as fish, baby mammals or invertebrates in the wild. According to Malcolm Smith, "the young are often said to eat worms, slugs and insects", but I do not know of any direct observations of this.

It may be assumed that the use of compost/dung heaps as egg incubators is generally an advantage to this species in that its range can be extended further north into cooler climes than would otherwise be possible. But this habit may well have its disadvantages. For example, over the past three years we have had warmer and drier summers than usual. This relatively small increase or fluctuation in high summer temperatures is likely to cause more dramatic effects within the compost heap, with possible deleterious effects for developing eggs. My results indicate that a constant temperature of 34-35°C may cause deformities and death. While compost heap temperatures are likely to be fluctuating rather than constant, it is known that temperatures within compost heaps may far exceed 35°C. Certainly the lower temperatures did not produce a good result with my eggs. Perhaps in cool summers many of the eggs laid outside of suitable heat-generating sites fail to hatch? Malcolm Smith refers to the work of Rollinat in France who reported eggs found in a hole in the earth on the 14th of November which contained living young on the point of hatching, and that "following a cold summer it is not rare to find batches of eggs in the Autumn, in which the young are dead, having been killed by the cold". He also quotes from a letter of Gilbert White, "snakes lay chains of eggs in my melon-beds...which do not hatch out until the following Spring, as I have often experienced". The possibility that partially developed embryos may be able to hibernate within the egg is of considerable interest and deserves further investigation.

In conclusion, it seems there has been very little systematic research on the Grass Snake in the U.K. either in the field or laboratory, apart from the excellent but unpublished work of Stebbings carried out in Dorset some 20 years ago. Many of the points I have raised in this article have no doubt been studied elsewhere, perhaps in mainland Europe? Nevertheless, I hope other members will be stimulated to contribute articles or letters on Grass Snakes to the *Bulletin*.

AN OVERVIEW OF THE OCCURRENCE OF PAEDOMORPHOSIS IN YUGOSLAV NEWT (*TRITURUS*, SALAMANDRIDAE) POPULATIONS

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INTRODUCTION

One of the newt species considered in this paper had the privilege to be the first described of all urodeles in which an alternative path in life history existed. More than 100 years ago, de Filippi (1861) found sexually mature individuals with larval characteristics of the Alpine Newt *(Triturus alpestris)* among a collection of metamorphosed newts. Since then facultative paedomorphosis, as this phenomenon is called, has been frequently discovered in many newt populations.

The Yugoslavian newt fauna consists of populations of six species: the Smooth Newt *(T. vulgaris)*, the Alpine Newt *(T. alpestris)*, and at least four species of the Crested Newts: *T. carnifex, T. dobrogicus, T. cristatus, T. karelinii* (Wallis and Arntzen, 1989; Kalezic et al., 1990). Thus far, most known paedomorphic populations were that of the Alpine Newt, followed by the Smooth Newt. Taking into account the whole range of these species, the occurrence of paedomorphosis in *T. alpestris* and *T. vulgaris* is most pronounced in the Yugoslavian part of their range. Among Crested Newts in Yugoslavia, only in two populations of *T. carnifex* from Montenegro possible evidence of paedomorphosis has been reported (Kalezic and Dzukic, 1990).

The objectives of this paper are to present some of the general characteristics of the occurrence of paedomophosis in Yugoslav newt populations, including a list of paedomorphic populations, their localities superimposed on the species' ranges in Yugoslavia, as well as characteristics of the newt biotopes and some consequences which paedomorphosis brings to bear on population structure and differentiation.

THE SMOOTH NEWT AND ITS PAEDOMORPHOSIS

This is the widest ranging of all European newts, occurring in west Asia too. It is also the commonest species in most parts of its range including Yugoslavia. In Yugoslavia the Smooth Newt can be found in almost all parts except the Velebit mountains and adjacent areas (Kalezic et al., 1990), and probably the western part of Macedonia (Fig. 1). Its Yugoslav vertical distribution ranges from sea level to almost 1800m above sea level (Mount Durmitor; Dzukic, 1990). The Smooth Newt is the only newt species inhabiting some Adriatic islands (Krk and Cres). Substantial morphological and genetical differentiation occurred in the Smooth Newt populations inhabiting the Balkan region during Pleistocene glaciations (Schmidtler and Schmidtler, 1983; Kalezic, 1984). At least four subspecies live in Yugoslavia: *T.v. vulgaris, T.v. meridionalis, T.v. graecus* and *T.v. dalmaticus* with probably a broad zone of gene flow between some of these subspecies (Fig. 1). The detailed distributions of these subspecies are in many respects still unknown. Also, some authorities denied the existence of *T.v. dalmaticus,* considering it to be *T.v. graecus* (e.g. Schmidtler and Schmidtler, 1983).

Up to now, paedomorphosis has been recorded in seventeen Smooth Newt populations (Table 1). (One individual with larval characteristics was enough to acknowledge the occurrence of paedomorphosis in a particular population). All paedomorphic populations, except one from the slope of Fruska Gora (No. 17), are situated in the Dinaric Carso not far from the Adriatic sea. The populations in question mainly inhabit surface water bodies which usually appear

at the sites of sinkholes and potholes with impermeable bottoms. These biotopes are fed by atmospheric rain water and occasionally by boiling springs and as such they frequently suffer a considerable lowering of water level. During severe droughts which are not uncommon in the Dinaric area, some of them occasionally dry up. As water has always been in short supply in this area, people take care of these ponds, enabling them to last. The incidence of paedomorphic individuals in such biotopes appears to be the highest, up to 50% (Kalezic and Dzukic, 1986), in comparison to other biotopes.

Other, less numerous biotopes with paedomorphic Smooth Newts include man-made ponds in fields fed by atmospheric and/or underground water and, as time passed, colonised by vegetation (Nos. 2, 5, 16, 17). Also Anthropogenetic in origin is another biotope, a drainage and irrigation canal which crosses Sinjsko polje (No. 8). To our surprise, a highly numerous Smooth Newt population occurred there with many paedomorphic individuals, living in a fairly strong water current.

THE ALPINE NEWT AND ITS PAEDOMORPHOSIS

This widely distributed European species has an extensive range in Yugoslavia too (Figure 2). It cannot be found along the coast, including Adriatic islands, lowland areas of the Danube plains, broad zones along the rivers Sava, Velika Morava, and in almost all of Macedonia. The largest populations of the Alpine Newt are to be found in hilly or mountainous districts above 700m, but sizeable colonies are also to be met within some lowland areas (less than 200m).

The Alpine Newt occurs in a wide variety of habitats in Yugoslavia. "Usual" habitats include ponds in woods, pools, lakes and snow-flowing streams in hilly or mountainous regions. However, it can be found in extremely arid environments in the Submediterranean zone at low altitude (less than 100m; Kalezic et al., 1990).

For a long time, paedomorphosis in the Alpine Newt was regarded as being invariably confined to high-altitude, deep glacial lakes or tarns. Of 22 populations in which paedomorphic individuals have so far been found, 15 were in such an environment. However, the rest of the populations inhabit Dinaric karst areas, often at quite low altitude (Nos, 2, 3, 4, 5, 6, 7, 12). Such populations are quite numerous in the Bukovica region (Kalezic et al., submitted) where they populated the same eutrophic habitat type as those of the Smooth Newt paedomorphic populations from the Submediterranean area of Yugoslavia. At one site (No. 12) paedomorphic Alpine Newts were found in relatively small shallow water bodies lying along a lost river in a karst field (Dzukic and Kalezic, 1984).

The localities inhabited by the Alpine Newt paedomorphic populations situated in high mountains were originally free of fish, which was important for the maintenance of paedomorphosis. That it was so was unfortunately confirmed a decade later when introduced trout caused the complete disappearance of newts, particularly of paedomorphic ones, in many such lakes (see present status in Table 2).

A subspecies level has been attached to many previously reported Alpine Newt populations with paedomorphic individuals. Werner (1902) started by describing a population from Prokosko Jezero (No. 10) as *T. a. reiseri.* A famous paedomorphic population from Bukumirsko Jezero (No. 20) was designated as *T. a. montenegrinus* (Radovanovic, 1951). Radovanovic (1961) described populations from Kapetanovo and Manito Jezero (No. 18, 19) as *T. a. piperianus,* and a population from Zminicko Jezero as *T. a. serdarus.* The individuals from all these populations were said to have larger and wider heads in comparison with the nominate form, besides some differences in colouring. Separate taxonomic positions of these taxa are still uncertain because of some discrepancies of results obtained by different approaches: morphological (Rocek, 1974), biochemical (Breuil and Gutllaume, 1984; Arano and Arntzen, 1987), and cytogenetical (Herrero et al, 1989).

TABLE 1

Population localities with observed paedomorphic Smooth Newt individuals, altitude, sympatry with other newt species, and present status (paedomorphic newts present +, absent –).

Locality	Altitude	Sympatry with	Present status	Reference
1. Ferlini	330 m	–	+	this study
2. Trget	195 m	–	+	this study
3. Diviska	470 m	–	+	this study
4. Bag	240 m	–	+	this study
5. Smilcic	190 m	–	+	Kalezic et al., 1987
6. Knin	(cca 300 m)	?	?	Wolterstorff, 1935
7. Sitno	175 m	–	–	Kolombatovic, 1908
8. Sinjsko polje	296 m	–	+	this study
9. Supljica	1350 m	*T. alpestris*	+	Dzukic & Kalezic, 1983
10. Kovacevica lokva	930 m	–	+	Kalezic & Dzukic, 1985
11. V. Osjecenica	990 m	–	+	Dzukic, 1981
12. Voluje oko	970 m	–	+	Kalezic & Dzukic, 1985
13. Rutesica voda	950 m	–	+	Kalezic & Dzukic, 1985
14. Dobrsko selo	250 m	*T. carnifex*	+	Kalezic & Dzukic, 1990
15. Markova lokva	220 m	*T. carnifex*	+	this study
16. Donji Stoj	0 m	*T. carnifex*	+	Kalezic & Dzukic, 1990
17. Sremska Kamenica	80 m	*T. dobrogicus*	+	Franolic & Cobic, pers. comun.

TABLE 2

Population localities with observed paedomorphic Alpine Newt individuals, altitude, sympatry with other newt species, present status (paedomorphic newt present +, absent –).

Locality	Altitutde	Sympatry with	Present status	Reference
1. Jezero pri Planini nad jezerom	1428 m	*T. vulgaris* *T. carnifex*	–	Seliskar & Pehani, 1935
2. Gucinac bunar	220 m	–	+	Tvrtkovic & Kletecki, submitted
3. Antinovic lokva	270 m	–	+	Tvrtkovic & Kletecki, submitted
4. Pajica lokva	275 m	–	+	Kalezic et al., 1990
5. Brgud	260 m	–	+	Kalezic et al., 1990
6. Grulovici	245 m	–	+	Kalezic et al., 1990
7. Suhopolje	900 m	?	?	Kolombatovic, 1908
8. Satorsko jezero	1488 m	–	+	Pocrnjic & Kosoric, 1967
9. Lokva kod koliba	930 m	–	?	Travizi, pers. comun.
10. Prokosko jezero	1640 m	–	–	Werner, 1902
11. Rujiste	1100 m	–	+	Djurovic, 1987
12. Nevesinjsko polje	850 m	*T. vulgaris*	+	Dzukic & Kalezic 1984
13. Kladopoljsko jezero	1380 m	–	?	Pocrnjic & Kosooric, 1966
14. Trnovacko jezero	1517 m	–	+	Radovanovic, 1961
15. Zminicko jezero	1285 m	*T. vulgaris*	+	Radovanovic, 1961
16. Vrazje jezero	1428 m	*T. vulgaris*	+	Pocrnjic & Kosoric, 1966

17. Zabojsko jezero	1477 m	-	-	Radovanovic & Lesnicenko, 1963
18. Manito jezero	1773 m	-	+	Radovanovic, 1961
19. Kapetanovo jezero	1678 m	-	?	Radovanovic, 1961
20. Bukumirsko jezero	1440 m	*T. vulgaris*	+	Radovanovic, 1951
21. Ridsko jezero	1970 m	?	?	Radovanovic, Col.
22. Crno jezero	2122 m	-	?	Radovanovic, Col.

DISCUSSION

We believe that the results of this paper, as well as others dealing with paedomorphosis among European newts, are in line with those in which it has been claimed that many urodele species had a notably variable life history (e.g. Duellman and Trueb, 1986). Three major life history pathways also existed in *Triturus* species. Most individuals in most populations (with a few exceptions including some Yugoslav ones) follow the ontogenetic path characterized by the metamorphosing of larvae into an immature individual which remains essentially terrestrial before reaching sexual maturity. Obligate metamorphosis may be the ancestral condition in the whole family Salamandridae if we assume that there is no evidence of paedomorphosis in *Tylotriton,* the most primitive genus of this family (see Wake and Ozeti, 1966). The second path is that followed by larvae with prolonged growth followed by attaining sexual maturity and afterwards metamorphosing into adults (immature efts are excluded). The third path is toward obligate paedomorphosis: larvae with prolonged growth mature sexually without completing metamorphosis. Whether paedomorphic individuals in Yugoslav newt populations are those from the second and/or third paths described above is still unknown. There is indirect evidence that the third path may be efficient at least in the case of the Alpine Newt in mountain lakes. Smirina and Sofianidu (1985) found that the life span of the paedomorphic and metamorphic individuals from Greek Alpine Newt populations was approximately equal. Individuals following the second path may take advantage of a favourable aquatic environment yet have the ability to metamorphose in order to escape that environment when it becomes deleterious. This might be the case with Smooth Newt and Alpine Newt populations with facultative paedomorphosis in Yugoslavia inhabiting biotopes in Submediterranean areas.

Collins (1981) did not find any correlation between the occurrence of paedomorposis and altitude in the Axolotl *(Ambystoma).* Nor did we in the case of two European newt species (see Tables 1 and 2). Also, it is obvious that the ease and frequency of metamorphosis of newt populations with facultative paedomorphosis cannot be correlated with geographical and ecological gradients as was claimed earlier (e.g. Gould, 1977). It appears that reproduction of newt individuals with larval features is a labile character and that each occurrence might be considered as an evolutionary independent event, as was suggested for ambystomatid salamanders (Shaffer and Breden, 1989). However, that newts of both species *(T. vulgaris* and *T. alpestris)* have more chance to become paedomorphic in Dinaric areas than in other parts of its range still keeps the hypothesis of ecological importance for polymorphic life history actual. Recent studies on the genetic basis of paedomorphosis in urodele species showed that the ability to become paedomorphic is under genetic control, albeit highly susceptible to environmental conditions (Harris, 1987; Semlitsch and Wilbur, 1989).

The presence of inheritable genetic variation, as shown by Semlitsch and Wilbur (1989) for *Ambystoma talpoideum,* supports the view that paedomorphosis may be an important microevolutionary mechanism (Gould, 1977; Alberch et al., 1979). Evidence that non-transforming urodeles have a significantly lower level of genetic variation than transforming was found (Shaffer and Breden, 1989). Also, paedomorphosis in newts is associated with a female-biased sex ratio (Kalezic et al., 1989), and paedomorphic-metamorphic population partitioning proved to be a significant factor that considerably increased phenotypic variation (Tucic et al., 1985; Kalezic et al., 1989). Taking into consideration two European newt species we may assume that paedomorphosis had more influence on population differentiation in the

Alpine Newt than in the Smooth Newt. It might be so because paedomorphosis in the Smooth Newt is limited to the retention of some gill structures only ("limited neoteny"; Reilly, 1987), while the same heterochronic phenomenon in the Alpine Newt retains more larval characteristics including perhaps the skull features (unpublished).

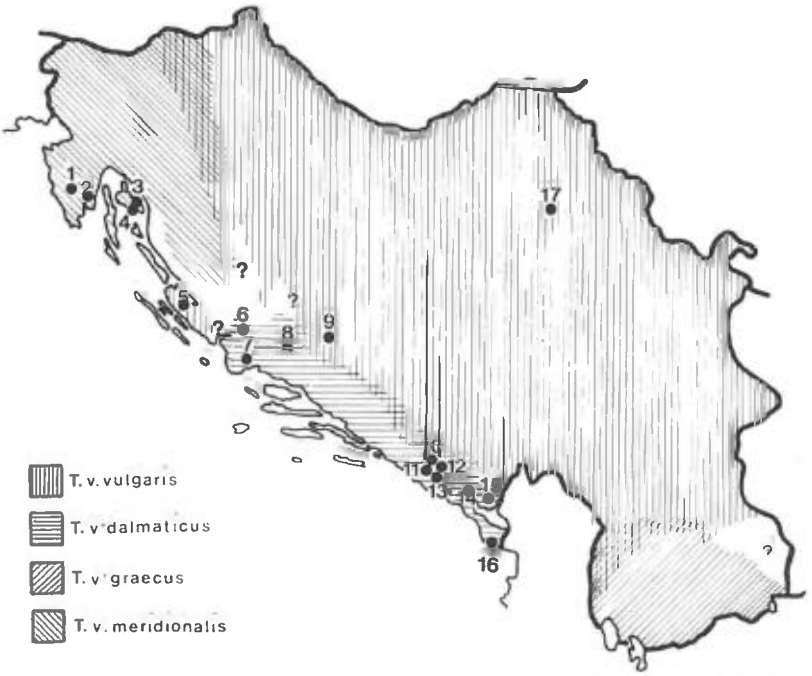

Figure 1. Map showing the distribution of the Smooth Newt taxa in Yugoslavia and the location of paedomorphic populations. For location designations see Table 1.

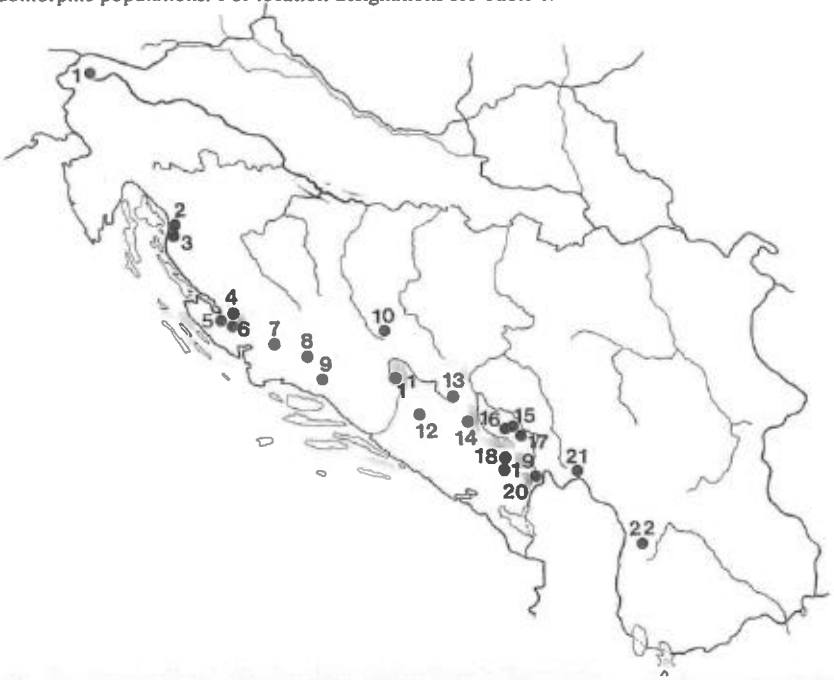

Figure 2. Map showing the distribution of the Alpine Newt in Yugoslavia, and the location of paedomorphic populations. For location designations see Table 2.

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Our colleagues Ana Travizi, Zvonimir Frąnolic and Dragan Cobic kindly gave us access to their unpublished data on newt paedomorphosis in Yugoslavia.

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CAPTIVE BREEDING OF *VIPERA URSINII URSINII (REPTILIA, VIPERIDAE)*

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INTRODUCTION

Vipera ursinii, a reptile found, especially in western Europe, in widely separated locations, is now in serious danger of extinction, and for this reason is included in CITES Appendix I (EEC regulation no. 3143/887, Commission of 19 October 1987). The decline of *V. ursinii* can be ascribed to different causes according to the distribution.

Numbers of *V. u. anatolica* are decreasing for reasons which have not yet been established (Honegger, 1978; Dodd, 1987); *V. u. rakosiensis* is in diminution in particular because of the destruction of the habitat and deliberate killing (Honegger, 1978 & 1981; Dodd, 1987); *V. u. renardi* for the progressive alteration or destruction of the habitat (borders of the Steppe and Steppe-forest) (Honegger, 1978 & 1981; Dodd, 1987; Kotenko, 1989); *V. u. ursinii* is affected by various factors (alteration of the habitat, capture and deliberate killing (Honegger, 1978 & 1981; Groombridge 1982; Dodd, 1987); and *V. u. wettsteini* suffers from the same combination of factors as *V. u. ursinii* (Honegger, 1978; Dodd, 1987).

Moreover, the very population structure characteristic of *V. ursinii* renders this reptile more susceptible to a further serious decline in numbers, above all in more western areas, such as the Gran Sasso d'Italia. The same is true for other small populations of European vipers which occupy areas at the borders of their territory, whether in terms of altitude or geographical distribution. For all the reasons given here, the capture of *V. ursinii* where no valid scientific reasons exist, is strongly to be discouraged.

CONDITIONS OF ACCLIMATIZATION

Although the literature on the subject states that the breeding of *V. ursinii* in captivity is extremely difficult (Bruno & Maugeri, 1976; Bruno, 1984), I have been able to show that this species will reproduce habitually in captivity as long as certain precise conditions are fulfilled:

- the specimens must be captured gently, preferably by being lifted by the tail.

- the specimens kept for breeding must be allowed to spend a period of at least 75-80 days in hibernation. It is not necessary to allow the reptiles an enormous amount of space, but it is essential to provide them with a habitat similar to that to which they are used in the wild; one, that is, which offers them a large number of hiding-places in which to take refuge at the first sign of danger.

The soil temperature should vary, according to the sector, from a minimum of 22°C to a maximum of about 30°C. The degree of humidity must be kept at around 78-84% (while I have found it possible to obtain mating and reproduction of *V. berus* with a level of humidity around 80-95%. An incandescent 60 watt lamp, turned on for between four and six hours a day, is sufficient for the heating. As far as lighting is concerned, white fluorescent 30 watt lamps, turned on for at least 8 hours a day, are needed. In my experiments I used conditions of 12 hours of light and 12 of darkness.

Since *V. ursinii* needs a considerable amount of cooling (reflecting the wide diurnal range of temperature in its habitat), it is worth lowering the nocturnal temperature to 12-16°C. In these conditions *V. ursinii* limits its activity to the daylight hours, retiring to its lair during the night. What is more, it exhibits trophically competitive behaviour less frequently, and less intensely, than *V. aspis, V. ammodytes* or *V. berus.*

It was later possible to feed the young vipers with newly metamorphosed frogs, small lizards and even with pieces of beef. The young vipers, like the adults under observation, tend to keep the prey in their mouths for a few minutes, whether it is fed to them alive or dead.

Plate 1. Adult *Vipera ursinii ursinii* photographed in sub-alpine sheep pasture, Abruzzo Italy, on 14th May, when much of the surrounding grassland was still covered by extensive patches of snow.

Photo: John Pickett

Plate 2. Adult female *Vipera ursinii ursinii* photographed in the wild basking at the edge of a dwarf Juniper bush *(Juniperus nana)* in montane grassland (approx. 1800m altitude), Abruzzo, Italy.

Photo: John Pickett

Plate 3. General view of sub-alpine habitat of *Vipera ursinii ursinii* in which female shown in Plate 2 was photographed. The vipers are abundant throughout this area of rolling grassland.

Photo: John Pickett

Plate 4. Mountain ridge inhabited by *Vipera u. ursinii* in Abruzzo, Italy. Altitude approx. 1800-2000 m.

Photo: John Pickett

OBSERVATIONS ON THE ADULTS

The adults that I kept in captivity all showed a watchful and irritable pattern of behaviour, even as long as two years after capture.

1 male and 2 females which I have kept since 26 April 1987 have reproduced twice to date (in both cases the same female gave birth, to 4 young on 15 August 1988, and to two, one dead and one alive, on 23 August 1989) while feeding in the meantime on live and dead prey. This consisted of rodents; newborn or recently weaned hamsters: and newborn rats, which proved to be the favourite food of these vipers in captivity (74% of the total food weight swallowed in two years of study). Large apterous *Orthoptera* were also popular (18%), above all in certain periods. The reasons behind the fluctuations in feeding preference are not clear, given the fact that the experimental conditions in which the vipers were kept did not vary in time. Lizards were occasionally swallowed (7.2%), frogs only on very rare occasions, and never when administered live to the vipers (0.8%).

In general, the females showed more willingness to accept prey of large dimensions than the males; this trait may well be characteristic of the species in the natural state, given that I have often come across cases of females preying on small mammals *(Microtus)*, while I have never observed the same phenomenon in males (Luiselli, in prep.).

I have only been able to observe mating on two occasions, first on 27 May 1988, then on 3 June 1989. In each case, both the courtship and the fertilization took place in the day, with behaviour similar to that of *V. berus*.

The growth of the animals was estimated by measuring at average intervals of 7 days, both the total length and the body weight. Figure 2 shows the progress in growth of the male and two females under observation. During the period in which the animals were kept active – from March to November of each year – the snakes each sloughed three times (at the end of May, June and July).

In the natural state, the sloughing cycle seems to be different, and growth on average to be slower (Luiselli, in prep.).

It must be remembered that each individual received an annual supply of food equal to about 300% of its initial body weight, and that in general the largest prey supplied weighed about 15% of the body weight of the snakes.

In the natural state, the yearly growth of this species is probably less.

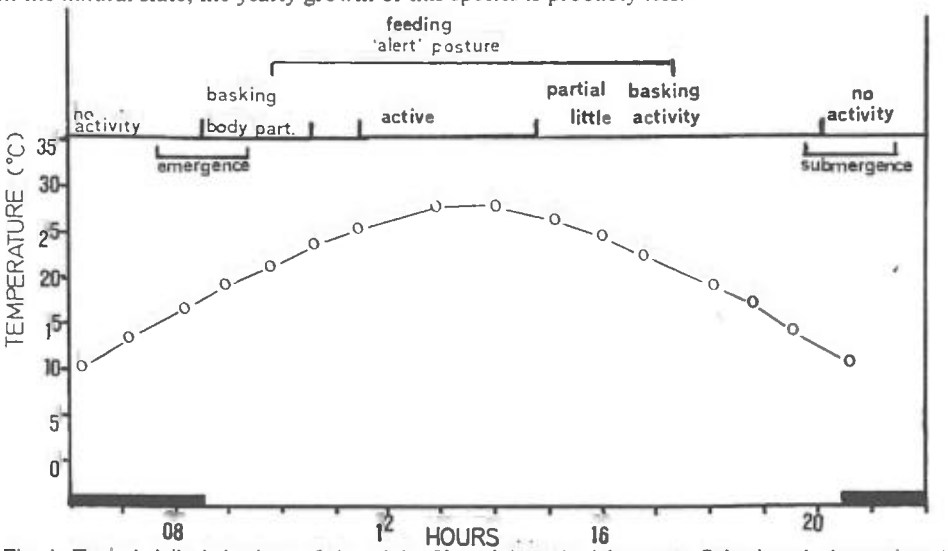

Fig. 1. Typical daily behaviour of the adults *V. ursinii* in the laboratory. Behavioural observations in the laboratory (data from 98 days) are shown with ambient air temperatures. Laboratory light period from 08.30 to 20.30. (As far as the symbols of the graph are concerned, these are derived from SPELLERBERG & PHELPS, 1977, though modified).

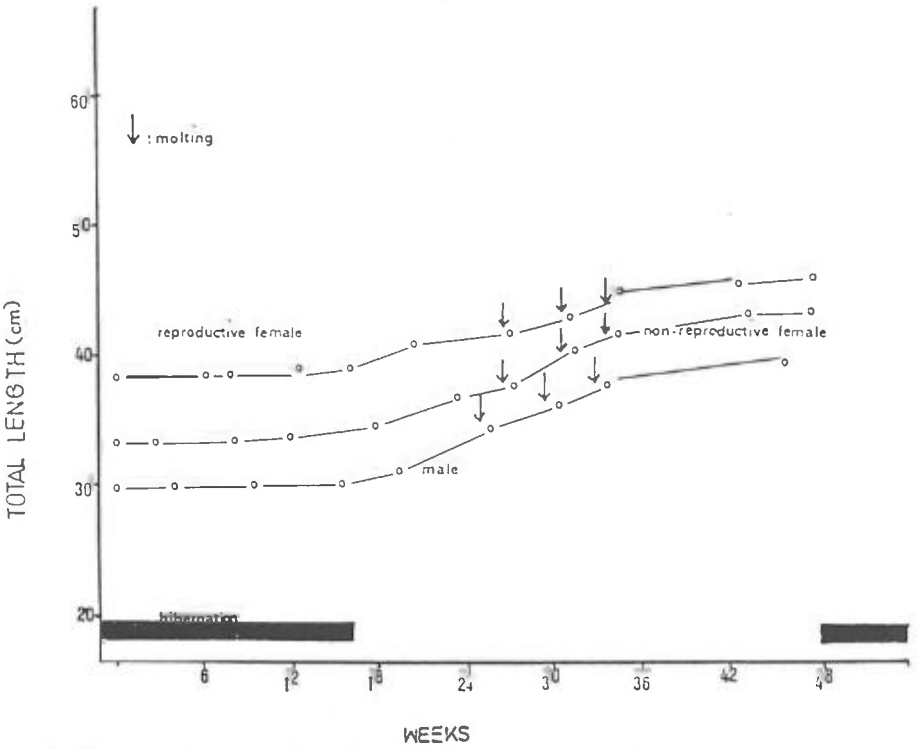

Fig. 2. The rate of growth and the sloughing periods of the adult *V. ursinii*, over a period of a year spent in captivity. The period of observation begins on 1 November 1988, and the numbers which follow are in relation to that date.

The graph shows a period of minimal growth (during hibernation) followed by one of maximal growth (from the end of hibernation to around the end of July (last sloughing of the year) and one of moderate growth (from August to October).

FEEDING AND GROWTH OF THE YOUNG

Newborn and young of *V. ursinii* in their first two years of life are extremely delicate and difficult to keep.

In the first place, none of the 5 young that I kept (4 born in August 1988 and 1 in the same month of the next year) began to feed spontaneously before the fifth week; two began to do so between the 6th and 7th week, and two more in the tenth week. One young viper, despite force-feeding, never learnt to eat unaided, and died at the age of 96 days.

Moreover, even when the young begin to feed themselves, they will only accept certain types of foods, and stubbornly refuse all others.

In the first year of life, the young vipers would only accept certain kinds of grasshopper, above all those belonging to the *Podismidae* and *Tettigonidae* families, and the species belonging to the genera of *Epipodisma, Halopodisma, Tettigoria, Phaneroptera, Decticus, Ephippigger* and *Troglophilus* were normally accepted without trouble. Members of the *Gryllidae*, such as *Acheta domesticus*, were normally refused, and accepted by one exceptionally active and voracious individual only.

Individuals of *Grillomorpha dalmatina* were occasionally accepted after the 8th week of life; other *Gryllidae* were devoured now and then after the 12th week, and with greater regularity between the 16th and 28th weeks. The young vipers particularly appreciated other types of food (pieces of newborn rodents) after the 13th week, but above all from the 30th week on, so that these eventually made up the basic element of the whole diet.

Plate 5. Detail of spurs of ridge shown in Plate 3 (above). Note the dwarf prostrate Junipers *(Juniperus nana)* characteristic of the habitat of this viper in its high-altitude populations in Europe.

Photo: John Pickett

THERMOREGULATORY BEHAVIOUR AND SLOUGHING CYCLE

Three cycles of thermoregulatory behaviour, a daily cycle, a feeding cycle and a sloughing cycle, are observable in the young, as in the young *Coronella austriaca* studied by Spellerberg (1977).

The daily behaviour usually follows the cycle of hours of light and hours of darkness: shortly after the lights are turned on, the young vipers come out of their hiding-places and thermoregulate under the lamp, positioning their bodies according to their thermal requirements. Like the young *V. berus* they are able from birth to flatten their trunks in a dorso-ventral direction, taking up a typically 'ribbon-like' position.

The daily period of basking lasts for a considerably longer time if digestion is taking place in the snake, or during the sloughing cycle. This lasts on average for 7-9 days, from the moment in which the ventral parts begin to become discoloured, to the moment of shedding; the eye usually becomes opaque 3-5 days after the first phase, and remains in this condition for 1-2 days. Finally the eye recovers its normal appearance, and the viper prepares to slough. Though they move very little, and only when disturbed, during the sloughing cycle, the young *V. ursinii*, like the adults, usually continue to feed. This kind of behaviour is fairly exceptional among European vipers, as is that of the females which, both in the natural state and in captivity, feed frequently even in the advanced stages of pregnancy.

Here it is worth mentioning that only 7 days before giving birth, the female in my possession killed and swallowed a hamster weighing 8 g.

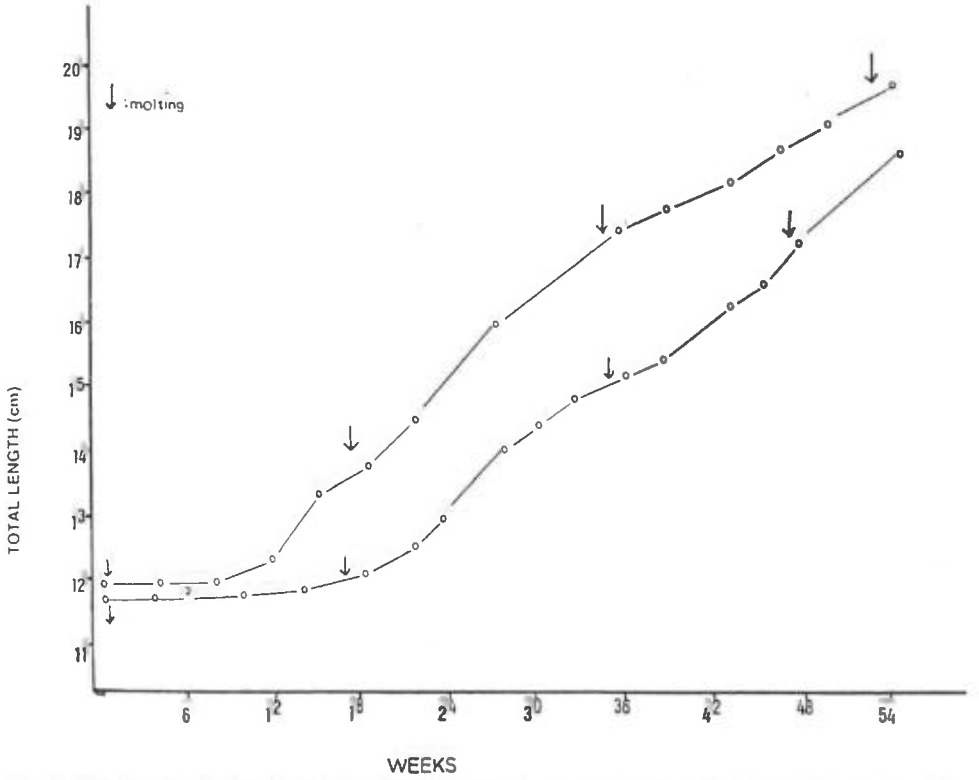

Fig. 3. The increase in length and the sloughing periods of two young snakes from birth to the 54th week of life. It can be seen that for the whole year of the study, the young vipers were not allowed to hibernate. The graph shows an initial phase in which the young vipers show only very limited growth, and a later phase characterized by rapid growth.

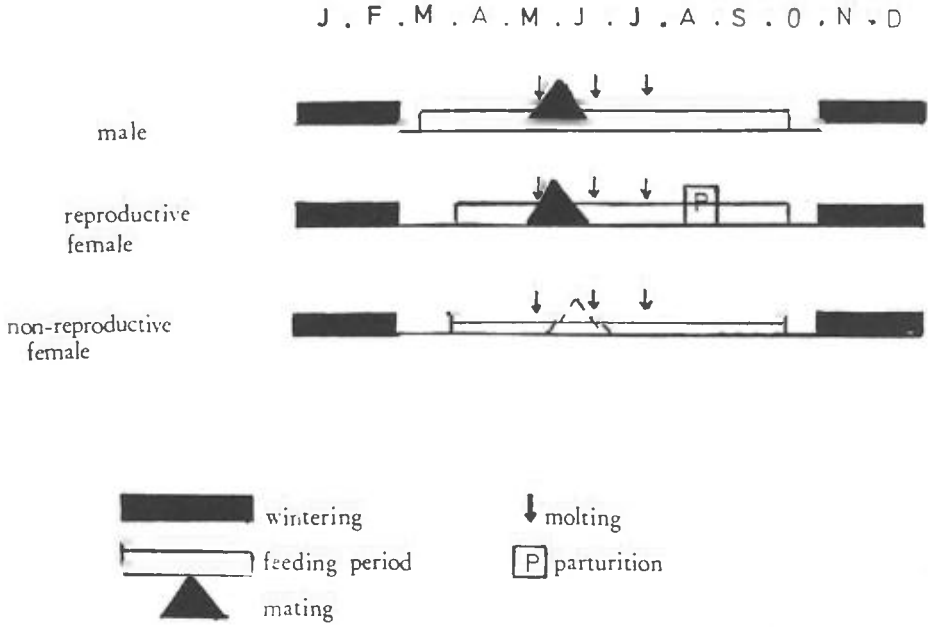

Fig. 4. Representation of the annual activity cycle for *Vipera ursinii ursinii* in experimental captive conditions (as far as the symbols are concerned, these are derived from Saint-Girons, Duguy & Naulleau, 1989, though modified).

GROWTH

The growth of the young is characterized by two clearly distinct stages:

a) a first stage (from birth to somewhere around the 6th-10th week) in which no significant increase in length can be noted, while a loss of weight of about 0.2-0.6 g (the original average birth weight of the young is 2.1-2.3 g) can be measured.

b) a second phase in which the vipers begin to gain weight and to increase in length as a result of beginning to feed. In this stage, the speed of their growth depends essentially on the frequency with which they feed.

CONCLUSIONS

It seems, therefore, that *V. ursinii*, though it cannot be compared with species such as *V. ammodytes*, is nevertheless capable of adapting to life in captivity, and can even be bred in captivity as long as a few precise rules are followed which take the animal's particular physiology into account. On the basis of my observastions, I believe it would be possible to set up a large-scale plan for the reproduction in captivity of this rare species of viper, with the aim (1) of reintroducing the reptiles into areas in which their population is seriously threatened with extinction, and (2) of studying in more detail the habits and the biology of this extremely interesting snake.

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NOTES ON THE HERPETOFAUNA OF ASTIPALAIA ISLAND (DODECANESE, GREECE)

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Amphibians and Reptiles of the Aegean Islands are far from being well known, although several researches have been carried out on these vertebrates during the past two decades (e.g. Pieper, 1970; Gruber and Schultze-Westrum, 1971; Lieftinck, 1974; Gruber and Fuchs, 1977; Broggi, 1978; Frör and Beutler, 1978; Beutler, 1979; Beutler and Frör, 1980; Schneider, 1983; Grillitsch and Tiedemann, 1984; Cattaneo, 1989).

In particular, some major biogeographic and faunistic questions still exist for a number of Aegean Islands in which only partial researches, if some, were carried out. This is also the case of Astipálaia Island, which is one of the less well known Aegean Islands as far as the herpetofauna is concerned. The only contributions in which data on the herpetofauna of this island are quoted are those by Zavattari (1929), Wettstein (1937, 1953), and Beutler and Gruber (1977). Things being as they are, we were stimulated to study the Amphibian and Reptile fauna of this island. Our researches were carried out in September 1988 and in June and August 1990.

Astipàlaia Island lies between 36° 31' and 36° 39' N and 26° 14' and 26° 30' long. E. Although it is administratively assigned to the Dodecanese Archipelago, this island belongs geographically to the Cyclades Archipelago (Fig. 1).

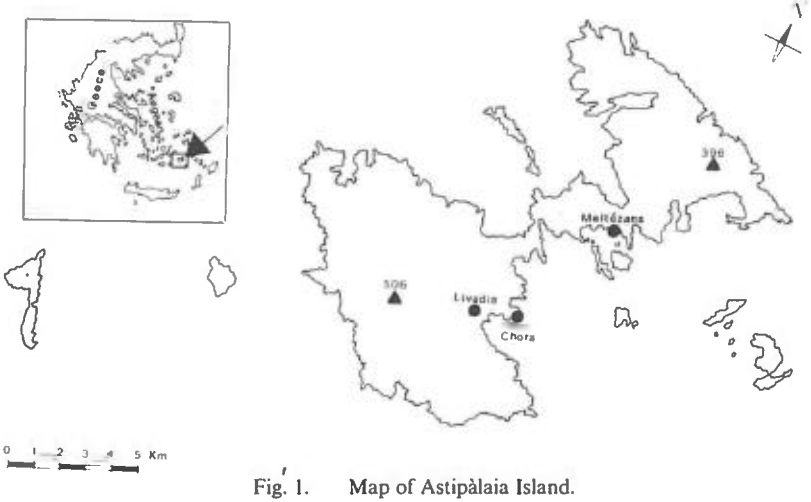

Fig. 1. Map of Astipàlaia Island.

The annual rainfall is relatively low (about 500 mm, according to Martelli, 1913a, b), but in some valleys springs and perennial streams exist. The vegetation is characterized by garigue with spiny shrubs (Plate 1). According to Beguinot and Vaccari (1912) and Martelli (1913b), the most important and widespread botanical species are: *Poterium spinosum, Juniperus phoenicea, Euphorbia dendroides, Pistacia lentiscus, Genista acanthoclados, Calycotome villosa, Ramnus oleoides, Salvia triloba, Brassica adpressa.*

During our researches we have found one species of Amphibian *(Rana ridibunda)* and three terrestrial species of Reptiles *(Hemidactylus turcicus, Cyrtodactylus kotschyi, Podarcis erhardii).*

Plate 1. Garigue and spiny shrub vegetation on the western side of Astipálaia Island (photo by F.M. Angelici).

Plate 2. A typical nesting site of *Caretta caretta* in a beach of Astipàlaia Island (photo by F. Riga).

Two other Reptiles, *Caretta caretta* and *Chelonia mydas,* occur in the marine area of Astipálaia and probably reproduce on the beaches of this island and of some minor satellite islets (Plate 2). Despite our investigations, we were never able to find the lacertid lizard *Ophisops elegans,* which was quoted for the island by Zavattari (1929), though it was not collected by other authors afterwards. Moreover, in our study no snake species were recorded, to further confirm the observations of the preceding authors.

Rana ridibunda occurs only in two streamlets sited on the western side of the island. In both these sites tadpoles (in June and in August), as well as adults, were observed. The species was already quoted for Astipálaia by Lanza and Vanni (1988). *Podarcis erhardii* is widespread and numerically abundant on the island, occurring in anthropized areas as well as in natural biotopes. As to the Gekkonids, *Hemidactylus turcicus* was observed and collected only in the vicinities of human buildings, while *Cyrtodactylus kotschyi* was observed in several localities either on delapidated walls and buildings or in rocky areas.

The occurrence of the two sea turtle species would suggest the preservation of the island's natural environments, especially the coastal ones.

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THE HERPETOFAUNA OF LEROS (DODECANESE, S.E. AEGEAN)

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INTRODUCTION

A period of two weeks, commencing 10th May 1990, was spent investigating the herpetofauna on the Greek island of Leros. Situated between Patmos, Lipsi and Kalymnos, in the Dodecanese island group of the southeast Aegean, the island lies some 33km off the mainland of Turkey.

Leors, with an area of 52.1 km^2 and a population of 6910, is covered by a series of rocky hills, the highest point being 320 metres. The vegetation consists mainly of *Phrygana,* with *Euphorbia acanthothamnos* prominent on the hillsides, and wooded areas of Pine and Oak. Though possessing a green and fertile appearance with cultivated fields, olive groves, vineyards and orchards around the villages, water on the island is mostly limited to seasonal streams and gullies, with a few small areas of remnant coastal marsh. Due to sea breezes the climate of the islands is more moderate than on the nearby southern mainland; mid day temperatures during my stay averaging 25°C, every day being clear and sunny. The previous winter's rainfall had been very poor and all water courses investigated were found to be totally dry. Based at Alinda, it proved possible to explore much of the island by foot during the time available.

At present, tourism remains relatively limited and has had little effect on the island's natural beauty, though there is great potential for its future development. However, this is unlikely to be of much significance, 'package tourism' being concentrated on the larger islands, i.e. Kos and Rhodes, with international airports.

The herpetofauna of the southeast Aegean islands has attracted a reasonable amount of attention, though much of the recording has been of a somewhat incidental nature. Further, more thorough, investigation of the individual islands is warranted, as is indicated by the continuing discovery of hithertoo unrecorded taxa, a particularly well documented example (e.g. Tiedemann & Grillitsch 1986) being that of the Ottoman viper, *Vipera xanthina.* Unknown outside of Asia Minor a little over twenty years ago, recent reports have since revealed its presence on most of the islands in the southeast Aegean.

In order to present as complete an account of the Leros herpetofauna as is currently possible, the following article, as well as reporting my own findings, relies heavily on information supplied (pers. comm. 1990) by Achilles Dimitropoulos and Richard Clark. During 1986 to 1988 Dimitropoulos made several visits to the island. Clark spent a week on Leros in April 1966. I am indebted to both for their cooperation and assistance with the following account.

After being photographed all captured animals were released where found. The localities mentioned in the text are shown in Fig. 1.

SPECIES LIST

BUFONIDAE

Bufo viridis Laurenti 1768

The only amphibian recorded on the island, found by Clark (pers. comm. 1990) in a marshy area near Gourna bay. Though not found by the author, local people seemed quite familiar with this species.

TESTUDINIDAE

Testudo graeca ibera Pallas 1814

Has been found at Temenia (Dimitropoulos pers. comm. 1990), possibly introduced to the island. Interestingly, a local near Ag. Irini informed me that "there used to be tortoises here many years ago, but not now". Known only from Kos in the southeast Aegean islands, occurring more frequently on islands of the northern Aegean (Ondrias 1968).

GEKKONIDAE

Hemidactylus turcicus (Linnaeus 1758)

Has been found by Dimitropoulos (1987, pers. comm. 1990) inside houses at Lakki. Also clearly described to me by locals as occurring in Alinda.

AGAMIDAE

Agama stellio (Linnaeus 1758)

Though very timid, the most conspicuous reptile on the island, found to be common and widespread. With the exception of a single pair it was only seen individually, and not in colonies as reported by Clark & Clark (1973) and Bowles (1989) during April in Turkey and Cyprus respectively. Inhabitated stone walls, buildings, large rocks, rockpiles, cliffsides; occasionally seen on tree trunks and rubbish dumps. Referred to in some recent literature as *Stellio stellio.*

FIGURE 1

KEY – 1 Alinda, 2 Ag. Isidoros, 3 Kokkali, 4 Ag. Irini, 5 Koulouki, 5 Lakki, 7 Temenia, 8 Akr. Despoti, 9 Lepida, 10 Xerocampos.

LACERTIDAE

Ophisops elegans ehrenbergii (Wiegmann 1835)

Found to be widespread and fairly common, though not occurring anywhere in great numbers, an average of seven specimens being seen each day. Three typical adult males captured averaged 46mm snout-vent, 132mm total length.

SCINCIDAE

Ablepharus kitaibelii Bibron & Bory 1833

A single adult found active during late afternoon near Ag. Irini on shady bank of a hillside terraced field with oak trees and bushes. Not previously recorded on Leros (Chondropoulos 1986).

AMPHISBAENIDAE

Blanus strauchi (Bedriaga 1884)

Adult of a dull purplish colouration, 16cm total length, found in same area as *A. kitaibelii* when heard moving at 16.30 hours through layer of fallen oak leaves and dry humus. A further, similar specimen found under large rock in dead vegetation below trees on hillside at Alinda. Complete sloughed skin found in rock scree on open, scrub covered hillside at Akr. Despoti. Not previously recorded on Leros, elsewhere in Greece known only from the islands of Rhodes, Kos (Ondrias 1968), Kastellorizo (Valakos & Papapanagiotou 1985) and Samos (Dimitropoulos pers. comm. 1990).

BOIDAE

Eryx jaculus turcicus (Olivier 1801)

Has recently been collected at Lakki; in the Dodecanese also known from Kos and Kalymnos (Chondropoulos 1989).

COLUBRIDAE

Coluber jugularis jugularis (Linnaeus 1758)

Adult of 135cm approx. caught in a cut wheat field at Kokkali. Shiny black with continuous, brownish red, fine striping running through body scales, venter red, throat and side of head brownish red. A further five adults, all appearing basically black in colour, briefly seen; two in olive groves at Xerocampos, single specimens in a garden at Alinda, a roadside ditch at Koulouki and a grassy slope between Lakki and Lepida. All rapidly escaped into large bushes and bramble growth. An appraisal of the various forms within the species has recently been given by Clark (1990).

Coluber najadum dahli Schinz 1883

Five adults, a dead specimen and two sloughs found in the Alinda and Gourna bay areas, all appeared typical of the subspecies. A melanistic form, *C. n. kalymnensis*, has been found on the neighbouring island of Kalymnos (Schneider 1979, 1983).

Coluber nummifer Reuss 1834

A single adult seen, killed by local on hillside at Alindas. Dimitropoulos (pers. comm. 1990) has found this snake to be not uncommon and widespread on Leros, even occurring on several of the surrounding small islets; described as variable, ranging from almost uniform grey to boldly marked with black blotches. Bites from this species and the closely related *C. ravergieri* (see Steehouder 1990) have resulted in painful swelling and discolouration.

Eirenis modestus modestus (Martin 1838)

Three of these docile little snakes of 22, 25 and 42cm total length, plus one DOR and a slough, found under large rocks on hillsides around Alinda. Uniform light brown with black markings, obscure on larger specimen, on head and neck. First reported from Leros by Pieper (1970) at Xerocampos. Present in two forms, either uniform or spotted (var. semimaculata), on several of the eastern Aegean islands.

Natrix natrix persa (Pallas 1814)

Found by Clark (1968, pers. comm. 1990) to be common in a small marshy area near Gourna. This species has adapted well to dry, barren conditions on central Aegean islands, preying mainly on lizards and geckoes (Gruber & Fuchs 1977). An individual caught by Clark disgorged a *Bufo viridis* and as yet there is no evidence to support a similar dietary adaptation for this snake on Leros.

VIPERIDAE

Vipera xanthina (Gray 1849)

Despite thorough searching only two dead specimens were seen; a large male of almost 90cm decapitated at Koulouki and a young male killed at Alinda. On a rocky hillside at Alinda, with dry stone walls, olive trees and thick bushes, eight had been killed by a local hotelier in the previous eighteen months. During an evening search of this same hillside a snake, almost certainly this species, was heard rapidly retreating through vegetation into a dry stone wall at 22.30 hours, but not seen. Secretive and almost entirely nocturnal in summer, Dimitropoulos (1987, pers. comm. 1990) has found this viper to be fairly widespread on the island, being especially common around Ag. Isidoros and Alinda.

DISCUSSION

With the inclusion of *Ablepharus kitaibelii* and *Blanus strauchi*, recorded on the island for the first time, a total of thirteen reptile and one amphibian species are now known to occur on Leros.

In common with other Dodecanese islands, no endemic species occur (Beutler 1979) and all are to be found in adjacent Asia Minor. The strong eastern influence on the island's herpetofauna is demonstrated by the presence of *Blanus strauchi, Coluber nummifer, Eirenis modestus* and *Vipera xanthina*. The most prevalent species are *Agama stellio* and, the only lacertid lizard to be found on the island, *Ophisops elegans*. Snakes are particularly well represented with seven species present, most evident being the diurnally active *Coluber* species. Due to its fossorial lifestyle *Eryx jaculus*, like *B. strauchi*, is not easily found, though *Eirenis modestus* and *Vipera xanthina* are probably more abundant than they may appear. The sparsity of freshwater habitats, particularly during the dry summer months, is significant for species such as the single amphibian, *Bufo viridis*, and for *Natrix natrix*, neither of which could be found by the author. *Hemidactylus turcicus* is almost certain to be more numerous than is presently indicated, though the status of *Testudo graeca* on Leors would appear to be uncertain.

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NEW RECORDS AND COMMENTS ON BRITISH PLEISTOCENE COLD-STAGE AMPHIBIANS AND REPTILES

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INTRODUCTION

Several publications on British Pleistocene interglacial amphibians and reptiles have appeared recently (*see* Holman, 1985, 1987, 1989: Hallock et al., 1990; Holman et al., 1990; and references within these papers); but there have been no new reports on cold-stage amphibians and reptiles since those briefly listed by Stuart (1982). The present report deals with new records of herpetological remains from a Wolstonian and a Devensian site, as well as comments on the distribution and abundance of cold-stage amphibians and reptiles in the Pleistocene of Britain.

WOLSTONIAN COLD-STAGE

The Wolstonian is the first cold-stage of the late Pleistocene in Britain and has recently been discussed in Stuart (1982). The Wolstonian cold-stage is followed by the Ipswichian interglacial stage.

Tornewton Cave, Torbryan, Devonshire — This site was detailed by Sutcliffe and Zeuner (1962) and has recently been discussed by Stuart (1982). The lowest stratum in Tornewton Cave has been designated the Glutton Stratum (diagram modified from Sutcliffe and Zeuner, 1962, in Stuart, 1982, Fig. 7.11) and has yielded arctic mammals. The immediately overlying Bear Stratum has a similar fauna. Both the Glutton and the Bear Strata are considered to represent the Wolstonian cold-stage, as amongst other evidences, they lie directly beneath the Hyaena Stratum which contains a typical Ipswichian fauna, "Frogs and/or toads" have been recorded amongst the small vertebrate remains of the Glutton and the Bear Strata (Stuart, 1982).

Rana temporaria Linnaeus
Material — Left ilium (Natural History Museum London, BM(NH) R-8972).

Remarks — In 1984 I was able to study the above material through the kindness of Dr. Angela Milner and Ms Sandra Chapman of the Natural History Museum, London. The ilium is from what I believe to be the Wolstonian portion of the Tornewton Cave strata. The ilium is identified as *Rana temporaria* based on the fact that it has its dorsal ilial blade (vexillum) low and indistinct from the shaft (ala) throughout about the posterior two-thirds of its length (see Holman, 1987, Fig. 2). This distinguishes it from other species of British and European *Rana* as well as from all of the North American species that I have been able to examine. *Rana temporaria* and *Lacerta vivipara* have the most northerly distributions of any of the modern British herpetofauna, and both species occur within the arctic circle today (Arnold and Burton, 1978, maps 36 and 70).

DEVENSIAN COLD-STAGE

The Devensian is the last cold stage of the British late Pleistocene and has recently been discussed by Stuart (1982). It is mainly equivalent to the Wisconsinan glacial stage of North America and is thought to have lasted for about 100,000 years. The Devensian cold-stage is preceeded by the Ipswichian interglacial stage and is followed by the Flandrian = North American Holocene) interglacial stage.

Shropham D Pocket, Norfolk — The greater Shropham site contains fossiliferous beds of both Ipswichian and Devensian age (Holman and Clayden, 1990). These fossiliferous beds occur in the Minn's Aggregates Company Pit near Shropham, Norfolk. (TM 005938). The

stratigraphy from the bottom to the top of the area where the Ipswichian herpetofauna was collected (Holman and Clayden, 1990) consist of (1) an undetermined thickness of Cretaceous chalk, (2) a chalky, pebbly gravel about 1 m thick, (3) a fossiliferous detritus mud containing typical Ipswichian mammals (including *Hippopotamus amphibius*) that ranges from approximately 1 to 5 m thick, and (4) Devensian gravels and muds at the top of the site that have yielded bear, wolf, woolly rhino, bison, red deer, reindeer, and mammoth.

A detrital pocket within the Devensian stratum yielded a cache of anuran bones that were collected by Martin R. Warren of the Cromer Museum, Norfolk, on May 22, 1985. These bones are the basis of the records below.

Rana temporaria Linnaeus
Material – One left and two right ilia (Cromer Museum Nos. CMSH-D-1-3) collected by Martin R. Warren May 22, 1985.

Remarks — These ilia represent one large adult and two smaller adult Common Frogs. The ilia, all nearly complete specimens, were identified on the basis of the same criteria used to identify the Tornewton Cave *Rana temporaria* in the section above.

Rana sp. indet.
Material — Four left and five right fragmentary ilia (Cromer Museum Nos. CMSH-D-4-12). Two fragmentary scapulae and a distal portion of a humerus (Cromer Museum Nos. CMSH-D-13-15).

Remarks — The above fragmentary ilia are identified as *Rana* in that they all have an ilial blade (vexillum). The fragmentary scapulae and the distal portion of the humerus are identified as *Rana* based on characters discussed in Hallock et al. (1990, *see* Figs. 3 and 4). Several other fragmentary anuran bones from the Shrophan D pocket are not assigned to genus. It seems probable that all of these anuran bones represent the Common Frog, *R. temporaria*.

TABLE 1: Occurrences of British Pleistocene cold-stage herpetofauna

ANGLIAN	
Halls Pits, Oxfordshire	Stuart (1982)
Bufo sp. and/or *Rana* sp.	
WOLSTONIAN	
Waterhall Farm, Hertfordshire	Stuart (1982)
Bufo sp. and/or *Rana* sp.	
Tornewton Cave, Devonshire	(this paper)
Bufo sp. and/or *Rana* sp.	
Rana temporaria	
DEVENSIAN	
Coston, Norfolk	Stuart (1982)
Bufo sp. and/or *Rana* sp.	
Nazeing, Essex	Stuart (1982)
Bufo sp.	
Rana sp.	
Lacerta vivipara	
Shropham D, Norfolk	(this paper)
Rana sp.	
Rana temporaria	
Upton Warren, Worcestershire	Stuart (1982)
Rana temporaria	
Wilmen's Pit, Middlesex	Stuart (1982)
"Amphibians"	

COMMENTS

The known amphibians and reptiles of the British Pleistocene cold-stages represent a strikingly depauperate herpetofauna. Only *Rana temporaria* and *Lacerta vivipara* have been specifically identified (Table 1), and the combined list from all of the British Pleistocene cold-stage sites consists only of the following forms:

Bufo sp. and/or *Rana* sp.
Bufo sp. indet.
Rana sp. indet.
Rana temporaria
Lacerta vivipara

The Nazeing, Essex, Devensian site (Stuart, 1982) has yielded the largest known cold-stage herpetofauna, yet this consists of only three forms: *Bufo* sp., *Rana* sp. and *Lacerta vivipara*. In striking contrast is the Cudmore Grove Hoxnian interglacial herpetofauna (Holman et al., 1990) that yielded 14 species of amphibians and reptiles including four exotic continental forms.

The two forms that are specifically identified from British Pleistocene cold-stage sites, *Rana temporaria* and *Lacerta vivipara*, have the most northerly distributions of any modern British herpetological species, and both occur well within the arctic circle today (Arnold and Burton, 1978, maps 36 and 70). It would be a parsimonious assumption that the material from British cold-stage Pleistocene sites identified as *Bufo* sp. represents *B. bufo* (also a northerly distributed species) rather than *B. calamita* or *B. viridis*; but this has not yet been substantiated by comparisons with series of modern skeletons.

In summary, the British Pleistocene cold-stages are represented by only three genera, *Bufo*, *Rana*, and *Lacerta* amongst which only the species *Rana temporaria* and *Lacerta vivipara* have been identified. Both of these represent the most cold-tolerant modern species that occur in Britain today.

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THE *ASPIDERETES NIGRICANS* MYSTERY

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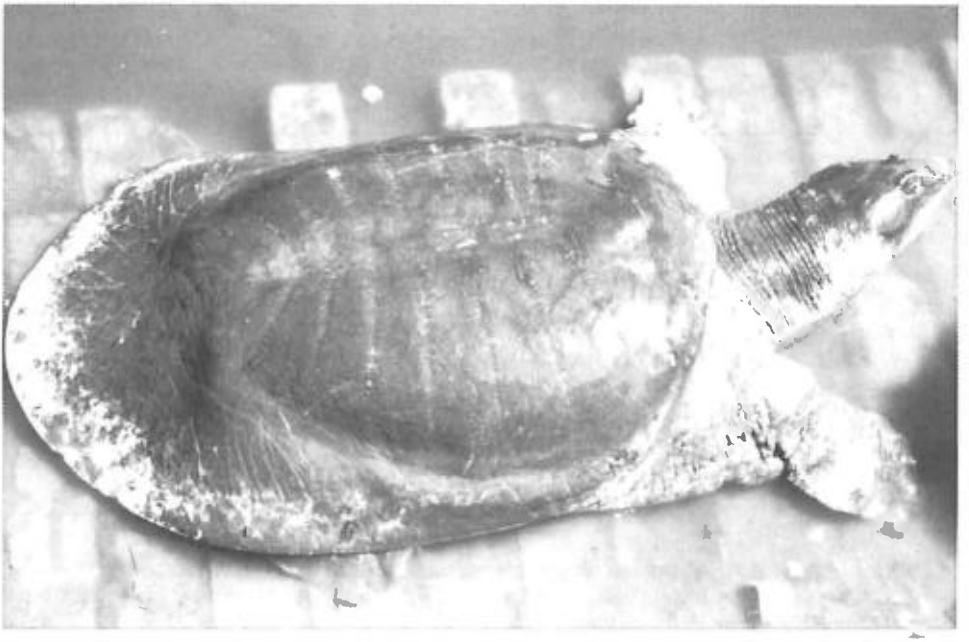
The Bostami or Black-mud Turtle, *Aspideretes nigricans* is known to occur in semi-captive condition at the pond of the shrine of Hazrat Bayazid Bostami in Chittagong, Bangladesh (Smith 1931). Later Khan (1982) mentioned it to be endemic to Bangladesh. During a recent visit to that pond on 23 February 1990, along with Prof Edward Moll, we were able to observe two young, one of which was definitely *Apideretes hurum*. *A. nigricans* is not only confined to the shrine pond but is also found in the adjacent ditches (Ahsan & Saeed 1989).

As part of my doctoral thesis I am surveying the herpetofauna of Bangladesh, particularly chelonians. During my survey I have collected evidence of the occurence of *A. hurum* in the Karnaphuli river system (near Chittagong), hitherto unreported. Moreover, *A. hurum* has also been recorded from several parts of Chittagong. As far as the history is known, Bayazid Bostami (whose name has been given to these turtles) once came to Sind to meet his teacher Abu Ali Sindhi, on which occasion he might have visited Chittagong (Huda 1985). If so, he might have brought the turtles here with him, in which case the species might be present in Iran, Sind or some other place from which he collected it. But there is no record of the turtles occurring anywhere except in Chittagong around the Bayazid Bostami pond.



Aspideretes nigricans, adult. Bayazid Bostami pond.

It therefore seems quite evident that these turtles might have been collected locally. In this case *Aspideretes hurum* might be the species, which after prolonged confinement in the pond as well as in-breeding has changed slightly into a new sub-species rather than a different species, *nigricans*. Khan (1987) assumed that *A. nigricans* might have evolved from *A. gangeticus*, which does not seem to be the case here. The presence of *A. hurum* young in the pond raises some confusion about the origin of the species *nigricans*. However, further studies on its taxonomy and distribution would shed some light on this mystery.

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LETTERS TO THE EDITORS

Dear Sirs,

Further comments on *Atheris*

I have read with interest the excellent article concerning the tree vipers, *Atheris,* by Catharine Pook, in Bulletin 31 (Pook, 1990). I should like to add some comments and correct a few minor errors in the article.

The opening paragraph describes *Atheris* as a "group of arboreal vipers". At present, the group contains two species *(Atheris superciliaris* and *Atheris hindii)* which are not arboreal; both are terrestrial (although *Atheris hindii* will climb into grass tufts). In fact, both these species were originally placed in the Palaearctic genus *Vipera.* Marx and Rabb (1965) transferred them to Atheris, on the basis of certain anatomical details. However, Brian Groombridge (as detailed in Broadley, 1983) considers both species not to be *Atheris,* and believes they may require the creation of two new, monotypic genera. I support this view; I am personally familiar with *Atheris hindii* and other members of the genus. Most species (as detailed by Pook) are broad headed, predominantly green, arboreal vipers, associated with evergreen forest. *Atheris hindii* and *Atheris superciliaris* are terrestrial, grey/brown snakes, without broad heads; *Atheris hindii* is associated with high altitude grassland and *A. superciliaris* with savanna flood-plain.

Pook states that *A. hispidus* is "the longest...of this group". Pitman (1973) mentions a specimen (a male) of 735 mm. However, he notes an *Atheris squamiger* of 780 mm (Pook also mentions this). From personal experience of both species, from the Kakamega forest in Kenya, I would think that *Atheris squamiger* is the larger species: I kept several that were in exces of 700 mm, and rarely saw any *Atheris hispida* larger than 500 mm.

I should like to expand on the ranges of various species mentioned in Pook's account. *Atheris desaixi* has so far been found in two areas in Kenya (see Spawls 1978): the forests of the northern Nyambeni range, at Igembe, and south-eastern Mt Kenya, at Chuka. Chuka was where Frank Desaix collected the first specimens. The Nyambeni range is a line of hills running north east – south west, on the north-east side of Mt Kenya. The two localities, Chuka and Igembe, are about 60 km apart, both in montane evergreen forest (for co-ordinates of these localities, see Spawls 1979). I suspect that at one time the distribution was continuous, and even today (although the forest in the area is disappearing) there are several areas in the region where I suspect the species may occur. Such areas have never been herpetologically explored, in particular the Itiene forest, which flanks the road leading north-west from Meru to Kangeta and Maua, and the forest south-west of Meru. The description of the species is in Ashe's (1968) paper. Incidentally, I personally would describe *Atheris desaixi* as a black and yellow snake, and I cannot recall seeing any with what I would call dark green scales. Morphologically, it resembles *Atheris squamiger,* and is probably derived from the same ancestral stock. During the so-called pluvial periods in the Quaternary, forest covered much of central and western Kenya; its subsequent retreat left various species isolated in forest "islands", on high ground, for example *Thrasops jacksoni* and *Naja melanoleuca (Spawls op. cit.).* I would like to search some of the forests on the eastern flank of the Abedare range and the eastern Mau: I suspect *Atheris* may occur there. In 1972 an unsolicited report was made to me of a Tree Viper from the Soit Ololol escarpment, north-west of the Masai Mara National Reserve, where *Atheris* have never been recorded.

The mountain range, Usambara, in north-west Tanzania, home of *Atheris ceratophorus,* has been mis-spelled. Incidentally, Rasmussen (1981) suggests that this attractive species, the only *Atheris* with horns, might have a wider distribution. In this context, it will be interesting to see what Don Broadley (herpetologist at the Natural History Museum in Bulawayo, Zimbabwe) and Kim Howell (biologist at the University of Dar-es-Salaam) have to say in their forthcoming annotated checklist of the reptiles of Tanzania.

Pook gives the range of *Atheris hindii* as "The Kinangop and Aberdare mountains, Kenya". This is original information, verbatim, from Loveridge (1957), repeated by Welch (1982). The syntax of this comment is a little confusing. The Kinangop is not a mountain range, but a plateau area and valley lying to the south-west of the Aberdare mountin range, about 500

m below the altitude of the Aberdare moorlands. It is not impossible that *Atheris hindii* occurs on the Kinangop but there are no definite records of this, and between the montane moorland on the summits of the Aberdares (where Atheris hindii is known to occur) and the Kinangop proper there lies a belt of montane forest/dwarf bamboo, which may act as a barrier. *Atheris hindii* has also been recorded on the moorlands above the forest line on Mt Kenya. Dr Hinde (for whom the species is named) sent the original specimen from Fort Hall (now Murang'a), from which Boulenger stated it originated. However, this is most doubtful; Murang'a is in savanna/grassland, at an altitude of 1400 m., and probably Hinde caught the specimen while on a trip to the Aberdares. Hinde actually lived at Fort Hall. All museum specimens of *Atheris hindii* with definite locality data came from the grassland of these two massifs, above the forest line, at altitudes of around 3000 m or more.

It is stated that the range of *Atheris superciliaris* is "..Mozambique, up the Zambezi river to Lake Malawi and southern Tanzania". This should say "up the Shire river", which is a tributory of the Zambezi and enters it at Caia. There are several records of the species north of Caia on the Shire, but only one north of there on the Zambezi, at Charre (Stevens, 1973). There is also a gap of some 700 km between the Mwaya (Tanzania, most northerly record) and Liwonde (Malawi) specimens of this enigmatic snake.

Pook suggests that where *Atheris* do occur, they are usually common. This is not my experience, where true tree-dwelling *Atheris* are concerned, and I would draw attention to Doucets' (1963 and data from Barry Hughes, University of Ghana, Doucet pers comm.) collection from Adiopodume, Cote d'Ivoire, where out of a total of 2783 snakes collected in eight years, only 6 specimens of *Atheris chlorechis* were taken. *Atheris hindii,* within its restricted habitat, is locally common (Ionides and Pitman, 1965), but it is not a tree-dwelling *Atheris.*

Pook mentions the literature records of prey species eaten by *Atheris;* to this list should be added snakes. Wallach (1980) records *Atheris squamiger* eating snakes, including a genuine case of cannibalism, when a green *Atheris squamiger* swallowed an orange phase individual of the same species. Incidentally, our live exhibit of *Atheris squamiger* at the Nairobi snake park were definitely arboreal during the day, but would descend to feed at night; live mice in the cage during the day were ignored but at night the snakes would come down to hunt.

I would like to commend Ms Pook for her interesting article and the photographs accompanying it are the best I have seen of *Atheris nitschei.* I apologise for the nit-picking appearance of some of my corrections, but I feel they serve a purpose. In Africa today, north of the Cuene – Zambezi river systems, little herpetological research is being conducted. At the same time, due to the widespread availability of computers, fax and photo-copying machines, vast amounts of data can be stored and processed. As a result, much information on the central Africa herpetofauna that is presently reaching the public is not original, but has been reworked. Hence information which has become garbled or is originally inaccurate or speculative is not always detected, and if further reworked, can become "fact". African herpetology is still in the alpha stage; new species are turning up regularly. For many countries north of Namibia and Zimbabwe, basic hereptological checklists are not even available. At the same time, a lot of myths are still being earnestly repeated in the literature, by those who are unfamiliar with the species in the field but have access to a computer and a photocopier. For this reason, I feel it is important to correct errors where they appear, otherwise they are perpetuated.

Yours faithfully,

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LETTERS TO THE EDITORS

Dear Sirs,

Preferred Habitat of *Hyla arborea*

You may recall from a previous article that I said that the European tree frog colony *(Hyla arborea)* on the Kidbrooke (S.E. London) site avoided trees and were not to be found higher than 1½ metres from the ground. I gave their preference as thorny scrub – in particular bramble bushes. In gardens they show preference for rasberry and blackberry bushes.

It was interesting, but of no great surprise, to learn that in Scandinavia they show a strict preference for thorn bushes of the rose (Rosaceae) family but in particular bramble and dog rose (the *Rubus fruticosus* aggregate and *Rosa canina* respectively). In fact the existence of the tree frog is closely linked with that of shallow, unshaded ponds (often temporary) and thorny scrub habitat. Clearly the ponds are of the utmost importance, but disturbance to the vegetation (ploughing, broad leaved herbicide spraying, afforestation (shading out the bramble) has also led to local extinctions.

Obviously, the way the tree frogs (originating from my garden colony) found the bramble covered Kidbrooke site, concentrated there and multiplied was no accident as I can think of no other suitable site for many miles. As I have read no other articles on this particular habitat preference it should leave little doubt as to why many past introductions failed (i.e. the introducers may have been influenced by the English name) or put the species near ponds that were too deep. This new information that I outline here should also be of use should conservation measures seem desirable on Britain's oldest established site in the New Forest area.

Other observations from the Kidbrooke site also seem confirmed by my Scandinavian observations. These refer to the annual behaviour of tree frogs in respect to the immediate environment.

The frogs do not hibernate under the bramble bushes but under moss and the thick tufts made by the tussock grasses on the Kidbrooke site. Presumably this is because the sun does not reach the ground under the bushes because of shading. I say this as the frogs crawl out of their hibernacula to bask when the early April sunshine warms the ground. This would not be possible under the bushes as the ground would reach the required temperature far later in the season and then require a climb of at least 1 metre to reach the sunlight. I would suggest, therefore, that to be ideal their environment should include a gradation from mosses/ grasses to scrub and possibly smaller trees (i.e. a "woodland edge" type of habitat). This needs to be open to the sun (as does the pond of course).

Recently I visited the New Forest tree frog site with the late Gerry Munday. Two calling males were spotted siting on bramble leaves (what else!) 7-8 ft up where the bramble had trailed through tall Gorse bushes. Thornier than that you just can't get!

Charles A. Snell, 76 Birdbrook Road, Kidbrooke, London SE3 9QP.

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