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THE BRITISH HERPETOLOGICAL SOCIETY

BULLETIN

No. 12 June 1985

BRITISH HERPETOLOGICAL SOCIETY

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

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

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

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

Publications

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

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

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

Conserving Sea Turtles, by Nicholas Mrosovsky. A critical review of the current problems and controversies of sea turtle conservation. Price U.K. £5.00 + £0.75 postage (surface mail) or £2.80 (air mail), U.S.A. $10.00 + $1.00 postage (surface mail) or £5.00 (air mail).

Meetings

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

Subscriptions

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

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

The Bulletin is edited and produced by
John Pickett and Mike Matthewson

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

REMAINING MEETINGS 1985

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

OCTOBER 8th	Dr Andrew Laurie (Dept. Zoology, Univ. Cambridge): Marine iguanas on the Galapagos Is. (Pacific Ocean) and El Nino.
OCTOBER 23rd	Dr Alan Charig (Chief Curator of Fossil Amphibians, Reptiles and Birds, Dept. Palaeontology, British Museum (Natural History), London): Dinosaurs: myths and misconceptions.
NOVEMBER 19th	(Meeting topic to be arranged by the Captive Breeding Committee).

BRITISH HERPETOLOGICAL SOCIETY (FOUNDED 1947) RULES (revised 1982; amended 1983, 84 and 85)

1. TITLE. The Society shall be called the BRITISH HERPETOLOGICAL SOCIETY (BHS).

2. OBJECTS. The promotion of the study and protection (including conservation through education and captive breeding) of amphibians and reptiles, particularly the European species.

3. MEMBERSHIP. Membership of the Society is open to all interested in the different aspects of herpetology.

4. SUBSCRIPTION

(a) The annual subscription, due on 1st January, shall be determined by the Council, which may alter it at any time, normally making any proposed change known to Members at the Annual General Meeting previous to the change. Institutional and Library Subscription Membership fees will also be determined by the Council.

(b) The subscription will include Society publications and should be paid before the end of the taxation year (6th April) at which time thereafter, otherwise, a reminder will be sent. Publications will be forwarded upon receipt of the subscription. A Member who fails to pay the subscription by 30th June shall cease to be a Member, but will receive a final reminder stating that his or her name will be restored to the Members' List by payment of the subscription.

(c) **Institutional and Library Subscriptions.** Institutional and Library subscribers may be unlimited in number and their annual subscription shall be greater than the Ordinary membership subscription, as determined by Council from time to time.

5. CATEGORIES OF MEMBERSHIP

(a) **Ordinary Membership.** The Society shall consist of an unlimited number of Ordinary Members resident in any country. Every Ordinary Member shall pay an annual subscription unless joining after September, in which case the sum for that year will be halved. Payment of the subscription implies acceptance of the Society's Rules. Membership for persons over the age of 65 shall, upon application, be half the Ordinary Membership fee.

If a Member, in the opinion of the Council, acts in a manner injurious to the interests or good name of the Society, the Chairman or his deputy will be directed to contact that Member, stating the nature of the alleged offence and asking for an explanation. The Council shall then allow **28** days for a reply or for a request from the Member to appear before Council. If the Council decides that the Member's explanation made in writing or verbally is unsatisfactory, it shall have the power to remove his or her name from the Society's List.

Honorary Membership. Persons who have rendered outstanding service to the Society or to herpetology are eligible for election as Honorary Members on the nomination of Council. Such Members shall not exceed **10** in number; they will receive all privileges of Ordinary Members and will be able to purchase Society publications at rates determined by Council.

(c) **Family Membership.** This will be at a rate set by Council, normally 1½ times the Ordinary Membership rate. Family Membership includes all members of a family (a family is defined as up to 2 adults and unlimited numbers of children below the age of 18) in Ordinary and Junior categories as appropriate, and entitles attendance at meetings. Families receive a single

copy of each publication of the *Journal* and *Bulletin,* and of the J. Herps newsletter if the family incudes one or more junior members. Other qualifications apply as in 5(a), except that both adults may vote at General Meetings.

Junior Membership. Schoolchildren up to the age of 17 are eligible to join the Junior Section of the Society on payment of an annual subscription determined by Council. Council may require proof of age.

Junior Members will receive the *J. Herps Newsletter* plus the *Bulletin* and are eligible to participate in any Junior Section meetings or projects that may from time to time be organised by the Education Officer. Junior Members do not receive the *Journal*, but can purchase that at a subscription rate decided by Council.

Junior Members may attend ordinary Society meetings.

Junior Members may be expelled from the Junior Section if, in the opinion of the Council, the act in a manner likely to be injurious to the good name, interests or aims of the Society.

6. COUNCIL

(a) **Composition.** The business of the Society shall be conducted by a Council consisting of Officers of the Society and other Members. The Officers will be the President, Vice-President (immediately retiring President for the period of one year), Chairman, Membership Secretary, Treasurer, Editor of the *Journal,* Librarian, Editor or co-editors of the *Bulletin* and Education Officer. Other Members of the Council shall be Chairman of Committee and Sections, regional Branches and Associations, and Specialist Groups, a representative of the British Museum (Natural History) Reptile and Amphibian Section (if none is already on the Council) and six elected or co-opted Ordinary Members. Ordinary Members shall not serve on the Council for more than three consecutive years.

(b) **Powers.** The Council shall meet not less than three times yearly as and when necessary. A quorum shall be nine Council Members. The Council shall have the power to suspend any Officer by a majority vote of three quarters of the Council Membership, following which a decision shall be made at a General Meeting to be called within 30 days if requested by the Officer concerned. In the event of a vacancy occurring between two Annual General Meetings, Council shall have the power to appoint a substitute to serve until a new election can be made at an Annual General Meeting or at an Extraordinary General Meeting.

(c) **The President.** The President shall be elected by the Council and will serve for a period of five years. He may stand for re-election against other candidates proposed by the Council or by Ordinary Members.

(d) **Other Council Members.** Other Officers and Ordinary Council Members shall be elected at an Annual General Meeting (AGM). The names of nominees of the Council for election or re-election shall be circulated not less than 45 days beforehand. Ordinary Members may put forward other candidates whose nominations, signed by at least two members and the candidate, must reach the Chairman 30 days before the AGM. In default of other proposals, Members recommended by the Council shall be deemed to have been elected. Only members who have been subscribers to the Society at the time ballot papers are circulated are entitled to vote. If alternative proposals have been submitted, the names of all candidates shall be circulated to all Members at least 10 days before an AGM when an election shall be held. A Member unable to be present at the AGM may record his or her vote by sending it in a sealed envelope to the Chairman, signed and marked "Ballot Paper". Such envelopes are to be opened by the AGM Chairman and the ballot paper handed to the scrutineers.

(e) **Deputies.** The Council may appoint a deputy or assistant to act for any Officer for an unspecified period.

(f) **Officials.** The Council shall have the power to appoint Officials (by a majority vote of two-thirds of Council membership) to undertake specified tasks on behalf of the Society. Such Officials may be honorary or paid. No Official shall *ex officio* have a seat on Council, but may be required to attend Council Meetings as part of his/her recognised duties.

7. DUTIES OF COUNCIL OFFICERS

(a) **Chairman.** The Chairman will be the Society's chairman in the absence of the President and will be responsible for co-ordinating the Society's activities with the assistance of other Council Members to whom he may turn. He will organise the talks to be given at Meetings and will appoint Deputy Chairmen, as necessary, who will be responsible for ensuring a vote of

thanks is proposed for speakers on behalf of the Society and that minutes are taken for each meeting, chairing the meeting themselves in the absence or instead of the President or Chairman. The Chairman will liaise between Officers of the Council, ordinary Council Members, Ordinary Members and representatives of other Societies, being involved with the Society's external relationships with other Bodies.

(b) **Membership Secretary.** The Membership Secretary will be responsible for receiving the Society's mail. He or she will keep an up-to-date list of Members and their addresses, recording the date when they first joined the Society and providing outline information on their interests. He or she will deal with enquiries, passing them to deputies as necessary, and will co-ordinate the Society's administration, including booking dates for the meetings, liaising closely with the Treasurer and taking minutes at Council meetings, should the Chairman be in the chair, and at the AGM. He or she should seek the assistance of Members outside the Council for the administrative duties involved, especially in connection with the distribution of the Society's publications, organising sub-committees as necessary. He or she will be a Member of the Society's Secretariat (administration committee).

(c) **Treasurer.** The Treasurer's duties will be to maintain books of accounts, control the receipt and payment of cash, liaise with the Society's Bank, ensure annual accounts are prepared, maintain an up-to-date list of fully paid-up Members, prepare lists of subscriptions due and send reminders to Members as specified in Rule 4, budget for future expenditure, present up-to-date financial returns at Council meetings or, after notice, when required and confirm the Annual Accounts Statement with two Auditors, who are Members of the Society but not Members of the Council. He will be a member of the Society's Secretariat.

(d) **Editors of the *Journal* and *Bulletin.*** On behalf of the Council, the Editors will be responsible for all matters connected with the publishing of the *Journal* and *Bulletin,* appointing editorial assistants or editorial sub-committees as appropriate.

(e) **Librarian.** The Librarian will be responsible for all matters connected with the Society's Library and publications. He or she can seek the assistance of other Members for the duties involved, especially for the sales of the Society's publications. He or she will draw-up a separate set of rules for the use of the Society's Library, liaising with the Librarian of the Linnean Society of London, where the Library is housed, as necessary.

(f) **Education Officer.** The principal duty of the Education Officer shall be to take responsibility for the running of the Junior Section of the Society. This responsibility entails the production and distribution of the *J. Herps. Newsletter* three times a year, the distribution of the *Bulletin* to Members of the Junior Section, the running of the stamped-addressed-envelope Advisory Service for *J. Herps.* and the organisation, if possible, of occasional meetings for Junior Members.

The Education Officer shall also undertake the organisation of or assist with any BHS exhibits at public exhibitions, conferences, shows, etc., the handling of any letters from schools, colleges or private individuals on educational aspects of herpetology or herpetological conservation education and the provision, whenever possible, of BHS speakers for meetings of other societies and organisations.

The Education Officer shall prepare an annual report of his or her activities and expenditure which will be presented at each AGM and published in the *Bulletin* following.

The Education Officer may solicit the aid of other Members when needed.

8. MEETINGS. The Society shall normally hold eight Meetings during the year which will include talks on a wide range of subjects of herpetology.

9. ANNUAL GENERAL MEETING. The Annual General Meeting shall take place before the end of the taxation year in late March or early April. The business transacted shall be the passing of the accounts for the previous year, the adoption of the Annual Report of the Council, including the regulation of the editing of the *Journal* and *Bulletin,* the election of the Officers and Members of Council, reports of the work of the Committees and sub-committees, Sections, Regional Branches, Associations and Specialist Groups, and any business for which due notice has been given to the Chairman, including a change in the Rules of the Society.

10. EXTRAORDINARY GENERAL MEETING. An Extraordinary General Meeting may be summoned by the Council or by not less than five members of the Society on a written

request addressed to the Chairman. During this meeting, the business for which it was convened shall alone be discussed. When calling a special general meeting on any application, the Chairman shall allow at least 14 days to intervene between the date of issue of the notices and the date fixed for the meeting. Should the date selected, upon agreement, coincide with a meeting of the Society, the subject matter of that meeting will follow the business for which the Extraordinary General Meeting was called. Otherwise, the meeting shall be held in London within 30 days of the receipt of the original request by the Chairman.

11. COMMITTEES AND SUB-COMMITTEES. The Council shall have the power to appoint Committees and Sub-Committees for special purposes. Membership of such Committees and Sub-Committees shall normally be restricted to Members of the Society. The period of office for all Members of Committees and Sub-Committees shall expire at the Annual General Meeting, but may be renewed by the Council then elected. Any Member of Council may attend a meeting of a Committee or a Sub-Committee, but shall not have a vote unless he has been appointed a Member of that Committee or Sub-Committee.

12. REGIONAL BRANCHES AND ASSOCIATIONS, SPECIALIST GROUPS. Regional Branches and Associations, and Specialist Groups, collectively considered as Branches, can be approved by the Council, any person being permitted to join any Branch wherever he or she may reside. The British Herpetological Society is a National Society and recognises a regional herpetological need.

A Branch shall accept, in general, the objects of the Society.

A Branch shall become self-supporting financially, organise its own programme and selectits own body of Officers, Meeting fixtures should not coincide with those of the main Society, but may be held on behalf of the Society.

Branch membership shall normally be restricted to those already Members of the Society.

Any major changes in policy of a Branch shall be subject to approval of the Council.

13. ALTERATIONS TO THE RULES. Any alterations or changes in the Rules may be adopted by two-thirds of the Members present at an Annual General Meeting or at an Extraordinary General Meeting convened for the purpose. The proposed change(s) must be stated in the circular convening the meeting and none which would cause the Society to cease to be charitable in law.

14. DISSOLUTION OF THE SOCIETY. In the event of the termination of the Society, any assets remaining should be made over to a charitable institution with similar objects.

REPORT OF THE CHAIRMAN OF THE CONSERVATION COMMITTEE FOR THE YEAR JANUARY 1st 1984-5

In accordance with the pattern of the 1983-4 Report (*Bulletin, 9,* 7: 1984) I review the activities of your Committee under the headings: monitoring, management and other activities with some inescapable overlap.

(a) **Monitoring.** Brian Banks, John Buckley and Tom Langton have been active throughout the season in studying the remaining Natterjack colonies in the U.K. Brian reported that much of his activity, in which he was helped by Gary Laverick, centred round the Cumbria sites: two new breeding areas were found. It proved possible to comment on the reproductive success of 24 out of the 27 known Cumbrian Natterjack sites. Brian and Arnold Cooke together prepared a fresh Report on the British Natterjack population. Brian attended meetings with NCC and others as a result of which new SSSIs were agreed. He was responsible for planning a scrape (shallow artifical pond) at a site not known to produce toadlets since at least 1977: in 1984, thousands of tiny Natterjacks emerged. Brian and Trevor Beebee continued work on the only remaining Southern heathland Natterjack site; as well as monitoring, this work included scrub clearance, bracken control and attempts to raise the pH of an otherwise suitable acidic pool. The paper work (licensing etc.) necessary to restock a fresh scrape on another southern heath was completed and the scrape prepared. It may be possible in later years to say that BHS not only

protected but actually re-established these attractive amphibians in areas of Southern England where not so very long ago they were quite common. John Buckley and Chris Raxworthy surveyed the Norfolk Natterjack sites and also the one at Sandy, Bedfordshire, created with the help and support of the R.S.P.B.: they provided maps and detailed results for the Committee's records. Chris surveyed ponds and other habitats for herps. in Cambridge, Hants, Herts and Surrey.

Brian Banks and Trevor Beebee completed their Report entitled *Factors influencing the reproductive success of the Natterjack toad (Bufo calamita) in Britain,* the result of work financed partly by a two-year Contract with NCC. The professionally competent nature of work and resulting Reports such as this emphasises the importance to BHS of its scientific members: without these BHS would lose respect and probably be unable to continue effectively its unique and valuable specialist husbandry, veterinary and conservation work.

Richard Griffiths reported to your Committee on his conservation efforts in Mid-Wales in 1984, where Great Crested newts are indeed rare. Of 124 sites surveyed by Richard's colleague, Simon Mickleburgh, 6 were found to have this species. Almost one-third of the site contained all five "common" amphibian species. Richard told us that Viviparous lizards and Slow-worms were "reasonably abundant in both town and country": snakes are uncommon and will be studied more intensively in 1985.

Dave and Marion Dolton sent their Pond Report for 1984, describing the condition and amphibian populations of at least 18 ponds in the Wimborne, Wareham and Bournemouth areas. Keith Corbett and Bill Whitaker assisted Tom Langton in his survey of London's ponds, financed by FFPS and the GLC. The results are of great interest to BHS members, especially in London and its neighbourhood. Keith and Bill have continued to study other ponds in the Home Counties, especially out of concern for Great Crested newts. In August, 1984, Keith, Beth Haslewood and I visited the waters near Newdigate, Surrey, where a colony of Edible frogs has been in existence for many years: we found the frogs apparently flourishing and recommended to the Local Authority that any threats to their continued health should be countered. Your Committee thinks that established populations of continental European herps should be protected: apart from the pleasure the sight of these creatures gives, they provide an opportunity for study without the expense and hassle of travel abroad. The Marsh frogs in the Lydd, Kent area and elsewhere continue to flourish: this is a spectacularly beautiful species which, however, does not do well in isolated ponds. Mark Jones continued his studies of Suffolk and Norfolk amphibians.

Committee members (especially Tony Braithwaite, Keith Corbett, Howard Inns, Jon Webster and Bill Whitaker) monitored heathland sites for Sand lizards and other reptiles, often combining this work with the BHS Smooth snake survey, CAT, the first year of which has been completed. As required by our contract I submitted a Report of this to Arnold Cooke of NCC in March 1985.

In 1984, CAT members surveyed 40 sites (31 in the New Forest and Dorset and 9 in Surrey/Hants). Some sites had many more visits than others, a perhaps inescapable flaw in this method of work. A total of 38 Smooth snakes were found on our sites (36 of these in Dorset/New Forest) and 6 in other areas. Our task is to catch these snakes, sex and measure them and draw the head-pattern for future identification. Scale-clipping, planned initially, proved to be distasteful to most of our members because of the distress it might cause to the reptiles. The work has been a great pleasure to the BHS team and has taught us much. The fact that quite generous travel and other expenses are part of the Contract lends a touch of professionalism that can only be good for us as herpetologists.

A remarkable event took place on July 14th, 1984. A party from NCC S-W Region had kindly agreed with BHS and Chris Tydeman of WWF to give up a Saturday to survey the badly damaged remains of Stokeford Heath, near Wareham in Dorset. At a site mined for minerals and scored with heavy vehicle tracks, Tom Langton spotted a Smooth snake basking on one of the few surviving patches of heather. The snake was a gravid female and probably the longest (72.5cm) ever found in the U.K.: it was admired by all. Perhaps Providence had put it there to remind us where our chief commitment lay.

In their Reptile Report for 1984, Dave and Marion Dolton describe the results of visits to 55 sites in Dorset/New Forest. Their contribution to the Committee's tasks in invaluable; the Doltons involve other BHS member in site monitoring and clearance and liaise closely with the Dorset Naturalists Trust. Dorset is of course the most important county for the rare reptiles. The rolev

Naturalists Trust. Dorset is of course the most important county for the rare reptiles. The role of the Doltons, living on Dorset heath, is filled by Tony Braithwaite and, recently, by Howard Inns for the same habitat in Surrey and adjacent areas of Hants: in particular, the enormous Hankley Common is now systematically and frequently surveyed. Tony and Howard supplied your Committee with detailed records. John Buckley, from Southampton, plays a similar part in the New Forest.

(b) **Management.** Jon Webster arranged 9 heathland Sunday tasks in 1984, involving 13 sites. Weather conditions were appalling on 2 occasions: it was difficult to travel in snow and ice whilst on site trees had to be felled and dragged through deep snow. Nevertheless, attendances were good (13-20) and morale high. 3 pond tasks in September, arranged by Keith Corbett, Howard Inns and Bill Whitaker, were poorly supported by your Committee.

Howard was appointed O.C. Bracken Spraying, an onerous task considered to be vitally important in preserving dry heathland but one which is not as well supported as it should be by our members. In his Report on this, Howard lists 8 sites (4 in Surrey, 4 in Dorset) that were treated: others taking part were Tony Braithwaite, John Buckley, Keith Corbett, Dave Dolton, John Gaughan, Tom Langton and Ed Wade.

Management agreements were obtained for important Surrey heaths and proposals made for Natterjack sites in Norfolk and Hants.

Jon Webster, as a condition of his support from World Wildlife Fund (WWF), reported on heathland management from 1980-84; he lists 28 sites, giving full details of ownership, habitat species present and past and proposed future management. This valuable dossier will be of great help to your Committee.

Members may recall that I published in the *Bulletin (4,* 26: 1981) a description of a flourishing Sussex colony of Viviparous lizards. Now, as a result of this publicity and of the good efforts of Arnold Cooke, this colony is to be protected as part of a local SSSI.

(c) **Other matters**

(i) **Sand lizard breeding.**

Mike Preston submitted a beautifully prepared Report on the Committee's programme for 1982-4, giving the history, political background and full details of the methods used. Progeny were released on 7 sites, including the Southport area. For the Surrey stock, Mike gives records of the date of birth, weight and length of all 29 individuals born in August 1984 and the same details of 15 of these after about 108 days. An attempt is in progress to understand and minimise the often high losses of juveniles over winter in outdoor vivaria. We also need more information as to the best times for release into the wild: monitoring has shown this to be generally successful. For 1984, 29 Southport eggs yielded 25 viable young; the figures for Surrey and Dorset eggs were, respectively 88 and 83 and 106 and 84. As a result 192 lizards were available for release and of these, 15 were put down in Southport and 77 in Surrey: the rest were retained for breeding. It is a condition of our licence from NCC that Southport stock be kept entirely separate from Southern animals, because of the visible genetic difference.

Anne and Marcus Langford have joined Dave and Marion Dolton in the breeding programme; some of their results apply to 1985.

(ii) **Meetings**

The Committee held 3 meetings in 1984, 2 at the Zoo and 1 (without advisers) at Shoreham. Attendance was excellent.

On June 4th, 1984, a number of well-known conservationists, together with 3 members of your Committee, were asked to an Open Day with the title *Conservation and Conifers* held by the

Royal Forestry Society at the Arne Plantations, Dorset. I was asked to speak on herps and, later, Mr. N. Grimwood, Owner of the Plantations, offered the S-facing, heather-covered bank at Stop 2 as a Sand lizard reserve. We arranged with Mr. J.A.K. Curtis, Agent for The Oakley Jones Company who manage the Plantations, for BHS to remove the small pines from about 0.5 acre of the bank at Stop 2. ("Arne 2 Bank") and our task force did this on November 11th. Sand lizards introduced here will be monitored by our members. Mr. Grimwood, who had already allowed us another reserve ("Arne Oil") in his plantations, is an enlightened owner with a desire to preserve our wildlife: he has left unplanted a quite large piece of excellent heath at North Slepe and has offered BHS further areas if we can identify them. On behalf of conservationists, I offer him our sincere thanks.

On 29th May, Committee members met SE Region NCC representatives at their old HQ in Belgrave Square for a review of problems on heathland and ponds. The Stokeford Heath meeting, referred to above, resulted in potentially useful plans. At its meeting on July 17th, Wildlike Link (WL) invited the NCC Chairman, Mr. W.H.N. Wilkinson for a discussion. BHS members, after briefing WL and NCC, asked what could be done to stop dune destruction in the Southport area and to improve fire-fighting, particularly in Dorset. We believe these questions were passed to Regions, with some effect. In a separate exercise, I wrote on behalf of your Committee to Mr. Wilkinson urging that more wardening should be provided on Dorset heaths. We have since been told that this has been done and BHS help acknowledged. BHS enjoys greatly improved relationships with NCC staff in the vital SW Region.

On November 11th, members met Dorset Naturalists Trust representatives in clarification of our mutual interests.

BHS is well represented on conservation groups for heathlands controlled by the Ministry of Defence and Local Authorities in Hants and Surrey: we much appreciate the co-operation of MoD and these Authorities.

On November 24/25th, 1984, Trevor Beebee chaired an Amphibian Ecology Seminar at Sussex University's delightful Country Conference Centre at the Isle of Thorns: 7 BHS members gave papers.

(iii) **Publicity**

On June 4th, 1984, Brian Banks appeared on the BBC TV "Blue Peter" programme and showed a copy of *Garden Ponds as Amphibian Sanctuaries,* giving my address and inviting viewers to send a s.a.e. for a copy. From June 7 to July 25 we filled 1247 requests; hundreds more came without the s.a.e. and a trickle continued for months. Brian gave 100 stamps to fill some without these. It seemed to us that quite a few writers seriously intended to try to maintain amphibians in ponds. The pond leaflet, written by Trevor Beebee, is a BHS best-seller. We obtained updated reprints of this and also of *Being Kind to Snakes.*

In July, 1984, on behalf of your Committee, I registered a protest against the re-alignment of the A3 Liphook — Petersfield trunk road, on the grounds that this will involve destruction of important wildlife heathland habitat. Trevor Beebee will attend the Public Enquiry.

(iv) **Finance**

On April 23, 1985, (a quiet period) total Committee assets stood at £2936.78, of which £2078.61 were "committed" as money for specific purposes. The "free" money came from interest on deposits (£154.99), cash not drawn for travel and other expenses (£419.46) and sales of John Buckley's booklet, donations and residue of past funds (£283.72). For the year (April-April) 1984-5, NCC gave us a capital grant (for chemicals and apparatus) of £1188.55, to which WWF added £1200. Our NCC grant for travel (at 6.6p/mile) was £1196.32. These monies, having been spent, are not included in the assets given above, except for the WWF residue of £153.70. I wish to express sincere thanks especially to Mr. E.C. Hammond (NCC Grants Officer) and Chris Tydeman (WWF) for all this generous help.

I should make it clear that all BHS members taking part in management or monitoring tasks are eligible to claim for actual travel refunds, provided that the task sites have been notified to NCC. NCC pays refunds only for work already done or apparatus bought, against a previously specified list.

Jon Webster obtained a grant of £1200 from BP and £600 from WWF, all to be paid out (not to BHS members) for work on Dorset and Surrey heathlands: residues of these funds and of Keith Corbett's "Pond" grant from WWF are included in our "committed" assets.

Council made your Committee a grant of £200 for 1984: this was for leases, insurance and affiliation to BTCV, all in the name of BHS.

Conservation Committee at December 31, 1984:

B. Banks, M. Beebee, T. Beebee, A. Braithwaite, P. Bryce, J. Buckley, K. Corbett, D. Dolton, M. Dolton, J. Gaughan, R. Griffiths, E. Haslewood (Secretary), G. Haslewood (Chairman), H. Inns, M. Jones, T. Langton, G. Laverick, J. Newton, M. Preston, C. Raxworthy, E. Wade, J. Webster and W. Whitaker.

Advisers:

E. Arnold, H. Arnold, A. Cooke, J. Griffin, J. Sims, R. Stebbings, C. Tydeman, J. White and D. Yalden.

During 1984, P. Bryce was elected to the Committee and H. Arnold made an Adviser.

BHS CAT for 1984:

A. Braithwaite, J. Buckley, A. Cooke, K. Corbett, D. Dolton, M. Dolton, J. Gaughan, E. Haslewood, G. Haslewood, H. Inns, A. Langford, M. Langford, T. langton, C. Raxworthy, E. Wade, J. Webster, W. Whitaker.

Apart from those mentioned above, I should like to thank, in the name of BHS, the following who helped in our 1984-85 tasks: C. Becket, T. Bernhard, D. Blakemore, G. Clay, M. Douglas, D. Green, M. Hodges, R. Paxton, C. Sloman, A. Welch and M. West.

June 1985 G.A.D. Haslewood

PROFESSOR J.L. CLOUDSLEY-THOMPSON (BHS Honorary Life Member, 1983) — HERPETOLOGICAL PUBLICATIONS LIST, INCLUDING GENERAL WORKS IN WHICH AMPHIBIA AND REPTILES ARE DISCUSSED

BOOKS

1961

Rhythmic Activity in Animal Physiology and Behaviour. New York & London: Academic Press 236 pp. frontisp., 33 text-figs., (reprinted).

1964

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HERPETOLOGICAL WORK AT THE BRITISH MUSEUM (NATURAL HISTORY) REPTILE AND AMPHIBIAN SECTION

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Herpetological research has been quite varied over the last decade or so, but nearly all of it has been related to the museum's collection of about 200,000 preserved reptiles and amphibians, accumulated over the last 150 years. While not the largest such collection in the world, it is arguably the most comprehensive and is unrivalled as a basis for the study of herpetological problems involving comparative morphology.

Most topics covered concern systematics — the recognition and naming of species and the elucidation of their relationships and distribution. Such studies and the publications that arise from them are an essential preliminary for other herpetological work, both in pure science and in applied fields like conservation and the treatment of snake bite. Among the groups recently investigated are Lacertid lizards, Sand Skinks, desert Geckoes, Giant Tortoises, Ranid and Discoglossid frogs, African Bufonid Toads, Vipers and Sea Snakes. Such studies typically involve direct and detailed investigation of the animals concerned but literature research into the historical aspects of nomenclature may also be important in stabilising the scientific names of reptiles and amphibians.

The collection is also used to survey variation in particular structures across a range of species, and a variety of organ systems have been studied in this way including the palate and jaw muscles of snakes, gecko feet and their adhesive mechanisms, and the cloacal and genital muscles of lizards. Such investigations are often relevant to systematics and may change views about the relationships of species. They may also help clarify evolutionary and functional problems and have thrown light on various aspects of tail shedding in lizards, morphological adaptations to spatial niche in Lacertids and the possible function of lizard mite pockets.

Attention has also been paid to the herpetofaunas of several poorly known regions, including the Mentawai Islands, parts of Malaysia and Arabia, the latter having been looked at from systematic, zoogeographic and ecological standpoints. Another area of interest is the present and recently extinct reptiles of the Southwest Indian Ocean, including the various endangered snakes and lizards found on small islands off Mauritius. This project was intitiated in connexion with the Royal Society Aldabra Project.

In recent years papers have been produced on more theoretical aspects of systematics and biogeography and on the possible causes of variation in genital structure among reptiles. Work has been undertaken in connexion with research by others in Archaeology and Anthropology, and identifications carried out for such bodies as health authorities, public analysts and H.M. Customs and Excise. Finally, in addition to more formal publications, a couple of books designed for wider audiences have been produced partly using the British Museum collections.

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Ed. note. This article was written by Dr E.N. Arnold, who took over as head of the section upon Miss A.G.C. Grandison's retirement in 1984, with contributions from other members of the staff including Dr C.J. McCarthy (Representative on BHS Council), Barry Clarke and Andrew Stimson. The Earl of Cranbrook (BHS President) has been a Trustee of the BM(NH) since 1981.

THE BREEDING ECOLOGY OF THE NATTERJACK TOAD IN RELATION TO CONSERVATION.

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ABSTRACT OF A TALK GIVEN TO THE BHS ON 27 APRIL, 1985

The contraction of the range of the natterjack toad in Britain led to a general effort to conserve the remaining colonies of this species. The toad now only occurs on three heathland sites in Britain (one a reintroduction) and about 30 coastal localities, mainly in North-West England, with a few sites also in Norfolk and Lincolnshire. It was evident from monitoring results that many of the toads breeding pools desiccated before any metamorphosis could occur, so during the early 1970's many deeper pools (scrapes) were excavated at the remaining sites. Unfortunately some of these new pools were not used, and in the others there was sometimes widespread mortality of spawn and tadpoles. The purpose of the research project was to determine the conditions required for the optimum breeding pool.

Natterjacks use the warmest water available (i.e. shallow pools), and also tend to spawn more often in larger water bodies. Water of low pH is avoided, as also are pools containing high densities of tadpoles. The major spawning effort is at the beginning of the protracted spawning season. It was noted that at the remaining heathland site in Hampshire there was a second spawning peak at the end of June, which may be associated with some females spawning twice.

The natterjack lays twice as many eggs as the common toad, and almost three times as many eggs as the common frog. This is believed to be an adaptation to breeding in pools that are unpredictable in terms of safety, so that in good years metamorphic success is maximised, compensating for the periods when there is no reproductive success. The animal is long-lived in the wild, with some females found to be twelve years old. As it matures at 3 years old the animal is able to survive unfavourable periods lasting for a number of years. However old females are more likely to produce inviable spawn.

The main cause of spawn mortality is desiccation, with up to 70% of spawn laid in pools that ultimately desiccated in some years at one large site. Other forms of mortality include attack by fungus, especially after cold weather, predation by other tadpoles, while the spawn is killed by exposure to water of low pH or high salinity.

Tadpole growth rates are more rapid when food is given to the tadpoles, while the presence of large numbers of frog and toad tadpoles inhibits the growth rates of natterjack tadpoles. When growth is slow, the small tadpoles are very susceptible to predation by a wide range of invertebrates, and the great crested newt. Many predators preferentially predate on the small natterjack tadpoles rather than the larger frog and common toad tadpoles. As the deeper scrapes attract large numbers of frogs and toads, and have larger, and more diverse populations of invertebrate predators, they are less favourable for successful tadpole development. These problems are not apparent in new scrapes, but as they age, and predator and competitor populations become larger, so reproductive success of the natterjacks declines.

Recommendations for future conservation management of natterjack sites are that scrapes should only be provided where absolutely necessary, i.e. where water levels fall due to drainage, or natural infilling of pools. New pools should be created in habitat that is unsuitable for frogs and toads (i.e. on frontal dunes), and should not be permanent. Indeed they should desiccate by June in the "average" year. Another successful system is to excavate pools on the top of grazed saltmarshes. Here tidal inundation by high winter tides kills off many of the invertebrate predators, and any frog or toad spawn. The natterjack spawn is laid at a later date when high tides are less likely.

THE SENSORY BASIS OF AMPHIBIAN ORIENTATION AND NAVIGATION

KRAIG ADLER

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ABSTRACT OF A TALK GIVEN AT AN EVENING MEETING OF THE BHS ON MAY 15th 1985

Animal orientation — as exemplified by migration — is a well-known phenomenon, yet until recently little was known about the cues and mechanisms used. Among amphibians it is well established that odours are important for orientation over short distances, but this sensory modality cannot explain most instances of long-distance movement since odour cues become disrupted and dissipate with increasing distance. For example, California newts (*Taricha*) routinely return home from artificial displacements of 15 miles or more, even though the intervening landscape consists of rugged mountains.

Among the cues utilized by amphibians, the sun's position can be used to move in a consistent compass direction without reference to landmarks, a type of movement termed compass orientation. However, as the sun appears to move due to the earth's rotation, the animals must (and do) integrate a sense of time in order to orient correctly. Thus, animals that have their internal (circadian) rhythm artificially shifted, later orient in a predictably different direction but one that is understandable in terms of a misinterpretation of the sun's position due to their incorrect clock.

As for honeybees and ants, amphibians also can use skylight polarization patterns for compass orientation but this cue, too, must be time-compensated since it is synchronized with the sun's position. Our research shows, however, that polarization patterns are not sensed by an amphibian's eyes but by the pineal body (*epiphysis cerebri*), in effect a "third eye", located on top of the head and *inside* the skull.

It is also known that amphibians can detect the earth's magnetic field and use this information to compass orient. Such a cue does not require time compensation. The Eastern newt (*Notophthalmus*) is extraordinarily sensitive to magnetic field, at least on a par with homing pigeons, and it is thus possible that magnetic information is used in addition for determining the animal's map position.

These recent discoveries show that we have underestimated the sensory capabilities of such seemingly "simple" animals. Clearly, amphibians, like probably all species of animals, have a multisensory system for orientation and future research may even reveal additional cues.

REPTILE AND AMPHIBIAN CONSERVATION IN THE NORTH EAST OF ENGLAND

Until recently much of the north-east of England was very poorly surveyed, but in 1981 an amphibian and reptile group was established within the Durham County Conservation Trust (The North East Reptile & Amphibian Group). The aims of this group are simple. To locate as many herpetologists in the area and to investigate the distribution of amphibians and reptiles in county Durham and Tyne and Wear. The poster in this article is an example of the sort of advertising that we used to obtain records (others were designed requesting information on reptiles, and encouraging people to stock garden ponds with amphibians rather than fish). Items on local radio and television have also been helpful in this respect, although such publicity has also caused a few headaches for members of the group. During 1982 we had a scheme called "Adopt a frog", to encourage people to establish garden pond colonies, and one of the group appeared on Radio Newcastle rashly offering to delivery frog spawn and newts from overcrowded garden ponds to amphibian free gardens. To our horror radio 4 heard about the interview and played it on the morning news item, with inevitable results, over 300 letters! Unfortunately 90% of these came from distant parts of the country, and most of the spring was spent writing apologetic letters to people who wanted frogspawn sent through the post!

The results of our efforts were successful on both fronts, the growth of the group was exponential in the first few years, and a large area of the two counties was surveyed. In fact the survey has expended into Northumberland and Cleveland. One side-effect of the growth of this conservation group was the formation of the new B.H.S. regional group in Durham. Several reports are being prepared, including one on the use of garden ponds by amphibians in Sunderland, a reptile distribution report, and a similar amphibian report, and these should appear in B.H.S. publications in the next year. Another report on the distribution of the Great Crested Newt has been prepared by the Trust, based on the results of a survey funded by the Manpower Services Scheme, and carried out by David Green.

At present we have a great deal of information on the distribution of species in these counties, but coverage is far from complete. Much of the survey work has been carried out, not surprisingly, near the major built up areas (Tyneside, Sunderland, Durham, and Darlington), although there are still probably areas that have not been surveyed. In between these areas survey work has been more patchy. As the results build up we should be able to identify the best sites for conservation purposes, and try to protect them. To some extent this has already been the case. Action by the group with the support of the Trust has prevented the destruction of at least 4 sites with Great Crested Newts. Scrub clearance has been started at some Crested Newt sites, and one the last Grass Snake colonies in the county. At this latter site there are also plans to establish artificial nesting sites for the snakes during 1985.

One of the best amphibian sites in the county (with all five local species) has been leased by the trust as a reserve. The aims of the group in the next five years are as follows:—

1. To improve our knowledge of the distribution of reptiles and amphibians in the area, and to identify the best sites in the area (so that these can be recommended to the N.C.C. as worthy of scheduling as S.S.S.I.'s).

2. To be in a position to know the locations of all Grass Snake colonies in the area, and to assess suitable conservation measures for the species.

3. To start regular habitat conservation tasks at sites where such work is required (i.e. clearing ponds of shading scrub, clearing moorland of invading pine etc., where management agreements can be arranged with land owners.

In order to continue this work we need more help. If you would be interested in any of the aspects of this work we would be delighted to hear from you, even if this only involves submitting a few records: they all count. The location of any important sites will be kept confidential.

The following people already act as recorders in the region and may be the best people to contact:—

Mr. J. Durkin, 4 Woodlands Close, High Spen, Rowlands Gill. (Reptiles and amphibians in the Tyneside area and Northumberland).

Mr. D. O'Brien, South Lodge, Durham University, Durham (Amphibian records for Durham county).

Mr. D. Race, 15 St. Andrews Street, Darlington, Co. Durham (Reptile recorder for Durham and Tyne and Wear).

Mr. R. Scaith, 14 Beaumaris Drive, Eaglescliffe, Cleveland (Herp. records for Cleveland).

A-HERPING IN TANZANIA, BUT HARDLY IN LOVERIDGE'S FOOTSTEPS

MICHAEL LAMBERT

In another article, Cranbrook & Lambert (1983) have considered the merits of undertaking herpetological work in tropical, especially (in relation to the U.K.) Commonwealth countries. Arthur Loveridge (1891-1980) is someone who has!

Arthur Loveridge was truly a herpetological pioneer in what was East Africa. His life's work is considered by Ernest Williams (1982), his successor at the Herpetology Department in the Museum of Comparative Zoology (MCZ), Harvard University, Cambridge, Massachusetts; while his bibliography was published during his life time by the Harvard University Press in four parts (1913-36, 1933-44, 1944-50 and 1951-58). Born in Penarth, South Glamorgan, the son of a family businessman in ship furnishing, he was accepted for the post of Curator at the then British East African Museum (the forbear of the present National Museums of Kenya) and arrived in Nairobi in 1914. He first started writing on the herpetofauna of East Africa in 1916 in the Journal of the *East Africa & Uganda Natural History Society.* Soon after his arrival, the First World War cast its shadow over East Africa and Loveridge joined the East African Mounted Rifles. During his period of active service, one particular moment of danger in German East Africa was remembered by the capture of the rare Usambara bluish-grey caecilian, *Boulengerula boulengeri.* When 'digging-in' under unpleasant shell-fire, one of his fellow-troopers unearthed this subterranean species, which Loveridge gladly took charge of before the trooper heeded his threat to run his bayonet through 'the snake'. His same devotion to the cause obliged him first to pester his sergeant and then the General in the midst of his staff for permission to obtain bottles of pickled snakes from an abandoned house in what soon was to become Tanganyika (now Tanzania). He got the snakes! Loveridge was then invited in 1924 to the U.S.A. by Thomas Barbour, Director of MCZ (The Agassiz Museum) at Harvard University. Besides taking his East African collection with him, he became Curator of the herpetological collection, completely reorganising it, and remained at Harvard until retirement in 1957. During this period, he made further collecting expeditions to Africa in 1925-26, 1928-29, 1933-34 and 1938-39, writing highly entertaining accounts of his experiences in four books of more popular appeal during the academically slack World War II years: 'Many happy days I've squandered' (1944), 'Tomorrow's a holiday' (1947), 'I drank the Zambesi' (1953) and 'Forest Safari' (1956). Immediately after his retirement, he left Cambridge, Mass., and with his wife made his retirement home at Varney's on the island of St. Helena in the South Atlantic: Africa was no longer the Africa he knew and loved!

Although perhaps of another generation, punctilious and a fanatic for neatness, Loveridge was pre-eminently a Curator-Collector-Naturalist, not an academic; always British, despite 33 years in New England, and a son of the Empire. Besides articles and letters in newspapers, including fifty in the *East African Standard* in the early 20s, Loveridge published over 275 works, including several editions of his popular books, between the years 1913 and 1958.

HERPETOFAUNA OF EAST AFRICA

Loveridge (1957) recognised 527 species and races of herpetofauna (169 amphibia, 358 reptiles) in what was East Africa (Kenya, Uganda and Tanzania, including Zanzibar). In more recent times, Schiøtz (1975) lists 87 forms of treefrogs in eastern Africa (including Malawi and Zambia); with revisions of the Typhlopidae by Roux-Estève (1974), Spawls (1978) lists some 106 forms of 46 genera of snakes for Kenya alone and Duff Mackay (1980) in an unpublished conservation report for Kenya includes 97 species and subspecies of amphibia. North of the Kenyan border, Lanza (1984) has just produced a check list for Somalia (a photocopy of the proofs only seen to date) which includes 27 species of amphibia (four endemic) and not less than 201 species of reptiles (75 endemic).

TANZANIA

Although not my first visit to Tanzania (previous visits in 1970, a week; 1978, four months; 1981, a week, and 1982, two weeks), my work for the Tropical Development and Research Institute (until 1st April 1983, Centre for Overseas Pest Research), London, involved in this instance two training courses over the period 26th October to 2nd November 1983 in Morogoro (about 196 km WSW of Dar es Salaam). Since Tanzania is a tropical country and an independent member of the Commonwealth, the opportunity was taken to consider the herpetofauna there.

Departing for Nairobi on 19th October, I continued via Kigali in Rwanda (renowned for the forest gorillas) to Dar es Salaam on 22nd October. The short rains had scarcely started and the normally hot humidity of the coast was relatively tempered by cool breezes of the South-East Trade Winds at this time of year. The Bahari Beach Hotel about 20 km north of the town and fringing the Indian Ocean normally provides a pleasant stay and one's first sighting of herpetofauna — this time a small house gecko in the bathroom!, probably *Hemidactylus mabouia,* a species separated from *H. platycephalus* by Broadley (1977), which ranges south of the Sahara Desert from Somalia to South Africa, and a half-grown individual of the common African toad, *Bufo regularis s.l.,* on the path outside a rondavel. Next morning (23rd October) with bright sunshine, little grey-bodied day geckos were basking on the trunks of pruned bougainvillea bushes in the landscaped gardens outside, probably *Lygodactylus picturatus* — the yellow-headed dwarf gecko, a specimen of which was caught later in the garden of the New Savoy Hotel in Morogoro (BM. 83. 1078).
But these are widespread species. I hoped to collect above the 2000m line in the Uluguru Mountains behind (SE. of) Morogoro, in particular in the Bondwa Forest, where many endemic species occur, including small frogs of the genus *Nectophrynoides,* which Miss A.G.C. Grandison (e.g. Grandison, 1978) of the BM(NH)'s Amphibian Section was keen to acquire.

Permits: Before contemplating the collection of species in Tanzania, especially rare or endemic ones, a permit is required, normally obtainable by writing in advance of a visit to: The Director of Wildlife, Ministry of Natural Resources and Tourism, Tancot House, P.O. Box 1994, Dar es Salaam; telephone Dar es Salaam (the code from London being 010 255 51) 27811-14. A Trophy Export Certificate, costing 2 Tanzanian Shillings (about 11p), is then issued, upon showing the specimens collected before departure from the country, in line with species protection under the Convention on International Trade in Endangered Species of Fauna and Flora (C.I.T.E.S.) of which Tanzania is a signatory. The permit is given with the proviso that the number of specimens, a list of species determinations and reprints of any scientitic papers published on the collection are later sent to the Director of Wildlife. For the Uluguru Mountains, a further permit is required to visit the area behind the Radio Tower, which includes the Bondwa Forest, since this is an area of military significance, and is available from the Post Office in Morogoro. Finally, to enter the Bondwa Forest itself and collect biological material, a further permit is required from the Regional Agriculture and Development Officer (R.A.D.O.), Ministry of Agriculture, P.O. Box 88, Morogoro. Without these permits, collecting in the Ulugurus is not allowed.
At Morogoro: Meeting up with three colleagues, who had flown from Nairobi's Wilson Airport in a Beaver aircraft of the Desert Locust Control Organization for eastern Africa, we drove by Land Rover inland from Dar es Salaam along the first part of the American-built, tarmac, Dar es Salaam — Lusaka (Zambia) Highway as far as Morogoro. We travelled through grey-green savanna scrubland on lateritic soil interrupted by reddening tracts of *Brachystegia* bushes.

Upon arrival at the old, pre-war built, corrugated iron roofed, former colonial, railway hotel in Morogoro, the New Savoy Hotel!, a further colleague met us. Dr Peter Merrett was an entomologist based with the Ilonga Research Station near Kilosa. He immediately brought out of the back of his Land Rover a cardboard box with a range of containers inside, each with a snake bathed in 5% formalin solution crammed inside. This miscellaneous collection totalled seven specimens (one fresh!), five from inside buildings which had been killed by local people or found dead on the tracks of the Ilonga Research Station. All the species are described in V.F.M. FitzSimons's (1980) *A field guide to the snakes of southern Africa,* and included a large specimen (BM.83.1087) of the eastern subspecies of the stripe-bellied sand snake, *Psammophis subtaeniatus orientalis,* which as its name implies is characterised by a black line or stripe along either side of the body. Although this specimen was caught inside laboratory, it is normally found in dry open bush country, seeking refuge among the branches of the nearest bush or tree.

It is frequently confused with the olive grass snake, *Psammophis sibilans,* a small specimen of which, in poor condition, (BM.83.1086) was also included with the collection. *Psammophis* is a genus of back-fanged Colubrids (Boiginae), and *P. sibilans* can be bad-tempered when caught (also known as the hissing snake), inflicting quite a serious bite, the venom of which, although seldom fatal, can induce unpleasant and painfull symptoms such as nausea and cold-sweats for some days afterwards. Feeding mainly on small mammals and lizards, itself often falling prey to predatory birds and other snakes such as cobras, it ranges widely in Africa and is found as far north as Cairo in Egypt where it inhabits gardens and has been given the name African Beauty Snake. The "fresh" snake which was found dead on the road by Emmanual Church in Bomo Road, Morogoro, together with a small, thin, preserved specimen from Ilonga (BM.83.1083), were of the non-poisonous colubrid, *Philothamnus semivariegatus,* the Spotted Wood Snake. The fresh specimen (BM.83.1084) was still bright green with dark specks on the front part of the body. It is an arboreal species, easily negotiating upright tree-trunks with the aid of strongly keeled and notched ventral and subcaudal scales, and averages 90-105cm (maximum 120-140cm) in length. It is often found far from water, moving across the ground by keeping the head well raised and feeding mainly on tree lizards such as geckos, chameleons and tree frogs. Of the other snake specimens from Ilonga, one included the savanna White-Lipped Snake, *Crotaphopeltis hotamboeia* (BM.83.1085), with flattened, short, broad head and rounded snout giving it an adder-like appearance. It is found at altitudes of up to 2000m. Largely nocturnal, the species prefers damp locations and is thus often found in gardens. Despite initial ferocity, as another back-fanged boigine, the effect of the venom being mild and certainly not dangerous, it becomes tame in captivity and accepts food (preferring frogs and toads, but also taking lizards and rodents) from the hand. The other Ilonga snake was the Snouted Night Adder, *Causus defilippii* (BM.83.1089), which as its name suggests is a front-fanged snake (F. Viperidae). A smaller, stumpier snake, it has a somewhat up-turned snout distinguishing it from the common Rhombic Night Adder, *C. rhombeatus.* The rather smooth, shiny skin is grey to mauve-brown dorsally, with a darker middorsal stripe and well defined dark V-shaped marking on the back of the head. It scarcely extends further north than Tanzania in southern eastern Africa, although extending as far north as Malindi in coastal Kenya, but rare, and averages only 30-40cm (maximum 45cm) in length with a very short tail. Finally, of Peter Merrett's collection was a Common or Eastern Tiger Snake, *Telescopus semiannulatus* (BM.83.1088), occurring from the northern part of South Africa to Congo and Kenya, which was found dead outside Pugu Secondary School, near Kisarawe (19 km WSW. of Dar es Salaam). The body is yellowish with large dark transverse bands. As another boigine, although rather slow-moving, it can, like *C. hotamboeia,* be irascible when disturbed. Mainly nocturnal, its main diet is geckos and other lizards, and, sometimes found up trees, will rob birds' nests of nestlings and eggs.
Upon opening his suitcase, which I had taken to Dar es Salaam for one of my Nairobi colleagues, a tiny worm snake of only 68mm long and 2mm thick emerged! This later proved to be Jan's all-black Worm Snake, or the appropriately named Bootlace or Thread Snake, *Leptotyphlops conjuncta* (BM.83.1082). It does not grow to more than 18cm long and ranges from Uganda to South Africa.

Later in the evening of 25th October, a veritable family of *Hemidactylus mabouia* promptly scattered on the black-painted walls of the communal shower room, some deftly (and helpfully!) picking off setled mosquitoes, and fluttering moths and other *dudus* around the naked light bulb above the veranda. Later an adult *Bufo regularis s.l.* slowly crawled across the hotel bar patio. Next day, basking in the late afternoon sun, an adult of probably the common Two-Striped Skink, *Mabuya striata,* scuttled into a crack in the hotel wall; on 28th October after an evening's rain two days later, another adult and juvenile were seen plying the edge of a flower bed beneath the low-clipped hedge of bougainvillea in front of the hotel while we waited in the early morning sun for transport to the Centre for Continuing Education of the University of Dar es Salaam Faculty of Agriculture, Forestry and Veterinary Science.

Morogoro and the Ulugurus: From the University Campus at the foot of the Uluguru Mountains, one could only see the whole of this northern part of the range on clear days for normally the peaks are cloud covered. The Ulugurus rise to 2138m (Lupanga) in the better known north and to 2646m (Kimhandu) in the south. Loveridge collected from the Ulugurus twice; the first time from around Government House, Morogoro (now the Rest House) in 1918 up to 3000 feet (914m) and the second in October 1926 in and at the edge of the rain forest which was still there then at 3000 to 8000 feet (2438m) (Barbour & Loveridge, 1928). This was in order to determine to

what extent the Uluguru rain forest species were related to the Usambara Mountains around Lushoto some 210km to the NNE. and separated by lowland savanna with only a small connecting link of the Nguru Mountains between. The Ulugurus also support forms linking them with the Nyika Plateau in Malawi farther south with only the Poroto Mountains forming a possible connecting link. The fauna of the Usumbaras was rather better known than the Ulugurus at that time for during German colonial days from the 1890s to World War I, there was a railway link with Tanga on the coast, and it was customary for residents there to seek the cool of the mountains for vacations and to recuperate. While doing so, specimens of amphibia, reptiles and other fauna were collected. Morogoro, being further from the coast, meant that the Ulugurus were less accessible. Loveridge, accompanied by his wife, also collected topotypic material from the Usambaras in November and December 1926 after visiting the Ulugurus.

Before departing from Tanzania, through an introduction of a colleague at TDRI, I wrote to Dr Sam R. Telford of the Denmark/Tanzania Rodent Control Project, an American herpetologist from Florida with a special interest in tropical lizards, enquiring whether he would be interested in collecting in the Bondwa Peak Forest in the Ulugurus. Sam Telford had been based at Morogoro for over two years, living on the University Campus, and had often collected in the Ulugurus before. Meeting up at his house, he agreed to get the necessary permits from the Post Office and Ministry of Agriculture. Regrettably, Dr Kim M. Howell of the Department of Zoology, University of Dar es Salaam, who has taken an interest in the Tanzanian herpetofauna, could not join us. Unfortunately, due to what we discovered later was an error in protocol (sometimes difficult for foreigners and other Commonwealth citizens to appreciate fully), we were only able to obtain a permit to go to the area behind the Radio Tower on the Bondwa Peak, but not to enter the forest where we wished to collect. We therefore decided, at Sam Telford's suggestion, to visit the virgin lowland Kimboza Forest, below Kibungu village (1km E. of the Ruvu River), to the east of the Ulugurus on Sunday, 30th October. Loveridge had not collected in this forest during his extensive visit to the Ulugurus in 1926.

On the Saturday before, although the weather was somewhat cloudy with sunny intervals having rained in the morning and the day before, we drove past the Regional Agriculture and Development Office near the Morogoro Cemetery (one maintained by the Commonwealth War Graves Commission, in memory of German and Commonwealth dead during a skirmish in Morogoro in 1916) — *Mabuya striata* were running over the tomb stones — and up the Morningside Trail to the Rock Garden, which had originally been constructed by the Germans and recently renovated by Japanese volunteers. After seeing no more than two half-grown *M. striata* and walking the 3 or 4km back to town with a grasshopper-collecting colleague, two reptile specimens were actually collected. First a *Hemidactylus platycephalus* (BM.83.1077) and then a Mozambique agama, *Agama mossambica* (BM.83.1080), both being very common species and both on trees by the side of the road, the agamid (snout-vent length 85mm) being caught where it sought refuge in a hole at the trunk base. With so many domestic and feral animals near the town, it was not surprising that no more reptiles were seen! The next day at the Kimboza Forest was a different matter.

The Kimboza Forest: Sam Telford picked us up in his Land Rover sharp at the pre-arranged time of 8.00 am. The sun in a completely clear sky was brilliant. After about an hour's drive over a reasonably even dirt road through a much cultivated area, we started to travel through the secondary forest/savanna mosaic so typical of the region. As we passed near some curious rock formations, we observed about 100m to our left two baboons eyeing us as they sunned themselves on a part vegetated rock. Shortly after, we went through the village of Mkuyni, where the Sunday market was in full sway with piles of bananas, paw-paw, pineapples and other fruits and vegetables for sale amongst the noisily chatting women in brightly coloured dresses and head scarves. At 9.15, we arrived at an open part of the Kimboza forest at an altitude of *c.* 300m. On the trunks of tall, white-barked trees, we saw from the road small lizards, pale-striped and blue-tinged, looking superficially like half-grown five-lined skinks, *Mabuya quinquetaeniata,* hunting in the sunshine on the trunks' surfaces. Sam informed us that they were gliding arboreal lizards, the eastern serrate-toad tree lizard, *Holaspis guentheri laevis,* a recording about which he intends to publish separately. Loveridge only collected this species in the Usambara Mountains in November 1926. Sam attempted to noose a specimen (Plate 1) for collecting a blood sample to look for malarial parasites, but in the end (the lizards elusively scuttled up their trunks!) skilfully used an air gun to knock one down. This little lizard (BM.83.1081) bore side flaps on the body

and pale blue tail-plates to aid gliding; its s-v length was 43mm. Sam did, however, succeed in noosing an *Hemidactylus platycephalus* (BM.83.1076) (Plate 2) for a blood sample and also a gravid female *Agama mossambica,* which was reddish dorsally and of s-v length of 82mm (BM.83.1079). An adult *Mabuya striata* ran over the trunk base just by our feet, and on the lower part of the trunk of another tree on the other side of the road, a largish skink quietly basked and slowly slid out of sight upon our disturbance which could have been *Mabuya maculilabrus,* the speckle-lipped skink. Loveridge collected this species at Vituri in the Ulugurus on 30th October 1926, exactly 57 years before! The eastern spiny-tailed lizard, *Cordylus cordylus tropidosternum,* which can climb trees had also been seen here before by Sam Telford. Amongst the bushes and heavy growth of green ground vegetation, a little frog (s-v length 14mm) was jumping and with some difficulty was collected among the base of plants' stems. This proved to be a juvenile *Arthroleptis (Schoutedenella) ? sylvatica,* together with two more very small specimens of 14 and 15mm s-v length found by a small leaf-filled stream passing through *Pandanus* forest 500m away (BM.83.1072-74). Loveridge (1957) appears to have assigned this frog to *Arthroleptis xenodactylus,* having collected the latter in both the Ulugurus and Usambaras, September to December 1926. Before going to the *Pandanus* forest, we took a tiny mud-rutted track to the right about 50m along the road and penetrated deep into the Kimboza lowland rain forest (Plate 3). Sam tried unsuccessfully (difficult in thick undergrowth!) to noose another *Hemidactylus platycephalus* on the trunk of a huge tree. By the side of a large, dark-coloured rock formation deep amongst the tangle of undergrowth and forest trees, at the base of which several centimetres of damp, decaying leaves had accumulated, we missed three more tiny frogs. But as we stood up again, we found ourselves face to face with a largish rock balancing on an outcrop; on the underside, several eggs, presumably of some gecko species, were adhering (Plate 4). In an open part of the forest, I collected a pair of forest grasshoppers *in cop.* for my grasshopper-collecting colleague, and we returned through the near inpenetratable tangle of bamboo-like vegetation, myself amazing at Sam Telford's sense of direction!, eventually reaching the track again. Upon return to the Land Rover, as fair exchange, my grasshopper-collecting colleague had two small frogs! One proved to be *Phrynobatrachus parvulus* (BM.83.1070) of 12mm s-v length and the other, rather larger specimen (s-v length 32mm) *Arthroleptis stenodactylus,* which is usually found in dry savanna, chiefly on the coastal plain in Kenya. Loveridge, the great taxonomic 'lumper' that he was, appears to have assigned *P. parvulus* to a subspecies of *P. ukingensis.* He had also collected *A. stenodactylus* in several localities in the Ulugurus in late September and October 1926. Finally of these forest frogs, a specimen of *Phrynobatrachus acridoides* (BM.83.1071) was caught by the *Pandanus* forest stream, a species with a huge range in Africa south of the Sahara and distinctly less interesting than the brilliant little turquoise-blue dwarf gecko, *Lygodactylus williamsi.* Hunting in the by now late morning sun, three of these small (s-v length c. 60mm) day geckos were seen from the road crawling along the ferociously thorned *Pandanus* fronds at the edge of the forest. Loveridge (1952) first reported this startlingly coloured gecko in Tanzania from a specimen sent to him and in his 1957 check list is given as only being known from the holotype. Sam Telford had only succeeded in collecting a few individuals (to be deposited later in the Florida State Museum, Gainesville) by cutting down *Pandanus* fronds the geckos had chosen to climb onto with a panga. It is quite endemic and only known from the Kimboza Forest in Tanzania. Also by the roadside, there were several quite large ranids basking which took great leaps into the tangle of drainage channel vegetation. They were probably savanna sharp-nosed frogs, *Rana oxyrhynchus,* or possibly the savanna stream dusky-throated frog, *Rana fuscigula chapini,* a specimen of which Loveridge collected at Mkuyuni at about the same altitude on 18th October 1926 only a few kilometres away.

Returning again to the Land Rover, we drove about a kilometre along the dirt road looking for a place to turn. Just as we had done so (by now it was after midday at 12.35) within sight of the Ruvu River below, a large Nile monitor lizard, *Varanus niloticus,* occurring over most of Africa south of the Sahara Desert, emerged from the roadside vegetation and apparently deliberately crossed the road in front of us before diving back into the undergrowth on the other side and entering the river with a loud splash. By 12.46 we were returning past the rock formations on which we had seen the baboons sitting in the morning and by 1.05 pm Mkuyuni village with its by now ebbing Sunday market. Two vervet monkeys leapt across the road in front of us — these monkeys also often entered the gardens of the houses on the University Campus in Morogoro — and nearly back at Morogoro at 1.45 pm, a brightly-coloured Kenya yellow-throated plate lizard, *Gerrhosaurus flavigularis fitzsimonsi,* with reddish dorsal scales ran across the road only

PLATE 1

Kimboza Forest, Tanzania. Sam Telford attempting to noose an arboreal lizard, *Holaspis guentheri laevis*, on the trunk of a tall white-barked tree in an open part of the forest.

PLATE 2

Hemidactylus platycephalus, a very common gecko of eastern Africa, successfully noosed in Kimboza Forest, Tanzania.

PLATE 3

Deep in Kimboza Forest, Tanzania. Sam Telford positioning himself to noose a gecko on the trunk of a large tree amidst the tangle of lowland tropical rainforest vegetation.

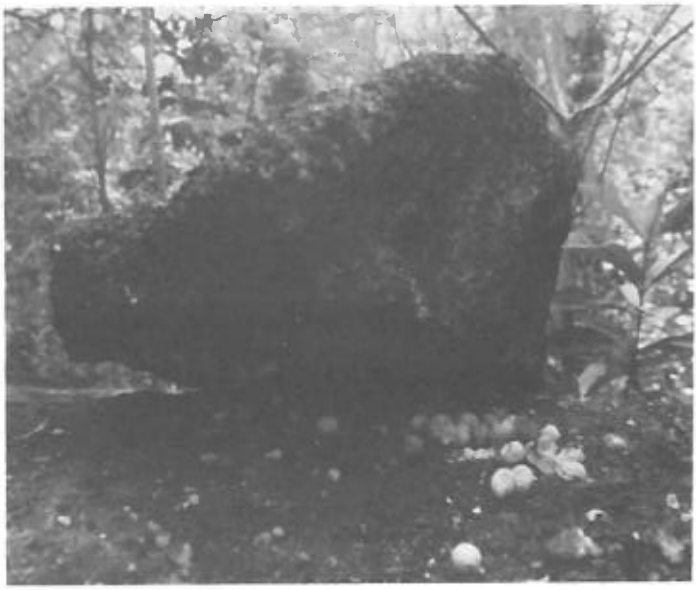

PLATE 4

Eggs of a forest gecko species beneath and adhering to the underside of rock perched on an outcrop deep in the Kimboza Forest, Tanzania.

10m in front of the Land Rover and into the scrub at the edge. By 2.00 pm, we were back at the New Savoy Hotel. It had been an enjoyable and interesting trip, well worthwhile even if only for the drive, let alone the herpetofauna!

Departure: Only in the morning before the day of our departure for Dar es Salaam and Nairobi, a little tree frog, *Hyperolius viridiflavus bitaeniatus,* with a s-v length of only 19mm and uniformly grey dorsally with reddish coloured limbs (BM.83.1075), was caught. It was basking in the sunshine on a leafy bush outside the building of the Centre for Continuing Education after much rain in the evening and night before. We finally departed from Morogoro on 3rd November.

Perspective:

No-one could have contributed more to our knowledge of the herpetofauna of East Africa than Arthur Loveridge. Still his 1957 check list is to all intents and purposes definitive. But there is still much work than can be carried out in Tanzania (and for that matter elsewhere in central Africa) while virgin forests still fortuitously remain, especially in inaccessible places which could still yield new species. Many of Loveridge's habitat localities no longer remain and to this extent his work is out of date, apart from some taxonomic revisions in light of further work by more recent authors.

It is of interest to compare the richness of this tropical herpetofauna with that of North America, as Loveridge (1957) himself does. Kenya, Uganda and Tanzania (with Zanzibar Island) — the East African Community no longer exists — occupy an area spanning the Equator of 1,761,099km_2. This total area according to Loveridge (based on the number in his check list), therefore yields one form for every 3342km^2. The area of North America (U.S.A. and Canada) is 17,398,521km^2, or about 9.87 times as big. Much of the area of Canada (9,570,540km^2), of course, is tundra and an inhospitable environment for ectothermic herpetofauna. But if one consider the total numbers of forms of herpetofauna in North America to be about 768 i.e. one form for every 22,654km^2, then the herpetofauna of 'East Africa', on an area basis is about 6.78 times as rich! And North America has about 3.53 times as many species as Europe! Then by sheer numbers alone, there should be justification enough for funds to be made available for European and North American herpetologists to consider specialising in tropical forms in Africa and elsewhere more than is being done at present.

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OBSERVATIONS ON THE AMPHIBIANS AND REPTILES OF SOUTHERN MOROCCO

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INTRODUCTION

The dry regions of North Africa support a large and particularly interesting number of amphibian and reptile species. Detailed accounts of these forms are to be found in several reports (e.g. St Girons 1956, St Girons and St Girons 1956. Pasteur and Bons 1957, Pasteur and Bons 1959, Gauthier 1967, Stemmler 1972, Werb 1979, Raxworthy et al., 1984). During May and June 1980 and September 1981, the author carried out a series of field studies on certain amphibians (Meek, 1983a) and reptiles (Meek, 1983b; Meek and Jayes, 1982) in southern Morocco. This paper reports on general observations on the herpetofauna located during the study periods, mainly concerning those species located on the study areas.

CLIMATE

Southern Morocco is situated in a geographical zone that is typically dry with hot summers and mild winters. An important geological feature is the presence of the Atlas mountains which buffer the coastal areas from the extreme aridity and temperature levels of the Saharan interior (-

buffer the coastal areas from the extreme aridity and temperature levels of the Saharan interior (Figure 1). Nevertheless temperatures on the coast are still high, for example during the hottest months (July and August) temperatures up to 47°c have been recorded. The coolest month is January when maximum daily temperatures average at 20°c although up to 30°c has been recorded, with the minimum daily temperature never falling below 0°c.

The region's arid nature is demonstrated by the rainfall figures. In July, the dryest month, the maximum recorded monthly rainfall is 1mm but usually no rain falls at all during this time. January is the wettest month with a maximum recorded fall of 155mm and an average of 48mm. For a more detailed account of the climate of the region the work by Griffiths (1972) should be ocnsulted.

HABITAT

Plates 1 and 2 show views of the main habitats investigated. Plate 1 shows an area of desert and part of a system of pools and irrigation channel that lay within it. This inland region had the highest temperatures and the lowest humidity levels recorded during the survey. Sand temperatures in May — June varied from a mid-morning level of 45°c in mid-afternoon; in September they approached 60°c. Air temperatures in May — June maximised around 35°c and in September reached 39°c. The temperatures of the water in the pools varied from 24 — 28°c depending on depth. In unshaded areas around the pools and water channel the relative humidity was approximately 45%. *Euphorbia sp* was the major plant species in the surrounding desert, although several trees (*Eucalyptus sp*) provided some shade near the water.

The locality shown in Plate 2 was an area of scrubland near the Atlantic coast investigated in 1980. Sand temperatures during the hotter times of the day here reached 35 — 40°c, whilst ambient air temperatures maximised around 33 — 35°c. The relative humidity during the hottest period of the day ranged from 45 — 50% but with frequent sea mists this could rapidly (within 15 minutes or so) increase to 96%. Air temperatures could also quickly decline to around 20°c. However, even with the absence of an evening mist, the relative humidity increased to approximately 80% during the hours following dusk. The vegetation here was mainly in the form of trees (*Argania* and *Eucalyptus sp*) with extensive areas of *Euphorbia.*

Amphibia

Anura
Ranidae
Rana perezi (Seoane, 1885)

A large population located in an area with abundant pools and an irrigation system running through it (Plate 1). The frogs ranged in snout-vent length from 16 - 78mm in May — June (n = 108) and from 20 — 79mm in September (n = 24) but the relative size frequencies at the two periods in the year were different. Figure 2a shows that in May — June they were skewed towards smaller individuals probably as a result of recently metamorphosed individuals; the general absence of these size classes in September (Figure 2b) probably a result of growth and predation. The frogs were usually seen basking on the banks of the pools and on the slopes of the irrigation channel (see Meek, 1983a). There was some variation in dorsal pattern in the population, Plate 3 shows the most common of these.

Bufonidae
Bufo mauritanicus (Schlegel, 1841)

Located in the same general area as *R. perezi.* Only juvenile and subadults were found at the water channel but adults were found in the surrounding desert. The young toads were seen in open areas throughout the day although a few retired to shaded areas during the hotter periods. Limb abnormalities were observed in a large (79mm SV length) animal located in the desert.

Reptilia

Chelonia
Testudinidae
Testudo graeca graeca (Linnaeus, 1758)

Four tortoises were located at a site near the coast (Plate 2). Three of the animals showed extensive shell damage. The relationship between activity patterns and body temperatures in these tortoises has been described by Meek and Jayes (1982).

Emydidae
Mauremys caspica leprosa (Schweiggar, 1812)

Adults and juveniles of this species were found in the area shown in Plate 1, where they were observed basking on the banks of the water channel (Meek, 1983b) or moving along the channel bed. Additional animals were observed at a dam near this site.

Sauria
Gekkonidae
Saurodactylus mauritanicus brosseti (Bons and Pasteur, 1957)

A small gecko (Plate 4) located during the day under large rocks in scrubland (Plate 2) and around the old town of Agadir. This species was only observed abroad from dusk onwards. Several females were found to be gravid, usually with two eggs visible (May — June). Captive individuals (none of which exceeded 45mm in total length) have eaten small crickets, fruit flies and tiny mealworms. Only one other species *S. fasciatus* is known from this genus. Both occur in N. Africa (Gruber, 1975) and in common with certain other ground living forms of gecko they lack adhesive toe pads.

Geckonia chazaliae (Mocquard, 1895)

One individual found under a large stone during the day near the area shown in Plate 1.

Tarentola mauritanica mauritanica (Linnaeus, 1758)

Found in all areas investigated. At the irrigation channel they were located on the bridges, sometimes basking, but at the other sites they were usually found under rocks during the daylight hours. A juvenile was found under a large rock on the desert area shown in Plate 1.

Agamidae
Agama bibroni (Dumeril and Dumeril, 1851)

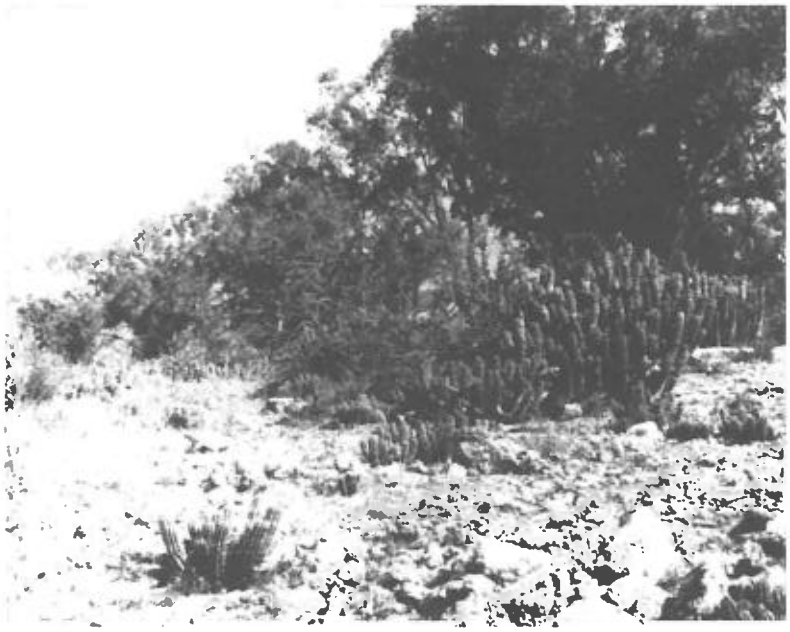


PLATE 1

Typical habitat features of the study area near Tiznit showing irrigation channel and surrounding desert. This view which faces southeast towards the Saharan interior, shows the rocky terrain and sparse vegetation, mainly *Eucalyptus* trees (top right) and Euphorbia dominated slopes (top left).

PLATE 2

Typical habitat features of the study area near Agadir. Vegetation growing on the rocky terrain was mainly *Euphorbia* (foreground) and *Argania*

Located at the site in Plate 2 and in the area around Agadir. All individuals observed were adults. The only lizard seen abroad during the hotter times of the day, its greyish colouring made it difficult to spot when it was motionless.

Scincidae
Eumeces schneideri algerensis (Peters, 1864)

Found in the dry areas shown in Plates 1 and 2. In the desert (Plate 1) they were always in association with dense growths of *Euphorbia sp.* During the day they were found in burrows, the entrance to which was normally under a large rock. One burrow excavated had a total length in excess of 2.5 metres and changed direction several times. Captive animals have accepted a wide range of food from mealworms, crickets and cockroaches to various types of commercial pet foods. It.is of interest to note that these lizards have only rarely been observed to drink water from a bowl. In view of the fact that there were no pools of water in the desert areas where they were found presumably some other mechanism for water uptake is used.

Sphenops sphenopsiformis (Dumeril, 1856)

One individual found in an area of sand dunes near the region shown in Plate 1. This form which is adapted for living in areas of fine sand has both the front and hind legs much reduced (the front legs more so than the hind legs, see Plate 5a) with movement being mainly in a snake-like fashion. The head is flattened and pointed for burrowing (Plate 5b). The lizard was caught at mid-day below the sand and it seems likely that the period of activity on the surface is restricted to such times when the surface sand temperatures were much lower than 55 — 66°c levels which are achieved during midday.

Chalcides mionecton (Boettger, 1874)

One lizard found in a dune system in association with *Sphenops.* Similar to *Sphenops* this form appears adapted for burrowing in fine sand.

Serpentes
Colubridae
Natrix maura (Linnaeus, 1758)

Found to be abundant in May — June in the area shown in Plate 1 but less abundant during September. Perhaps because of the high daytime substrate temperatures, they were never seen at any great distance from the waters edge. Several animals were caught while swimming in the irrigation channel where they were observed hunting *R. perezi.*

Malpolon monspessulanus monspessulanus (Hermann, 1804)

Two specimens located in the area shown in Plate 2. Both snakes were adults and exceeded 1 metre in length. These snakes were also seen being used by the local snake charmers in Agadir.

DISCUSSION

A total of eleven reptile species and two species of amphibian wre observed on these field trips. However, not all the species known from the areas investigated were located and for a more complete account of the herpetofauna of these regions, more extensive reports, in particular the excellent account by Stemmler (1972) should be consulted. Several detailed studies of the regions herpetofauna have been made. One of the most interesting being that of Gauthier (1967) who observed that certain species of reptile in North Africa adjust their periods of activity with season. Indeed, knowledge of a species activity period(s) in these regions is useful if they are to be observed abroad, as many of the lizard species in particular are bimodal, with activity periods in early morning and late afternoon. However, the desert agama (*A. bibroni*) appears to be active in unshaded areas even during the period of highest temperatures although these lizard are usually found where there are abundant shade plants. Raxworthy et al., (1984) recorded this species in undisturbed areas usually in association with *Eurphorbia* succulents, which is in general agreement with the present observations, although some individuals were located amongst the ruins of the old town of Agadir destroyed by an earthquake.

FIGURE 1

Map of south west region of Morocco showing locations of the two main study sites (☆) and other areas where reptiles were found (O). The study area near Tiznit refers to plate 1; the study site near Agadir refers to plate 2.

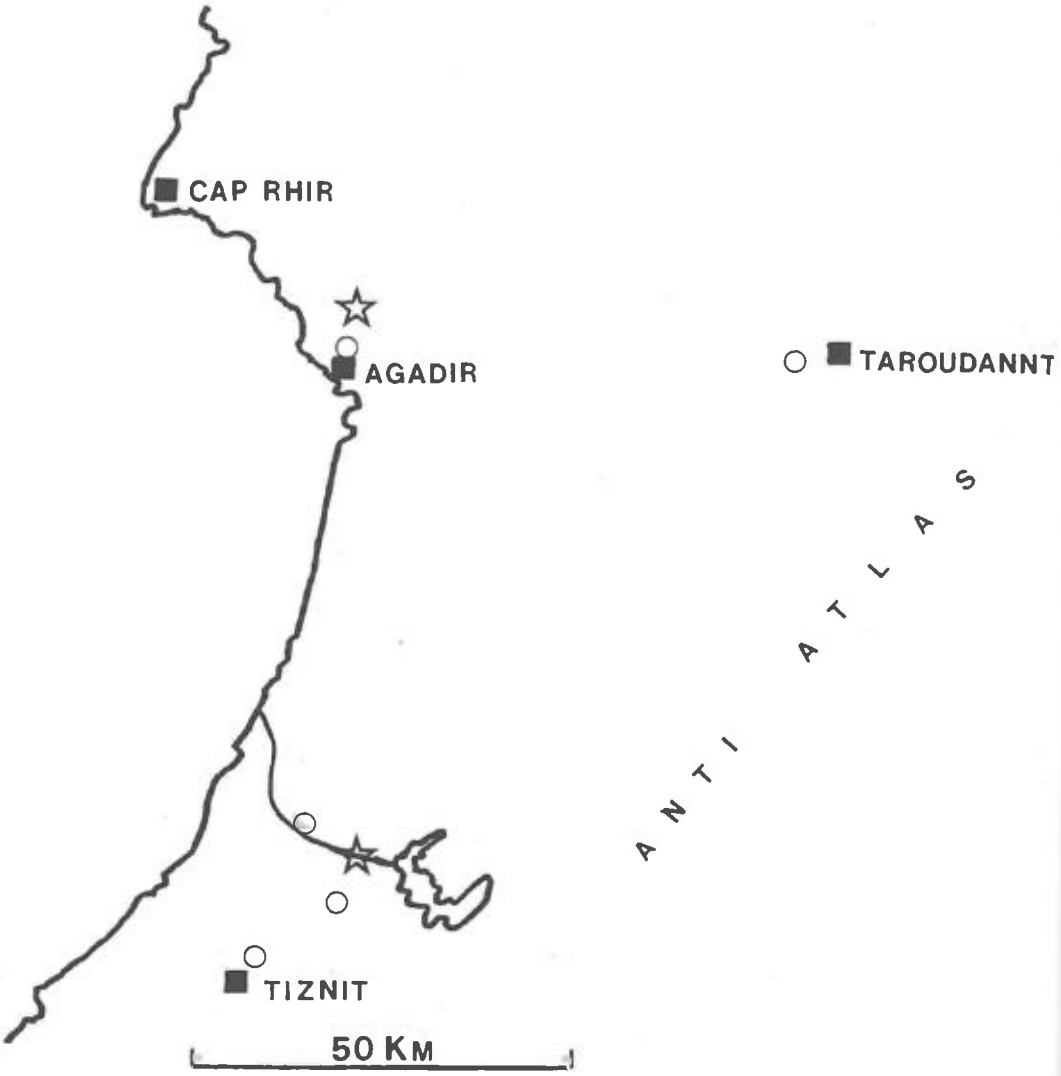
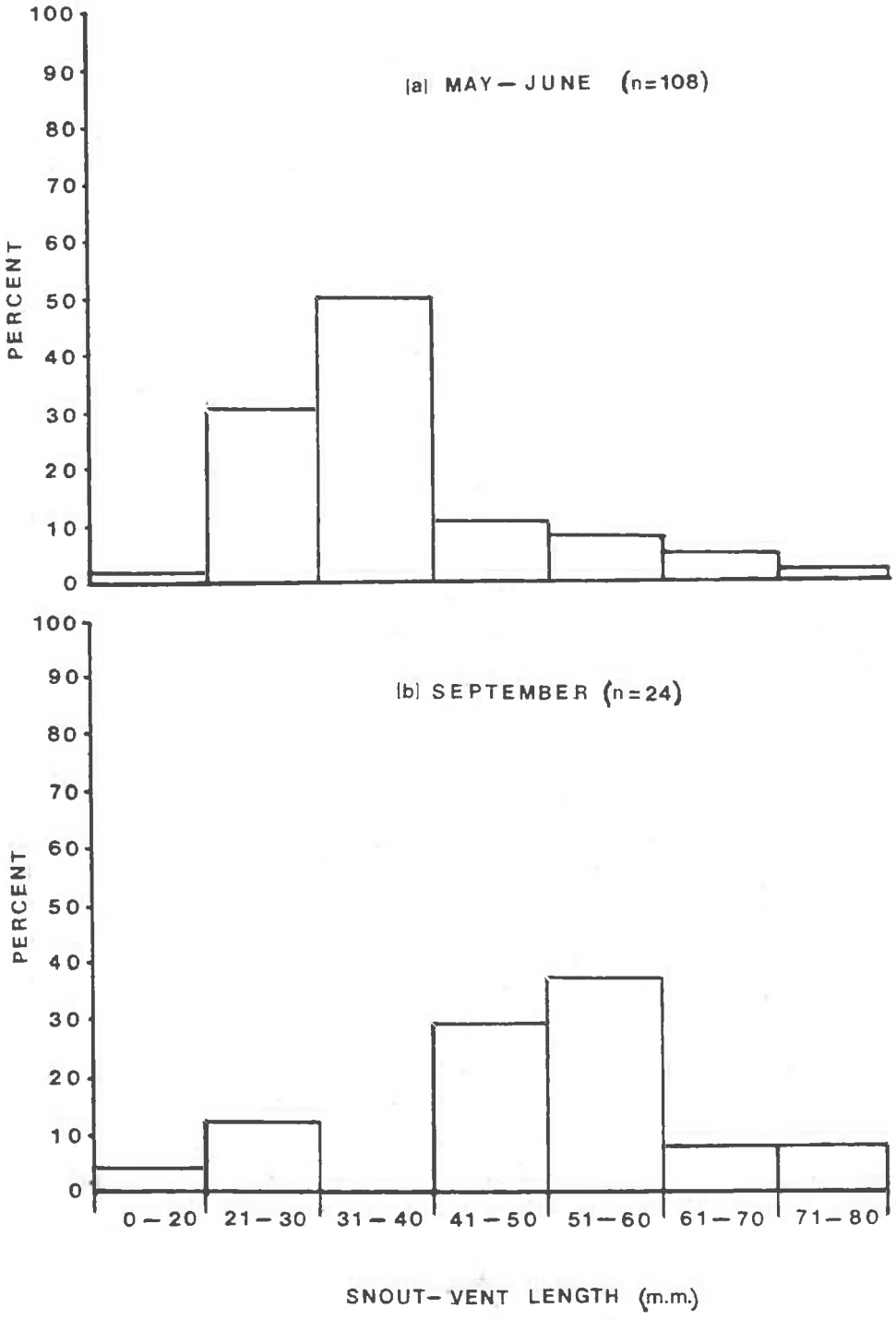


FIGURE 2

Histograms of size frequencies of *Rana perezi* sampled in May — June 1980 and September 1981.



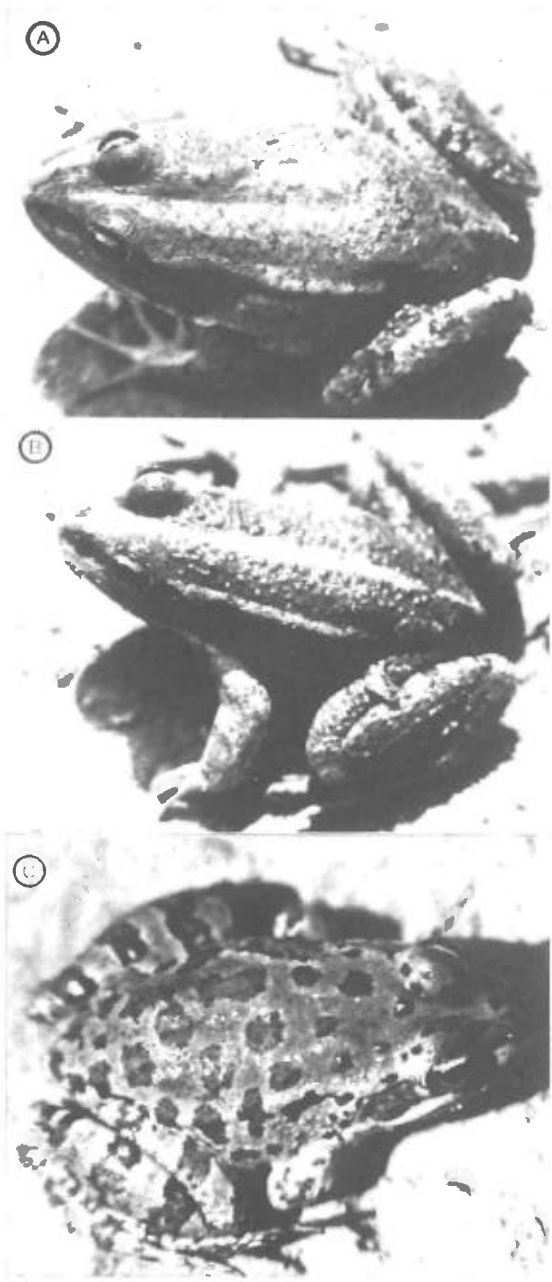


PLATE 3

Principal variations in dorsal patterns of *Rana perezi* based on 24 captured animals in September 1981. Plate 3a shows the most common (79.2%) followed by 12.5% with a dorsal stripe (Plate 3b). Only 8.3% had the pattern shown in Plate 3c.

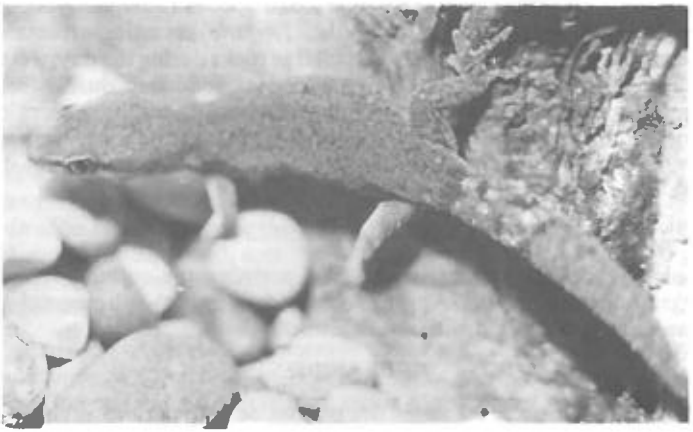


PLATE 4
Adult *Saurodactylus mauritanicus* found 5km north of Agadir (Plate 2)

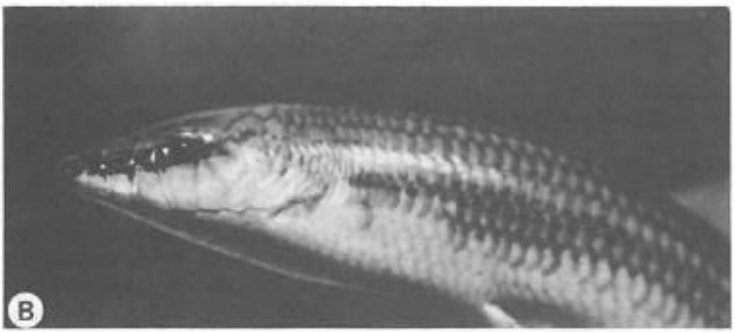


PLATE 5
Adult *Sphenops sphenopsiformis* found near the area shown in Plate 1. Plate 5a shows the elongate body and reduced limbs; Plate 5b the pointed head and specialised scales covering the ear openings. Apparently these and other features are adaptations for living on sand dunes.

From examination of the faeces of some of the lizard species (*Saurodactylus, Tarentola* and *Eumeces*) it would appear that ground living beetles (*Tenebrio*) are an important element in their diet. These beetles, which shelter in clusters under large rocks during the day, were found active in great numbers on the desert floor during the hours following dusk, where their slow movements probably make them an easy prey for the lizards. In addition to scorpions (probably two species one of which may have been a *Buthus sp.*) other invertebrates were also observed, mainly spiders, grasshoppers and locusts. The scorpions were found during the daytime under rocks but these other types were usually day active.

ACKNOWLEDGEMENTS

Mr. Ken Umpleby spent many hours in the field assisting the author in the collection of specimens for this and other reports. Arthur Holliday developed the photographs. Helen Meek typed the manuscript and assisted with the fieldwork.

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OBSERVATIONS ON NEOTENY IN THE SMOOTH NEWT

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Neoteny in newts is the condition where the larvae fails to metamorphose, and in some species is able to breed in this condition, for instance as in the Axolotl. Many of the newts exhibit partial neoteny, a condition where the gonads fail to develop. This condition seems to be more common than true neoteny, and has been recorded in the Alpine Newt, and all three of the British species (Smith 1969). In some cases the specimens may be very pale in colour (Smith's book has a good photograph of such an individual), and this has been suggested to be due to a fault in the pituitary gland. In many cases, however, neoteny has been reported to be influenced by either diet, light, temperature or rainfall.

The object of this article is to note the observations I have made on neotenous newts at a pond near Sunderland since the tender age of 7! The neotenic individuals were found in two large cooling ponds at Ryhope Pumping Station, a steam engine once used by the Sunderland and South Shields Water Company who built it in the mid nineteenth century. The pumping station is now preserved by a conservation group, and run on bank holidays. The cooling ponds have vertical sides with an overhanging rim all the way round the edge, and are approximately 2m deep. I remember both being full of water in the 1960's, but since then one has started to leak, and is now dry, while the other is only half full. The ponds have held large populations of Smooth Newts for as long as I have been going there, and were also used by a breeding colony of Common Toads. Recently the base of the drained pool has tended to flood and form shallow pools, and is used by small numbers of Common Frogs. Quite how the various amphibians escape from these pools is difficult to imagine, particularly for the anurans, and it is the case that juvenile toads seem to linger about the wells of the pond, and can be seen clinging to projections on the limestone blocks used to construct the pool. Adult toads are only very rarely observed in the pond so that they obviously have some method of escape. Sometimes newts can be found hiding in crevices between the limestone block.

The first neotenous individual was caught in 1967, and was of adult size. The specimen was taken to school and kept on our nature table for a week, after which time it escaped and fell into a bucket of varnish (confessions of so-called conservationist time!). Another neotenous newt was captured in 1970 by a friend, but it was not until I read Malcolm Smith's book in 1974 that I realised the significance of these specimens. I returned to the ponds and from a sample of 27 newts that I captured, three were neotenous. These three specimens were taken home and kept in a warm aquarium. All three were over 7.5cm long and had thick bushy gills. After a period of about one week these were noticeably starting to be resorbed, and within a few days all three animals had metamorphosed. The interesting thing was that once metamorphosis was complete the secondary sexual characteristics immediately became very obvious (i.e. a more swollen, dark cloaca in the male, and the differently patterned bellies), unlike the situation in normal metamorphosing larvae, which retain colouration typical of the female for a number of years until they are mature. I do not know if the newts were mature before metamorphosis , but Walhovd (1975) reported a neotenous female of this species laying fertile eggs in captivity.

All the specimens therefore that I have collected have metamorphosed within a few weeks of removal from the ponds, and therefore these observations are similar to those reported by Frazer (1973) who found that large tadpoles of the Crested Newt when removed from steep sided pools metamorphosed within one week after being kept in an aquarium containing water from the same pond.

It seems to me that this condition is probably induced by low temperatures. Beebee (1983) noted that when Natterjack tadpoles were kept in cold water they grew much larger than siblings kept at higher temperatures, and similar observations for other amphibian species have been reported by other workers. Smith reported the suggestion that steep sided pools made it difficult for the newts, to escape, and so favoured the production of neotenous individuals. Although escape from the Ryhope pools was probably hindered by the steep sides, and the overhang, I feel that the condition was probably induced by low temperatures. In recent years I have used max — min thermometers to record temperature differences between steep sided and gently shelving pools. Between 17.4.84 and 12.5.84 the maximum and minimum temperatures recorded in the steep

sided pool ranged from 8.5-19C, while another pool with gently shelving edges ranged from 1.0-28C. Clearly the pool with vertical sides experienced higher minimum temperatures, and much lower maximum temperatures than the other pool. It is likely that the pools at Ryhope, which were twice as deep as the steep sided pool whose temperatures I noted above, and in the cooler climate of the north — east of England were even colder, and it was probably this factor that induced the partial neoteny in these animals.

It would be interesting to carry out further work on animals from this pond, but unfortunately, (as reported by Banks and Laverick, in press) since the mid 1970's the Sunderland and South Shields Water Company now empty the ponds each year for cleaning purposes. This used to be done in April, and the result of this was the extinction of the Common Toad at the site. Following a request by myself in 1980 these pools are now cleaned out at an earlier date, but this was too late to prevent the exinction of Common Toads at the site. The Smooth Newt still persists at lower densities in the pools, and with the co-operation of the water company should continue to thrive, but it is a great pity that any neotenous individuals will be killed when the pool is cleaned each winter.

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FROGS AND COLLECTION IN CORNWALL

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INTRODUCTION

Smith (1953) estimated the demand for frogs *(Rana temporaria)* by British laboratories to be about 150,000 p.a. By 1970, the requirement had probably changed little with the largest dealer in Britain supplying about 85,000 p.a. (Cooke, 1972). While most of the frogs were collected in Southern Ireland, many originated from Cornwall. In addition, as many as 100,000 p.a. might have been collected by schools for their own use (Kelly and Wray, 1971). Since then, dissection of the frog has been more or less eliminated from school examination syllabuses (Cockrane and Dockerty, 1984), and the overall demand has fallen considerably. Under the Wildlife and Countryside Act, 1981, dealers must now be licensed by DoE and must send in returns at six-monthly intervals stating how many frogs have been sold. Returns for 1983 stand at a total for UK dealers of 59,700 of which 14,200 originated from Cornwall and 42,800 from Southern Ireland. For 1984, these figures were 59,700, 14,700 and 27,900 respectively. While not all dealers are licensed or are making return, these figures are consistent with a reduction in demand.

Although the Cornish frog population has had to withstand the brunt of collection on the British mainland, there was no indication of any overall impact on population levels either up to 1970 (Cooke, 1972) or during the 1970s (Cooke and Scorgie, 1983). Indeed, the Cornish frog population appears to have changed little in recent decades, unlike most populations elsewhere in Britain. Nevertheless, the DoE statistics have confirmed that Cornwall remains a 'hotspot' for frog collection and there has been concern expressed by Cornish people about the activities of the collectors. A possible complicating factor is that increases due to the creation of garden ponds may have compensated for losses in traditional field sites because of collection or other influences, and so masked any effects. The aims of this enquiry were to attempt to determine (1) whether significant changes had occurred in the Cornish frog population during the early 1980s and (2) whether population in any particular localities might be at risk from collection.

METHODS

Questionnaires were distributed during the spring of 1985 to about 50 individuals and schools who had helped with the previous enquiries of Cooke (1972) and Cooke and Scorgie (1983).

The questionnaires asked for information on local changes and specifically asked for details about collection.

In addition, Jim Wright, recorder of amphibians and reptiles for the Cornwall Trust for Nature Conservation, appealed through the media for information on numbers of frogs seen in 1985.

RESULTS

A total of 14 correspondents volunteered information via the questionnaires for the following areas: Bodmin, Launceston, Liskeard (2), Lizard, Newquay, Porthleven, Redruth, St Ives, St Stephen, Saltash, Torpoint, Truro, Upton Cross. Comments on population fluctuations during the early 1980s could be summarised as follows:

No change or no general trend	6
Already extinct locally	1
Increase	3
Decrease	4

The reports of increases included one of a recovery following a decline in the 1970s and one of a population being introduced into a school pond. From this information, there seemed to have been no marked trends. Several of the correspondents were aware of the prosecutions and of the advertisements for frogs in local newspapers, but only one provided new information. This concerned an episode at Tremboath near Stithians (Truro), where collectors were twice caught with frogs on private land and reported to the RSPCA.

The appeal by CTNC resulted in information from about 40 localities. Long term decreases were reported from Lowertown (Helston) and Luxulyan (St Austell). Recent decreases were mentioned for Devoran (Truro), Nanstallon (Bodmin) and St Martin-by-Looe, while decreases specifically in 1985 were recorded for Porthleven, Cheesring (Liskeard), College Woods (Penryn), Tolvadden Downs (Camborne) and Clowance (Camborne). Only from a garden pond in Carharrack (Redruth) was there a report of more frogs in 1985.

DISCUSSION

From the various reports received, it seems that while there have been some decreases in frog numbers in the wider countryside in Cornwall, these have been more or less offset by gains in garden ponds. No evidence was received that collection has had any observable impact on frog populations.

The questionnaire enquiry on changes in areas revealed little recent change, whereas the survey of specific sites or localities in 1985 indicated several decreases. Individual discrete populations are likely to be prone to greater fluctuations from year to year than are populations spread through an area and observed over half a decade. 1985 was evidently a bad year for frogs in a number of localities. One reason for this may be death of frogs trapped under the ice during the early spring of 1985. Such mortality is known to have occurred in Cornwall (J. Wright, pers. comm.) and quite widely in England generally, but it is possible that collection might also have been involved to some extent. Certainly there is some local concern that, despite the long-term trend towards less collection, the increased publicity recently has attracted more people to attempt to make a quick and easy profit. Additionally, many frogs that are collected evidently do not survive long enough to be sold and therefore do not appear in the DoE statistics. The situation requires further monitoring. Accordingly, NCC and CTNC are discussing with the Education Authority a schools project for 1986.

ACKNOWLEDGMENTS

I am very grateful to everyone who has helped, especially Jim Wright.

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SPUR-THIGHED TORTOISE *(TESTUDO GRAECA)* WITHOUT THIGH SPURS

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Testudo graeca Linnaeus, 1758 is one of the world's best known tortoises. It has been imported into Britain as a pet in numbers hovering around 100,000 a year (Lambert, 1980). One of its key characteristics, conventionally used (with or without others) to distinguish it from congeners in the Mediterranean Basin and Southwestern Asia, is the thigh spur: on either side of the tail, on the back of the thigh, there is a conspicuous conical tubercle, as shown in Fig. 1A (Wermuth and Mertens, 1961; Başoğlu and Baran, 1977; Arnold, Burton and Ovenden, 1978; Payne, n.d.). Indeed, all of 78 specimens of *T. graeca* sspp. examined in the Zoological Museum of the Department of Zoology, Hebrew University of Jerusalem, clearly possess this identification mark. (The tubercles were small but distinct in HUJ-R 933,♂). So did hundreds of individuals which I have examined in the field throughout northern Israel, including the smallest juveniles.

This contrasts with the frequent variation in another supposedly diagnostic character, the single (unpaired) supracaudal plate. Among 83 specimens (the same plus five carapaces), it was divided (paired) in 7, and "pseudodivided" (coloration only) in 2, approximating 10%.

A herpetological survey of the deciduous Tabor oak *(Quercus ithaburensis)* forests near Allone Abba, Israel (32°45'N, 35°10'E) was conducted by my herpetology class and the Israel Herpetological Information Center (Society for the Protection of Nature in Israel) on 23-24.V.1984. We found there an adult female *Testudo graeca terrestris* Forskål, 1755 which was exceptional in totally lacking thigh spurs. The postero-ventral skin of each thigh comprised sub-equal small scales without the least indication of a tubercle (Fig. 1B). In all other respects this individual was normal, including the supracaudal plate (single) and tail structure (characters which aid the distinction from *Testudo hermanni*). Unfortunately, under the influence of conservation-oriented students, the specimen was not retained but only photographed on the spot (filed, Werner films nos. 559 & 665) and released.

It remains unproven whether the aberration observed was genotypical or only phenotypical. But its occurrence seems to further illustrate a bipartite truism. First, it is only natural for any character usually employed in distinguishing between related taxa, to occasionally vary also within the taxa. If the character never underwent mutation, how could it vary between related taxa? Second, it would be unsound to base identification keys on single characters, even relatively stable ones.

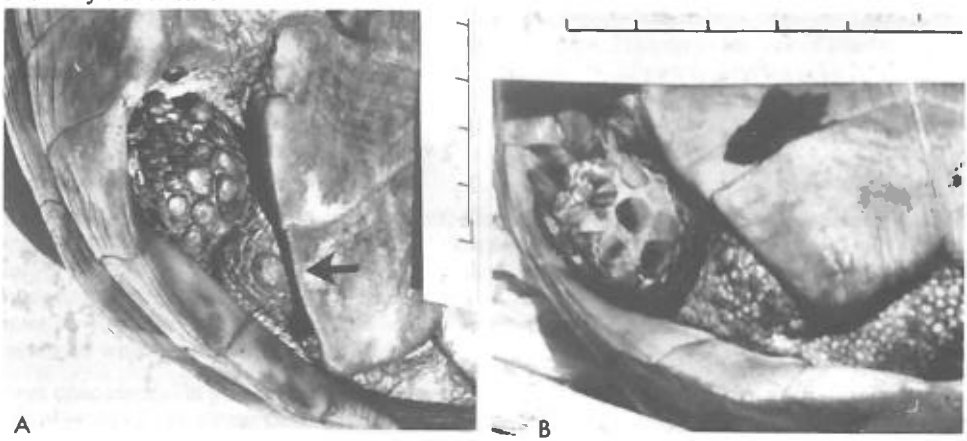

FIGURE 1

Posterior ventral area of *Testudo graeca terrestris* individuals from northern Israel. A, female from Mt. Hermon, 1400m (lent alive by the Bet Ussishkin nature museum of Qibbuz Dan, photographed 22.V.1973), showing thigh spur (arrow); B, female from near Allone Abba (photographed 24.V.1984 in the field), showing absence of thigh spur. (Scale, centimeters.)

ACKNOWLEDGEMENTS

I thank Eytan Avital, Amos Bouskila, Gad Perry and Sylvie Fridman for manifold assistance with students and reptiles; Avi Shmida and the Bet Ussishkin nature museum for loan of the tortoise in Fig. 1,A; A. Niv for preparing my photographs for the press; and S.C. Anderson and H. Wermuth for commenting on the manuscript.

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HYLA RUBRA: A CASE OF ILLEGAL IMMIGRATION

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Daudins treefrog *(Hyla rubra)* is a species more commonly encountered in South America, and therefore when a specimen was found by my parents in Hexham market (Northumberland), it created quite a stir! This specimen had been expatriated as a result of taking refuge in a bunch of banana's which were subsequently exported by Fyffes. When the fruit was being sorted out in the shop the traveller leapt out, to the horror of the shop assistant, and was thrown onto the street, where my mother found it sitting on the edge of the curb.

This specimen settled down in captivity, and was identified with the help of the British Museum, as *Hyla rubra rubra* (Daudin, 1802). This subspecies is part of the *Hyla rubra-Hyla x-signata* complex, (Lutz, 1973). The animal was olive brown, on the dorsal surface, with two parallel dark dorsolateral stripes, separated by a cream interval. These stripes ran from the rear of the eyes, to the base of the hind limbs. The dark stripes were often interrupted by pale patches, characteristic to each individual, allowing them to be identified. There was also a thin stripe from the front of the eye to the nostril, and some dark barring on the hind-limbs. The ground colour varied in shade from dark brown to pale olive depending on the substrate, and degree of illumination of the vivarium. The skin was slightly verrucose.

At the time the first specimen was identified, I was unable to obtain much information on secondary sex characteristics, except that the females were larger, and the males of a preserved sample had slight vestiges of pigment on the chest. Subsequent publicity about the treefrog on television and in the local papers resulted in more specimens being found and sent to me, so that I received 10 more specimens between 1976 and 1978 from as far afield as London and Glasgow, all imported into Britain in the same manner as the original specimen. Observation of these specimens showed that the larger females (up to 35mm long) had a dirty white throat and belly, while the smaller males (the largest was 29mm long) had a yellow belly, getting paler to the posterior end of the animal. The throat was most brightly coloured, presumably due to the presence of the vocal sac. Further confirmation of the sex of these specimens was obtained when only the males were observed croaking. The sound was reminiscent of that produced by rubbing the edges of two 10p coins together, one held perpendicular to the other. The call was repeated at intervals of 1-2 seconds, and was not particularly loud.

When they first arrived the treefrogs were very thin, and often were rather weak, a result of a three week voyage at a temperature of about 50°F. All of the treefrogs given to me soon displayed an active interest in food, although the first attempts at feeding often failed. As they grew stronger they were more efficient at catching their prey. Flies up to the size of bluebottles, moths and small spiders were all taken readily, although mealworms were usually refused. I remember one small frog, about 20mm long, managing to swallow a large bluebottle almost its own size. They were very agile and food was often taken in mid-air. Obtaining food in the summer was easy, but in the winter they took bluebottles, obtained as "gentles" at a local fishing shop.

When maintained at room temperature they fed readily, but a slight increase in temperature was required to induce calling. They were largely corpuscular/nocturnal, although food was taken during the day when they were hungry. They survived well in captivity, with several specimens living for 3 years after importation. The main problem with them was that being so agile (much more so than the less streamlined European species of *Hyla*) they were prone to escape if presented with the opportunity.

I was unsuccessful in persuading them to breed, although the males called frequently, and a pair was observed in amplexus once. I no longer have any of these delightful amphibians, although they continue to appear in the country: I know of one that arrived in Scotland last year, but which died a few weeks after arrival. If anybody has succeeded in spawning this species, or has any information on their ecology in their native lands (the Guianas, and Brazil, mine came from Surinam — Dutch Guiana), I would be pleased to hear from them.

ACKNOWLEDGEMENTS

I would like to thank Miss A.G.C. Grandison of the British Museum for help with identifying the first specimen.

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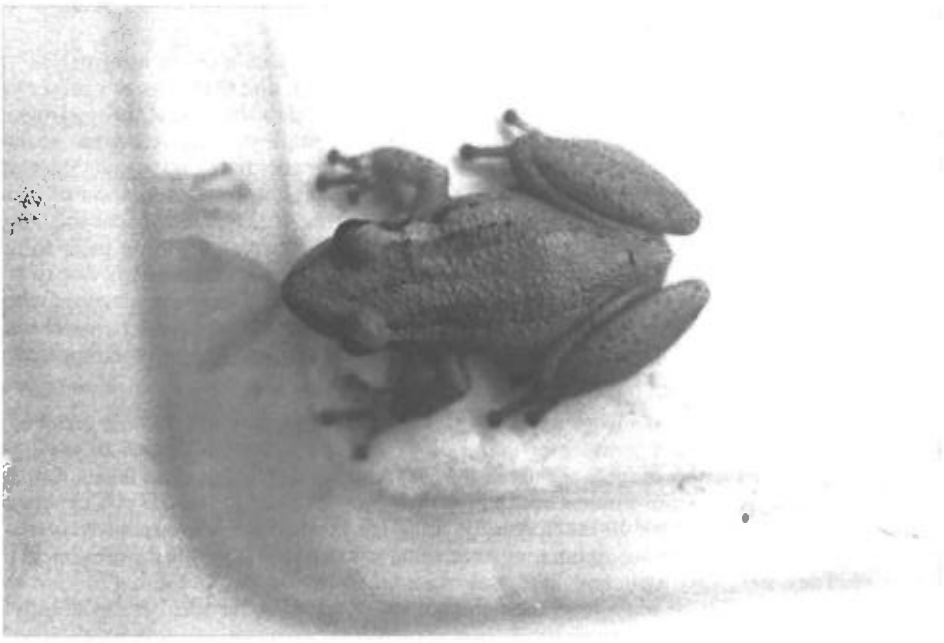

PLATE 1

Male Daudins treefrog *(Hyla rubra rubra),* the first specimen caught in Hexham, length — 25mm.

LETTERS TO THE EDITORS

Dear Sirs,

In discussing the possible routes by which the Natterjack might have colonised Ireland, Trevor Beebee does not refer to the two old records of "frogs" in Co. Waterford, one by Giraldus Cambrensis in the late 12th century and one in 1630. Since there is no firm evidence that *Rana temporaria* occurred in Ireland before the known successful introduction in Dublin in 1699, these records, which must presumably refer to some species of frog or toad, are as likely to have been Natterjacks as Common Frogs. This lends a slightly more plausible air to Beebee's second, more direct route for the colonisation of Ireland by the Natterjack. Either or both records could, of course, refer to any of the European frogs or toads that somebody had taken it into his head to translocate. But the coincidence of both old records in the same south-eastern county does suggest some sort of continuity.

For the documentation of the above records, see my *The Ark in Our Midst* (1959).

R.S.R. Fitter
Drifts, Chinnor Hill, Oxford OX9 4BS
February 14, 1984

Dear Sirs,

STORAGE OF SPERM IN NEWTS

This spring as well as last spring, as a result of a close watch on the Smooth Newts in our garden pond, I noticed an early burst of egg laying in mid-March continuing until the first week in April. Commenting on a similar observation for an Oxfordshire pond, Deryk Frazer in 'Reptiles and Amphibians in Britain' suggests that a very early courtship by overwintering newts could result in this early egg laying. However, no Smooth Newts at all overwintered in our pond, which is the rule, and the males began courtship only after some eggs had been laid, so the males were not fertilising these eggs. Besides this, the females avoided courting males until early April, swimming away from them invariably. If we dismiss the possibility of females laying a batch of sterile eggs, or parthenogenesis, which both seem rather unlikely, then it is clear that these eggs are fertilised using last year's stored sperm.

There was further evidence of this with the Crested Newts. This time, egg laying began in late March, before any males were in the pond. It was several weeks before the males had come into breeding condition, during which time the two females had laid nearly 100 eggs between them.

An early burst of egg laying, as soon as a female enter the pond, could well be a form of insurance. Both the female and the species as a whole would benefit if the female was later predated, since the production of some eggs, despite their old genetic combination, is better than no eggs at all. Early egg laying also gives the larvae more time to develop in cold summers, which is important for the Crested Newt larvae, needing at least 5 months to develop into newtlets.

I would be interested to know if other newt watchers have noticed this in the same species or in any other newts. Delayed fertilization has been noted in the closely related Fire Salamander.

William Atkins
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LETTERS TO THE EDITORS

Dear Sirs,

I feel moved to write in support of Mark Jones' sentiments expressed in his article on Adders and the DWAA.

For some years up to 1977 I had been breeding Adders in aquaria, indoors. I had exactly the same problems as Mark when I applied for my license and it was some months before it was grannted, in fact I suspect that had I not been M.I.Biol. it would not have been granted.

I consider that it is nonsense for this snake to be included in the Act, especially as our only other potentially dangerous animal is the fox which is excluded.

Do we have the support of the Society on this matter? If not why not?

In conclusion the only constructive advice I can offer Mark is to keep his Adders indoors and at least he may be saved the sight of barbed wire in his garden!

Yours faithfully,
Adrian Barnes,
22 Milton Grove, Locksheath, Southampton

Dear Sir or Madam,

This musuem has a (live) albino toad, which was found locally in 1983, and this Spring I was shown a garden pond in Leeds with albino frogs breeding in it. I am planning an article on these animals for the Bulletin of theY orkshire Naturalists' Union, and I should like to include brief details of other British populations which contain albinos. Could you or your members supply me with brief details of such colonies? Any assistance will, of course, be duly acknowledged.

Yours faithfully,
William A. Ely,
Keeper of Natural History, Clifton Park Museum

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Articles, news items, notes and letters on any aspect of herpetology are needed for the Bulletin. Contributions should, if possible, be typed. Handwritten items should be clear and legible. All contributions should be double spaced and on one side of the paper only. They should be sufficiently presentable to be given directly to the printer. Contributions are urged wherever possible to follow the "Instructions to Authors" printed on the inside back cover of the British Journal of Herpetology. Titles, headings and sub-headings should be in block capital letters, but not underlined. Only latin names should be underlined. The name and address of the author should immediately follow the main heading, except in letters. Photographs can be reproduced only from good quality black and white prints. Reprints of articles can be supplied to authors. These must be requested from the Editors before the Bulletin goes to press.

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