

**THE BRITISH
HERPETOLOGICAL SOCIETY
BULLETIN**



**No. 47
Spring 1994**

THE BRITISH HERPETOLOGICAL SOCIETY

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

Registered Charity No. 205666

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

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

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

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

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

Meetings

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

Publications

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

Subscriptions

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

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

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

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

The Bulletin is edited and produced by
Simon Townson and Neill Clark.

Contributions and correspondence arising from the Bulletin should be sent to:
Neill Clark, 15 Rivenhall End, Welwyn Garden City, Herts AL7 2PJ.

FRONT COVER

Laemactus longipes see article on p.23.

photo: P.J. Stafford

BRITISH HERPETOLOGICAL SOCIETY MEETINGS FOR 1994

Meetings are usually held at Birkbeck College, Malet Street, London WC1 or at New Denham Community Centre, Oxford Road (A4020), New Denham, Uxbridge, unless otherwise stated.

New Denham – how to get there:

From Uxbridge Tube (Piccadilly/Metropolitan): turn right into High Street, continue on through shopping centre to Odeon Cinema. Follow right-bending High Street until Oxford Road is met, turn right (north) into Oxford Road and continue north, past Dog and Duck Pub, to Community Centre.

- May 1st Joint Conservation & Federation Committee meeting.
Frensham Common National Nature Reserve (details from
Jan Clemens: 0203-506416)
- May 7th Captive Breeding Committee Amphibian meeting
(New Denham)
- May 15th “Leapers & Creepers” events, organised by Surrey Wildlife Trust,
following by later (7-9pm) visit to Beam Brook*
Details from Julia Lychley, Tel: 0737 643827
- July 2nd Captive Breeding Committee Animal Husbandry workshop
(New Denham)
- October 15th Autumn General Meeting (Birkbeck College, London)
Speakers will be:
(1) Chris Wild (*Nottingham*):
 “The montane chameleons of the Cameroon Highlands”
(2) Dr Jim Foster (*Durrell Institute of Conservation & Ecology*):
 “Reptile conservation in south India”
(3) Dr Angelo Lambiris (*Essex*):
 “Southern African amphibians”
- November 5th Captive Breeding Committee Captive Stock Sale
(New Denham)
- December 3rd Research Committee meeting (Birkbeck College, London)

* For those unfamiliar with Beam Brook, this is an old nursery site with a series of small ponds near the village of Newdigate (south of Dorking) in Surrey. Since 1905 it has been home to a variety of both native and introduced species of amphibians and reptiles; it is especially renowned for its colonies of Edible Frogs, Italian Crested Newts and Alpine Newts. BHS Members may either turn up at 7 pm at the Beam Brook site, or go there following attendance at the “Leapers & Creepers” session that runs through the day and should finish by 5 pm. There will no charge for entry, and Members will be allowed to examine and net the various ponds during the visit (but not to take away any animals caught).

For those going directly to Beam Brook, the nursery is situated in Partridge Lane, approximately 1 mile due east of Newdigate village (Map ref. TQ 216423). It is reached from Newdigate by taking the road leading out to the north-east, which after about a mile turns south-east and becomes Partridge Lane. Beam Brook is signed on the west side of the road.

THE BRITISH HERPETOLOGICAL SOCIETY CONSERVATION COMMITTEE REPORT: 1992 & 1993

The Conservation Committee, founded in 1969 to deal with the threats facing our native herpetofauna, now approaches its 25th anniversary. In this time a great deal has been achieved in terms of habitat management, site protection and acquisition and an ongoing monitoring programme. During this time we have seen lowland heath becoming increasingly fragmented and thousands of farm ponds lost from the landscape. These trends have meant that many localised herptile populations have become isolated from each other and in some cases, face possible extinction. In the last few years the conservation movement has gained momentum and the public at large are voicing concern over threats to natural habitats and the wildlife they support. The politicians are also taking environmental concerns more seriously and are having to place them higher up on the political agenda.

Compared with many other countries, Britain only has a relatively small number of reptile and amphibian species, three of which are particularly threatened and whose protection has been the mainstay of this committee. However, we were fully aware that the 'common' species were facing threats from various sources and that herpetologists working all over the country were needed to monitor populations in their area. Only by working closely with other herpetological organisations, the voluntary conservation sector and the statutory conservation bodies could we hope to solve this problem. If these problems have been solved or if the right moves have been made to tackle the issues is for the individual to decide after reading this report.

Conservation Committee Membership

The following individuals have been members of the committee during the past two years; Mr B. Banks, Ms M. and Dr T. Beebee, Mr D. Bird, Mr A. Braithwaite, Mr J. Buckley, Ms J. Clemons (Chairman), Mrs M. and Mr D. Dolton, Mr P. Edgar, Mr C. Fitzsimmons, Mr J. Gaughan, Dr R. Griffiths, Mrs E. and Prof G.F. Haslewood, Mr H. Inns, Mr M. Jones, Mrs A. and Mr M. Langford, Mr D. Mills, Mr N. Moulton, Mr M. Noble, Mr M. Preston, Mr D. Race, Mr P. Reynolds, Mr K. Sherrard, Dr M. Swan, Mr E. Wade, Mr J. Webster, Mr W. Whitaker.

The Conservation Committee will greatly miss the late Prof G.L. Haslewood, whose interest and contribution to the committee has been invaluable over the last twelve years. We are pleased that Mrs E. Haslewood will still continue to serve on the committee.

We are also grateful to the following individuals who have acted as advisors to the committee: Dr H. Arnold (ITE), Dr A. Cooke (English Nature), Mr K. Corbett (HCT), Dr A. Gent (English Nature), Mr T. Langton (HCI).

Site and Species Protection

Fortunately, the recession has meant relatively few cases of herptile habitat destruction. In Dorset, a road threat to one of the densest populations of reptiles in N. Europe has been blocked, pending a second public enquiry. At Holnest, Dorset, a site acquired by the County Council for a waste tip was found to be used by a great crested newt population. Although planning permission had been granted an application for a judicial review was made, so the site could yet be saved. Fortunately the balance of power at the Council, following the local elections, gave the Liberal Democrats overall control and the planning application for the landfill was consequently

invalidated. The ultimate fate of the site is still unclear but it is hoped that it will eventually become a local reserve. Work has already started on adjacent land, not owned by the County Council, to improve several occupied ponds.

A survey of a site near Peterborough, scheduled for the development of a new town revealed the presence of the largest great crested newt colony known in the UK. Although the developers have agreed to set aside part of the area as a reserve, this cannot accommodate the sheer number of animals involved. BHS & HCT, together with English Nature are currently investigating improved conservation options for this development.

During 1993, BHS and HCT worked closely with BP and English Nature to develop a land management plan for the Goathorn Peninsula in Dorset. This has important implications for the principal sand lizard colony on the peninsula, especially where a proposed pipeline crosses a boundary bank. If 'overriding public interest' in terms of national energy sources outweighs conservation protection then appropriate compensation must be provided. The land management plan has incorporated heathland restoration and represents a positive relationship between the conservation sector and a developer.

BHS & HCT in liaison with Forestry Enterprise have continued to carry out a programme of management to maintain rare reptile populations at thirteen reserves within the Dorset Forest District totalling 40ha. Such management has included tree and scrub clearance, spraying invasive bracken and the creation of sandy tracks which act as protective firebreaks as well as providing a suitable medium for Sand Lizard egg laying.

The English Nature Species Recovery Programme for the Natterjack toad is approaching its third year. The aim of the programme is to secure the long-term self-sustained survival in the wild of species threatened by extinction. This contract has provided valuable funding for research, management work and translocations. Several new sites, in suitable habitat, have been created in Dorset, Suffolk & Surrey.

Survey Work

In 1992 water levels were below average in most of Britain for the third year running, and natterjack breeding success suffered as a result. In 1993, the high rainfall resulted overall in a much improved breeding season. Ephemeral ponds did not desiccate as quickly and future survey work will be able to confirm this success. A new breeding colony of natterjacks in Cumbria, 140m above sea level was 'discovered' in 1993. The locals, of course, had known of their existence for some time!

Each year BHSCC and HCT produce an annual survey programme of rare reptile sites. This work is carried out by BHSCC volunteers and HCT employees during the species' active season. Over the last two years priority has been given to monitor reintroduction sites, sites under threat and sites where specific management to enhance the habitat for herpetofauna has been carried out. In order to better assess the status of herpetofauna at these sites and others, all rare species survey records have been entered into the BHSCC Database. The database now contains over 9000 herpetological records and incorporation of a mapping facility is the next stage in its development.

Captive Breeding & Translation

Natterjack Toads were introduced to three new sites as part of the Species Recovery Programme.

Viable breeding stocks of Dorset, Surrey and Merseyside sand lizards have been maintained in outdoor enclosures, where the lizards are able to deposit their eggs naturally. The eggs are then transferred indoors for incubation and hatchling lizards are reared for release six weeks later. A proportion are overwintered before being

released the following Spring. Over the last two years a total of 340 lizards (1992 - 173 & 1993 - 167) have been reared and subsequently released onto a total of three prepared and agreed re-introduction sites in Surrey, Dorset and mostly recently in the New Forest.

The BHS/HCT sand lizard breeding project at Marwell Zoo has been awarded £5000 by British Gas as part of the 'Grassroots' scheme. The money will be used to build another vivarium.

Management

BHSCC/HCT own, lease, license and manage over 80 sites in Surrey, Sussex, Hampshire and Dorset, HCT employ Field Officers in Dorset and the Weald to organise and carry out management programmes and with BHSCC also arrange an annual winter management task programme. As stated in the last report, the employment of professional herpetologists by HCT has enabled an even greater amount of important conservation work to be carried out to enhance the status of herpetofauna at these sites, but the help of the experienced volunteer is still as valuable as it has been in the past.

Table 1. Total amount of scrub clearance undertaken by BHS 1992/93

Year	Area Cleared (hectares)	No of Volunteer days worked
1992	10.67	267
1993	11.58	266

It is also encouraging that the Education Committee organises conservation tasks and a total of 72 YHC members and parents have cleared 1.7ha of trees and scrub during 1993. This will provide a valuable training in herpetofauna site management and older YHC members are encouraged to 'graduate' to the main task programme.

BHS/HCT also organise a bracken spraying programme, essential if our reserves are to support the ideal habitat for rare reptiles. This involved in 1993, HCT employees and contractors carrying out 430 working days of chemical spraying covering 56ha of habitat which included several BHS reserves.

At the main natterjack toad sites on the Merseyside sand dune system, scrub encroachment in recent decades has facilitated the spread of the common toad and reduced the natterjack range by up to 80%. Current management includes the removal of common toads and their spawn together with scrub clearance. The largest management exercise has been the removal of invasive scrub by contractors from fixed dunes on the Ainsdale Hills LNR, as part of the Natterjack Recovery Programme.

Publications

A number of papers and reports were published by committee members and an informative leaflet on the provision of egg-laying sites for grass snakes was well received. The committee has a regular column in British Wildlife magazine and the 'Save our Reptiles' colour booklet has recently been revised with financial assistance from English Nature.

Consultations

During 1993, the BHSCC were consulted about the following developments:

- Biodiversity Challenge – a plan for action from the voluntary conservation sector.
- A future for Britain's Ponds: An agenda for action – Pond Conservation Group

UK Implementation of EC Habitats & Species Directive – DoE

UK Biodiversity Convention Action Plan – DoE

A Framework for Herpetological Conservation in the UK – JNCC

National Amphibian & Reptile Recording Schemes – JNCC/ITE

Common Species

The declining status of the great crested newt and the other widespread species reflected a need for a national network of herpetofauna recorders and local groups and the committee were concerned that the Leicester Polytechnic National Amphibian & Reptile surveys were no longer funded. The appointment of a new 'Common Species Co-ordinator' will go a long way to promoting the conservation of the common species in the UK. This three year initiative is the result of negotiations between the statutory agencies English Nature, Scottish Natural Heritage and the Countryside Council for Wales with the private sector, namely Herpetofauna Conservation International Ltd, HCT and BHS. The main aim of the post is to promote the conservation of the common herp species in the UK and BHS member Mr J Foster was the successful candidate for the post.

Several committee members have been instrumental in establishing reptile and amphibian groups in their home area. The Warwickshire & Somerset BHS groups in affiliation with the County Trusts, has resulted in new volunteers coming forward to help compile site registers and carry out management on important sites in the area. The Dorset group was established to take over the role of the species protection officer. This group is made up of BHSCC members and HCT personnel and apart from monitoring and management work, chase up planning applications and attend important meetings. It is hoped that a Hampshire BHS group will be established shortly.

The conservation committee are also grateful for reports from the following BHS members:

Mr W Atkins – monitoring of a threatened great crested newt colony in Berkhamstead.

Mr R Calff – in liaison with British Rail has secured a management agreement for a valuable reptile site in Middlesex.

Mr D Sussex – a survey of the herpetofauna in E. Berkshire.

Mr R Davies – long-term toad population studies at an ephemeral lake, similar to an Irish turlough in Dyfed.

Mr M Barnicote – observation of a common lizard colony in and around a railway station in Bedfordshire.

Finance

The committee's administration budget covers the costs of affiliations to Wildlife & Countryside Link and BTCV, meetings expenses, printer and photocopier requisites, stationery and postage.

The Leaflet fund serves to ensure that adequate stocks of all our leaflets are always available.

Income to the Land Fund during 1992 and 1993 amounted to £11,472.19 (donations) and £4,768.74 (interest). The Land Fund appeal has now reached to over a third of its target of £100,000 and it is pleasing to report that this now totals £35,568.20. Some of the interest is being used to pay leases on several BHS reserves, as this cost could no longer be met by the administration budget alone. The Conservation Committee are grateful to BHS members for their continuing generosity.

Acknowledgements

We are indebted to the following individuals and organisations who have made donations to the Land-Fund during 1992 and 1993.

ASRA, Dr Baksh, B. Banks, T. Beebee, D. Bird, Birmingham Midshires Building Society, Bitterne Park School, Mr A. Brock, J. Buckley, R.G.H. Chapman, J. Clemons, R.H. Davies, Mr C.J. & Mrs J.E. Edwards, A. Ellen, C. Fitzsimmons, Clare Fletcher, Mrs A. Fogg, N. Fry, Mrs Elaine Fryger, J. Gaughan, R. Griffiths, Mr & Mrs Harper, Lucy Harris, Herne Bay Amphibian & Reptile Club, Mrs J.M. Hosie, N.H. & C.M. Hoskins, Mrs K. Howland, H. & L. Inns, London Zoo, T. Martin & Family, D. Mills, Mr C. Monk, Morrish Builders, K.D. Myers, Mr Osbourne, Mrs R.H. Oxford, T.J. Palmer, P. & M. Platts, M. Preston, P.W. Rote, Diane Sandland, Sussex Amphibian & Reptile Group, Valerie Trimby, Upton Junior School, T.B. Vause, M. Walters, J. Warden, J. Webster, B. Whitaker, YHC, Young Oryx Club.

A special thanks to Mr N. Clemons, BHSCC Database Manager, for his time and efforts in developing a database for the purpose of recording and analysing herpetological data.

We are also very grateful to HCT for obtaining the necessary funding in order to carry out active conservation work. It is most rewarding that the two organisations not only work together as a team, but also have their own individual identities in order to tackle more effectively the many threats facing our native herpetofauna.

REPORT OF CAPTIVE BREEDING COMMITTEE (CBC) MEETINGS DURING 1993

May 14th. Chris Davies gave a very interesting lecture on breeding European Lacertas and Amphibians in his garden in Worthing. The use of open air enclosures, cold frames and greenhouses was covered with some interesting adaptations for increasing the size and shape of standard greenhouses. This was followed by an informal get together whereby members could discuss problems and successes over a coffee or glass of wine and buffet style snacks.

July 3rd. Mark Geach brought together two colleagues, a parasitologist, Peter Daszak, a bacteriologist, Malcombe Barnicote and Mark giving the veterinary advice. This was a fascinating afternoon of sound husbandry advice with a more in depth look at the problems that can occur when dealing with wild caught animals. Members were shown how to prepare fecal samples so they could screen their own animals for parasitic burdens with ample opportunity to look at examples under the microscopes provided by the CBC. The three speakers showed slides of varied reptile and amphibian problems and how they could be treated.

September 25th. Henk Zwartepoortr, Joint Head Keeper of Reptiles at Rotterdam Zoo gave an excellent insight into the numerous and varied species kept and bred not only by the Zoo, but in his large private collection. Henk must be congratulated on the numbers of unusual and difficult species being bred. The Reptile Section is looking into passing on certain species of captive bred animals to the private sector so that new populations can be maintained, thereby increasing the numbers and genetic diversity of such species.

November 6th. Open Day. This was the third year running that we have now run this event and it has proved a very popular day with members. It has always been our policy to allow only captive bred animals to be sold at this event and it is regrettable that certain animal rights factions tried to stop the event taking place. These people are now pressurising local authorities to make it as difficult as possible to run such events despite the fact that it only promotes the good side of the reptile and amphibian hobby, by recommending that only good quality, healthy and well adapted animals are sold. The latest in equipment and housing back this up to ensure that potential new owners of animals can get sound advice, so providing the optimum conditions available. Many people are so completely divorced from nature that it is important a close association between wild animals and ourselves is maintained, thereby encouraging awareness and conscience of our disappearing and beautiful world. Reptiles and amphibians are an ideal tool for this purpose.

Care Sheets. We are still trying to get the last few care sheets in their new format, this is a time consuming task and in the mean time the following can be obtained, maximum of 3 care sheets per member free of charge, enclosing large S.A.E., or 1.00p to non members. If more than 3 care sheets are wanted, add 50p per copy. Treefrogs, Newts and Salamanders, Frog and Toad Tadpoles, Newt and Salamander Tadpoles, The Green Iguana, Lacertas, Blue Tongue Skinks, Leopard Geckos, Royal Pythons, Garter Snakes and Tortoises.

During the course of the year hundreds of letters are received with queries on husbandry, obtaining species, vivarium design, lighting, food, legal and veterinary matters. Often our secretary Monica Green, or CBC members are not provided with a S.A.E., please

could you do so in the future. In most cases the cost is carried by the private individual of that committee and can work out to a substantial sum over a period of time. As Chairman of the C.B.C., could I also ask if telephone queries to me personally could be between 7.00 pm - 10.00 pm on Mondays and Fridays when I am more likely to be available.

Queries relating to specific animals can only be responded to accurately if full latin name, common name and country of origin are given. Better still, locality records of area animal was found if wild caught.

In order that pet shops dealing in reptiles and amphibians can have a better understanding of their requirements one of our advisors is currently involved in training staff in several outlets around the country.

CBC PROGRAMME FOR 1994

May 7th, 7-10pm, speaker Peter Foulsham, "Keeping and Breeding Amphibians". Snacks and refreshments provided free of charge. After lecture there will be an opportunity to show and exchange animals. Chance for an informal chat.

July 2nd, 2.30-5.30pm, speaker Robert Sprackland, author of Giant Lizards. Subject will be maintenance of lizards with emphasis on monitors.

BREAK

Panel of experts will be in attendance to answer questions on all aspects of keeping and breeding reptiles and amphibians.

**ALL MEETINGS WILL BE AT NEW DENHAM COMMUNITY CENTRE,
OXFORD ROAD, NEW DENHAM, UXBRIDGE**

**T. Thatcher
(Chairman)**

VIRAL DISEASES OF REPTILES

JOHN E. COOPER

Faculty of Veterinary Medicine, Sokoine University of Agriculture, Morogoro, Tanzania, East Africa

(Present address: Volcano Veterinary Centre, B.P., 105 Ruhengen, Rwanda)

Thirty years ago, in their classical work "Principal Diseases of Lower Vertebrates", Reichenbach-Klinke and Elkan devoted only two paragraphs to possible viral infections of reptiles.

In the intervening period, interest in the subject has escalated and viruses have now either been isolated or identified from all orders of reptiles except the Rhynchocephalia (tuatara). The subject remains in its infancy, however, in that many of the viruses detected have not yet been investigated in detail and their relevance in terms of health and disease is unknown.

Some of the more important viruses of reptiles i.e. ones that appear to be responsible for disease, are listed below.

Order	Virus/disease	Comments
Chelonia (tortoises, terrapins and turtles)	Green turtle Herpesvirus	Causes "gray-patch disease in young green turtles <i>Chelonia mydas</i>
	Herpesvirus- associated stomatitis	Reported in tortoises from North and South America and Europe
	Herpesvirus- associated hepatic necrosis	Reported in at least three species of North American turtle (terrapin)
	Iridovirus infection of liver and spleen	One case reported in a Hermann's tortoise <i>Testudo hermanni</i>
	Papilloma-like virus	Skin lesions of Bolivian side-neck turtles <i>Platemys platycephala</i>
Crocodylia (crocodiles, alligators, ciamans etc)	Caimanpox	Skin lesions in Spectacled Caimans <i>Caiman sclerops</i> and Nile Crocodile <i>Crocodylus niloticus</i>
	Adenovirus infection of Nile Crocodile	Hepatic and intestinal lesions
Squamata <i>Lacerta</i> (lizards)	Poxvirus of flap- necked chameleon	Inclusions in monocytes of <i>Chamaeleo dilepis</i> in Tanzania
	Poxvirus of tegu	Skin lesions in a <i>Tupinambis teguixin</i>

	Papilloma of lacertid lizards	Skin lesions in European Green Lizard <i>Lacerta viridis</i>
	Adenovirus infection of Jackson's chameleon	Respiratory and alimentary inclusion bodies in a <i>Chamaeleo jacksonii</i>
	Adenovirus-associated hepatic necrosis	Hepatic and other inclusion bodies in at least two species
	Erythrocyte virus infection of lizards	Inclusions in erythrocytes of various species
Squamata Ophidia (snakes)	Venom gland Herpesvirus infection	Detected in venom and/or venom gland of Asian snakes
	Herpesvirus infection of Boa Constrictors	Inclusions in liver and elsewhere of young <i>Constrictor constrictor</i>
	Adenovirus-associated hepatic necrosis in a Boa Constrictor	Inclusions in liver, virus isolated
	Paramyxovirus	Associated with respiratory disease and death in many species of snake in Europe and North America
	Inclusion body disease of boid snakes	Associated with neurological signs in various boids including Boa Constrictor

Diagnosis of virus infections of reptiles is based upon one or more of the following:-

- | | |
|------------------------|--------------------------------------|
| 1. clinical signs | 4. virus isolation, using cell lines |
| 2. histopathology | 5. transmission studies |
| 3. electron-microscopy | 6. serology |

The veterinary surgeon who suspects a viral infection in reptiles should seek advice from colleagues who have appropriate experience and laboratory support. In the meantime, every effort should be made to contain the infection by isolating affected animals and instigating a rigorous program of hygiene and quarantine. Post-mortem material and clinical samples must be carefully stored for subsequent investigation.

Acyclovir has appeared to assist recovery in tortoises with Herpesvirus stomatitis⁴. Vaccines against virus diseases are needed.

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- Reichenbach-Klinke H, Elkan E. (1965). *Principal Diseases of Lower Vertebrates*, London, Academic Press.
- Jacobson ER. (1993). Viral disease of reptiles. In Fowler ME ed. *Zoo and Wild Animal Medicine*. Philadelphia, WB Saunders.
- Ahne W, Kurstak E, eds. (1989). *Viruses of Lower Vertebrates*. Berlin, Springer-Verlag.
- Cooper JE, Gschmeissner S, Bone RD. (1988). Herpes-like virus particles in necrotic stomatitis of tortoises. *Veterinary Record*; 123:554.

AN ADDITION TO THE ARTICLE
'NOTES ON THE HERPETOFAUNA OF SOME OF THE
CYCLADES ISLANDS, GREECE'

DAVID BUTTLE

2 Manchester Place, Norwich NR2 2SH

Due to an error, the following was omitted from the above article (BHS Bulletin 46: 5-14). Also included under the notes for Kimilos should have been:-

Ablepharus kitaibelii kitaibelii (Scincidae)

Three adults were found in the south of the island. Not previously recorded on Kimilos (Chondropoulos, 1986).

Thus, with the inclusion of the above species, ten reptile species are now known to have been recorded on Kimilos, i.e. *Tenuidactylus kotschyi*, *Hemidactylus tureicus*, *Lacerta trilineata*, *Podarcis milensis*, *Ablepharus kitaibelii*, *Eryx jaculus*, *Elaphe situla*, *Natrix natrix*, *Telescopus fallax*, *Vipera lebetina*.

REFERENCE

Chondropoulos, B.B. (1986). A checklist of the Greek reptiles. I. The lizards. *Amphibia-Reptilia* 7: 217-235.

ERRATA

From the article entitled "Techniques and Principles of Herptile Photography", by J.A.S. Elkins, *Bulletin* 46, 19-24.

Para 3, line 5, 200 m should read 300 m.

Para 3, line 14, 200 m should read 200 mm.

Para 6, line 15, Super 6 should read Super G.

Mr Elkins also took the cover photograph of the Fire Salamander, used in *Bulletin* 46.

MEANINGLESS SPECIES PROTECTION OF EUROPEAN HERPETOFAUNA UNDER THE BERNE CONVENTION AND THE NEW E.C. DIRECTIVE

HENRIK BRINGSØE

Esthersvej 7, DK-4600 Køge, Denmark

HERMAN A.J. IN DEN BOSCH

*Zoölogisch Laboratorium, Rijksuniversiteit Leiden, P.O. Box 9516,
NL-2300 RA Leiden, The Netherlands*

The protection of European reptiles and amphibians has the attention of many herpetologists. It is therefore remarkable that so little concern has been expressed about the list of European species as protected under the new E.C. directive (published e.g. in *Herpetofauna News* of November 1992 by Tom Langton). The outline mentions 38 species on Annex II: these require habitat protection. An amazing number of 127 species have been denominated to require strict species protection and are thus listed on Annex IV (though some have also been included on Annex II). A milder protection is intended for four frogs on Annex V (to allow the production of frog legs?).

It is striking that the E.C. (or now E.U.?) apparently considers that there is a greater need for species protection (via Annex IV) than for habitat protection (Annex II). The rationality behind this is not at all clear to us. Earlier serious doubt has already been expressed as to the Appendix II adoption of reptiles and amphibians in the Berne Convention – many of which are very common (Pickett & Townson, 1981) – and other animal groups (Lyster, 1985). Unfortunately, the convention has actually not established criteria for inclusion in or deletion from the appendices (Lyster, 1985)!

The E.C. Annexes II and IV are largely identical with the Appendix II of the Berne Convention, but since a number of signatory countries to the convention are not E.C. members, there are logically some differences in the lists. It is, however, strange to see the Turkish *Lacerta danfordi* on the E.C. list. Probably this is because of poor taxonomic knowledge: the Greek island *danfordi* are presently considered to be *L. anatolica* and *L. oertzeni*.

It is not only such errors of fact, but also the emphasis on species protection and the oversimplified, Eurowide intended application of faunal lists, wielded by people behind desks or by green fanatics, that worries us. The resulting rules, moreover, spring into existence almost completely outside of democratic or even oligarchic control.

So far, it is uncertain how a parallel enforcement of both legislations will be carried out. For that reason, and because of their similarities, our critique pertains to the species protection of both systems. In the following we shall focus on the inappropriateness of the adoption of just a few of the now strictly protected species, but such remarks could well be made on many others on the appendices and the new annexes.

The extremely common lizards *Podarcis muralis* (largest distribution within the genus) and *Podarcis sicula* are apparently considered threatened by E.C. officials since they

are on Annex IV. Only for the subspecies *P. muralis muellerlorenzi* on the Italian rocky islet La Scuola, Honegger (1981) states it is probably decreasing. Certainly some populations can be locally vulnerable, typically near the margins of the species' range (this is virtually a law of nature), but *P. muralis* is by no means endangered in its entire distribution (Gruschwitz & Böhme, 1986).

A good example of a locally threatened population is the one northernmost, small colony of *P. muralis* in Maastricht in The Netherlands. With about 100 animals the common wall lizard is the rarest Dutch reptile. Indisputably it enhances the national species diversity. The drastic decline some years ago was a clear example of habitat destruction: the old fortifications were restored by filling every crack with cement. Happily the actions of a sole amateur convinced the local authorities for the need of a lizard-friendly restoration. A breeding project by Dutch amateurs (Kruyntjens & Biard, 1991) then helped the population to recover. On a European basis, however, a strict general protection makes no sense at all; even a few km south of Maastricht *P. muralis* thrives in abundant populations in Belgium.

Of the fifty odd currently recognised *P. sicula* subspecies, Honegger (1981) mentioned three threatened ones: *P. s. cerbolensis* on the island of Cerboli, *P. s. coerulea* on the Faraglione rocks, and *P. s. sanctistephani* on San Stefano. Decline due to over-collecting is only imaginable for the blue coloured *P. s. coerulea*, though Mertens (1952) already also pointed out that rats share the rocks with the lizards. The reason for *P. s. cerbolensis*' decline is guessingly "Over-collecting?". For the decline of *P. s. sanctistephani* Honegger (1981) lists an intricate complex of predation by feral cats and *Coluber viridiflavus carbonarius*, interbreeding with accidentally introduced *P. s. sicula*, an unexplained decrease in reproduction potential and an epidemic. Just try to stop that by putting *P. sicula* on any Annex or Appendix!! Henle & Klaver (1986) moreover called Honegger's reasons for decline "an hypothesis out of the blue without any ecological support" and consider a change in gene frequency caused by migration combined with unchanged selection pressure as a major factor.

It is indeed a sad example of a listing that, like those of many species, has been based on guesswork and other non-scientific material.

It does not make sense to give very common species a strict species protection just because one population or subspecies is threatened. With the past subjective European tradition many subspecies have been described on an ambiguous basis. Though these are widely recognised as being of little or no scientific use, such obsolete improper deeds strangely enough find extensive misemployment in environmental policies, so that a creature these days should be "happy" if it has a trinomen. One shudders at the future consequences: a political taxonomic avalanche?

Many species in the Berne Appendix II have been added in 1987. We are unaware of the basis. Some are Greek species (now also on the E.C. Annex IV) in which we have been much involved. Instead of habitat protection, a virtually useless formal species protection of all Greek reptiles and amphibians has been adopted. Should that show the outside world in black and white that Greece cares about its wildlife? Should Greece (although it still has not ratified the Berne Convention), or any other contracting party, put forward proposals that lack sound ecological support, they must indeed be rejected. Nature is too precious to allow smoke screen tactics.

One of us is especially acquainted with *Podarcis peloponnesiaca* (Bringsøe, 1986) which was also included. Throughout its range (except parts of the northwestern and northeastern Peloponnese comprising its marginal distribution) it occurs in stable and abundant populations. *P. peloponnesiaca* is not collected to any appreciable extent, neither for terrarium nor scientific purposes.

With over twenty years of field experience we have seen in the wild most of the now strictly protected herpetofauna. With rare exceptions none of them seems to be under any species-specific threat and some are surely the most abundant vertebrates in their area. Some are extremely numerous, like *Podarcis dugesii* on Madeira. On the island it is considered to be a pest by tomato and vine growers and the animals are even judged to have a negative impact on tourism (Matuschka, 1992). Who is going to see that no lizard comes to any harm and that the widely used (Matuschka, 1992) strychnine poisoning stops? Will the poor farmers get dispensations or can they claim compensations? In any case such an E.C. protection is bound to backlash on the lizards and on the credibility of the whole system.

Naturally we do not dismiss the notion that some species are, or could soon become (e.g. certain vipers), very rare and need special, almost individual protection, but to catalogue well over a hundred species is utterly out of touch with reality.

The Berne Convention places strongest emphasis on the protection of habitats of species which have been listed as threatened. We can only hope that this shall also apply to the new E.C. Directive, but as yet we have no indication that it will. The species lists (appendices) form in practice the basis for all protection within the convention, habitat protection as well as species protection (though Article 4 promises on paper the protection of endangered natural habitats). This rudimentary type of legislation means that habitats can be protected because listed species live there. Thus, as it is today, removing the many non-threatened species from Appendix II could result in reduced possibilities for habitat protection, against all our good intentions. Therefore this kind of legislation is inappropriate because the real threat to the vast majority of our reptiles and amphibians (and many other life-forms) comes from habitat destruction.

Luckily this is in reality reflected by numerous cases with fine efforts of habitat protection, a few of which are referred to in Herpetofauna News 2(6): 3-4. Nevertheless, a thorough revision of the convention is warranted: we should with the highest priority prevent further destruction of the natural environment even though the species living there may not need species protection. One should keep species protection and habitat protection apart, though inevitably a number of species will need both types of care. However, species preservation without attention for the habitat demands can only be a last resort measure and should never be top of the bill. Nature conservation is not a simple game for bureaucrats and taxonomists waving faunal and floral lists, but a highly complex biological exercise, requiring skills in many areas.

A significant degree of flexibility should be incorporated by the possibility of protection of single populations rather than entire species. Members of groups on the edge of their range do not necessarily fall into this category since decrease or increase there is a natural phenomenon in the dynamics of taxa. Grand, world-wide solutions do not exist.

We feel that the pointless high-level protection of the very common species may in the end profoundly devalue management efforts for seriously threatened species. As authorities and the public realise that *Triturus cristatus*, *Rana arvalis*, *Podarcis muralis*, *P. sicula* etc. are in many areas virtually all over the place, it could have grave consequences when we try to defend the really endangered species like *Salamandra (atra) aurorae*, *Alytes muletensis*, and *Gallotia simonyi* and their habitats. These animals have at the moment the same kind of protection in the law under the Berne Convention (with slight differentiation in the E.C. Directive) as the common and abundant species. It is plainly a question of honesty.

It is also difficult to understand why in certain official herpetological circles the amateur herpetologists are repeatedly accused of forming a major threat to the European herpetofauna. Also Böhme (1992) in an excellent review of "Conservation of European Reptiles and Amphibians" posed this question and wondered why the editor (or authors?) in a negative, dogmatic and unfounded way points the finger to the amateur. This is all the more incomprehensible when they know that journals like those of the British Herpetological Society, of the Dutch *Lacerta*, the German *Salamandra*, etc. have each issue filled with valuable contributions of these "amateurs".

Action must be taken to update the Convention and the E.C. Directive to a much more realistic level with a sound ecological basis, and to initiate a major revision of the appendices and annexes with respect to reptiles and amphibians.

In addition, an open discussion in accessible journals would surely help to gain support much more easily than does scheming behind the scenes, a fate which prevented publication of this paper in *Herpetofauna News* (and a previous one initially submitted to *Amphibia-Reptilia*: Bringsøe, 1992) for an extended period of time. Problems and disagreements just do not disappear if you shout loud enough, ignore them or sweep them under the carpet, neither by inventing draconic measures. Instead we see a constructive dialogue as the only solution for a realistic preservation of our wildlife.

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THE CROCODILE POOLS OF THE WESTERN DIVISION, THE GAMBIA

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INTRODUCTION

The Gambia lies on the West coast of Africa approximately 13° North of the equator. The country follows the course of the Gambia river deep into Senegal which surrounds it to the North, South and East. It has an Atlantic coast to the West. For administrative reasons the country is split into five divisions, and these are subdivided into districts.

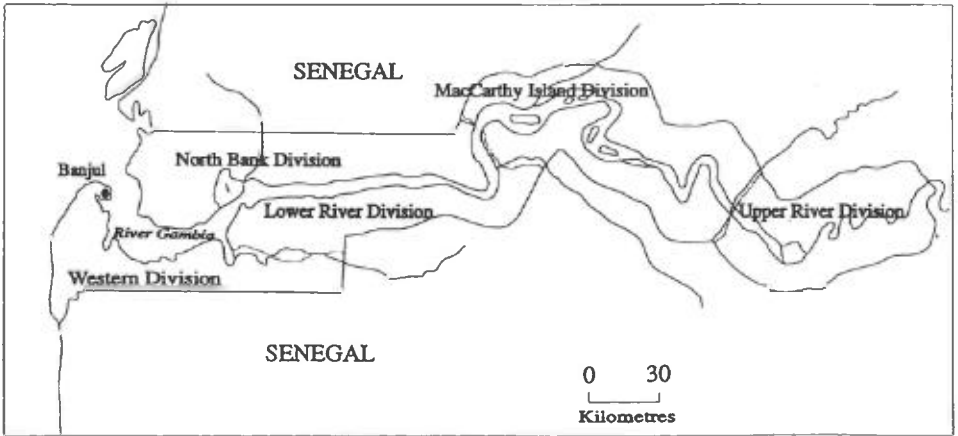


Fig. 1. The Gambia, administrative divisions

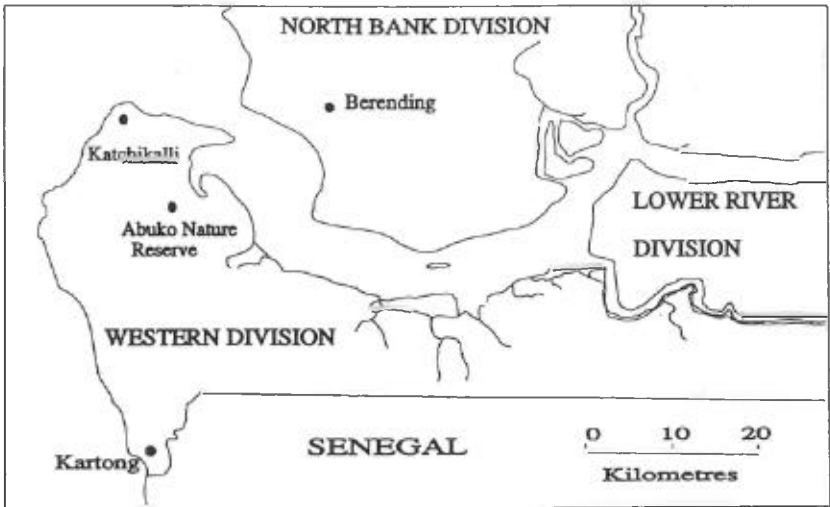


Fig. 2. The Crocodile Pools in Western Gambia

A tourist industry has become established since 1965, with currently over 120,000 visitors per year, mainly from North Western Europe. The majority of tourists visit during the dry season, September to March, but the country is now trying to develop an 'off season' tourist clientele as well. All the main tourist hotels are situated on the Atlantic coast, on the South side of the river, in the Western division, and the majority of excursions that the tourists take are within this administrative area.

Despite the large number of English speaking tourists and visitors, with the exception of the work on the Dwarf Crocodile (Anon, 1990, Jones, 1991), there has been very little published on the herpetofauna of the Gambia. We have been fortunate enough to visit the country during the last three years with groups of students; primarily to study mangrove biology. These visits have enabled us to make a brief study of the Nile Crocodiles that are present in the Western division and that are easily and safely viewable by visitors.

CROCODILE SPECIES

Three species of crocodile are traditionally listed as occurring in the Gambia. (Edberg, 1982). These are the Nile Crocodile, *Crocodilus niloticus chamses*, the Slender-snouted, Long-snouted, or Bottle-nosed Crocodile, *Crocodilus cataphractus cataphractus* and the West African Dwarf Crocodile, *Osteolaemus tetraspis tetraspis*.

The West African Dwarf Crocodile has been the subject of a conservation project in the Abuko nature reserve, and this project appears to be achieving some success, (Jones, 1991). This species aestivates in burrows between December and May so the majority of visitors are most unlikely to see them. It now seems doubtful that this species survives in the Gambia outside Abuko (Jones, 1991).

The Slender-snouted Crocodile has been stated to be present in the Gambia (Andersson, 1937), however the last authenticated record that we have been able to find relating to this species refers to them in the MacCarthy island division prior to 1931. Jones (1991) failed to find any during the extensive work done in Abuko and now considers them to be extinct in the Gambia.

The Nile Crocodile is still present at several sites in the Western Division and is said to breed throughout the rest of the country. It is one of the few remaining large animal species in the Gambia, and really the only one that it is possible to guarantee tourists a sight of.

THE POOLS

There are three pools containing Nile Crocodiles that are easily accessible to visitors in the Western division, one of them is in the Abuko nature reserve, the other two are sacred pools.

Sacred crocodile pools are not uncommon in West Africa. Guggisberg (1972) refers to them in Nigeria and Liberia, and Hudson (1991) describes a pool at Warourou in Mali where the crocodiles are at least tolerated within very close proximity of the villagers because they are considered a 'good omen'. We have found only one brief mention of the Gambian sacred crocodile pools in the herpetological journals (Jones, 1991). These pools are described though, with varying degrees of inaccuracy, in several of the tourist guides.

Abuko Nature Reserve 13° 05' N 160° 46' W

According to the brochure Abuko is neither a nature reserve nor a zoo (Brewer, 1985). It is in fact a remnant of riverine forest, approximately 500 metres by 1,500 metres which has been fenced in as a water catchment area since 1916. For this

reason it has remained generally undisturbed whilst the surrounding countryside has been cleared for agricultural development. The potential of the site, as a reserve, was realised by the Brewer family in 1967, and as a result of their actions the government designated it as such almost immediately.

In the centre of the reserve is a large pool, approximately 350 metres by 35 metres wide at its broadest point. This pool was formed by damming the Lamin stream which runs through the reserve. There are a relatively large number of Nile Crocodiles in this pool, and during the dry season it is usually possible to see several of them basking at the side of the pool during daylight hours. In the three years that we have visited we have always seen between ten and twenty-two Nile crocodiles, ranging from half a metre to three and a half metres in length.

Visitors to the reserve pay an admission charge of 15 Dalasis (£1.20) during the tourist season and 10 D. (80p) outside the tourist season. For this they are allowed to walk around the two and a half kilometres of winding path. Where the path approaches the crocodile pool there is a fence, approximately one metre high to prevent crocodile/human interaction. Other than this there is no physical separation of wildlife and visitors except for the caged animals in the animal orphanage, some distance from the pool. The outside of the reserve now has a double fence, partly to reduce the risk of fire spreading into the reserve. This fence though is likely to prevent any crocodile migration into or out of the reserve.

There is much other herpetofauna in the reserve, Nile Monitors (*Varanus niloticus*) are particularly common, agamas are very common, as are skinks (*Mabuya* spp.). The toilets near the crocodile pool usually yield geckos and there are many varieties of snake present including venomous ones. The snakes are particularly secretive though and several of our students have complained about not seeing any! In the first eighteen years after the reserve opened there were over half a million visitors with no recorded incidents of snake bites. (Brewer, 1985).

Katchikalli 13° 28' N 16° 40' W

This is the 'sacred pool' that is the most accessible for tourists and therefore the one with the greatest number of European visitors. It is situated just to the North of the town of Bakau, and about one kilometre South of the coast at Cape St. Mary. The site has the edges of Bakau coming up to the Southern boundary and to the North there is an area of agricultural land leading up to the coast. To the East there is an area of woodland containing one very large Silk Cotton tree (*Ceiba pentandra*) in the centre. This species of tree is considered to be sacred in the Gambia, and this particular tree is considered to be particularly so because a famous holy man is said to have sat under it regularly. Although only occupying one or two hectares at most this woodland contains many birds, a troop of Green Monkeys (*Cercopithecus aethiops*) and numerous monitor lizards, which are frequently seen near the crocodile pool.

The pool itself is circular and about twenty-four metres in diameter; it is situated in a depression in the ground approximately two metres below ground level. The 'guides' say that it is seven metres deep in the middle. The depression has a retaining wall around it for 300° of the circle with a slope up to the woodland for the other 60°. Within the depression there is a one or two metre strip of land (depending upon water level) surrounding the pool. Visitors may climb down onto this strip to get a closer look at the crocodiles and to meet 'Charlie'. Until recently access to the pool was by climbing down a steel step ladder which was moved around according to where the crocodiles were. In July 1993 a set of concrete steps was completed at the North side of the pool.

The surface of the pool is completely covered by a very dense growth of Water Lettuce (*Pistia stratiotes*). This cover prevents an accurate count being made of the number of crocodiles present. The density of this plant also proves a hazard to hatchling crocodiles, and for this reason they are removed from the pool area and reared until they are almost sixty centimetres long before being reintroduced at about fourteen months of age.

Although the Water Lettuce prevents an accurate count being made of the number of crocodiles present the local 'guides' say that there are sixty. This would seem possible. In three consecutive years we have seen eighteen, twenty-three and sixteen respectively. These visits were all made during the hottest part of the day and during our stays several crocodiles were seen to enter the pool and some were seen to leave it. Clearly a pool of this size is not capable of supporting this number of crocodiles and there is much supplementary feeding. This is done using 'Bonga' fish, a cheap local marine fish. 'Bonga' appears to be the Mandinka name for *Ethmalosa fimbriata*, (Lesack, 1986).

One of the attractions of Katchikalli is 'Charlie'. He is a sixteen year old Nile crocodile who was 'hand reared' and as a result is very tame. Although he tolerates human physical contact he does not mix quite so well with other crocodiles. Normally the other crocodiles do not come within one metre of him. As a result of him tolerating human contact he has appeared in many visitors photographs. He has also appeared on British television, on John Wilsons' fishing programme on Channel Four. His presence and demeanour has permitted our students to examine a crocodile in much closer detail than they would be able to in the United Kingdom!

Kartong 13° 05' N 16° 46' W

This is the Southernmost sacred crocodile pool in the Gambia being less than five kilometres North of the border with Senegal. The pool is situated to the South West of the village in an area known as Folonko. It is approached by a short walk from the road. We visited it in the early afternoon when the crocodiles were all in the water and it was not possible to assess the numbers present. Only one was seen.

On the side of the pool to which the public have access there is a wire fence which averages about one and a quarter metres high. There is a gate for pedestrians through this, the gate normally being held closed by a loop of wire. Inside the gate on the Western side of the pool there is a sandy viewing area for visitors. To the East, behind the pool from the visitors viewpoint, there is a slope up to the surrounding woodland.

As with the pool at Katchikalli this one is about two metres below ground level and a retaining wall of concrete blocks has been built around most of the depression in which it is situated. On the visitors' access side there are steps down to the water. The pool itself is circular, about eleven metres in diameter, and, as at Katchikalli, the surface is totally covered with Water Lettuce.

In view of the distance from the tourist hotels (about forty-five kilometres) this pool clearly has few European visitors. We encountered none during our visit and the local children who walked from the edge of the town to the pool with us did not speak English, nor apparently any other European language. There was no attempt to charge us an admission fee, but we were required to remove our shoes before entering through the gate.

The third sacred pool in the Gambia is at Berending, some nine kilometres West of Barra, in the Niimi district of the North Bank Division. As yet we have been unable to visit this site.



Nile crocodile *Crocodylus niloticus*

photo by author

THE ROLE OF SACRED POOLS

In recent times the commercial significance of the pool at Katchikalli has been clearly recognised. There is an admission charge of 10D. (80p) and there are stalls selling batik at either side of the entrance.

The pool at Kartong, because of its distance from the tourist hotels is unlikely ever to make much of an income from admission charges if they were imposed. Clearly both pools are of spiritual significance still to the local population. This seems to be independent of tribal origins; on our visit to Kartong the local children who accompanied us were between them speaking at least three different tribal languages (Barnaby, 1993). At Katchikalli the actual running of the pool is done by a family who are Mandinka, but with many Jola connections.

Faal (1991) describes the Jola as being the people who had been longest resident in the Gambia. For centuries they are said to have continued to hold the traditional African beliefs about the sacredness of the earth and the divine energy found in certain rocks and groves. Unlike most of the rest of the population of the Senegambia area the Jola were highly resistant to change or the influence of other ethnic groups, being the only sizeable population in the Gambia virtually untouched by Islam. A recent school textbook (Anon, 1992) states that some members of both the Serer and the Jola people will not eat the flesh of crocodiles because they believe that their ancestors were descended from a crocodile.

Local people who use the pools for spiritual assistance seem to do so for one, or more, of three main reasons.

Fertility is always the first suggested reason for seeking assistance if one asks local people why they visit the pools. It is widely held that a woman who has problems conceiving should come to the local pool and bathe in the water. She is not expected to bathe with the crocodiles. Screens are provided a little way away from the pool

behind which she can bathe with some modesty. At both Katchikalli and Kartong there are tin cans in evidence. These are clearly used to carry water for the purpose of bathing. If the lady subsequently becomes pregnant she is expected to bring the baby back to the pool to show it to the crocodiles to acknowledge her appreciation (Barnaby, 1991).

Wrestling is a national sport in the Gambia, it is keenly followed by most of the population and is popular with tourists too. Before a major contest a contestant may wish to ask for spiritual assistance and do so by washing at a crocodile pool. Although we have not yet investigated why, it appears that Kartong may have greater significance to wrestlers than Katchikalli.

Important business deals may also benefit from a visit to the crocodile pool before being concluded. Interestingly the guides and taxi-drivers never give any further details on this matter although willingly discussing fertility and wrestling!

The crocodiles seem to benefit from the existence of these pools; they are fed at Katchikalli, breed there and are assisted in rearing their young. Although crocodiles are reportedly still eaten in the Gambia (Jones, 1991) we have not found anybody in the Western division who admits to eating crocodile, or who, possibly more significantly, knows anybody who eats crocodile. Certainly the crocodiles within the sacred pools would appear to be at no risk of being killed for meat or skin.

It was reported to us that in 1992 Charlie had left the pool at Katchikalli and wandered into the town of Bakau. He was netted and carried back. It is not clear whether he was initially recognised as Charlie or if any crocodile would have been returned to the pool.

The effect of these pools on the wild crocodile population is probably minimal as far as Katchikalli is concerned because of the density of human population around the pool and its distance from totally wild populations. Yet there are reports of new crocodiles of two or more metres arriving in the pool during the rainy season. In addition to Charlie's walk into town the 'guides' at Katchikalli say that other crocodiles have left the pool and lived in the salt water Cape Creek one kilometre away for short periods of time. The situation at Kartong is possibly more conducive to regular interaction with wild crocodiles, the local human population density is much lower and there is no reason to suspect that there are not genuinely wild crocodiles in the area. These points clearly need much further research.

FURTHER WORK

It is hoped to visit the country again in 1994 when we will try to visit the crocodile pool at Berending in the North Bank division. Further researches into the origins and history of the pool at Katchikalli are required and we hope to continue our investigations in this area.

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AMPHIBIANS AND REPTILES OF THE UPPER RASPACULO RIVER BASIN, MAYA MOUNTAINS, BELIZE

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The Maya Mountain range is a dominant and spectacular landscape feature of Belize which runs northeast to southwest across the central and southern part of the country, extending in the west over the border into Guatemala. Its geological base consists largely of a granite core covered by Paleozoic sediments, overlaid in all but the highest parts with limestone. The Upper Raspaculo river basin lies in the centre of the mountain range immediately northwest of the main divide, separating western and eastern watersheds. The basin is about 24 km long and about 8 km wide, enclosing an area of approximately 200 km², and the river runs in a southwesterly direction to the Macal, a major tributary of the Belize River. The headwaters and catchment area are inaccessible by land and the valley has remained uninhabited since the Mayan pre-classic period of 250 BC.

The valley slopes of the Raspaculo generally have a very thin soil cover and outcropping of rock is common. The basic vegetation type is broad-leaved rainforest, but the area has been prevented from reaching a climax state by the continual effects of cyclones and flooding. The most severe storm damage was caused by Hurricane Hattie in 1961, which left some 80% of the canopy trees either felled or with their crowns stripped away. Consequently the area is characterised largely by regeneration with secondary growth tree species such as *Cecropia obtusifolia* (Guarumo, Trumpet), *Swietenia macrophylla* (Mahogany) and *Schizolobium parahybum* (Quamwood). In lowland areas there also persists an abundance of old-growth forest trees including *Dialium guianense* (Ironwood), *Guarea grandiflora* (Wild Akee), and *Protium schippi* (Copal Macho), and in upland areas *Cedrela odorata* (Cedar), *Cordia alliodora* (Salmwood) and *Bursera simaruba* (Gombolimbo) (Brokaw, 1991). Conspicuous in the understorey are several species of small *Chamaedorea* and *Geonoma* palms, and the occasional colony of the large terrestrial bromeliad, *Aechmea magdalenae*. Other plant forms present include shrubs, lianas, epiphytes (orchids, aroids, bromeliads, cacti) and a variety of ground herbs, particularly *Selaginella* sp. Using the life-zone system of Holdridge (1967), Hartshorn *et al* (1984) places the region near the transition between the "Subtropical moist forest" and the higher "Subtropical lower montane moist forest" zones. Rainfall in the area is thought to be in the region of 2540 mm per year (Walker, 1973).

The reptiles and amphibians of Belize were first documented by Smith (1941), and later more comprehensively by Henderson & Hoevers (1975). A number of additional species have recently been listed, by McCoy (1990), Meerman (1992) and Stafford (in press). In terms of its herpetofauna the Maya Mountains has remained something of an unknown quantity. The region falls within the Petén faunal area described by Campbell and Vannini (1989), encompassing the northern portion of Guatemala, all of Belize, and the lower Polochic and Motagua Valleys, but its higher peaks may represent an isolated sub-area, and at least one frog, *Rana juliani*, appears to be endemic (Hillis & de Sa, 1988). By most accounts however, the area is not noted for endemism of terrestrial vertebrates.



Eleutherodactylus chac



Gravid female *Norops lemurinus* of the golden "diamondback" type.

The herpetofauna of the Upper Raspaculo was initially investigated in January - February 1991 (Stafford, 1992), and this was followed by a second survey of the area in mid-April to early June 1993, together covering the duration of the dry season and beginning and end of the wet season. Animals were recorded by conducting intensive searches at different times of the day and night and during different weather conditions. A drift-fence and pit-fall trap system (O'Shea, 1992) was used to sample small terrestrial and semi-fossorial species, although this was found to be somewhat selective. However, the method was effective in trapping some of the diminutive snakes (*Tantilla* and *Ninia* spp.), toads, and some terrestrial lizards, including the nocturnal ground-dwelling gecko, *Coleonyx elegans*. In 1993 a pair of opossums (*Philander opossum*) were observed to enter the buckets at night and may have treated them as a regular source of food.

A full report on the geology and biodiversity of the area is currently in preparation.

Composition of the herpetofauna

Reptiles were the most well represented component of the herpetofauna, accounting for some 76% of the total number of species. Altogether, 42 species from 15 families were recorded, consisting of 1 caecilian, 1 salamander, 6 anurans, 2 toads, 1 chelonian, 1 crocodylian, 11 lizards and 19 snakes. Of these 14 were recorded in 1993 and not seen at all in 1991 (denoted by *). Species diversity was greatest among the terrestrial, forest-dwelling reptiles, while in terms of overall numbers the most abundant species was the anoline lizard, *Norops humilis*.

Amphibia

As might have been expected, more amphibians were recorded at the end of May 1993, coinciding with the beginning of the wet season. The Red-eyed tree frog, *Agalychnis callidryas*, was first heard calling on the night of 23rd May after light rain, followed by *Smilisca baudini* on 27th May, and it is likely that a number of other species would have made their presence known had the expedition continued into June and July. The only amphibians to be found active during the height of the dry season were *Rana vaillanti*, along the banks of the river and tributary streams, *Eleutherodactylus* frogs (*E. chac* and *E. rugulosus*) in leaf litter, and the two toads, *Bufo marinus* and *B. valliceps*. A large ranid frog found in 1991 and presumed to be *Rana berlandieri* Baird, has been tentatively re-assigned to *R. vaillanti*. In January 1991 the caecilian, *Gymnopsis syntrema*, was recorded from the area, representing an extension to the geographic range of this species.

Species recorded:

Order: Gymnophiona

Family: Caeciliidae

Gymnopsis syntrema (Cope)

Order: Caudata

Family: Plethodontidae

Bolitoglossa m. mexicanus Duméril, Bibron and Duméril

Family: Bufonidae

Bufo marinus (Linnaeus)

B. valliceps Wiegmann

Family: Leptodactylidae

Eleutherodactylus chac Savage

E. laticeps (Duméril)

Eleutherodactylus cf. *rugulosus* (Cope)

Family: Hylidae

**Agalychnis callidryas* (Cope)

Smilisca baudini (Duméril and Bibron)

Family: Ranidae

Rana vaillante Spix

Reptilia

Snakes and lizards accounted for all but two of the reptiles recorded. Amongst the lizards, a greater presence of arboreal species was noted in 1993, either on or close to the ground. In particular, a female *Laemanctus longipes* was found (27th April) moving away from a shallow scrape beneath a tree root which contained three eggs. A gravid female captured in the Colombia Forest, Toledo District, is known to have laid five eggs in August (McCarthy, 1982), but the reproductive biology of this elusive canopy-dwelling species in Belize is otherwise poorly known. Another arboreal form, *Corytophanes cristatus*, seen only once in 1991, was observed more frequently in 1993, usually perched vertically on stems and lianas as described by Davis (1953). On one occasion a trio of males were also observed fighting between themselves on the forest floor. The "giant" green anole, *Norops biporactus*, another strictly arboreal species, was also more in evidence on tree trunks nearer to the ground towards the end of May.

The only other anole recorded in 1991 was the small terrestrial, semi-arboreal *N. humilis*, while in 1993 a further species, *N. lemuringus*, was found in considerable numbers. To some extent the rather sudden and inexplicable appearance of *lemuringus* has displaced the smaller *N. humilis*, confining it more to the forest floor, while the larger *N. lemuringus* was also commonly observed up to 2.5 metres in the understorey. On two occasions *N. lemuringus* was observed at night during light rain. The colour and pattern of *N. lemuringus* in the area is highly variable; specimens were found which varied brownish-grey with either a broad whitish dorsal stripe or large pale, dark-centred quadrangular blotches on the dorsum, while two females were pale greyish with large, tan or golden-yellow, diamond-shaped dorsal markings. The same colour and pattern variation has also been recorded in populations from Costa Rica, with the diamond pattern apparently restricted to females (Taylor, 1956).

Snakes account for the greatest percentage of species recorded (45% of the total number of species), the most frequently seen being *Coluber constrictor stejnegerianus* (this species was mistakenly identified in 1991 as *Mastigodryas melanolomus*), followed by *Micrurus* spp. and *Coniophanes fissidens*. Of the 16 genera represented, 9 can be classified as diurnal and chiefly terrestrial forms (*Bothrops*, *Coluber*, *Coniophanes*, *Lampropeltis*, *Masticophis*, *Micrurus*, *Porthidium*, *Scaphiodontophis*, and *Stenorrhina*). Species adapted to a predominantly sub-terranean existence were represented by 3 genera (*Adelphicos*, *Ninia* and *Tantilla*), the most commonly seen being *Tantilla canula*. A specimen of *Tantilla* with a distinct collar and salmon-red coloration on the venter was subsequently found to be assignable to the species, *T. schistosa*. Terrestrial or semi-aquatic species further comprised 2 genera (*Drymobius* and *Xenodon*), and semi-arboreal species were represented by 2 (*Constrictor* and *Spilotes*), while only 1 strictly arboreal species was recorded (*Imantodes cenchoa*).

Evidence of seasonal inactivity was apparent in certain species of snake. In April and May (1993) the Jumping viper, *Porthidium nummifer*, was recorded in some numbers and also a Fer-de-Lance (*Bothrops asper*), while in January and February (1991) there were no viperid snakes recorded at all. *Porthidium* was found on the drier, rocky northerly-facing slopes, and the single *Bothrops* close to the river in a thicket of *Aechmea*. Both were found actively foraging on rather cool overcast days following overnight rain, within a temperature range of 17-21°C and high humidity (90-100%). On one occasion *Porthidium* was observed abroad at the coolest time of the day before dawn at 04.30 hrs. Despite meticulous searching, neither species

was observed basking. The apparent absence of *Porthidium* between January and March, and *Bothrops* until the end of May suggests that in upland areas the two species may remain inactive, possibly in aestivation, during the driest time of the year. In other, lower-lying and consistently wetter parts of Belize the Fer-de-Lance is known to be active all year round, although most abundant in the wet season. It is likely that two fairly common arboreal genera in Belize, *Leptophis* and *Oxybelis*, would have also been recorded had there been more rain and a greater presence of their anuran prey.

Coral snakes (*Micrurus*) were found to be relatively common and occurred in almost the same numbers as *Coluber constrictor*. Close examination of four specimens, and field observations on a further thirteen confirms that the genus is represented in the area by at least two species, *M. diastema* and *M. hippocrepis*. A number of *M. hippocrepis* were observed with distinctive black edging to the scales of the red bands and a completely black snout, and may be assignable instead to *M. nigrocinctus*, while two of the more typical *hippocrepis* had incomplete black banding. In terms of their relative numbers, coral snakes of the *M. hippocrepis/nigrocinctus* complex were the most abundant, representing some 70% of *Micrurus* seen.

Species recorded:

Order: Crocodylia

Family: Crocodylidae

Crocodylus moreleti Duméril and Bibron

Order: Testudines

Family: Kinosternidae

Kinosternon scorpioides (Linnaeus)

Order: Squamata

Suborder: Sauria

Family: Geckonidae

**Coleonyx elegans* Gray

Family: Iguanidae

Basiliscus vittatus Wiegmann

Corytophanes cristatus (Merrem)

**Laemantus longipes* Wiegmann

Norops b. biporcatus (Wiegmann)

N. humilis uniformis Cope

**N. lemurinus bourgeaei* Bocourt

Iguana iguana rhinolopha Schmidt

Family: Scincidae

**Eumeces sumichrasti* (Cope)

Sphenomorphus cherriei (Cope)

Family: Teiidae

Ameiva festiva (Lichtenstein and Von Martens)

Suborder: Serpentes

Family: Boidae

Boa constrictor imperator Daudin

Family: Colubridae

**Adelphicos quadrivirgatus visoninus* (Cope)

Coluber constrictor stejnegerianus Hoervers & Henderson

Coniophanes f. fissidens (Günther)

**Drymobius m. margaritiferus* (Schlégel)

Imantodes cenchoa leucomelas Neill
Lampropeltis triangulum polyzona Cope
Masticophis m. mentovarius (Duméril, Bibron and Duméril)
 **Ninia diademata nietoi* Burger & Werler
Scaphiodontophis annulatus (Duméril, Bibron and Duméril)
 **Spilotes pullatus* (Linnaeus)
Stenorhina freminvillei Duméril, Bibron and Duméril
Tantilla canula brevis (Günther)
 **T. s. schistosa* (Bocourt)
 **Xenodon rabdocephalus mexicanus* Smith
 Family: Elapidae
Micrurus diastema sapperi Roze
Micrurus hippocrepis (Peters)
 Family Viperidae
 **Bothrops asper* (Garman)
 **Porthidium nummifer mexicanus* (Duméril, Bibron & Duméril)

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OBSERVATIONS ON THE HERPETOFAUNA OF SOUTHERN NORWAY (SØRLAND)

RICHARD CLARK

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This article deals with investigations carried out in the counties of Aust Agder and Telemark from 1991-1993. The majority of finds were made in the immediate vicinity of the town of Arendal and inland at altitudes of under approximately 300 meters. Journeys further inland and at higher elevations were carried out from time to time and the area covered in this report is presented in Figure 1. Figure 2 puts this region in perspective with the rest of the country. Arendal Kommune itself covers about 275 km² with 38,000 inhabitants. The offshore islands of Tromeøy and Hisøy have bridge connections to the mainland and the reptile and amphibian life of these two islands is also considered. Despite population expansion of recent years and the building of housing estates and individual private dwellings there has been little environmental destruction and woodlands, fields and marshes remain undisturbed. Farming is non-intensive. Hedges and ditches are preserved which form important sanctuaries for wild life. A combination of respect for animal and plant life and total protection of all species enables the herpetofauna to survive alongside man's activities. A few minutes car drive from the centre of Arendal town brings one out into the countryside and it is possible to walk considerable distances along footpaths and through the woods and forests, by the many lakes and streams in total solitude despite the fact that habitation is never far removed.

The total known content of the herpetofauna of Norway is presented in Table 1, together with that for Britain, Denmark and Sweden. This listing includes all species that have been recorded within the political boundaries of these countries which are known to be, or possibly are, native. It does not take into consideration the fact that in some cases distribution is very limited nor that there is a marked decline in numbers in the higher latitudes. As far as Norway is concerned documentation is poor. Both the Sand Lizard, *Lacerta agilis*, and the Natterjack Toad, *Bufo calamita*, are recorded from the Swedish side of the border with Norway in S.W. Sweden. It is probable that investigations will reveal the presence of these species in Norway. In the case of the Sand Lizard there have been important finds recently both in northern Denmark and Sweden (Manzke & Winkler, 1990). Although the Sand Lizard exists in the extreme north of Denmark it does not appear to have been successful in crossing what is now the Skagerrak and colonising the southernmost part of Norway. In Aage Wildhagen's article on the Common Lizard (Wildhagen, 1949) appear photographs not only of this species but the Sand Lizard too although the author does not distinguish between the two. These pictures were taken by the Danish photographer Hans Hvass, presumably in Denmark though this is unclear. It is not impossible that the Sand Lizard has already been observed in Norway but not identified as such. The Green Toad, *Bufo viridis*, can be termed an exotic species which has migrated from the east of Europe. This is known from the extreme south coast region of Sweden but does not appear to have made further inroads west and north. Much careful searching is clearly required in the "grey zone" on the fringes of the known ranges of these species to determine whether there might be penetration into Norwegian territory.



Fig. 1: o towns, villages, islands (upper case)

lakes and rivers (lower case)

■ altitudes in meters above mean sea level



Fig. 2: Map of Denmark and Scandinavia – Area Covered In Report Cross-Hatched

TABLE 1

	BRITAIN	DENMARK	NORWAY	SWEDEN
<i>Triturus alpestris</i>	-	+	-	-
<i>Triturus cristatus</i>	+	+	+	+
<i>Triturus helveticus</i>	+	-	-	-
<i>Triturus vulgaris</i>	+	+	+	+
<i>Bombina bombina</i>	-	+	-	?
<i>Pelobates fuscus</i>	-	+	-	+
<i>Bufo bufo</i>	+	+	+	+
<i>Bufo calamita</i>	+	+	-	+
<i>Bufo viridis</i>	-	+	-	+
<i>Hyla arborea</i>	-	+	-	+
<i>Rana arvalis</i>	-	+	+	+
<i>Rana dalmatina</i>	-	+	-	+
<i>Rana lessonae</i>	†	+	-	+
<i>Rana temporaria</i>	+	+	+	+
<i>Anguis fragilis</i>	+	+	+	+
<i>Lacerta agilis</i>	+	+	-	+
<i>Lacerta vivipara</i>	+	+	+	+
<i>Coronella austriaca</i>	+	?	+	+
<i>Natrix natrix</i>	+	+	+	+
<i>Vipera berus</i>	+	+	+	+

Symbols: + present - absent ? possibly extinct † doubtfully native

Sources: Arnold, Burton & Ovenden (1978), Mertens & Wermuth 1960), Steward (1969), Welch (1983) and others, see text.

Of the snakes all three species are found in all the countries listed though it is possible that the Smooth Snake, *Coronella austriaca*, is now extinct in Denmark. The Grass Snake, *Natrix natrix*, is no longer to be found in north Denmark. The massive destruction of natural habitat in Denmark and the agricultural policies of the European Community have probably much to do with this. Compared with Britain these two species fare much better, mostly for climatic reasons. Although the more northerly latitude means longer winters, and colder ones, this is not so significant as the benefit Norway receives in summer from the longer days and the continental aspect. Smith (1954) has demonstrated how the July 60°F (approximately 15.5°C) isotherm has its highest point on the eastern side of England more or less to Newcastle. On crossing the North Sea it turns smartly northwards to the southern point of Norway and runs well north to beyond 67°N in Sweden. Apart from the western seaboard of Norway all the country south of latitude 67° benefits from this condition in the summer. Thus it is that the Grass Snake reaches to about 65°N whereas in Britain it is not found north of the border. The Smooth Snake, as will be seen, is also helped by this factor of warm summers though in Norway its existence seems to be confined to the south which is about the same latitude as Aberdeen. On the Swedish Baltic

Coast it has been found nearly to the 65th. parallel, though this is admittedly an isolated record (Kauri, 1970). The mean temperatures of the summer months of July and August are as high in southern Norway as the south of England. Eastbourne with 242 hours of sunshine in June is bettered by the Norwegian south east coast which has in excess of 280. Even well inland the average is between 240 and 260 hours (sources Manley, 1952; the Norwegian State Meteorological Service).

Neither *Triturus cristatus* nor *T. vulgaris* have been found. Otherwise all species recorded from Norway have been observed and caught. Captured material has been released as near to the original finding place as possible.

SPECIES ACCOUNT

SALIENTIA

Bufo

Bufo bufo bufo (Linnæus). The Common Toad

To date only found in the immediate area of Arendal and inland at low elevations under about 150 m. Sometimes a road casualty. It is active by day even in the summer as on 21st June 1993 when a large adult measuring 95 mm was found at 18.30 in sunny conditions on the edge of a mown field. Another was found on a woodland path at 15.30 on August 7th. The Grass Snake feeds on toads and a 85 mm example was disgorged in fresh condition by a 90cm snake. I have searched for spawning sites in vain. Recently metamorphosed youngsters were found on August 10th 1992 in longish grass near a lake. On August 7th 1993 several babies were found in the same area along damp sections of a forest track flanked by shallow ditches. The Common Toad emerges from hibernation when the ground is still snow covered, pushing its way to the surface through the snow. This is pictorially displayed in Norges Dyr, 1992 edition.

Rana

Rana arvalis arvalis Nilsson. The Moor Frog

This species is known from the immediate coastal belt round the south of Norway. I have not identified this frog with any certainty but it is easily confused with *Rana temporaria*. Distinguishing characters, such as the more pointed snout and a greater separation of eye and tympanum, I have not found helpful since several examples found have one or other feature but not both. The Danish zoologist Liebekind writing in 1941 did not consider it to be a species separate from *R. temporaria*. Prevailing opinion today is that *R. arvalis* is a good species but there is no doubt that it is difficult to identify positively. Kauri (1970) suggests that the Moor Frog prefers a damper environment than the Common Frog and that ecological preferences serve to keep the two species apart in areas where they are sympatric.

Rana temporaria temporaria Linnæus. The Common Frog

Apart from some doubtful identification, see above, most frogs found have been assigned to this species. The Common Frog seems scarce near the coast but is occasionally encountered inland and at higher altitudes though generally singly or in pairs. Usual habitats are road ditches, small pools and damp woodland providing the tree cover is not too dense. It may be encountered in quite dry environments such as forestry tracks in partially cleared woodland. It is known from over 1000 m altitude. The highest personal record is a little over 500 m by Nesvatn in Telemark.

SAURIA

Anguidae

Anguis fragilis fragilis Linnæus. The Slow or Blind Worm

This is the commonest reptile in the region. It occurs abundantly in the coastal and lowland regions, on the off-shore islands and well inland up to more than 500 m. It lives in both dry and damp environments but avoids dense woodland where the sunlight fails to penetrate. De-forested regions which have stood for a number of years with secondary vegetation taking over are also colonised to limited degree. It frequents roadside verges and is consequently often found as a road casualty.

Activity is mostly confined to overcast, sultry days and the evening when it is to be found roaming on shady paths and amongst vegetation. In lightly wooded areas it can be encountered at any time of the day and pregnant females will bask in the full summer sun. On the 23rd July 1993 I found two gravid females, one on a rock with heather clumps, the other in longish grass at around 18.00. With sunset at a little after 22.00 the sun was still powerful, air temperature 20°C. Mostly it is found in hiding under rocks, discarded rubbish especially sheet metal and less often under logs. The same hiding place may be used over a prolonged period and then abandoned. On the 15th August 1992 two Slow-worms were found under a rusty dustbin lid close to a rock outcrop in a field of long grass and bramble clumps. One of these was a male with regenerated tail. On the 22nd March 1993 this male was found under the same piece of metal on a day with the air temperature 7°C at 13.30. On the 11th April it was again in residence, 16.00 air temperature 6.5°C. but was absent on a revisit on July 24th. Weather conditions on the 22nd March were chilly, there was ice on puddles in the shade and yet the Slow-worm was quite active. Since it is inconceivable that it could have over-wintered with so little protection it must be assumed that it had come out of hibernation some days earlier and re-occupied its former haunt.

Both Smith (1954) and Street (1979) state that the blue spotted Slow-worm is not found in Scandinavia. This in fact is not the case. It was first found near Oslo in 1958 (Kauri, 1970) and since then in Sweden. I have taken two specimens, both males. The first was on May 17th 1993 on a shady woodland path. The ground was lead grey, spotted faintly with blue. The flanks pinkish, belly off white marked with dark grey on the midline, sparsely anteriorly developing into heavy black markings on posterior half. On the dorsum was a fine black dorso-lateral stripe and a light vertebral stripe. The ear cavity was indicated by a slight depression. Body length 200 mm, tail regenerated. The second specimen, found under a piece of metal sheeting on June 6th 1993, was a uniform dull medium grey with the blue spotting scattered but clear. This sloughed on June 9th and the blue spotting was brilliant in intensity. This had a body length of 220 mm, tail regenerated. Voipio (1956) remarks that blue spotting, which is confined to males, occurs in only 3.4% of material examined in Finland. Kauri (1970) remarks that this condition is extremely rare in Norwegian Slow-worms.

The largest female that I have measured had a body length of 180 mm, tail 160 mm. My two largest complete males were 200 mm body, 235 mm tail and 190 mm body, 220 mm tail. These were two of three found in hiding together under a piece of discarded roofing felt. The third, also male, had a body length of 220 mm, tail 150 mm regenerated. Smith (1954) gives the tail length in males as 55% of the total. This is the case in the two examples mentioned above which had a tail length of 54% and 53.7% respectively. The incomplete male would therefore, by extrapolation, have had a body length of close on 490 mm.

Lacertidae

Lacerta vivipara Jacquin. The Common or Viviparous Lizard

The Common Lizard is much less frequently encountered than the Slow-worm. Moreover it seems absent in the coastal region. Despite intensive searching of a wide range of biotope I have never found it. Whether this is the case elsewhere in the lowland littoral I cannot say. Inland over about 250 m the Common Lizard makes an appearance but never in large numbers. A particular site may support three or four individuals and one will then have perhaps to search a considerable area to find another population.

Essentially this lizard prefers a damp habitat. I have never found it far from water or marshy tracts. Grassy tussocks, brushwood and heather clumps are favourite basking places. I have also found it in quite shady woodland, but on the margins, and drier banks and rock piles. Higher up in the mountains at least up to 500 m this lizard displays similar habitat preferences. On 13th August 1993 at 510 m altitude above Nesvatn two juveniles were seen on the edge of meadows and at 340 m altitude close to Skrevatn two were found basking on a log in partially cleared forest in a brief interval of sunshine. Both these sites are a long way inland, over 100 km from the coast.

SERPENTES

Colubridae

Coronella austriaca austriaca Laurenti

This species is the least well known of the Norwegian snakes. The range, according to Street (1979) and Andren & Nilson (1992), is a belt round the coast from Oslofjord westwards to Stavanger. Kauri (1970) comments on the need for a warm and dry micro-climate. It has been doubtfully recorded from the Trondheim district but these records, made many years ago, Kauri regards as spurious. I was therefore surprised, while driving along the edge of Nesvatn in Telemark, about 100 km inland as the crow flies, to observe a Smooth Snake lying on the gravel road surface. This locality is about 510 m altitude and as far as I am aware this must represent the first find of this species so far inland at a relatively high elevation. The ability of the Smooth Snake to extend its range into the interior is probably dependant on it following the river valley systems. These do not exceed 300 m even considerable distances from the coast and have plenty of warm, protected sheltered areas which would favour this snake.

In contrast to Britain the Smooth Snake is to be found in a broader spectrum of ecosystems. I have found it on stone walls, open rock surfaces in open fields, light woodland, quite moist meadows and road verges. Street (1979) says that it is often found in hiding. This is not my experience in Norway. All my specimens have been found day active. The one I took on a stone wall on August 11th 1992 was lying in the full sun at about 17.00, air temperature 21°C. Despite searching under logs, stones and many pieces of corrugated metal sheeting I have never found it though two cast skins under one piece of metal indicated that this was probably a refuge place. It is normally a ground dwelling snake but there have been records made of it climbing into bushes and shrubs which is an attribute not usually credited to it.

The example I found inland, a male of 555 mm, was typically marked with a double row of chestnut bars down the back on a fawn ground. Those from the coastal zone had the bars single or double on the immediate anterior part fusing into dark

longitudinal stripes with a shadowy mid-lateral stripe and in one case, a female found killed, there were no barrings at all. All these snakes were quite dark and diffuse in overall appearance with the ground colour forming a lighter vertebral line. There was a deal of variation in the size and form of the head "coronet".

For details of size and scale counts see Table 2. It will be apparent that the Smooth Snake reaches a larger size than it does in Britain and the more southerly parts of its range. A particularly large specimen was caught by Frank Lunden from the Oslo district. This was officially measured by the Zoological Museum in Oslo and found to have a length, without stretching of 890 mm with a weight of 145 g. In 1957 an 825 mm specimen was taken near Tvedestrand, a few kilometres up the coast from Arendal (Kauri, 1970).

TABLE 2

A	B	C	D	E	F
Male	720	150	19	166	57
Female	680	105	19	183	44
Male	645	135	19	165	58
Male	630	140	19	154	57
Female	600	100	19	177	48
Male	555	115	19	172	57

Diagnostic data for *Coronella a. austriaca*

A sex B total length (mm) C tail length (mm) D dorsals E ventrals F subcaudals

The Smooth Snake is also found on some of the coastal islands. A baby specimen was found as a road casualty on Tromoy on September 1st 1991 and a smallish adult was observed but not caught on a woodland path in late April 1991. At one locality only about three kilometers from the centre of Arendal I have found the Smooth Snake sympatric with both the Grass Snake and the Adder. Here Slow Worms are particularly common and these feature as a main constituent of the Smooth Snake's diet.

Natrix natrix natrix (Linnæus). The Grass or Ringed Snake

On observations made in 1991/2 I came to the conclusion that the Grass Snake is rather uncommon in the area. In 1993 I have found it quite often in places that I have searched time and time again with no result. One example is a much used woodland path close to my home. This I have walked countless times without seeing any Grass Snakes. On April 30th in the early afternoon, temperature 19°C, a small specimen was found here on a heather/stony bank and on August 7th, two largish specimens were seen near the same spot on boulders beside the path. People speak of it as being fairly abundant and a farmer told me that he often sees Grass Snakes in a small brook on his land. It has been found as a road casualty on several occasions in the spring and early part of the summer (May and June particularly). Otherwise I have found it amongst brushwood and grassy banks. A pair were found in 1992 at a locality that I have kept under inspection for a long period. On August 12th

1992 two snakes were heard moving off into thick undergrowth. On returning about one hour later a female Grass Snake was caught as it lay basking. On August 15th careful searching disclosed the other snake well concealed amongst grass and undergrowth. This proved to be a male. Both were kept in captivity for a short period, the female especially remaining very aggressive, hissing loudly and striking out when any attempt was made to pick her up. The female measured 920 mm, the male 835 mm. The snakes were released on August 21st and on September 1st the female, which had now sloughed, was re-seen. This pair have not been found again in 1993.

Norwegian Grass Snakes seem to display aggression. I have only handled one that has "feigned" death and then briefly. One was caught in the grounds of the Zoological Gardens in Kristiansand and shown on national television. When approached it immediately adopted a defensive posture, striking out determinedly. This was practically a melanistic specimen. Many examples I have seen have been dark in colouring, often a dark olive-grey especially in females. Sometimes the colouring becomes nearly black against which the white or pale moon patches stand out in vivid contrast. Even on these dark specimens the ventral surface has the typical black/white checkered pattern. There are as a rule four rows of black spots dorso-laterally and laterally but these can be absent, the whole snake then being uniform. On one male I caught the belly was uniform dull white with a black stripe down the mid-line. Occasionally one finds Grass Snakes with a zig-zag dorsal pattern resembling the Adder. These are known from Sweden and other places in eastern Europe (Street, 1979). I have observed one such example which unfortunately escaped.

The largest example I have measured totalled 970 mm, a road casualty. The largest known Norwegian example comes from Mjåvatn a short distance inland from Arendal. This was found on May 1st 1957 and measured 135 cm. Stories of Grass Snakes of quite fantastic size from Aust Agder have been collected by Arne Mjåland from Birkeland. These were published in the regional newspaper in 1992 and refer to snakes in excess of 3 meters. Distrustful though one may be of such reports there is good evidence that the Grass Snake can reach impressive dimensions. Kauri (1970) gives details of what must be the largest Grass Snake unofficially recorded in Scandinavia. Even though the example had to be released and not accurately measured the credentials of the finder are impeccable. This refers to an encounter in Sweden. Henry Norling was a railway employee and amateur herpetologist with a special interest in the Grass Snake:

"I was driving a rail tricycle between Jarna station and Södetalje on the 11th July 1959. . . . when I saw a snake crawling under the tracks, spanning both of the rails. I reckoned its length to be therefore about 175 cm. It was as thick as a 1kg eel, completely black with no markings. I got hold of it just behind the head and standing upright and holding it against me its tail was still well on the ground. My height is 186 cm. It hissed and bit me twice on the left hand. I changed my grip and was bitten twice more. The skin was bruised and torn and bled somewhat. I tried to get the snake into my lunch box; this was unsuccessful for I had no sooner got some of the coils in the box than the first one or two came out again. In the meantime I was bitten five times more on my right hand I am probably stronger than most people but I couldn't manage to control the snake. I have caught snakes which measured 116, 120 and 126 cm but they were small compared with this. I was forced to release it after half-an-hour because I had nothing I could keep it in."

(Author's translation).

This snake must have been over 200 cm long since it is unlikely that it hung straight down without some bends in the body.

Arne Mjåland's collection of tales (all interestingly enough from a small area not far from Arendal) stretch the imagination considerably but there is one which has to be taken seriously since the person concerned claims he measured the snake and there is no evidence to suggest other than it was a factual encounter. Tengel Sunde, also coincidentally a railway employee, killed a huge snake in September 1949 about one kilometer east from Hynnekleiv station:

"I was working on the railway track when I saw a snake lying on the hillside in the proximity of the line. I couldn't see the entire snake as it crept under a slab of rock about two meters in length. I cut off a branch from an oak tree and attacked the snake. The snake then came at me so I was forced to retreat but eventually killed it. It proved to be a terrible monster. I measured it and found it to be 371 cm long and as thick as a beer bottle. The head was as big as a grown man's clenched fist. My work mates reckoned it must have escaped from a circus because they couldn't believe that there were such huge snakes in Norway. I killed it because this was a place where people come to pick berries and I was afraid that they would come across it."

(Author's translation)

Well, perhaps large snakes like railway lines! Although one must admit to being sceptical that *N. natrix* could reach such a huge size it is known that both the Four-lined Snake (*Elaphe quatuorlineata*) and the Montpellier Snake (*Malpolon monspessulanus insignitus*) from the Attica region of Greece attained lengths many years ago of close on 300 cm since there is preserved material in Athens to prove it. Achilles Dimitropoulos, with whom I have discussed the matter, remarks that the vastly increased road traffic and of course the urbanisation of Attica reduced the growth potential of these species since many would fall victim to man's activities. To find either of these species today even as much as 200 cm in length is a rarity. With a proven length of over 200 cm *Natrix natrix* could in favourable circumstances grow even larger and Norway remains, as has been stated, relatively well preserved with regard to natural landscape, its forests, moors, marshes and wild tracts.

Viperidae

Vipera berus berus (Linnæus). The Adder or Common Viper

This is the commonest and most widely distributed of the three snake species. It occurs up to at least 1000 m and in a variety of habitats often occurring on the edge of fields, woodland, road sides and in agricultural areas as well as entering gardens. It receives a good deal of attention through the journalistic media. Since, like all wild life, it is protected by law it is seldom killed and the most usual reaction to its presence round houses and gardens is how to deter it or remove it. Suggestions have varied from moth balls, paraffin or diesel fuel where they like to lie basking to filling one's garden with families of hedgehogs! Despite its apparent frequency accidents seem rare. There was a case recently of a 9-year old girl being bitten while picking wild strawberries. She suffered a badly swollen leg with considerable bruising but was fully recovered after a few days in hospital.

Like the Common Lizard the Adder occurs in some places but not others and is most definitely colonial. One can search extensive areas of countryside and not find it at all. Two localities close to where I live have permanent populations of adders which I am able to visit regularly during the course of the active season. Details on observations made on these snakes is not presented here since it is intended to carry out longer term research. Otherwise I have found it well inland and, like the Grass Snake, is to be found on country roads where I have encountered it both dead and alive.

The active season is longer than one might expect from the latitude though the mild winters of recent years have probably contributed somewhat. The final sighting I made in 1992 was on October 6th at one of the two sites mentioned above which is situated on the edge of a roundabout on the busy E18 route from Oslo to Kristiansand. A small copse adjoins the road on one side and is surrounded by meadows on the others. There are deep rocky clefts and boulders and is a hibernation retreat though the estimated population does not total more than four or five individuals as far as I have been able to determine. The adder in question was a melanistic male about 60 cm long. The air temperature was about 10°C and the snake had chosen a warm protected spot to bask. Visits were undertaken daily until October 13th. Despite maxima temperatures of over 10°C (17°C on the 7th) no further sightings were made and the weather then became abruptly wintery with night frosts and sleet. In the middle of February the weather turned mild and the hibernation locality was checked with negative result. A snowy period followed at the end of the month but March 7th was mild (8°C) and sunny. A visit on this date also proved negative. Thick snow still covered the fields and the lakes were frozen. Though mild the weather continued mostly cloudy until the 16th and on this date was made the first sighting of *V. berus*. Fortunately this was the same individual seen on October 6th. Although it cannot be certain that the snake had emerged from hibernation on March 16th it cannot have been out of its winter quarters for more than a day or two. This gives a hibernation length of about 160 days. Smith (1954) gives a hibernation period of between 140 and 150 days in Denmark and Britain. Street (1979) quotes Prestt (1971) who states that in Dorset the males hibernate for about 150 days and the females 180. It would seem that at least in the relatively mild and protected southern part of Norway adders have an active period similar to Britain despite the longer winter season. Inland too *V. berus* is known to make an early appearance. A most interesting article appeared in Agderposten on March 29th 1993 entitled "Hoggorm på snø" (Adder on the snow).

The encounter place high up in the mountains towards the end of April, year not stated:

"I was skiing on the snow-covered plateau in the mountain region between Valle, Tokke and Fyresdal. The sun was blazing from a cloudless sky, soon it would be May, soon summer. Everything was tranquil and warm. The snow was lying about a meter deep but the streams were open and the bogs and marshes softening. Round the birch groves and willow scrub the snow was thin and patchy but there was still plenty of deep snow here 800 m up. Suddenly I saw something long and dark which disrupted the harmony of the snow surface. It is neither a twig nor a branch being too supple in form. Could it be a snake, a snake on the snow? I walked over to the "twig". The forked tongue which flickers leaves no doubt that it is a snake. A fully grown adder, the zig-zag marking clearly visible. This specimen is probably about 70-80 cm long. A large adder, one of the biggest. I snapped a couple of pictures and left it in peace. It will have a hard time of it when the evening chill sets in. We both slide on our way, the adder and I." (Author's translation)

The article is accompanied by a photograph. Apart from the somewhat lyrical description of the incident there is much of interest here. From the indicated size, albeit approximate, the snake must have been a female and the circumstances demonstrate how mountain adders utilise the warmth of the spring sun to take advantage of as long an active season as possible. The lowest temperature in the spring that I have found it active was about 6.5°C (April 11th 1993).

Adders in Norway and elsewhere in Scandinavia reach a larger size than in Britain. Males often attain 600 mm, the largest that I have measured, caught inland at about 500 m, totalled 635 mm. Females regularly exceed 650 mm, my four largest being 670 mm, 750 mm, 770 mm, 810 mm. Wildhagen (1949) reports that the largest adder examined by a Norwegian museum was 765 mm. Kauri (1970) states that 800 mm is not so unusual. The Oslo Zoological Museum has one from Jeloy in Oslofjorden that was 825 mm when alive, 810 mm after some time in spirit. Kauri also reports that large adders are found in the mountains where they can reach 820 mm, as from the Hardangervidda National Park at Haugastol, over 1000 m altitude. In the north of Sweden a length of 104 cm has been recorded, (Gislen and Kauri, 1959).

Melanistic adders occur more frequently than normally coloured individuals. Of 25 adults snakes caught or observed in the lowlands and moderate altitudes, under 300 mm elevation, 60% were black either wholly or partially. The degree and intensity of the black pigment varied. Some were a rich, jet black with the lip shields white edged, on others the colouring was more of a very dark ash-grey against which the zig-zag marking was just visible on close inspection and was sometimes more distinct than others. One female was a beautiful dark smokey grey with a bluish tint. The melanistic condition was roughly equally divided between males and females where sexing was possible. On the 40% which could be described as "normal" there were a few on which the ground colour was much reduced (four males, one female). Three males had the vivid contrast between brilliant silver-grey ground and deep black zig-zag which intensifies in the breeding season. Of the total of ten "normally" marked individuals eight were males. Two adders taken inland at over 500 m altitude, a male and a female, showed no sexual dimorphism, both being yellow-brown with a dark brown zig-zag, ventral surface black tail tip sulphur-yellow. Whether melanism is confined to lower altitudes and is absent or rare in the mountains has not been determined. Winkler (1991) has observed a relatively high proportion of melanistic adders in a study of amphibians and reptiles on the Swedish island of Öland. Melanism develops gradually during the first three or four years of life, the young on birth being brown with a darker brown zig-zag. However of a group of four recently born babies seen on August 12th 1992 one was a deep smokey grey with black zig-zag and two were dark brown with black zig-zags. A two year old adder found on September 18th 1992 was refound on August 20th 1993. This was typically coloured in 1992 but a year later was much darker in colour and showing the development of melanism. It was found at precisely the same location.

CONCLUSION

This report represents a first stage in the cataloguing of information on Norwegian amphibians and reptiles by the author. It appears that little detailed research has been carried out in Norway and that there is plenty of scope for making valuable contributions. This can be broken down into three main areas:

1. distributional records of known species especially in the higher altitudes and on the margins of what is the officially accepted range parameters.
2. more intimate research into the life cycles of certain species such as *V. berus* and habitat preferences of *C. austriaca* which seems to display a greater tolerance of climate and biotope than is normally attributed to it.
3. to establish whether *L. agilis* and *B. calamita* are to be found in Norway and if so their extent of penetration into the country.

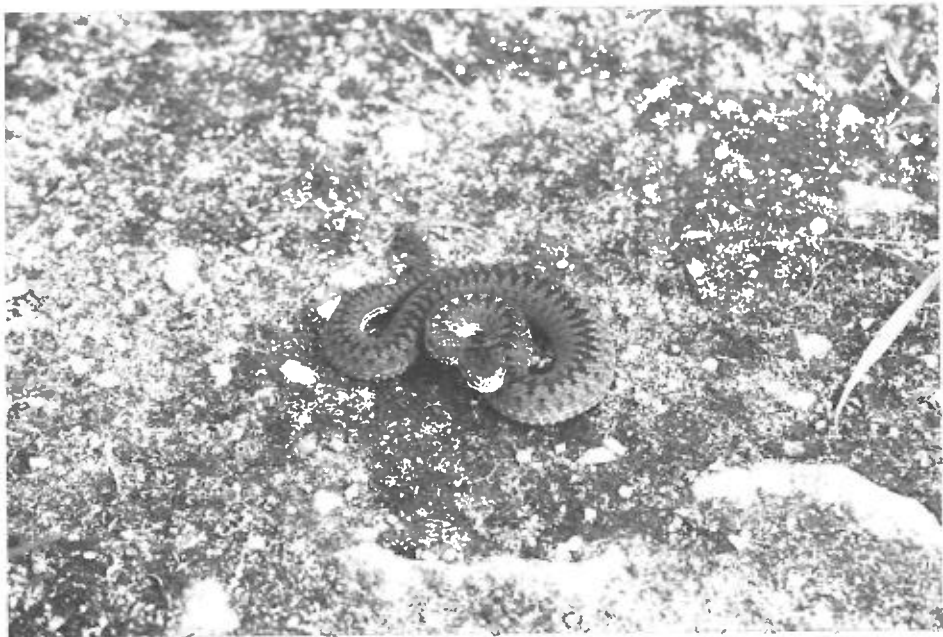


Plate 1: New-born *Vipera berus*



Plate 2: *Coronella austriaca* 55.5 cm male from Nesvatn



Plate 3: *Coronella austriaca* 64.5 cm male from Arendal

It is intended to pursue these investigations in the years to come as time allows. Norway is strongly recommended to all readers as a country to visit with the opportunity of observing the herpetofauna in unspoiled environments often set against great natural beauty.

APPENDIX

Some knowledge of the Norwegian names for the various amphibian and reptile species could be useful for the visitor to Norway interested in observing the herpetofauna.

Scientific	Norwegian
<i>T. cristatus</i>	Stor salamander
<i>T. vulgaris</i>	Lite salamander
<i>B. bufo</i>	Padde
<i>R. arvalis</i>	Spissnutet frosk
<i>R. temporaria</i>	Vanlig frosk, buttsnutet frosk
<i>A. fragilis</i>	Stålor, blindorm, kopperslange
<i>L. vivipara</i>	Firfisl
<i>C. austriaca</i>	Slettsnok(g), slettorm
<i>N. natrix</i>	Buorm
<i>V. berus</i>	Hoggorm

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