

### BRITISH HERPETOLOGICAL SOCIETY c/o Zoological Society of London, Regent's Park, London NW1

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

## **OFFICERS 1980**

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Chairman, Conservation Committee	Dr T. Beebee
Education Officer	Mr V. Taylor
Committee (Main)	Dr A.J. Millwood Mr K. Corbett Dr I.R. Swingland Dr A.S. Cooke

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

Mr J. Webster

John Pickett 84 Pyrles Lane Loughton, Essex.

### **REMAINING MEETINGS FOR 1980**

All meetings start at 7 pm and are held in the Lecture Theatre of the Linnean Society of London, Burlington H ouse, Piccadilly, London, W1., unless otherwise stated.

- JUNE 24th Care and breeding of amphibians. An open meeting and discussion to which members are encouraged to contribute. Live animals and slides welcome.
- JULY 9th Visit to the London Zoo. An informal meeting organised by the Captive Breeding Committee, held during a Members' Evening of the Zoological Society of London. B.H.S. members should meet at the Fellows' Entrance in the Outer Circle of Regent's Park at 7 pm. If the party has already entered the Gardens, please tell the gateman that you are with Mr Peter Bennett or Mr Simon Townson.
- AUGUST 23rd Special Saturday meeting organised by the Captive Breeding Committee, to be held in the Zoological Society of London Meeting Rooms, Outer Circle, Regent's Park, London, NW1 (The Meeting Rooms are sited next to the Zoo Library and Offices, approximately opposite the Fellows' Entrance to the Zoo).

Time of Meeting: 1 pm to 5 pm. There will be three speakers:

- Mr B. Langerwerf (Netherlands Herpetological Society). Breeding Lizards in captivity on a large scale. (Mr Langerwerf is probably the world's most successful breeder of lizards).
- 2. Dr Antony Millwood. On the Care and Breeding of Captive Amphibians.
- 3. Mr Simon Townson (Chairman, B.H.S. Captive Breeding Committee, Department of Medical Helminthology, London School of Hygiene and Tropical Medicine, University of London). The Herpetology of the Cayman Islands, with particular reference to Iguanas of the genus *Cyclura*, and the Cayman Turtle Farm.
- SEPTEMBER 24th Care and breeding of reptiles. An open meeting and discussion to which members are encouraged to contribute. Live animals and slides welcome.
- OCTOBER 21st Dr R. E. Stebbings (Conservationist, Institute of Terrestrial Ecology, Monks Wood Experimental Station). The Natural History of the Grass Snake in Dorset.
- NOVEMBER 26th Dr E. N. Arnold (Reptile Section, British Museum). The Decline of the World's Giant Tortoises.

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## **NOTE TO MEMBERS**

From this issue, the 'Newsletter' has been succeeded by the 'Bulletin', as announced in the December 1979 issue of the 'Newsletter'. The purpose of the 'Bulletin' will be to publish news, meetings programmes, informal articles and papers on all aspects of Herpetology, and members' letters and advertisements. We would like to increase the international interest of the 'Bulletin', and welcome news, correspondence, and articles from foreign herpetologists. Material is now required for the next issue.

### **Subscriptions**

Subscriptions for 1980 became due in January; because of the Society's precarious financial position, prompt renewal of subscriptions would be appreciated from those who have not paid.

## NEW EUROPEAN HERPETOLOGICAL SOCIETY

May we inform you that, in the course of thorough discussions in Bonn on 10th and 11th September 1979, 24 Herpetologists from 8 European countries have founded the

### SOCIETAS EUROPAEA HERPETOLOGICA (SEH)

The aims of this new association are to further scientific research, to participate in all problems regarding the conservation of amphibians and reptiles, and to encourage closer collaboration between Herpetologists. The SEH intends to realize this not only by organising meetings, congresses, and symposia, but mainly by publishing a new journal "Amphibia-Reptilia", devoted to scientific papers on all aspects of herpetology.

The residence of the SEH is, officially, in Bonn, F.R. Germany, but the following Executive Council has been elected:

President:	Dr Josef Eiselt, Vienna, Austria
Vice-President:	Dr Jean Lescure, Paris, France
General Secretary:	Dr M.S. Hoogmoed, Leiden, Netherlands
Vice-Secretary:	Dr Alfredo Salvador, Leon, Spain
Treasurer:	Dr Heinz Wermuth, Ludwigsburg, F.R. Germany
Vice-Treasurer:	Dr Franz Tiedemann, Vienna, Austria
First Co-Editor:	Dr Helmut Hemmer, Mainz, F.R. Germany
Second Co-Editor:	Dr Alain Dubois, Paris, France

Membership is open, worldwide, to all interested persons and institutions. Admission is submitted to approval of the Council. Membership dues for individuals are 70.-DM (140.-DM for institutions) for 1980, which will include the price of the journal, the first issue of which will be published early in 1980. For membership kindly apply to the Treasurer:

Dr Heinz Wermuth, Museum f. Naturkunde: Zoologie Arsenalplatz 3 D-7140 LUDWIGSBURG, F.R. Germany

Manuscripts by members of the SEH only, intended for publication in the journal, will be accepted by either of the two Co-Editors:

Prof. Dr Helmut Hemmer	Dr Alain Dubois
University Institute of Zoology	Laboratoire Reptiles et Amphibiens
Postfach 3980	Musee Nat. d'Histoire Naturelle
D-6500 MAINZ	25 Rue Cuvier
F.R. Germany	F-75005 PARIS France

All members of the Executive Council invite you to join the SEH in membership, and are ready to provide you with all information wanted. December 1979, on behalf of the Executive Council:

Dr M.S. Hoogmoed, Secretary General SEH Rijksmuseum v. Natuurlijke Historie Postbus 9517 NL-2300 RA LEIDEN Netherlands Dr Josef Eiselt, President SEH Naturhistorisches Museum Postfach 417 A-1014 WIEN Austria

N.B. Subscription price for non-members can be obtained from Akademische Verlagsgesellschaft, Bahnhofstrasse 39, Wiesbaden, B.R. Deutschland.

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## WILDLIFE INTRODUCTIONS TO GREAT BRITAIN (1979)

The B.H.S. received a letter from the Nature Conservancy Council (NCC) International Branch, requesting comments on a Discussion Paper produced by the UK Committee for International Nature Conservation. An independent Working Group on Introductions, under the chairmanship of Mr I. J. Linn, was set up to provide independent scientific and professional facts and opinion on introductions of plants and animals, in order to facilitate the formulation of official policy.

With this aim in mind, comments were welcomed from individuals and organisations, in order to achieve, as far as possible, a consensus in the formulation of such a policy. The Working Group decided to produce its report in the form of a discussion paper, which, it was hoped, would generate further amendments and comments on the subject of introductions.

The letter dated 23rd May 1979, requested points by the 29th June 1979.

In consultation with the Conservation Committee, Dr Lambert, on behalf of the B.H.S. made the following points on the NCC Working Group's Discussion Paper, copying them to the Conservation Committee with a silent copy to the President:-

"Thank you for your cyclostyled letter of 23rd May 1979 inviting comments on the Discussion Paper written by your Working Group on Wildlife Introductions to Great Britain, May 1979.

I have some comments to make on behalf of the British Herpetological Society (B.H.S.).

Since amphibian and reptile species introduced to Britain have been listed in a separate annex (p 27) based on the work of Sir Christopher Lever, it would probably have been helpful if the B.H.S. had been approached a bit earlier (see Preface) for discussions on reintroductions within Britain. The B.H.S. Conservation Committee has had a lot of experience in this field in connection with the conservation of the three rare species of British Herpetofauna. Their experience may well be relevant to any other similar work carried out abroad.

I enclose a copy of 'The Policy' published by the B.H.S. Conservation Committee in 1973 (British Journal of Herpetology, 4(12), 339-341). You will see where I have drawn attention to the relevant section on the re-introduction of species.

Amphibians and reptiles do not usually spread naturally, with the exception in Britain of the introduced and alien marsh frog, *Rana ridibunda*, in its unusual habitat of dykes and drains on Romney Marsh in Kent. They therefore do not readily fall into any of the categories specified in the discussion paper. It is agreed, however, that species alien to Britain should not normally be introduced.

Translocations and re-introductions are part of the B.H.S. policy for the conservation of the rare British Herpetofauna. It can involve, normally experimentally, the translocation and subsequent re-introduction of individuals of a species (e.g. sand lizard, Lacerta agilis, and smooth snake, Coronella austriaca) from one part of the country (e.g. Dorset) where there are (doomed) thriving colonies to other parts (e.g. Surrey) where in the present-day suitable habitat (in this case mature, dry heathland) the species may or may not still occur in low numbers. Importantly, this involves stock nationally i.e. from the same Country. On this basis, we agree with Para. 23: a, b and d on p 16, but not strictly c. Para. 23c is too vague and can lead to unfortunate misunderstandings. There is a little information on the genetic effects of mixing populations in the case of reptiles and this leads to controversy based on speculation rather than on field evidence. Such niceties as genetical integrity may in this instance have to give way to the needs of a species' survival or conservation in the Country. In the case of rare British Herpetofauna, translocation and reintroduction can assist in their conservation since they have limited powers of dispersal and are restricted closely by habitat type. It would be useful to note that the B.H.S. Conservation Committee has reported high levels of success in their attempts to re-introduce the sand lizard.

With reference to Para. 16, p 11, experimental re-introductions have been successful in the case of the sand lizard, but have failed in the case of the natterjack, *Bufo calamita*. In both instances, particularly in the case of the latter, much has been learnt about the species' requirements (see NCC policy on the Conservation of rare British Herpetofauna based on discussions in a Group organised by Dr B. O'Connor, NCC Deputy Director). Sometimes the only means of conserving a species can be established by carrying out

experimental re-introductions.

With reference to Para. 10. p 6, it should be noted that controlled re-introductions of rare British Herpetofauna can be a positive tool in their conservation and the maintenance of populations in reasonable (viable) numbers.

The SPNR Policy (p 21) is too regional for national consideration. Genetical effects of introduction or re-introduction should be considered on an international or intercontinental level. Heavy genetical considerations are not relevant in the main for amphibians and reptiles (see earlier). Translocations or re-introductions within a Country should normally be habitat associated e.g. heathland to heathland, dune to dune etc, within the largely similar climatic range of the Country.

In the WWF Manifesto (P 22), the B.H.S. fully agrees with the point 1 under Section C (p 23): Introduction. The introduction stock should be from the closest possible race e.g. the re-introduction of *Testudo graeca* to S.W. Spain from N. Morocco and not from W. Turkey; the hypothetical introduction of *Lacerta agilis* to England from Holland, say, and not Romania or S.W. Russia, or *Bufo calamita* from Belgium, say, and not Spain.

I hope these few points and the enclosed copy of the B.H.S. policy on re-introducing rare British species will be helpful.

Thank you for showing the Discussion Paper on Introductions to the B.H.S."

M.R.K. Lambert (B.H.S. Secretary) London, 29th June 1979

For further reading:-

- Frazer, J.F.D. (1964). Introduced species of amphibians and reptiles in mainland Britain. British Journal of Herpetology, 3, 145-150.
- Lever, C. (1977). The naturalized animals of the British Isles. London: Hutchinson. 600 pp.
- Nature Conservancy Council (1979). Wildlife introductions to Great Britain. The introduction, re-introduction and restocking of species in Great Britain: some policy implications for nature conservation. Nature Conservancy Council, London, on behalf of the UK Committee for International Nature Conservation. 32pp.
- N.B. It is hoped that the Conservation Committee will review this last publication, for the British Journal of Herpetology, together with the NCC's National Policy for the Conservation of Endangered Herpetofauna and their Habitat (in preparation). Copies of Wildlife introductions to Great Britain are available from the Nature Conservancy Council, 20 Belgrave Square, London SW1X 8PY. Price £1.20, incl. postage.

### M.R.K.L.

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## FROM THE BEGINNING – BHS PUBLICATIONS AND ORGANISATION ANNOUNCEMENTS

On 1st August 1947, the Hon. Secretary of the British Herpetological Society, Mr Alfred Leutscher, circulated a *Bulletin* saying that the Society was successfully inaugurated on 11th July in London.

It was decided that the Society's publications should take the form of:-

- a) A Bulletin to be issued to members, as and when necessary, to convey information as to the Society's activities, meetings, progress, etc.
- b) A Journal of proceedings, free to members, to be published annually, and containing work submitted by members.
   The work and abjusts of the Society were:
  - The work and objects of the Society were:-
- a) To encourage further study of all branches of Herpetology in this Country and in Europe.

b) To promote friendship and cooperation between members by organising intercorrespondence, meetings, field-outings, etc, when and where convenient.

The following members were elected as the first Officers of the Society:-

President: Dr Malcolm A. Smith (British Museum (Natural History), London) Hon. Secretary & Treasurer: Mr Alfred Leutscher (British Museum (Natural History), London)

Hon. Editor: Dr Angus d'A. Bellairs (Department of Anatomy, London Hospital)

Ordinary Committee members:-

Dr Helen Spurway (Department of Zoology, University College, London) Mr H W Parker (British Museum (Natural History), London)

During the discussion at the inaugural meeting, Dr Smith stressed the great importance of a study into the habits and ecology of reptiles and amphibians as much had yet to be learnt in this field. It was felt that here was an opportunity for amateur and professional alike.

Meetings would be held initially in London and with an increase in membership from outside, regional meetings could also be considered.

It was felt, in view of expenses and the desire to produce a good publication, the Journal should be left in the hands of the Committee.

The Bulletin was subsequently referred to as the *Notice* and No. 2 was circulated in September 1947.

The work and objects of the Society were amended to read:-

- a) To encourage the study of Herpetology, in particular of this Country and Europe.
- b) To publish a Journal containing papers and reviews on all aspects of Herpetology.

The first issue of the Journal would contain a paper by Col R. N. Taylor, OBE, on the distribution of amphibians and reptiles in Britain.

The Society's first General Meeting was held on 26th September 1947 at University College, London, and, although only attended by 17 members, was very successful and stimulating.

As an alternative to such names as *Coronella* or *Anguis*, it was agreed by the majority of members, as the result of a questionnaire, that the Journal should be called 'British Journal of Herpetology' and this was announced in Notice No. 4 (January 1948).

A Membership Register was also produced and circulated with amendments to keep it up to date as more members joined the Society.

Additional Committee Members were elected at the AGM 1948, held in the Linnean Society's rooms, Burlington House, London, in September:-

Major Maxwell Knight (auditor)

Mr J. W. Lester (Curator of Reptiles, Zoological Society of London)

Mr B. M. Smith (vivarium keeper and breeder)

Dr Helen Spurway's resignation was regretfully accepted. Ordinary Committee Members now numbered four.

It was announced in Notice No. 14 (July 1950) that two branches would probably be formed within the Society: a London Branch and a Northern Branch. The inaugural meeting of the proposed London Branch was fixed for 12th October 1950, and another for the Northern Branch at Timperly, Cheshire. The Branches were approved by the Committee, any person being permitted to join any branch, wherever he may reside, provided he first became a member of the Main Society. The branches were formed in response to many requests, and should be of special interest to beginners in herpetology, since one of their aims is to encourage the study of reptiles and amphibia in the vivarium. It was recommended certain principles be adopted:-

- 1. a Branch shall follow, in general, the aims and objects of the Parent Society.
- 2. a Branch shall become self-supporting, run its own programme and select its own body of Officers. Fixtures should not coincide with those of BHS General Meetings.
- 3. Branch membership shall be restricted to those already members of the Parent Society.
- 4. Any major change in policy of a Branch shall be subject to approval of the Parent Committee.

In Notice No. 16 (June 1951), the Secretary drew attention to the importing of tortoises during winter months which was raised during AGM 1951. A resolution was passed deploring this winter sale, although the President, Dr Smith, pointed out that the Society could only take an indirect action in stopping this.

It was announced in Notice No. 17 (October 1951), that the Northern Branch had had to be disbanded due to lack of support and internal differences. Dr J. F. D. Frazer was elected onto the Committee in 1951 and Mrs M. Green in 1952.

Notice No. 20, the last, was circulated in October 1952. Mr Leutscher had resigned as Secretary at the fifth AGM (March 1952) held in the Meeting Room of the Zoological Society of London, Regent's Park, and was replaced by Mr J. I. Menzies. 'Agenda and Abstracts of the General Meetings' were subsequently circulated to announce future General Meetings, together with a 'Report of the Auditors and Committee' for AGMs in March.

Dr Malcolm Smith resigned as President in 1955 and in accordance with elections held at the AGM, Dr J. F. D. Frazer was elected President in his place. Mrs M. Green became Assistant Secretary to Mr Menzies, and Secretary, replacing him, at AGM 1957. The Society continued a steady course for the next 12 years.

In 1969, Mr Keith Corbett proposed that a Conservation Committee be formed, and this was chaired by Mr J. W. Steward until 1971, and in January 1970, Mrs Green established the BHS Newsletter No. 1. This has continued until December 1979 (No. 21) with a new format being started by new Joint Editors, Messrs J. Pickett and S. Townson in July 1976 (No. 14).

Mrs Green resigned as Secretary in 1976 and her replacement, Dr Lambert, formerly Assistant Secretary (Conservation) and Chairman, BHS Conservation Committee, was confirmed at the 1977 AGM as Joint Secretary with Mr P. A. W. Bennett. Mr Corbett became Chairman of the Conservation Committee until December 1977, when Dr Beebee replaced him. Dr M. Peaker replaced Dr H. Fox as Journal Editor in 1977.

It was proposed by Messrs Pickett and Townson that a BHS Captive Breeding Committee be formed in 1976. Mr Townson became the first Chairman. The British Journal of Herpetology completed its fifth volume.

It is appropriate at this stage of the Society's development that the name of Newsletter, complementing the Journal, should now be changed to *Bulletin*, as first named when the BHS's inauguration was announced with the circulation of the first notice, 33 years ago.

M. R. K. Lambert, BHS Secretary, c/o Zoological Society of London, Regent's Park, London NW1 4RY

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## **CONSERVATION COMMITTEE ANNUAL REPORT – 1979**

The usual spectrum of activities continued through 1979 with a general increase in intensity of almost all facets of the work.

### 1. Reptile conservation management

A grant of £1,200 awarded by the Nature Conservancy Council was used to fund

clearance tasks, using national and county conservation corps labour, at several heathland sites in Surrey, Dorset and Hampshire between January and March. Conservation committee members supervised and physically assisted with the work, which was designed to tackle some of the most urgent overgrowth problems. The tasks were mainly over weekends but one was for a full week.

Other residential tasks at two major heathland sites in Surrey, in which conservation corps labour was also employed, were also intended to clear important reptile sites and the conservation committee was involved in the planning and supervision of the exercises.

One of the sites sprayed with bracken-killer (Asulam) in 1978 was resprayed during summer 1979; this form of control is expensive but seems to be working well.

During the autumn conservation committee members (joined on one occasion by volunteers from Winchester College) carried out 5 more 1-day clearance operations at heathland sites in Surrey.

Despite all this effort the tasks remaining to be done are prodigious; many of the heathland 'key-sites' are far from adequately cleared and bracken spraying will also need to be pursued intensively at several in the future.

### 2. Amphibian conservation management

Part of the above NCC grant was used to fund heath clearance at the remaining natterjack site in southern England on 3 weekends during early 1979. Birch recoppicing continues to be a major problem in this area, which will certainly need a good deal more attention in the future.

A trip to Cumbria was undertaken in May to liaise with NCC and the Cumbria Naturalists Trust; plans to excavate a total of 14 natterjack ponds at 3 important dune sites were agreed and finalised, and planning permission and funds have been applied for. If all goes well the work is scheduled for summer 1980.

A conservation committee member supervised a pond excavation for natterjacks on Merseyside during November, designed by us but funded and on land owned by the National Trust.

Following conservation committee advice, and partly funded by us, the Norfolk Naturalists Trust excavated a scrape for natterjacks at the only remaining heathland site in East Anglia (now managed as a reserve by NNT).

### 3. Monitoring and research

Fieldwork during spring and summer, and later in September, has continued to confirm the success of heath clearance and of sand lizard reintroductions instigated some years ago by the conservation committee. Evidence of breeding (hatchlings) was apparent in many of these places during the autumn.

Natterjacks used the new Norfolk scrape successfully and also bred in the southern England site, though less successfully with an apparent total loss of tadpoles. Some 400 toadlets were reared up to about 20-25 mm size and released at this latter site as the start of a 3-year programme to try and revitalise this population. Elsewhere in England natterjack breeding success was very variable in 1979; the cold spring caused heavy mortality of larvae in some sites, whereas in others the high water levels produced the largest numbers of toadlets for many years.

One conservation committee member visited the Eire natterjack sites and found good numbers of animals at all the places where they were seen on the last visit (1974) as well as one other.

A study of marsh dykes in Sussex confirmed that these constitute a poor habitat for all the British amphibians even when surrounded by pasture. Only the introduced *Rana ridibunda* seems to do well in such places.

### 4. Education

The conservation committee was represented at the first ever Wildlife Fair held at Marwell Park (Hampshire) in September. Our stall, which included displays of live specimens, was well received and attracted a lot of interest.

### 5. Political developments

There has been essentially no progress towards the publication of the National Policy for Herpetofauna Conservation, which is being put together by NCC following extensive discussions during 1977 and 1978. The conservation committee continued to press for a rapid publication of this important document.

Liaison arrangements between NCC and the conservation committee have been in force (formally) for nearly 2 years now, and in December 1979 Dr Gay of NCC produced a short document outlining how these procedures should operate. This followed correspondence between the 2 organisations during 1979.

Meetings were held between conservation committee members and SE and SW region NCC staff to discuss the continuing shortfall of activity in heathland conservation, with regard to SSSI scheduling, clearance etc. Progress in these areas continues to be slower than we would like, since the effort involved in removing trees from an area obviously becomes greater with every year of waiting around that passes. Efforts to persuade the Forestry Commission to make available more of their heathland holdings in Hants and Dorset also continued, albeit at rather a slow pace.

Major problems in our relationship with NW region NCC were brought to a head by the breakdown of the liaison procedure during a planning application for a golf-course at Formby which will endanger the largest natterjack breeding site in the UK. The outcome has been that the golf course will go ahead, with provisos which attempt to safeguard the breeding site and include the provision of new ponds at each end of the course at the developer's expense. However, the exclusion of the conservation committee from a crucial part of the preliminary negotiations with the developers, as well as other problems such as the failure to pursue sand lizard protection measures on the Merseyside coast, have caused us to make complaints about the NW region NCC and an enquiry along these lines is currently continuing. The establishment of an effective and coordinated conservation lobby in this particular part of Britain, which suffers from more direct assaults from the planners than most others, seems to us essential but not yet achieved after 10 years of trying.

### 6. Internal matters

10 people responded to the conservation committee's appeal for help in the June 1979 newsletter; the result is that we now have improved representation in the far NW of England, a nucleus of assistants in the Merseyside area and 4 more prospective helpers with heathland clearance in the south. We still need more in the latter area; any volunteers, please get in touch.

Financial transactions are summarised below:

Input: 59.53 carried over from 1978 200.00 from BHS main society 1,200.00 from NCC (clearance contract)

Total £1,459.53

- Outlay: £1,200 to pay BTCV, local Conservation corps & conservation committee members (travel costs only) for heathland clearance tasks. £66 to pay later BTCV invoice for accommodation during tasks.
  - £89.93 for: Dorset development plans, 2 sweep nets to provide vivarium food, entrance fee to Wildlife Fair, contribution towards NNT natterjack scrape, headed notepaper, and herbicide.
    - £100 towards Committee members travel (other than on NCC contract work). £25 of this went towards the May Cumbria trip, which actually cost more than £90 because a car had to be hired; and the remaining £75 distributed towards the total of 11,700 miles travelled by members (ie working out at 0.64p / mile)

Total £1,455.93

The conservation committee therefore starts 1980 with a balance of £3.60.

Trevor Beebee, January 1980

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## **CAPTIVE BREEDING COMMITTEE – ANNOUNCEMENT**

Members are reminded that information sheets on the care of reptiles and amphibians in captivity are available from the Chairman of the Captive Breeding Committee, Mr Simon Townson, 23 Fladgate Road, Leytonstone, London E11 1LX. Please enclose a large stamped addressed envelope. Subjects at present covered are listed below:

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

A full report from the Captive Breeding Committee for 1980 will appear in the December issue of the Bulletin.

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## **JOURNAL REPORT 1979**

Papers published	1979	1978	1977
Pages published Number of papers	62(A5) 17	110(A5) 16	91(A5) 18
Time (months) between receipt and publication (range)	19(5-30)	25.5(7-36)	23.5(2-26)
Papers received (final figures for 1978 in p	parentheses) from UK	from Abroad	Total

8(5)	16(6)	23(11)
8(5)	5(4)	13(9)
0(0)	0(0)	0(0)
1(0)	7(2)	8(2)
0	2	2
5(3)	0(0)	5(3)
0(0)	0(0)	0(0)
	8(5) 8(5) 0(0) 1(0) 0 5(3) 0(0)	$\begin{array}{cccc} 8(5) & 16(6) \\ 8(5) & 5(4) \\ 0(0) & 0(0) \\ 1(0) & 7(2) \\ 0 & 2 \\ 5(3) & 0(0) \\ 0(0) & 0(0) \end{array}$

### Referees

The Editor is most grateful to the following who refereed papers in 1979: E. N. Arnold, R. A. Avery, T. J. C. Beebee, A.d'A. Bellairs, D. R. Blatchford, A. S. Cooke, P.M.C. Davies, J. M. Dodd, J. F. D. Frazer, O. F. Jackson, I. F. Spellerberg, R. G. Vernon.

Papers awaiting publication -12 (16 in 1978, 21 in 1977)

Comment – The increased number of papers on British species is very encouraging and appears to justify the decision taken to accelerate publication of these articles. Unfortunately, the same cannot be said for papers on captive breeding. The most serious cause

of concern for the future is that many of the papers judged suitable for publication are much longer than those previously received. While this trend is a healthy one in that more definitive papers are appearing in the *Journal*, there might come a time when acceptable papers have to be turned down owing to a lack of space.

A note on the numbers of papers received over the last decade. The figures for 1970-1976 are for those published since I do not know how many were turned down during that period:

1979	23	
1978	11	
1977	19	
1976	16	
1975	26	
1974	15	
1973	16	
1972	21	
1971	12	
1970	14	
Overall ave	rage = 17.3 papers	/year
1975-1979	average = 19/vear	

Our acceptance rate over the past three years has been 58%. Assuming similar trends in future years, the number of suitable papers will be 11/year. Since papers are tending to get longer, this seems an acceptable number to publish, although a small reduction in 1980 would be welcome to finally get rid of the back-log.

M. Peaker, Editor

# \* \* \* \* \* KIBBUTZ TO BREED CROCODILES

(Taken from the Jerusalem Post)

HAIFA - A crocodile farm, the country's first, is to be set up by kibbutz Mevo Hama in a warm-water pool at Hamat Gader, on the banks of the Yarmuk River southeast of Lake Kinneret.

Plans call for breeding the crocodiles for their skins, while the farm will also, it is hoped, attract tourists.

A member of the kibbutz will go to South Africa this month for training at a local crocodile farm and a South African crocodile breeder will help the kibbutz establish the farm.

The pool, to be fed by the natural sweet water spring at Hamat Gader will be warm enough, at 28C, for the crocodiles. The kibbutz plans to turn the surrounding area into a miniature tropical jungle to provide an attractive setting for viewing the reptiles. Plans call for breeding 200 crocodiles a year.

The kibbutz is already successfully growing shrimps in the warm water available at the site and marketing them abroad.

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# OBSERVATIONS AND NOTES ON THE CAPTIVE BREEDING OF THE GREEN SEA TURTLE (CHELONIA MYDAS) ON GRAND CAYMAN, BRITISH WEST INDIES

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### INTRODUCTION

The Green Turtle (Chelonia mydas) has a worldwide distribution in tropical and subtropical seas, and different races have been recognised throughout this large range. Its colouration is variable, although basically greeny-brown with darker markings, with the flippers and head olive green. This species may reach a weight of several hundred pounds, and Carr (1952) mentions old American records of up to 850lbs. They are found most commonly in shallow areas of continental shelf where there is sufficient food in the form of marine grasses. Diet of the adults consists mainly of vegetation, but they will occasionally take animal material such as jellyfish (Bustard 1972). During the first year or so of life they are mainly carnivorous. Tagging experiments have shown that Green Turtles migrate thousands of miles between feeding and nesting grounds; for example, experiments by Carr (1968) have suggested that Brazilian Green Turtles travel to Ascension Island in the mid-Atlantic to nest. Little is known about the behaviour and migrations of juvenile turtles.

The Green Turtle is the best known species since it is widely distributed and its flesh has the best flavour. In American and Caribbean waters it was over exploited at a very early date, when they were collected in vast numbers by seamen and settlers as a source of fresh meat, since captured turtles would live for a considerable period. Often the individuals collected were females on the beach about to lay eggs, which no doubt worsened the situation. Because the Green Turtle is so predictable in its breeding and feeding sites it is an easy target for man, who is increasingly moving into previously undisturbed areas.

In different parts of the world the status of this species varies considerably: for example, there are healthy, large colonies on the coasts of Australia (Bustard 1972), but in some parts of the Caribbean they can no longer be found (Carr 1968), and on a global scale the Green Turtle is greatly depleted and is listed in the IUCN Red Data book as an endangered species. The world's best known "turtle-ologists", Professor Archie Carr and Dr Robert Bustard, have talked at great length about the possibilities of farming this species, and have suggested that such a rational exploitation may be the most effective method of conservation.

During February 1979, while studying herpetology of the Cayman Islands, I was honoured to be a guest of the Cayman Turtle Farm Limited, on Grand Cayman. In this article I will describe the farm and briefly relate some of its history and great success, giving my own impression of this establishment and the importance of the research and achievements carried out there.

### **Description of the Farm**

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Green Turtle farming on Grand Cayman was started in 1968 by Mariculture Limited, with a small prototype farm at Salt Creek. In 1970 when the turtle population had reached 30,000 the farm was moved to its present site at Goat Rock (Plate 1) and later after financial difficulties, new owners renamed it the Cayman Turtle Farm Limited. Continued expansion has been necessary to accommodate the current turtle population of around 70,000.

Sea water is continuously pumped through all the tanks on the Farm thus ensuring

maximum cleanliness and minimum risk of infection. The water is pumped in from the sea at one end of the Farm, circulated and discharged at the other end. Each hour the pumping system circulates 2.6 million gallons through tanks varying in size from 12 to over 75,000 gallons. All the turtles are fed on a pelleted feed, similar in appearance to that used in other livestock farming industries, and is sometimes supplemented with locally mown turtle grass (*Thalassia*). The pellets float and vary in size according to the age of the turtle, so that they can pick them from the surface. The pellets are high in protein and give an efficient food conversion ratio and rapid growth rate. The amino acids therein are those found to be essential for hatchling Green Turtles by Wood (1974), and are similar to those generally considered essential for mammals.

The Farm is divided into eight distinct areas, which are briefly described below (Plate 1 and Fig. 1).

#### Area One

These eight tanks normally hold turtles between the ages of six and eighteen months, and each tank (depending on size) is capable of holding between one thousand and five thousand turtles (mostly commercial growing stock).

#### Area Two

These small tanks contain the baby or hatchling turtles, which are all between 3 days and 6 months of age. The baby turtles are brought to these tanks from the hatchery, where the eggs have incubated for approximately 8 weeks at a mean daily temperature of  $28^{\circ}$ C. The eggs are initially removed from all verified nests on the artificial beach (Area 5, see later), placed in batches of up to 100 in three layers in styrofoam boxes and covered with a muslin cloth and a thin layer of sand. The boxes are then placed in an open-sided hatchery with good ventilation, temperature fluctuation in the boxes being reduced by the styrofoam. The survival rate of baby turtles on the farm is obviously much higher than in the wild, where the eggs are subject to human and animal predation before they hatch, and after they hatch crabs, birds, and fish kill the majority of the survivors.

#### Area Three

These two large tanks contain commercial growing stock of a medium size. The length of the carapace can be a rough guide to their age. For example, a 10" carapace indicates a one year old turtle, 15" would indicate 18 months, and 20" about three years. When turtles begin to get sizeable they look incapable of moving anything but slowly; however, they can move surprisingly quickly in bursts of up to 20 miles an hour.

#### Area Four

These six small round fibreglass tanks came from the first turtle farm site at Salt Creek, where they were floated in the sea attached to cat-walks and contained all the original Green Turtle Stock. Now they contain various species of turtle, including Loggerheads (Caretta caretta), Hawksbills (Eretmochelys imbricata) and Ridleys (Lepidochelys olivacea). These are kept purely for observation and research and the Cayman Turtle Farm has no intention of farming these other species on a commercial scale. It is worth mentioning that most other species of sea turtle are carnivorous, which causes their meat to have a strong and less appealing flavour.

#### Area Five

This large pond (Plate 3) and artificial beach contain the breeding herd. Basically in this area the turtles mate, the females crawl up on the beach to deposit their eggs and return to the water. The pond measures approximately 200 ft (60.5m) by 86 ft (26.5m) giving an area of about 0.4 acres (0.2 ha). It is about 10 ft (3.1m) deep on the north-west side and shelves up to an artificial beach about 35 ft (10m) wide on the south-east side. The capacity of the pool is about 0.75 million gallons, and sea water is pumped through at a rate calculated to give 18 changes daily.

In order to accelerate the Farm breeding programme it was necessary to bring to Cayman mature wild male and female turtles. As the Cayman Turtle farm was not started until 1968 the oldest farm reared turtles are only just reaching maturity. The farm reared

turtles can be easily recognised by their far superior shell colours and patterns. In 1973 the first known nestings in captivity occurred in this breeding pond, subsequently eggs were laid on the artificial beach and healthy turtles hatched. This was a major breakthrough and in 1975 the farm achieved its second major step forward when a farm reared female laid 601 eggs and healthy hatchlings emerged.

During the mating and laying seasons farm personnel maintain a 24-hour watch on the pond and artificial beach: all the breeding turtles are tagged so it is therefore easy to keep records of such facts as when and how long each turtle mates, and how many eggs each female lays per nest and per season. In Cayman, mating occurs between April and July each year. Following a complex courting procedure, male and female will mate sometimes for periods of up to 52 hours. The laying season in Cayman is from May until September. During this period and only at night the females crawl up the artificial beach, scoop out a 2 to 3 ft hole with their rear flippers and then deposit their eggs, cover their nest and return to the water. This, of course, is an exact replica of their behaviour out in the wild. Females have laid up to 230 eggs per nest and the Farm has recorded one female which nested 10 times in one season laying over 1,700 eggs in the artificial beach.

### Area Six

This double row of tanks holds commercial growing stock from 6 to 18 months. There are also small tanks used for research experiments in feed, stocking density and medication.

### Area Seven

These oblong tanks were the last to be constructed at Goat Rock, and water circulation within this particular shape and size tank has proved to be very efficient. Three of these tanks normally hold larger commercial growing stock, whilst three tanks nearest the road are reserved for future breeding stock. As the turtles become older, they spend less time floating on the surface and during non feeding periods can be seen resting on the bottom, occasionally coming up to the surface to breathe.

### Area Eight

This large area contains the majority of the commercial growing stock over 18 months of age.







Plate 1. The Cayman Turtle Farm At Goat Rock, Grand Canyon.



Plate 2. Captive bred Chelonia mydas. Commercial growing stock over three years old.



Plate 3. The large breeding pond and artificial beach. Turtle tracks can be seen in the sand. Mating pairs of turtles are coaxed into the meshed pens on the right of the picture to prevent displacement of the copulating male by others.



Plate 4. Small tanks used for research and medication purposes in Area 8.

### DISCUSSION

I realise that many turtle lovers may not be sympathetic towards the idea of farming turtles for commercial purposes, but I believe that a rational exploitation in this way may be the best approach from the turtle's point of view. Firstly I would like to make a few points about the way the Cayman Turtle Farm was set up, it's aims and achievements, and the attitudes its owners and employees have towards conservation.

The Farm is a new and unique operation, and in the absence of existing farm stocks to draw on, this pioneer farm had to obtain its foundation material from the wild, but did so with as little disturbance to wild populations as possible (Simon 1975). Up to 1973 the stocking of the rearing tanks at the farm depended entirely on the artificial incubation and hatching of eggs collected from natural beaches, with the permission of the appropriate authorities. During the period 1971-3 almost all of the eggs collected came from nests doomed by tidal washout or volcanic sand, so that loss of hatchlings to the wild was small in comparison with the number of eggs collected, which was 188,568 (Simon 1975).

The Farm is now entirely self-sufficient, since it has taken no eggs from the wild since 1978, and does not intend to do so again (Johnson, personal communication, Cherfas 1979). Representatives of the Department of the Environment and British management authority for CITES (Convention of International Trade in Endangered Species) recently

stated that the Cayman Turtle Farm meets the criteria for a farm as outlined in CITES, since its products are now derived from a closed operation.

The success of the Farm is heavily dependent on research, and a competent team of zoologists are continually working on more efficient means of turtle husbandry and equally important, a fuller understanding of the Green Turtle's life cycle and biology (Simon 1975; Simon, Ulrich & Parkes 1975; Wood & Wood 1978; Wood 1974; Ulrich & Owens 1974; Ulrich & Parkes 1978). Of particular importance is a complete understanding of its reproductive habits, and considerable progress has also already been made in areas such as nutrition and disease control.

As mentioned previously, the first breakthrough came in 1973 when the first farm laid eggs hatched successfully. Up to this time there had been no reproductive activity in the large breeding pool which contained about 70 ex-wild turtles. However, on April 12th 1973 a burst of mating activity occurred after the introduction of two Surinam males (Ulrich & Owens 1974) at the beginning of the mating season. Not only did the two new males mount females almost immediately after 15 days in transit, but within a few days mating activity was shown by at least two of the previously inactive males. It would appear that turtles kept continuously together all year round do not become sexually active in the mating season, and require some kind of trigger, such as the introduction of the wild Surinam males. Therefore in 1974 the males were segregated from the females except during the mating season, which proved successful: this technique was effective in breeding the Giant tortoises of the Galapagos, and is probably a familiar manipulation to most reptile breeders. The 1974 season provided an interesting example of the importance of the social environment in sexual behaviour (Ulrich & Parks 1978). A pair of ex-wild turtles, both of which had been sexually active in 1973, were isolated in a large tank from February to June 1974 where in this situation they showed no sexual activity. They were then transferred to the breeding pool, where the male, apparently stimulated by competition, quickly mounted the female, as afterwards did two pool mates.

The table below shows the breeding results for 1973 and 1974 (from Ulrich & Parkes 1978).

	<u>1973</u>	<u>1974</u>
No. of females laying	19	14
No. of clutches	92	80
Average no. of clutches per female	4.8	5.7
No. eggs	11268	9752
Average no. eggs per female	593	697
Average no. eggs per clutch	122	122
Hatch rate %	42.3	44.8

Although the hatch rates are relatively low when compared to eggs collected from wild rookeries (80%) and hatched under the same conditions, these results clearly show that the Green Turtle can be captive bred on a large scale, and with further research and experience these figures should improve dramatically. Whether or not the reproductive cycle from farm bred turtle to farm bred turtle can be completed, is not likely to be answered before the early 1980s, when stock hatched from eggs laid on the farm in 1973 should become sexually mature.

Unlike illegally poached turtles, every part of a farm reared turtle is utilized to make a variety of products, including steak, soup products, shell products (whole shells and jewellery), leather, and oil. Although this exploitation of the Green Turtle may not appeal to many BCG members, I do believe it to be a realistic approach to the problems of conserving the species and satisfying the demand for turtle products. Man has been killing turtles and their eggs in vast numbers for centuries, and passing legislation to protect them has not stopped poaching on a large scale, since many poor people rely on this animal to make a living. However, if there is an alternative to poached material, in the form of superior high quality farm products at acceptable prices, then this can only be a good thing: wild populations will not be threatened by this kind of venture and the control of the distribution and export of farm products operate within the law, and that pseudo-farms, as with some crocodile farms, do not emerge. Arguments suggesting that selling farm products may stimulate the market and increase demand for wild turtles are not convincing, as there is little evidence for this being true.

The big "spin-off" from this commercial venture is the great deal of knowledge gained, at private expense, about the biology and large scale captive breeding of the Green Turtle. The uses this information could be put to for conservation projects are numerous. For example, Robert Bustard (1972) has shown that releasing pen-reared yearlings to the wild increases overall survival something like 50 to 100 times over the natural situation. Further research has to be completed to determine whether or not pen-reared turtles behave normally when released to the sea, although results so far are encouraging. Alternatively, captive bred hatchlings could be released directly to the sea: survival up to the hatchling stage would be much higher than in the natural situation, where a large percentage of eggs and hatchlings are killed on the beaches. Because the employees and owners of the Farm have been so open and published their methods and techniques developed over many years, we now have the technology and understanding to breed marine turtles on a large scale, which, I am convinced, may prove invaluable to their future conservation.

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# POLITICAL PROBLEMS FOR THE CAYMAN TURTLE FARM: WHICH WAY CONSERVATION?

#### JOHN PICKETT and SIMON TOWNSON

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A curious and disturbing attack has been made on the Cayman Turtle Farm which may affect its prospects of survival. The British Government has permitted the import of the Farm's products into Britain, on the grounds that the turtles are captive bred or captive reared from eggs taken legally from the wild before March, 1978. The UK Department of the Environment has also attempted, unsuccessfully, to persuade the United States Government to lift its ban on products from the Farm, as the US market is vital to its success. The ban applies not only to the sale of the Farm's products within the United States, but also prohibits shipment of the products through US ports to other destinations; this is a serious problem for the Farm. However, the apparently reasonable approach by the British Government's scientific advisers, an approach which is endorsed by many other conservationists, has met with great criticism from the more extreme factions of the conservation movement which appear to be opposed to the Turtle Farm in principle. Two articles campaigning against the farm have appeared in the New Scientist magazine. The nature and methods of criticism are extraordinary and alarming, and deserve close examination.

An article reporting the controversy, entitled "No end to Trade in Turtles", by Jeremy Cherfas, appeared in the New Scientist on 13th December, 1979. Cherfas outlined the views of the British Government, i.e. that the Government was satisfied that the Cayman Turtle Farm met the criteria for a farm as outlined by the Convention of International Trade in Endangered Species (abbreviated as CITES). The article then lists a number of arguments against the Farm. John Burton, of "TRAFFIC", claimed that the Farm did not meet the CITES criteria because it was not a closed operation, despite the fact that the Farm deposited an affidavit in the US to the effect that it has taken no eggs from the wild since March, 1978, and does not intend to take eggs from the wild again. Nicol Duplaix, of TRAFFIC's US office actually accused the Farm of buying "wild" turtle meat from Ecuador, packing it in Farm labelled tins, and re-exporting it as farmed meat. This last accusation did the Turtle Farm a great deal of harm, and was later found to be totally baseless; it seems that it was merely used in a dubious attempt to discredit the Turtle Farm.

The Cherfas article also states that though the Farm "may now be approaching the point where it is truly a self-sufficient farm rather than a ranch for rearing wild caught animals", "conservationists" object to the Farm on other grounds. It seems to us that these grounds have no relevance to the conservation issue and are in fact trivial and spurious. These issues are: that it sets a bad example in using high protein food for turtles, food which could be used directly to "nourish hungry people"; that the farm employs few people; is capital intensive; that "the end product is so expensive that only wealthy people can afford to buy it". All this, it is claimed, is "unthinking exploitation". We would like to examine these points individually:

1. Why is using high protein food for turtles a bad example? This implies that the food used for the turtles is directly depriving hungry people. This implication is absurd, since the feeding of high protein pellet food is standard practice in modern livestock husbandry throughout the world.

2. The statement that the Farm employs few people is untrue; in fact the Farm is one of the biggest local employers on Grand Cayman, in an area of poor natural resources. The people of the Cayman Islands have historically been dependent on the sea and turtle fishing for their livelihoods, and turtle farming gives some hope of continuing employment in this tradition, without affecting wild populations, in the face of dwindling natural resources.

3. That the Farm is "capital intensive" is used by Cherfas as grounds for criticism. "Capital intensive" merely means that the owners have had the courage to spend a considerable amount of money on this project. To this point the Farm has given no return on the money invested because of its experimental nature. It is beyond our comprehension why this private expenditure should be a source of "worry" for "most conservationists".

4."The end product is so expensive that only wealthy people can afford to buy it". Not only is this irrelevant to conservation, it is also an exaggeration. One of us (ST) ate turtle meat in a Caymanian eating house, frequented by local people, at a price comparable to Beef. Of course, the price at Harrods in London will be another matter. Prices, as everyone knows, are determined by supply and demand.

A further argument used against the Farm is that it took 15 years to reach its present position, during which time it supported itself by processing turtles and eggs from the wild. Its success in breeding and raising turtles has allegedly encouraged other people to start similar enterprises in other parts of the world. expecting "15 years grace during which time they will take turtles from the wild". Current international law makes this impossible. The Cayman Turtle Farm was the first of its kind, and took its original stock legally from the wild before current international restrictions were implemented.

A further article in the New Scientist, by Jeremy Cherfas, appeared on 27th March. 1980. and raises several more dubious arguments. Originally, CITES permitted trade in endangered species if they were captive bred. Later, at a meeting of member states in Costa Rica, March 1979, "captive bred" was defined as "the offspring of parents that mated in captivity, providing that the breeding herd has been shown to be able to produce two successive generations in captivity". This is being used as an argument against permitting trade in farm products, because the Farm's captive bred turtles are not yet old enough to produce second generations. As it is only a matter of time before this occurs, and as all parties in this controversy are aware of this, it seems extraordinary that this should be used as a serious argument against the Turtle Farm. This seems especially unfair as until the meeting of March 1979, the Farm was working on the understanding that its products would comply with the CITES regulations.

The Turtle Farm no longer takes eggs from the wild; this is established beyond doubt. Yet Cherfas seems to begrudge this fact, neither agreeing or disagreeing with it, only stating that "It is true that turtles are breeding there. In the future, its turtles may qualify as captive bred under the CITES. But they do not qualify yet". He states that turtles being marketed now were hatched in 1976, and in that year the Farm took 25,500 eggs from the wild in Surinam against 15,186 eggs from its own breeding herd. He uses this as an argument against the Farm trading now, despite the fact that he knows no eggs are now taken from the wild. This is a classic case of retrospective legislation. International law permitted the turtle farm to take eggs and turtles from the wild for breeding and commercial raising stock. We now have the ridiculous situation where the farm has legally reared the stock to a marketable size, but is now not to be allowed to sell its products. This grossly unfair method of legislation, which immediately threatens the existence of the Farm, we are pleased to say is not practised (by a long tradition) by the British Government.

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It is lamentable that the Farm's achievement in being totally self-sufficient in eggs does not seem to be worthy of mention. Cherfas only refers to the fact that for another two years "at least", some of the turtles sold will not have been captive bred. He refers to the lower fertility of captive raised females as opposed to wild caught females, it being about half that of eggs from wild caught females. Of course the Turtle Farm is acutely aware of the problem, and is working to solve it, but no credit is given them for this.

Cherfas's article ends with a quote from a spokesman of the Department of the Environment, who said that the Department "was satisfied that they have been taking steps to comply" with CITES. "Although they won't have completed the full cycle until 1982 we are prepared to back them until then". In our view, this is a perfectly reasonable and constructive approach by people who obviously have the interests of sea turtles at heart, and theirs is the correct attitude.

It will be noted that the arguments used against the farm are negative; it is plain from the persistent use of comparatively trivial arguments, in the absence of more serious and genuine grievances, that the Farm's critics do not wish to find solutions to the problems, and seem opposed in principle to turtle farming. It is significant that in his first article Cherfas quoted the accusation about the Farm "laundering" turtle meat from Ecuador; this serious allegation was found later to be untrue, but he does not mention this in his second article, as he may have been expected to, in fairness to the Turtle Farm and the Department of the Environment.

Some people, including members of this Society, may object to the farming of turtles on philosophical grounds, as they would to the farming of any other animals for meat, and this is a view anyone is entitled to. Our own view is that in present circumstances the commercial farming of sea turtles will, on balance, benefit the turtles, directly by ensuring the survival of the species if it should meet with its tragic extinction in the wild; also by providing a future source of animals for restocking experiments in the wild. The Turtle Farm, though a commercial venture, has never been a profitable one, but has been kept going at least partly by the owners' interest in the survival of turtles. The Farm needs encouragement and the co-operation of the scientific community, not harassment by it. We hope that the constructive attitude of the British Government will prevail against the current strange and negative tide of opinion. The turtles and the farm deserve better.

The pioneer of sea turtle conservation, Professor Archie Carr, in his book "So Excellent a Fishe", on the subject of sea turtles and the future, states "The one move that appears most promising as a way to accomplish the dual aim of feeding people and saving natural turtle populations is to set up turtle farms".

## MORE ABOUT GARDEN PONDS

### TREVOR BEEBEE

Following from John Pickett's excellent recent article in the Newsletter about the value of garden ponds to amphibians in Britain, I would like to add a few observations of my own on this subject.

Firstly, in 1978 I attempted to obtain information about garden ponds in the Brighton area in a systematic way by the use of surveys, site visits etc. I received data from more than 200 pond-owners, some 50 or so of which I actually went to see, as well as other evidence of the overall pond numbers in the suburban areas. A number of interesting facts came to light. The sheer abundance of garden ponds was astonishing; in Brighton about one garden in seven has a pond, and half of these are used by amphibians of one sort or another. This meant that in my study there were more than 7,000 Frog, 3,000 Common Newt, and 2,000 Toad breeding sites. Palmate and Crested Newts do not occur except in one or two gardens where they have been deliberately introducted by 'practising herpetologists'. Secondly, pond depth, size, vegetation, age, PH and ionic score all had little correlation with use by amphibians and were therefore apparently unimportant over quite large ranges. The effects of fish were interesting; Toads did not mind their presence at all, and somewhat surprisingly Frogs also quite often bred successfully in fishponds as long as there were not too many fish present. Newts, however, fared rather worse and any herpetologist would be well advised to omit fish altogether. It is evident that, at least for the three species mentioned above (and similar results were noted in a Leicester survey), suburban pools now offer an important refuge for our native amphibians.

I have constructed garden ponds myself over the last 12 years or so, and would like to add a few further observations. Butyl liners, though expensive, are in many ways the best materials for pond construction but one unfortunate experience of mine is worth a warning: the makers claim that such liners are not damaged by plant growth, and by and large this is true, but I once introduced some burr-reeds as marginal plants with disastrous results; seeds fell behind the liner somehow, and razor-sharp shoots growing upwards through it resulted in a series of expensive punctures. So this is a plant to avoid.

Terrestrial habitat surrounding the pond also warrants some thought. If large areas can be left to grow "rough", this will be of obvious benefit by forming hunting and hiding grounds for frogs, toads and newts. Grass on lawns should be kept short and mown regularly, this being better than infrequent assaults when it might have grown sufficiently high to conceal newly-metamorphosed frog or toadlets in summer. The animals will not stay on very short grass, and thus avoid being minced.

Although Crested Newts rarely colonise garden ponds naturally, they frequently seem to do well if deliberately introduced. Fish-free pools are highly preferable, and of course stock should only be taken in small numbers (2-3 pairs) from healthy colonies. I started with this number three years ago, and now have an estimated 30-40 animals breeding regularly in two adjacent ponds (one of which is 17ft x 12ft x 2ft, the other considerably smaller). On the other hand I have not succeeded in establishing toads, which seem to be fussier than frogs, though the former certainly do colonise those garden ponds which happen to be to their liking in quite a big way. The Brighton survey did not really resolve the problem of the factors which make a good toad pond, although there seemed to be some preference for larger and older pools. Palmate Newts do reasonably well if introduced, and probably much better still in less chalky districts than Brighton; geology is probably an important factor with this species.

Though personally not in favour of introduction of non-European exotic species, there are some forms just across the channel which do well in garden ponds and which I see no reason to discourage. I, and no doubt many others, have successfully established thriving

colonies of both Edible Frogs and Alpine Newts, and quite probably there are other suitable candidates too. In my view since those species from Europe which are likely to be able to establish themselves in Britain are almost always from areas where our own native species also occur, destructive competition is improbable and our fauna is a little the richer as a result.

Finally, I have occasionally heard the suggestion that property sales may suffer from the installation of garden ponds as a potential danger for young children; as a counter-argument I can only say I have no doubt that in the case of our last move it was the fascination of the pool (and especially the Edible Frogs!) to the children of the prospective purchaser which actually clinched the deal.

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### MEMBERS' ADVERTISEMENTS

- \*Information wanted on non-native reptile and amphibian introductions (be it back garden or more grandiose). Also wanted, tadpoles of Tree Frogs, Green Toad, Fire Salamander, young or adult Wall Lizards (*Podarcis muralis*), Italian greenish form. For sale or exchange: Palmate Newts, Common Newts, and Common Frogs. Cannot Send. Charles A. Snell, Tel. 01-856 9852.
- \*Wanted: female *Pleurodeles watl.* For sale or exchange: captive bred Fire Salamanders, 6 months old, feeding on earthworms and slugs. J. Daniels, Tel. Medway 75274 evenings.
- \*For sale or exchange: one pair of 7" Jugged Turtles; other turtles wanted. Nigel A. Stevens, 5 Delmaine House, Maroon Street, Poplar, London E14 7QJ.
- \*For sale or exchange, one pair each of the following: Australian Dumpy Treefrogs (*l.itoria cacrulea*); Fire-bellied Toads, Yellow-bellied Toads, and European Green Toads. Wanted: any south American Horned Frogs (*Ceratophrys*). Information wanted: on the breeding of any tropical tree frog, particularly those from Australia. R. Campbell, 3 Burrow Gate, Penrith, Cumbria.
- \*For sale: African House Snakes (Boaedon fuliginosus), 1980 hatchlings. M.J. Welch, 28 The Ridgeway, Warwick. Tel. Warwick 42246.
- \*Wanted: information on specimens of Marine Turtles of known age. Urgently needed in studies of age determination.

Dr J. Frazier, Dept. of Zoological Research, National Zoological Park, Smithsonian Inst., Washington D.C. 20008, USA.

\*Information wanted on the breeding of the African Bullfrog, Rana adspersa, and any information on the determination of sex. Is anyone aware of any successful breeding in captivity? Information also wanted on the keeping of Red-Eared terrapins in an outdoor pond all year round; is breeding likely in this country outside?

Antony Henn, The Dutch Nursery, Great North Road, Bell Bar, Hatfield, Herts. Tel. Potters Bar 53372.

\*Wanted: Garter Snakes, any species. Also sale/exchange female Python m. bivittatus, 7/8 ft.

Barry Mellors, 6 Higher Boskerris, Carbis Bay, St Ives, Cornwall. Tel. St Ives 6423 anytime.

\*Wanted: To purchase, a complete set or individual issues, of the International Turtle and Tortoise Society Journal. Also a copy of "Freshwater Tortoise of Australia and New Guinea", by John Goode, 1967.

Details to Derek J. Foxwell, c/o Conservation section, The City Museum, Queens Road, Bristol BS8 1RL. Tel. 0272 299771 ext. 291 (weekdays) or 0272 838296 (evenings and weekends).

# THE CAUCASIAN GREEN LIZARD, LACERTA STRIGATA, EICHWALD 1831, WITH NOTES ON ITS REPRODUCTION IN CAPTIVITY

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#### Description

Length: 106mm (male) - 112mm (female). The characteristic colour of the adult is clear bright green over the first two thirds of the body, while the hind quarters including legs and tail, are olive brown. The female is similar, but the green is not as intense, and the body retains some of the spots and a trace of the stripes of the juvenile colouring. In the breeding season, the head, throat, and sides of the neck turn deep blue in the male; the throat of the female is greenish yellow. The belly of the male is greenish or greenishyellow, that of the female white. The juveniles are olive brown in colour with five clearly defined narrow, whitish, longitudinal stripes, between which are irregular small dark spots. The stripes fade and gradually disappear with the onset of maturity, but may be retained longer in the female.

### Distribution

N.E. Anatolia; the Caucasus; West Central and N.E. Iran, and the south western extremity of Turkmenistan (Central Asia).

### Habitat

Lacerta strigata occupies a wide variety of habitats within its range. It is found in steppe, mountain-steppe, semi-desert, by the banks of rivers or small streams, in meadows, the borders of steppe-forest, windbreaks in cultivated land, the margins of vineyards and gardens, roadside and canal banks. Within these areas it avoids barren places or low vegetation, but lives by preference around small bushes, bramble, wild rose or dense weeds. Cover is sought in the holes of rodents or in rock piles, — the lizards themselves sometimes dig burrows of 50-70mm in length. In the mountains, this species reaches an altitude of 3000 metres in some regions. In favourable localities population densities may be high. At Stavropol a density of 460 per hectare has been recorded (Bannikov and Darevski, 1977); in eastern Georgia 400 per hectare (Mus-gelishvili, 1970); by Lake Sevanin in Armenia, 27-34 individuals were counted in a walk of 1 km. (Bannikov and Darevski, 1977).

### **Period of Activity**

The lizards emerge from hibernation in mid-March when temperatures reach 16-18<sup>o</sup>C. In mild winters in Georgia activity may commence in February. The adults usually begin hibernation in September, but the young remain active through October into November.

### Reproduction

Mating begins early in May, with a peak period in the second half of May. Egg laying commences towards the end of May and extends until early July. Each female usually lays two clutches each of 6-11 eggs. The first clutch is normally laid at the end of May/ beginning of June, the second at the end of June/beginning of July. The eggs measure  $8-10 \times 15-18$ mm. The incubation period is about six weeks. The young emerge from the end of July until mid-September. At hatching, the young have a snout-vent length of 30-32mm. Maturity is reached at an age of 22-23 months.

### Food

Beetles (20-60% of stomachs examined), spiders (12-30%), woodlice (-25%), snails (13-22%), ants (-26%), flies (4-18%), bugs (-11%). Also grasshoppers, moths, cicadas.

### Parasites

Trematodes (Brachylaemus), nematodes (Physocephalus); ticks (Haemophysatis).

### Lacerta strigata in captivity

About four years ago I received from a friend in Eastern Europe 2 males and 1 female L. strigata. From the beginning they proved to be a very easy species to keep in my gardenterraria. Lacerta strigata is closely related to Lacerta viridis, L. agilis and L. trilineata, in that order. They have been crossed successfully with both L. viridis and L. agilis by Wolfgang Bischoff. The young are very similar in appearance to those of L. trilineata, and years ago L. strigata was regarded as a subspecies of L. trilineata. It was to be expected, therefore, that in captivity they would be as easy to keep as L. agilis and L. viridis. Breeding in garden vivariums proved to be very easy, almost exponential: in 1977 I was lucky to breed 6 L. strigata, while in 1978 26 young were born, and in 1979, 131.

I keep the lizards in different kinds of vivariums:

- 1) A brick-walled glass covered enclosure of 3 sq. m, facing south, in good weather 1/3 of the glass is removed.
- 2) A glass covered enclosure similar to the above, of 12 sq. m.
- 3) An open air enclosure of 600 sq. m.

The lizards thrive in all of these enclosures, where they live all year round, hibernating successfully. The winters within their natural range can be very severe, so the lizards are well able to survive the winters of North West Europe. In this regard, I noticed a most remarkable thing; in the warmest vivariums the lizards went into hibernation earlier than in the open-air enclosure; this applied particularly to the females. It seemed as if the females, after laying their three clutches of eggs automatically go into hibernation after a short period of activity of a few weeks. In the open air enclosure, of course, mating and egg laving are later. In the hot summer of 1976 the lizards in the glass covered enclosure had already disappeared by the end of August when temperatures outside exceeded  $30^{\circ}$ C (=90F). Yet in the same enclosure I saw the first lizard emerge from hibernation on 29th January 1977 during sunny weather, at an outside air temperature of 10°C. In 1977 the strigata were hibernating by 17th September in beautiful weather. In 1979 in the warmest glass covered enclosure the lizards were gone by 28th August, while in the same year in the open air enclosure some females laid eggs on 20-22 September. In 1980 the first males appeared in one glass covered enclosure in February, and in another on March 25th. In the open air enclosure the animals did not appear until the beautiful weather of mid April.

Mating takes place mostly in the second half of April and in May. Eggs are laid from the end of May in the glass covered enclosures and a month or more later in the open air enclosures. A female may lay up to three clutches at intervals of about 3-4 weeks depending on food and weather. The number of eggs in a clutch varies from 8-10 in the case of young females to 10-15 in the case of old females. Therefore, one female can produce up to 40 young each year. My impression is that the more food the lizards are given, the more eggs are produced.

In the glass covered enclosures it is necessary to give calcium and vitamin D3 to the lizards, otherwise the eggs will not contain sufficient calcium for proper development: they may develop to the point of hatching but will die because the skeleton of the young lizard will be too weak to enable escape from the egg. This problem does not occur in open air enclosures. I give calcium in any way possible: egg shells in the enclosures, and calcium lactate in the drinking water are good methods. Vitamin D3 I give in amounts of 10,000-20,000 International Units per litre of water; the water is changed and a fresh mixture given each 2-3 days.

When the females are given good food, conditions and vitamins the incubation time is quite short. At a temperature of  $28-30^{\circ}$ C the incubation period is 50-54 days. The shortest incubation period I have observed was 44 days at  $29-30^{\circ}$ C. The sand in which the eggs are incubated must be fairly loose and not compacted, so that the eggs have sufficient oxygen.

The young grow very quickly; if they are kept warm and active through the winter they can reach maturity and breed the following spring. If the young (hatched in July-September) are kept outdoors during the winter in glass covered enclosures, they enter hibernation during November which is much later than their parents. They will reach maturity about a year after birth, and be ready to breed in their second spring.

Like other species of *Lacerta*, the males fight during the mating period. They can be kept with other species of lizards; I have kept them with smaller lizards; *Lacerta monticola*, *L. saxicola*, *L. praticola* and other small wall lizards; with species of about their own size: *Lacerta agilis*, *L. viridis*, *Agama stellio*, *Agama caucasia*, and also with larger ones: *Lacerta lepida pater*, adult Gerrhonotus multicarinatus.

I feed the lizards mostly on crickets, mealworms and flies.



Plate 1 Young Lacerta strigata. The two on the left are some months old, and have developed dark spots. The one on the right is less than two months old and has the characteristic pattern of the new-born.



Plate 2 Adult male (3-4 years old)



Plate 3 Adult female (3-4 years old)

#### Conclusion

*Lacerta strigata* is an excellent lizard for garden vivariums; they are easy to breed and can be kept with many other kinds of lizard. Another attraction is the variability of their own colour with different ages and sexes. It seems the conditions in glass covered enclosures in gardens in NW Europe are even more favourable for this lizard than its natural habitat.

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## NATURALIZED REPTILES AND AMPHIBIANS IN BRITAIN

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The indigenous wildlife of Britain is meagre indeed compared to that of continental Europe. In the final period of glaciation of the Ice Age the huge sheets of ice extended well down into southern England: only when they had receded could the animals then living in warmer climes return from their havens in southern Europe. Colonization of Britain was simplified by the fact that at that time the gap now occupied by the English Channel was dry land. When, some 5,000 to 10,000 years ago, the so-called 'Land Bridge' was invaded from the north and south by the sea, and continental Europe split from the British Isles, those species already in Britain became divided by the Channel thus formed from those which had not yet reached so far north. Since that time, additions to the British fauna have been forced — with or without the assistance of man — to face the barrier of the sea.

Alien animals have been introduced into Britain for three main reasons, – economic, ornamental and sporting: a fourth reason has been the 'curiosity factor' – in other words the animal has been introduced and released simply out of curiosity to find out what would become of it. It is into this last category that the naturalized amphibians and reptiles in Britain all fall.

The earliest known attempt to naturalize the Wall Lizard (*Podarcis muralis*) in Britain was in 1932, when a dozen were released at Farnham Castle in Surrey, reinforced by two more in the following year. In 1951 Dr Malcolm Smith announced the rediscovery of this colony in the garden of a nearby private estate, to which they had apparently migrated.

In 1937 two hundred Wall Lizards were released at Paignton in Devon, where a few remained until the 1960s.

In 1954 Lord Chaplin turned out 15 Wall Lizards in the garden of his home at Totnes in Devon where they bred annually, and by 1976 numbered around 100 individuals.

Two apparently flourishing colonies of Wall Lizards were discovered in about 1962 on the Isle of Wight, of which one - at Ventnor - is believed still to exist.

In 1964 an unknown number of Wall Lizards were liberated on East Burnham Common near High Wycombe in Buckinghamshire, but it is not known whether they have survived.

The only other certainly extant colony of Wall Lizards, which has been established since at least 1957, is at Hampton Court in Middlesex.

The most important liberation of Marsh Frogs (Rana ridibunda) in Britain was made by Mr E. P. Smith (better known as Edward Percy, the playwright), who in the winter of 1934-5 introduced a dozen to a pond in his garden at Stone-in-Oxney in east Kent, bordering the Walland, Romney and Denge Marshes.

By 1979 Marsh Frogs were widely but patchily distributed over more than 100 square miles of Romney Marsh and the Rother Levels, extending as far west as the eastern end of the Pevensey Levels near Bexhill. They are also to be found in the southern half of the Isle of Sheppey and on the Iwade marshes in north Kent. New areas are still being colonized, although more slowly than before, and there is evidence of some decline in numbers in recent years.

As a colonizer the Marsh Frog is undoubtedly the most successful British alien amphibian. A number of factors have helped it to become so firmly established, of which probably the most important are the suitability of the habitat and an abundance of food.

Romney Marsh - an area devoted almost entirely to sheep farming - consists of small fields divided by ditches and sewers edged by narrow strips of ungrazed grassland, with few hedges. The future of the Marsh Frog there depends almost completely on the continuation of sheep farming. Should this ever be abandoned in favour of arable farm-

ing, which would entail the in-filling of the waterways and their replacement by hedges, the Marsh Frogs would almost certainly soon become extinct.

It is conceivable that the Edible Frog (R. esculenta) inhabited southern England during the climactic optimum around 4,000 B.C., although no fossil evidence has so far been discovered to support this theory. Edible Frogs may well have been brought to Britain by Roman gourmets together with the Edible Dormouse (Glis glis), but there is no reason to suppose that either ever escaped or were released into the countryside.

Edible Frogs are known to have been established at Foulmere Fen in Cambridgeshire at least by the 1770s, but no evidence exists to show how they arrived there.

The earliest recorded introduction of Edible Frogs into Britain was in 1837, when Mr George Berney imported both frogs and spawn from Paris to his home at Morton near Norwich in Norfolk.

In 1853 Mr Alfred Newton, F.R.S., discovered a colony of Edible Frogs between Thetford and Scoulton, also in Norfolk, where they were said to have been established since at least 1820. Twenty-three years later Newton and Lord Walsingham found another colony at Stow Bedon in the same area, which had apparently been in existence for over a decade.

Between 1840 and 1910 many introductions of Edible Frogs were made in various parts of England (as well as at least one in Scotland), some of which may still survive today.

Most of the more recent introductions have taken place in and around the London area. From 1929-1961 Edible Frogs were to be found in a number of gravel pits at Ham in Surrey, from where they spread to Twickenham, Teddington and Sudbrook and Richmond parks. A colony on Esher Common, dating from before 1958, may still survive.

In north London Edible Frogs were established in various ponds on Hampstead Heath between 1939 and 1965. In 1948 colonies of over 100 were discovered in the two Highgate Ponds and in Viaduct Pond. Other metropolitan and suburban populations have existed in Epping Forest, and at Walthamstow, Snaresbrook and Leytonstone.

In view of the many colonies which have been established in the past, it is surprising that so few are certainly extant today; in 1976, when the author was gathering material for his book on naturalized animals in Britain, only eight colonies (3 in Norfolk, 4 in Sussex, and one in Surrey) were known definitely to exist; there may well, however, be other so-far undocumented populations in other parts of the country.

What is believed to be the only extant colony of European or Green Tree Frogs (Hyla arborea) in Britain was discovered in 1962 in a small pond on the edge of the Beaulieu Abbey Estate in the New Forest in Hampshire, where it has apparently existed for some 70 or 80 years. The entire colony is believed to number only about a dozen to twenty individuals, but this seems enough to maintain a viable population. The pond, which measures about 80 feet in diameter and is surrounded on three sides by low trees and shrubs, is in an exposed position on the top of a hill; the water, which dries out in late summer, normally is around 2-4 feet deep, and in hot weather is noticeably warm to the touch, which may help to explain the success of this apparently unique colony.

Two possible reasons have been advanced for the failure of other introductions of Tree Frogs in Britain; firstly, some are believed to have been made with the stripeless Tree Frog (*H. meridionalis*) from southern Europe and North Africa, to which our climate would clearly be inimical; secondly, many of the introductions have apparently been predominantly of males; Tree Frogs are usually collected at their breeding ponds, where the males remain for most of the breeding season, whereas the females only appear to deposit their eggs, and then depart. Thus for much of the year the population of a pond is largely male.

In 1967 a number of African Clawed Toads (*Xenopus laevis*) were released by Mr Frank Boyce in some ponds on the cliffs at Brook near Freshwater on the Isle of Wight, where within a decade they had increased to between 40 and 50 individuals. The success of this colony has presumably been due at least in part to the comparatively mild climate of the release site.

In 1878 or 1898 a quantity of Midwife Toads (*Alytes obstetricans*) were accidentally introduced to a nursery garden near Bedford, reputedly in a consignment of ferns and waterplants from southern France. In 1922 about a dozen were removed by Mr W. S. Brocklehurst to his private garden nearby; in 1950 another colony was discovered not far away, and a small population was found to have survived on the original nursery garden site. In 1933 a small colony of midwife toads was established in a private garden on the outskirts of York, and in 1947 5 adults and a dozen tadpoles were transferred by Mr Robert Brocklehurst from his father's garden in Bedford to his own near Worksop in Nottinghamshire. In 1954 Lord Chaplin introduced two egg-carrying males from the London Zoo to his garden near Totnes in Devon. Most, if not all, these colonies are believed to exist today.

At least one colony, with a population of several hundred, of the Alpine Newt (*Triturus alpestris*) has survived for many years in a Surrey garden. Other alien species which have occurred in the wild in Britain in the recent past, but so far as is known are not currently established, include the European Pond Tortoise or Terrapin (*Emys orbicularis*), the Tesselated or Dice Snake (*Natrix tesselatus*), the Southern or Italian Crested Newt (*T. cristatus carnifex*), the Yellow-Bellied Toad (*Bombina variegata*), the Fire-Bellied Toad (*B. bombina*), the Painted Frog (*Discoglossus pictus*), and the Green Lizard (*Lacerta viridis*); this last has been released in Wales and Ireland as well as in mainland England. It occurs on the Channel Islands autochthonously.

The author would welcome recent information on any of the species mentioned in this article, or indeed on any other reptiles and amphibians currently believed to be naturalized in Britain.

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# NOTES ON SOME OF THE REPTILES AND AMPHIBIANS OF NORTH-EAST GREECE

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Though much field-work has already been carried out on the herpetofauna of Greece (Clark 1968), most of it appears to have been concentrated on the many islands and the southern mainland in particular, so it was with considerable interest that I departed for an overland holiday to the Sithonian peninsula, North-east Greece on May 26th 1979. Also on the trip with me were my wife, son and two friends.

The first reptile of the trip was not sighted until the third morning, by which time we had reached North-west Yugoslavia. On stopping for dinner along the road to Ljubjana I explored a small rubbish tip nearby and on lifting up a piece of cardboard in some long grass I found a female Smooth Snake, *Coronella austriaca*, an interesting capture as it was the first specimen I had seen on various trips abroad. Further down the road to Beograd, I also saw my first Yugoslavian amphibians, Fire-bellied Toads, *Bombina bombina*, and Marsh Frogs, *Rana ridibunda*, in a man-made pool along the roadside.

The next day, just before we reached the Greek border, at the town of Gevgelija, we suffered a major mechanical breakdown and as we had to wait for new parts for a day, I decided to spend the time searching the surrounding hillsides. As I walked along the edge of the road, a Montpellier Snake, *Malpolon monspessulanus*, easily identified by its piercing expression, disappeared into a hole in a bank. Two or three Tortoises, *Testudo hermanni*, were also seen here and a couple more were sadly found dead on the road, but in spite of these casualties, they were extremely abundant in the scrub further up the hillside. In the space of an hour or so, I saw perhaps sixty or seventy Tortoises of varying sizes, which convinced me that the loss of a few road casualties had probably had not too bad an effect on the Tortoise population as a whole. Many of the ones that I found were near shallow scrapes in the earth, but I do not know whether these scrapes were where they rested at night, or where they had hibernated throughout the previous winter. Green Lizards, *Lacerta viridis*, were fairly common in this area, and a large Whip-snake, *Coluber jugularis caspius*, narrowly evaded capture in the long grass.

Having repaired the van, early the next day we set off on the road again and by mid-afternoon we had arrived at our final destination, a small peninsula in North-east Greece, situated in the province of Challidiki, South-east of Thessaloniki. Our first camping-place was a small sheltered cove at the base of a cliff and accessible only from one winding dirt-track along w hich it was impossible to drive the van. The sea was a glorious blue and the sun blazed down on the sandy beach. As we walked along the track, we watched a large school of dolphins chasing a shoal of fish across the bay and a Kestrel flew from its nest on the only tree on the beach. Green Lizards and Wall Lizards, *Podarcis sp.* scurried into the bushes.

After a day of relaxation, early in the morning on June 3rd, I headed back up the road to a slow-moving river that we had passed the day before. As I approached the river-bank, I was surprised to see a gravid female Green Lizard laying submerged in the water with just its head protruding above the surface. Though I had not witnessed this phenomenon before, two more females were observed in the same position that morning and I wondered if males used the same method of temperature regulation, though none were seen. As I waded up the river, I caught or observed Marsh Frogs, Yellow-bellied Toads, *Bombina* variegata, Striped-necked Terrapins, *Mauremys caspica*, Pond Turtles, *Emys orbicularis*, Dice Snakes, *Natrix tessellata* and one Grass Snake, *Natrix n. persa*. The Turtles were captured as they walked along the river-bed and picking them up proved to be quite an unpleasant task as they invariably discharged a foul-smelling defence odour.

It was with a feeling of immense satisfaction that I strolled back down the track to our

camp that evening and to round the day off nicely, I caught three more species -a Slowworm, Anguis fragilis, an Agile Frog, Rana dalmatia, and lastly, an attractively marked Green Toad, Bufo viridis, all of them obviously enjoying the cooler evening air.

A couple of days later, on June 5th, we moved camp to a more accessible beach further along the peninsula, near the village of Sarti. Three Montpellier Snakes were found dead on the road between the two sites and as we drove back from the village at about 11 pm the same evening, a Cat Snake, *Telescopus fallax*, was caught crossing the narrow track.

Over the next few days I spent many hours scouring the surrounding hillsides in search of various reptiles and in addition to the species that I had already caught, four more were added to the list of captures. A gravid female large Whip-Snake, which subsequently laid eight eggs, was trapped on the edge of a lagoon near the beach; three Blind Snakes, *Typhlops vermicularis*, were found under a boulder in a rocky area on the edge of a wood; a Glass Lizard, *Ophisaurus apodus*, was caught in some long grass, and finally, shortly before we left Greece, a Javelin Sand Boa, *Eryx jaculus*, was brought to me by one of the locals.

During the course of my searching, many snakes evaded capture and therefore could not be positively identified, but owing to the speed with which they moved and the uniform colouration of their bodies, it is probable that most of them were either large Whip-Snakes or Montpelliers. No Ratsnakes, *Elaphe*, or evidence of them such as sloughs etc. were seen or found and if they do occur in this area, as the temperature was constantly in the 80s, I think it highly likely that they are most active in the cooler months of the year, when competition for food with the fast-moving diurnal snakes is not so fierce.

Summary of reptiles and amphibians caught by the author in North-east Greece in June, 1979.

Anura	Testudines
Bufo viridis	Emys orbicularis
Bombina variegata	Mauremys caspica
Rana ridibunda	Testudo hermanni
Rana dalmatia	Ophidia
Sauria	Eryx jaculus
Podarcis sp.	Typhlops vermicularis
Lacerta viridis	Coluber jugularis caspius
Anguis fragilis	Natrix n. persa
Ophisaurus apodus	Natrix tessellata

Malpolon monspessulanus insignitus Telescopus f.fallax

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# DR. ELKAN WRITES ABOUT SALAMANDER LORE

Readers interested in Salamander folklore may like to see the following lines taken from "La Rôtisserie de la Reine Pédauque" (The Eating house of the Queen Pédauque) by Anatole France (1922). The book is most amusing to read and is full of the extraordinary conceptions our forefathers had of nymphs, salamanders and other irrealities.

P.46 "He had hardly spoken when the door opened and a large black-clothed man burst into the frying kitchen with a storm of wind and snow. "A Salamander" he cried, "A Salamander". And, taking no notice of anybody, he bent over the fireplace and started to rummage about among the embers, endangering Brother Angel who coughed miserably, having to swallow coal and ashes with his soup. But the man continued raking through the fire crying: "A Salamander!....I see a Salamander!" And all the while the flames made his shadow appear on the ceiling like that of a huge bird of prey.

"With you honour's permission" said my father, "All I see is a miserable monk and no Salamander." "And really I don't mind, because from all I have heard they are nasty hairy beasts with horns and large claws."

"What a mistake!" said the dark man, "The Salamanders look like women or rather like nymphs and they are beautiful. But it would be stupid of me to expect you to see this one. To see a Salamander one has to be a philosopher and I doubt that there are any such in this kitchen."....It is quite probable that this Salamander came for you and your pupil. I saw her distinctly from the street while I passed this tavern and if you had a better fire she would be easier to see. .... The smoke, rising up the chimney hood, curved itself just then with particular grace and assumed shapes well simulating suitably padded loins if helped with a little positive imagination. I did therefore not altogether lie when I said I saw something. "My child," said the magician to me, "Never forget that you have seen a Salamander. It's a sign that you are going to be a scientist, perhaps even a magician." (P. 136 f) Look at the clouds over our heads and their wonderful shapes. That is where the Sylphes and the Salamanders live, lovable and beautiful creatures that they are. The delights we can experience in uniting with them are inconceivable. Compared with a Salamander the prettiest village girl is only a shrivelled mummy. They give themselves gracefully to any philosopher. You probably remember the beauty which accompanied Descartes on his voyages. Some say it was an ordinary girl whom he took along, others maintain it was an automaton which he made with incredible skill. In fact it was a Salamander, which this clever man had chosen as a companion. He was never seen without her. Once, crossing the sea, he took her on board in a box made of precious wood and lined with silk inside. Size and shape of the box stimulated the curiosity of the captain who opened the lid while the philosopher was asleep. He discovered the Salamander and, being of low intellect and education, he concluded that such a marvel could only be the work of the devil. Frightened out of his wits he threw her into the sea. Obviously the beauty did not drown but had no difficulty in rejoining her friend the professor to whom she remained faithful all his life. When eventually he died she left this realm and has never been seen again. This example will give you an idea of love between humans and Salamanders. These unions are much too sublime to be regulated by contracts. The ridiculous abracadabra used in ordinary marriages would be entirely out of place. What part could a notary with a whig or a fat parson play on such an occasion?...Remember these revelations my son. They will be useful to you, for certain symptoms show me clearly that your future lies in the bed of a Salamander.

Translator's note: ....and if you want to know more about these marvellous Salamanders, read the book. As to the 'Reine Pédauque' all the author tells us about her (P.7) is that 'she had webbed feet like the geese and the ducks".

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## EDUCATIONAL ASPECTS OF HERPETOLOGY

### V. F. TAYLOR BHS Education Officer

Every single BHS meeting can be regarded as an educational venture since members attend in order to improve their own personal knowledge or understanding of an aspect of herpetology: over the past 10 years however there has been an increasing awareness of the urgent need for a broadening of BHS efforts to include educational activities involving groups outside the Society. These "extra-mural" activities can be broadly divided into two categories separated by the type of target audience for which each is designed — for convenience they can be labelled as "technical" and "general" education.

There is a continuing need for the organisation of inter-society and inter-disciplinary courses and symposia on a wide range of herpetological topics. Examples of this type of exercise include the residential courses that we have run at Theobalds College when we encouraged mutually beneficial communication between herpetologists and the veterinary and teaching professions. I think that we were in fact the pioneers in this field although we have now been overtaken by the splendid efforts of John Coborn and ASRA – if we were in competition with ASRA this would be a terrible disaster but if education proves anything it is the need for co-operation as opposed to competition and in fact I am very pleased and excited that others are also active in this field. "Technical" educational activities can also consist of single, more formal lecture situations with groups of persons experienced in associated disciplines; my recent talk to the Zoological Society at Reading University for example falls into this category.

General educational activities can be regarded as herpetological public relations exercises aimed at audiences which may range from Womens' Institutes to Boy Scouts. At this level one is often required to provide an "educational entertainment" but such a prospect should not deter the would be speaker. Provided that the speaker sets himself realistic objectives this type of event can be both enjoyable and valuable — in many respects it requires more skill than the delivery of a more technical dissertation to a more academic group and the end result is certainly just as satisfying. In the field of general education work with children is particularly valuable and here I am lucky in that my job enables me to organise herpetological sessions for classes of children. Several of the classes that I have taken this winter are going on summer camps to the Swanage area and so I have been able to put them in touch with Tony Phelps at RIGB which illustrates yet again the potential for inter-society co-operation, since he is able to provide an ideal practical follow up to my mainly theoretical introduction.

Effective educational activities need not be restricted to lectures, talks and courses however since they can in fact be carried out from the comfort of ones home – such is the power of the pen. I am at present working on an article which I hope will be published by the Institute of Biology in their Journal of Biological Education, whilst other members of the Conservation Committee have had articles published in other journals. All of these serve to illustrate the power of the pen as an educational tool.

As previously mentioned the past ten years have seen the development of a general educational awareness throughout the herpetological world; I hope that the next ten years will show that this is only the tip of the iceberg. The potential for educational developments is great and it is up to us to exploit it to the full.

\* \* \* \* \*

The following article was brought to our attention by Nick Millichamp. It originally appeared in a publication by the American Society of Ichthyologists and Herpetologists. In the interests of serious taxonomic endeavour, we reprint it here, with acknowledgements to the ASIH.

# A NEW SPECIES OF ANURAN, RANA MAGNAOCULARIS, THE POP-EYED FROG

### **RANK FROSS**

### Loyal Ontario Museum

Night collecting along roads in Ontario has revealed a new species of frog strikingly characterized by enormous eyes and a flattened body. The species is described below and the adaptive significance of its diagnostic features are discussed.

#### Rana magnaocularis Holotype:

Loyal Ontario Museum 12854, adult male, collected on Highway 401 five miles north of Toronto, 10 May 1973.

### Diagnosis:

Eyes enormous, protruding tongue usually extended, body and limbs highly flattened dorso ventrally. Dorso lateral fold absent. Otherwise resembles *Rana pipiens*.

### Description:

Body subdiscoidal. Depth of body 1-2mm. Snout-vent length 6 inches. Maximum body width 3 inches. Skin somewhat cornified usually with a series of polygonal indentations running transversely across the body. Colour green or brown, marked with large circular dark spots (which occasionally run together) with light margins. Underparts white.

### Habitat:

Found on or sometimes beside asphalt roads where traffic is fairly heavy. Most common in spring.

### Discussion:

Three questions require attention. Of what significance is the peculiar morphology, why is it restricted to a single habitat and how does it move?

Why is the body so flattened and why are the eyes so large? We believe that these are adaptations to the peculiar habitat. Normally frogs are at least partially hidden from potential predators by reeds, grass or bushes. On the road they are completely exposed, however. In evolving a two-dimensional body, the pop-eyed frog is enabled to escape the attention of all predators excepting those immediately overhead. Were the eyes also twodimensional, they would be incapable of lateral vision. So instead they are enlarged to make up for the loss of view resulting from the recumbent body.

Obviously, locomotion is difficult with a discoidal two-dimensional body. This may explain why they are not found off the road - they are incapable of surmounting rough surfaces.

We were at first puzzled as to how it moved from one place to another, observations on live specimens being lacking. Initially we found the tread-like markings found on the upper surface puzzling. Of what use were the treads in locomotion when they were not in contact with the ground? Analogy with the hoop snake offered a hypothesis; the frogs roll themselves into a ring, insert the extruded tongue in the posterior, and roll themselves neatly along, thereby engaging the treads with the road surface. A colleague has suggested alternately that the ridges may permit turbulent air from passing cars to lift the frog, into the air, leaf like. Steering would be possible by lowering one leg or the other like aeroplane flaps.

# A LETTER TO THE EDITORS ON SAND LIZARDS

Sirs,

I have lived for four years in the northern end of the Black Forest (W Germany) and I noticed, even at colder high altitudes, an abundance of Sand Lizards, *Lacerta agilis*, along the sides of paths and clearings in quite heavily afforested areas, and without a trace of sand. I have also noticed them in a forest in Sweden where there was no sand. I read in a report of the BHS Conservation Committee that successful population maintenance and re-introduction has only occurred with a programme of tree clearance and making bare areas of sand for egg laying.

Forest workers in Germany told me they used to find their eggs under leafy compost at the edges of clearings. A friend of mine brought six eggs over from the Black Forest region (kept in moist peat) 9 years ago; these hatched and bred in a garden vivarium where I supplied peat for egg-laying. They later escaped when a neighbour's sheet blew from the clothes line and flopped over the vivarium wall. Last summer a neighbour called me into her garden to catch a strange creature. It was a Sand Lizard.

My opinion – for what it's worth – is that it is possible that the Continental/Scandinavian individuals, because of greater genetic variation (here I assume that Britain, being on the periphery of the range, was originally colonised by relatively few individuals before the Britain/mainland Europe land bridge disappeared) have evolved a better egg retention and/ or incubation mechanism. The fact that they can survive in areas of Sweden with only a short summer period would suggest this.

If the British population is possibly inferior, might it not be a good idea to bring lizards over from colder areas of Europe, allow them to breed in open-air vivaria, then release them to see if this new genetic material could prove a "shot in the arm" for our own populations.

I feel there could be a good chance that this may allow them to extend their range and no longer be tied to the open sandy areas.

I am sure that at this point the purists will be pulling their hair out, but I do feel sure that a thriving Sand Lizard population in this country would be far better than the possibility of an extinct but pure British population.

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

Ed. Comment:

Although we are not intimately familiar with the local climates of the Black Forest and southern Sweden, we think it likely that, because of their more easterly continental position, sunshine hours are greater, producing slightly more favourable conditions for incubation, and thus relieving the Sand Lizard of its dependency on the open sandy areas in the more oceanic and equable climate of Britain.

### \* \* \* \* \*

### ALBINO SLOW WORMS

Mr Nigel Stevens, 5 Delmaine House, Maroon Street, Poplar, London E14 7QJ, collected a typically coloured female Slow Worm on a rubbish tip at Harold Hill, Essex, in the summer of 1979. On 13th September 1979, the female gave birth to three normal and four albino babies. Mr Stevens is raising these on a diet of small slugs, aphids, and earthworms.

\* \* \* \* \*

# DIETARY DEFICIENCY IN GARTER SNAKES

In the winter of 1978, a female Eastern Garter Snake, *Thamnophis s. sirtalis* in my collection began to act very strangely. She seemed dis-orientated and threw her head about. I sought advice from the BHS and was informed that it could be a disease caused by a deficiency of vitamin B, probably due to the feeding of fish as the main diet for extended periods.

I took the following steps:

- 1. Changed the diet to earthworms.
- 2. I mixed a small amount of "Becosym" (a vitamin B supplement syrup used for humans) with the drinking water, and also placed a small amount on the earthworms.
- 3. Raised the temperature.

Within three days the snake was acting normally and appeared to have recovered. The treatment was continued for a few more days, to be sure. Now I make a point of mixing small amounts of "Becosym" syrup with the water when fish has been fed for an extended period. If more than a very small amount was added to the water, the animal refused to drink.

David Hawden, The Lodge, Busbridge Hall, Godalming, Surrey

# A CASE OF "RED-LEG" IN TADPOLES OF THE AMERICAN BULLFROG, RANA CATESBEIANA

In November 1979, I had seven large (approx. 3") larvae of *Rana catesbeiana*. When inspecting the aquarium one day, I found five dead, one ailing, and the seventh apparently normal. All of them were coloured a rich rose ventrally, both on the abdomen and tail. In an endeavour to save the remaining two larvae, they were transferred into about 2.5 ltrs of tap-water containing approximately 25 ppm of Quinine Sulphate. Ten hours later only the seventh specimen remained alive. After a further 40 hours this tadpole was completely devoid of external symptoms of infection.

> V Hawkins, 7 Yardley Close, Yardley Lane, Chingford, Essex \* \* \* \* \*

Members Advertisements (Continued from page 22)

\*Good homes wanted for free Red-Eared Terrapins Male 4½", Females 3¾" and 5½". For sale or exchange: *Pelomedusa subrufa*, female 5½", *Sternotherus odoratus*, male 3½", *Podocnemis unifilis*, female 7", *Geomyda trijuga thermalis*, female 7½". Wanted: *Chinemys reevesi*, adult male or juveniles, *Emys orbicularis*, adult male. *Phrynops hilarii*, adults (5" +), either sex. All BR carriage paid. Richard Inskeep, 26 Luxor View, Leeds LS8 5JT.

\*For sale: young male (5ft) Indian Python (P.m. bivittatus). Brenda Carter, 'Lochaber', Kingswear Road, Hillhead, Brixham, Devon. Tel. Brixham 2599.

\*For sale: 11ft male captive bred *P.m. bivittatus*. Also adult male Yellow Anaconda (Eunectes notaeus).

Simon Townson, Tel. 01-989 9570.

\*Wanted: Axolotls, either colour, for breeding. Also Barred Tiger Salamanders, Ambystoma tigrinum mavortium; Valley Garter Snakes, T. sirtalis fitchi, ex Central Valley of California.

John Pickett, 84 Pyrles Lane, Loughton, Essex. Tel. 01-508 6624.

## BRITISH HERPETOLOGICAL SOCIETY COMMITTEE 1980

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

Members' private addresses:

President:	Dr J.F.D. Frazer	Warren Farm, Boxley, nr Maidstone, Kent. Tel. 0622 52524
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Joint Secretary: (activity, co-ordination, talks, liaison, external relations)	Dr M.R.K. Lambert	Centre for Overseas Pest Research, College House, Wrights Lane, London W8 5SJ. Tel. 01-937 8191 ext. 205
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Chairman, BHS Cap- tive Breeding Committe & Joint Editor of BHS Bulletin	Mr S. Townson ee	23 Fladgate Road, London E11 1LX. Tel. 01-989 9570
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