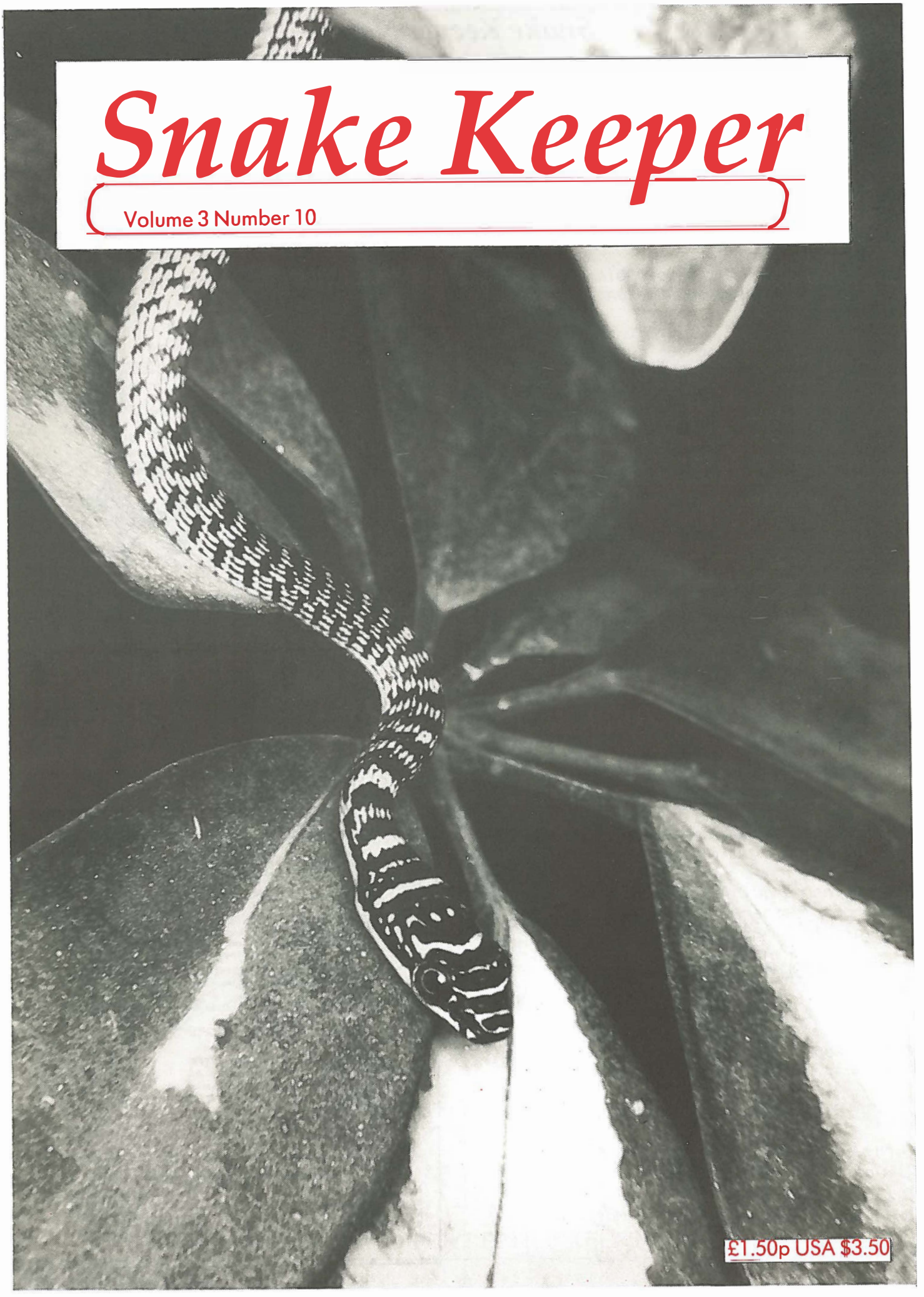
Snake Keeper

Volume 3 Number 10



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Snake Keeper News

DUTCH SNAKE SOCIETY 'SNAKE DAY'

The Dutch Snake Society 'Snake Day' will be held on the 21st October at the University of Utrecht, Dept 'Bijzondere Dieren', Yalelaan 1, De Uithof, Utrecht. The programme of events is as follows:

10.00hr Opening remarks/Society news

10.30hr Snakes of the Colombian Highlands by M. Höggren, Sweden

11.15hr Break

11.45hr The genus Pituophis by Vince Scheidt, USA

12.30hr Break

14.00hr Quarantine and therapy of infectious diseases in snakes by M. Kik & G. Dorrestein, RUU, Dept. Bijzondere Dieren

14.45hr Break

16.00hr American Lampropeltis and Elaphe species by Vince Scheidt, USA

16.45 Closing remarks

Various trade stands will be selling a wide selection of books and reptiles during the day. Back issues of Litteratura Serpentium will be available from the DSS stand together with posters and stickers.

Refreshments (sandwiches, tea, coffee etc) will be on sale during the day.

For further enquiries contact Jaap Kooij, telephone Netherlands 02523-77253. (From UK dial 010 31 2523 77253.)

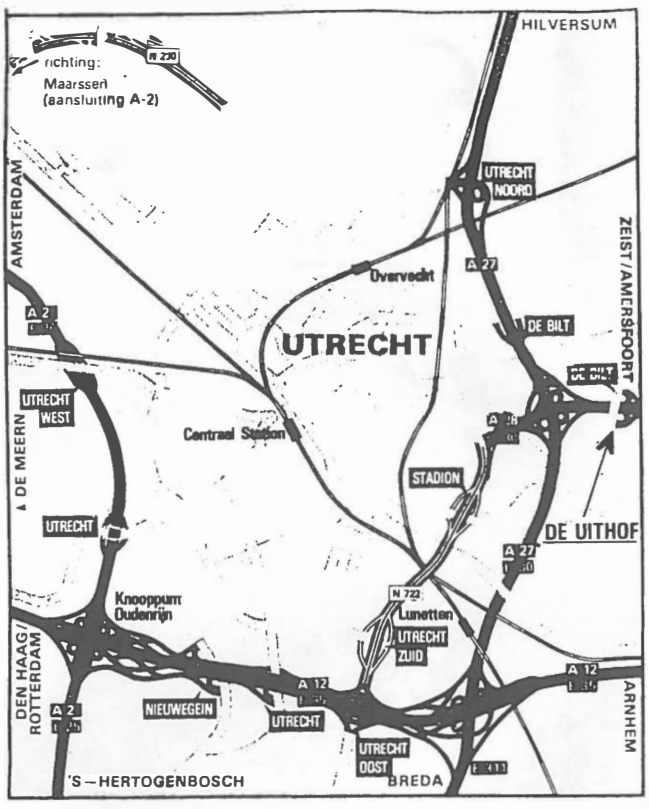
HERPETOLOGICAL SOCIETY MEETINGS

Nottingham Branch of the IHS

10th October 7.30pm — *Wollaton Hall Natural Hist. Museum, Wollaton Park, Nottingham. Speaker: Mike Linley*

14th November 7.30pm — *Wollaton Hall Natural Hist. Museum, Wollaton Park, Nottingham. Speaker: Chris Mattison*

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Snake Keeper

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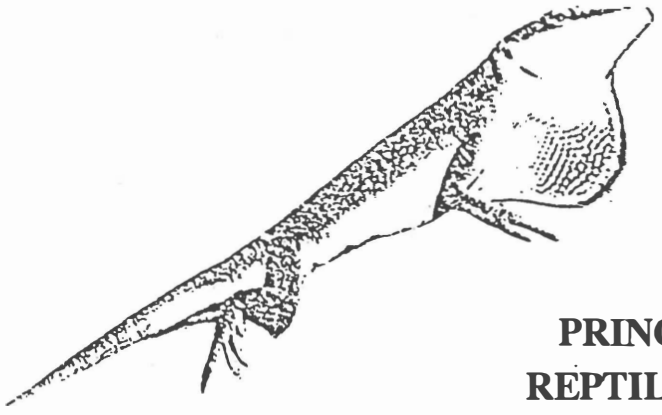
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Front cover: Chrysopelea ornata
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The Milos Viper, *Vipera lebetina schweizeri,* and the Threat to its Future

by Kevin J Hingley

I spent the first two weeks of June this year in Greece with my son Jade. Our first few days were spent in and around Athens in order to meet my long-standing pen friend Achilles Dimitropoulos. Whilst in Athens with Achilles we worked out an itinerary to visit certain islands, the first port of call decided upon being Milos.

After just over seven hours of sailing by ferry we reached Milos around 10.30pm and settled for the first hotelier who approached us when we stepped onto the pier. We were too tired to haggle and in dire need of a shower before partaking of supper and some liquid refreshment. After a very restful night our first investigations were carried out in the eastern part of the main town and port of Adamas. At the very edge of town we encountered our first herptiles in the form of Kotschy's gecko, Cyrtodactylus kotschyi, and the Milos wall lizard, Podarcis milensis. We spent much of our first day heading east along the coastal hillsides and beaches searching for whatever animals we may encounter. Our quest was brought to an abrupt end when a very strong wind whipped up and we headed back to Adamas for a beer and a bite to eat. Shortly before reaching the restaurant we'd chosen to dine at my son realised he had lost his wallet so we hurriedly retraced our steps in an attempt to recover it. We failed to find the wallet (which contained his holiday spending money) but at least I encountered a Milos Viper as it was emerging from the base of a tree. Earlier in the day I had encountered a Kotschy's gecko diving for cover in the same hole from which the viper now emerged. The viper saw me as quickly as I had noticed it so unpacking my camera from its bag took second place to trying to extract it from the hole with my press stick. The snake hissed loudly, the sound no doubt amplified by the hollow it was trying to retreat into. It inflated its body and I couldn't get my stick between its coils so it got away from me.

However, there is a more important reason for this article and that is to explain the status of this endangered snake which is supposedly heavily protected. This particular subspecies, Vipera lebetina schweizeri, is only found on a few islands in the West Cyclades. Certain specimens are beautifully coloured reddish-brown or even melanistic and they are much sought after by herpetologists of certain countries, especially the Swiss; many specimens are collected annually for sale in central Europe. The owner of the hotel we stayed at on Milos saw my press stick sticking out of my rucksack and immediately asked if we had come to catch 'Lebetina' as the islanders call this snake. When I said we were only there to photograph these snakes he told me that many Swiss people stay in his hotel during the year in order to catch Lebetina and that I should take some with me. I told him that it was illegal but he merely shrugged his shoulders before asking if I wanted to buy any!

A few years ago a Dutch herpetologist, Van Mook, instigated a programme designed to protect the Milos viper. With the help of a local policeman, both children in schools and the adult population were made aware of the plight of the snake, pointing out that it was also internationally protected by law. It seems however that there are still a number of unscrupulous Milos islanders prepared to sell these snakes to anyone who wants them or alternatively turn a blind eye to collectors.

On one occasion some European collectors were caught about to leave Milos with a large collection of reptiles including, of course, Lebetinas and they got their just desserts. All the animals were released, their catching equipment was confiscated and they were deported from Greece with the warning that if they returned they faced a jail sentence.

However, this has not deterred others and the collecting still goes on. The current estimate is that 10% of the population of the vipers is taken annually from the island. According to Van Mook these snakes command high prices of up to £540 each on the black market so it is easy to see why they are being collected with such high prices being involved.

During our stay we didn't witness anyone else doing anything vaguely herpetological but even if we had seen the collecting of Lebatinas going on the police presence on Milos is almost non-existent; and who knows where the police station was anyway! If Van Mook's report is correct (and I see no reason to doubt him as he has contributed greatly towards the preservation of this snake), then in ten years time the population on Milos will be almost wiped out due to illegal collecting, the local interest in the preservation of Lebatina having dwindled or been overlooked because of the high price they command.

I intend writing to the appropriate Greek Ministry to inform them that the Milos viper is still being collected and I will consider sending a petition if Snake Keeper readers are prepared to send me their signatures to support my request for action to be taken in order to protect this snake.

For interested readers a full report of the herpetofauna seen during our two week stay will appear in 'The Herptile' (Journal of the International Herpetological Society) later this year. I would like to thank Achilles Dimitropoulos and his wife Helen and their family and friends for their overwhelming hospitality during our stay in Athens, and for allowing me to read Van Mook's apparently unpublished report.

*****

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Problems Associated with Maintaining a Healthy Zoo Reptile Collection

by Terry Boylan

Introduction

One of the main problems in maintaining a healthy reptile collection in a zoo is usually the reptile house.

Reptiles are a diverse group and since it is not practical to enclose each species within a mini-environment exactly suited to its needs (even if they were known), most zoos must make do with one uniformly heated and illuminated building within which makeshift measures are often employed to simulate a natural environment.

The very nature of the reptiles' physiology make them such difficult candidates for healthy maintenance and husbandry. For instance, reptiles are no longer strictly regarded as being "cold-blooded"; this idea was shown to be erroneous some 40 years ago. Whilst it is true that reptiles produce between one fifth and one tenth as much metabolic heat as a similar sized mammal (Bradshaw), they are able, if given the opportunity, to seek out the temperature they prefer and, by physiological and behavourial means, to maintain it either above or below their surroundings.

How and why they do this is important for the reptile keeper who wishes to do a little more with the zoo's reptile collection than simply display it like goods in a shop window.

Temperature

They seek out certain temperatures because they have what is known as a preferred body temperature which may differ from species to species. The preferred body temperature is that temperature which enables the reptile's metabolic and other functions to perform at maximum efficiency during its active period. Once that temperature is reached thermoregulatory mechanisms enable some reptiles to maintain it at an astonishingly constant level, even though the surrounding temperature may fluctuate above or below that level.

Now obviously the conditions in a zoo terrarium are a far cry from those existing in a reptile's natural state, especially if the reptile house was designed and built by non-herpetologists. To enable a reptile to seek out its optimum operating temperature in a zoo

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setting takes a lot of foresight and knowledge, and the unfortunate result in a lot of zoos has been the construction of gigantic sweat boxes with a minimum of control over individual units. If put into a glass cage with little opportunity to select a temperature gradient, the body temperature of the reptile will be similar to its surrounding temperature. This may not be the temperature which that particular species would have chosen but, generally, it will make do, and even thrive, providing other criteria for its continued well-being are met.

I can recall an example of a lizard not thriving because it was not given a high enough temperature range. Before renovations at Taronga's reptile house enabled us to thermostatically control each exhibit, the cages were heated in groups of six, so one had to select six species of reptile for display that would all tolerate the same temperature setting. In this group we had a colony of the Desert Iguana (Dipsosaurus dorsalis) a desert dwelling species from North America. The group of cages were heated to about 28 degrees C; a temperature which seemed adequate, as indeed it was for all the remaining species. In the Dipsosaurus feeding response was not good and they were not as active as we thought they should have been. I supposed that this may have been due to lack of sunlight and so installed an ultra-violet light in their cage as a substitute. Within the space of a few minutes all the lizards, including those which had previously remained hidden, had climbed onto branches and positioned themselves in a typical basking fashion close to the lamp where the temperature is some 38 degrees C. All commenced feeding voraciously within ten minutes of positioning themselves and they became more active than previously.

It was obvious that the immediate problem lay not in the lack of sunlight but in not providing enough heat. The optimum preferred temperature range of this species, I have since discovered, is around 40 degrees C, perhaps the highest of any reptile and, in fact, it will be found during the hottest part of the day when most other animals have taken refuge (Switak).

Obviously we need to pay more attention to captive reptiles' temperature preferences for they are inextricably tied to health and reproduction; many reptiles need a temperature drop at night for continuous good health. It is now common practice amongst many reptile keepers to cool down certain species, particularly those from temperate zones, during the winter in the belief that this will provide the stimuli or the correct hormonal trigger to ensure a successful mating when the temperature is once again increased.

Many reptile keepers are also now providing 'hot spots' in their exhibits which enable the animal to choose a temperature gradient between cool and warm. This may be particularly beneficial for some desert species whose temperature range in the wild may fluctuate from one extreme to the other. Some species such as the Australian Copperhead and the Green Python will not tolerate a uniformly hot exhibit, and so also benefit from such a choice. Interestingly enough, Green Python eggs likewise will not tolerate what reptile keepers regard as the average artificial Python incubating temperature of some 30 degrees C, needing a lower temperature than any other Python eggs (Ross).

In the reptile house at Antwerp Zoo, the bottom of each cage is subdivided into sections under which are thermostatically controlled heaters. Two heated areas are always divided by a cool one thus giving the reptiles a choice. Two infra-red heat lamps also operate on an alternate cycle to give an additional range. Heating is turned off at night to allow a normal cooling off period.

Lighting

Adequate lighting is another problem with the older reptile houses. Obviously reptiles, like other animals, need an alternating cycle of light and dark, but it also seems that the length of light

period corresponding to seasonal changes may have a significant effect on reproduction (Gans). There is still uncertainty as to the correct light wave length required by reptiles. Obviously sunlight as near as possible to the strength a certain species would encounter in its native region would be ideal but completely impractical in a zoo holding many species from around the world. In practice zoos, including Melbourne and Sidney have installed overhead light in their reptile exhibits that closely approximate the sun's longer ultra-violet wavelengths. The shorter wavelength from the old Gro-lux tubes, while still being great for plants, are now regarded as being of little benefit to reptiles. Both Melbourne's and Sidney's Zoo reptile houses have generally had favourable reports from these lights shown mainly in improved feeding response from recalcitrant species. Time will tell if improved reproduction behaviour will follow, although I feel confident that it will.

Humidity

As natural a stimulant as sunlight is rain and its corollary, humidity. This at least is not difficult to simulate. Amphibians are the most obvious examples of how reproductive behaviour can be elicited by a good shower and high humidity, but other species such as turtles and crocodilia can also be affected. The bellowing of Taronga's alligators during a rainstorm is evidence of this, although whether it be the actual rain, the accompanying thunder and lightning or a combination of all three is hard to know.

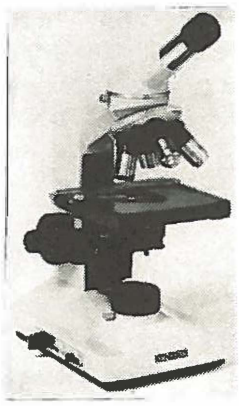
The crocodilian exhibit at Antwerp Zoo's reptile house has a simulated thunderstorm for four minutes every half hour. Electrically operated shutters close and darken the exhibit while a projector throws an image of morning storm clouds onto the walls. The normal tape recorded background bird songs change and the sound of distant and then closer claps of thunder are heard whilst strobe lighting simulates lightning. The grand finale is a downpour of prewarmed water from a ceiling tank!

The amount of humidity a species will tolerate once again depends on a knowledge of its habitat and behaviour. Some arboreal animals will actually prefer to drink water drops from foliage and will not suffer from high humidity whilst others preferring a low humidity will tolerate and seek out a small area of dampness to facilitate skin shedding. Continual dampness on cage strata however should be avoided as this provides an ideal medium for protozoan and fungal infections to flourish, and for this reason cage spraying should be a judicial and careful business and not simply a heavy drenching.

Decoration

After heating and lighting have been provided, any cage decorating must take into account the psychological as well as the physical well-being of the reptiles to be exhibited. In addition the viwing public must be kept in mind. For instance, ground boas of the genus Eryx are not much value as an exhibit species because of their habit of completely burying themselves beneath sandy soil. To allow the public to see these burrowing snakes would mean keeping them on a shallow stratum. This could deprive them of security, cause them to refuse food and lead to eventual death. Consequently not many zoos exhibit these reptiles.

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Sometimes, particularly with snakes, the keeper must do a balancing act in trying to provide just enough cover for the reptile to feel secure and yet not so much that it disappears completely from view, although the latter choice may be necessary for newly arrived specimens until they become accustomed to human presence. Large pythons do not seem to be terribly concerned at such open exposure and this is possibly a reflection on their size and less secretive life style in the wild.

Feeding

Getting newly acquired reptiles to feed will often depend in the final analysis on the type of cage set up that has been provided for them, including the amount of cover available. Generally most snakes will accept dead mice and rats, though some snakes will react timidly and withdraw their heads into their coils if food is offered to them. Sometimes moving the dead prey just sufficiently for the snake to become interested and simulating a fleeing action by the prey animal will elicit a feeding response. Very rarely, a snake will refuse all food even though all its requirements have apparently been met. After eliminating all possible causes such as different food preferences, temperature, ill health, etc, it may be necessary to force feed the specimen. Because of the risk of injury to the snake, force feeding is only carried out as a last resort and only then by experienced reptile keepers. Obesity can also become a problem with captive reptiles and this can lead to ill health and inability to breed; in such cases a period of fasting must be enforced.

Amongst colubrid and boid snakes in particular, and others which employ a swift strike-and-constrict method of despatching prey, careful supervision must be adhered to during feeding to avoid a free-for-all if groups of snakes are kept together. Separating the snakes along with their dead prey with each in a cloth bag is one method of overcoming this problem for smaller species. With venomous species additional care must be taken. Most snakes rely on movement as well as smell for locating prey. Once dead mice have been brought into close proximity to excite their olfactory senses, a hand movement during feeding may be just the signal for a bite in the belief that the hand is prey. Most keepers (or at least those still alive) rely on long forceps for feeding venomous snakes; many bites to reptile keepers occur either on or very near the specified feeding day, when a snake is at its most alert.

Baby reptiles can provide the biggest headache for reptile keepers. Most baby snakes, after some perseverence will accept small or pink mice soon after hatching or birth, and will obtain all vitamins, minerals and trace elements needed for their correct growth directly from the whole prey animal. However, with baby lizards, turtles and crocodilians a great deal of thought must go into providing a balanced diet. Sunlight (or a close substitute) must also be provided for the correct synthesis of vitamin D, a lack of which can cause skeletal and shell defects.

At Taronga, we find that by far the largest number of enquiries the reptile department receives from members of the public, concern the poor health of baby turtles. Whatever the complaint, it invariably originates from an inadequate diet - i.e. minced meat. Most of these turtles, if they have survived into adulthood, are so pathetically deformed that they must be destroyed.

Supervision is also important during the feeding of baby reptiles. Quite often a few youngsters will be more robust than their siblings, will eat more and, eventually, may even intimidate the smaller of the group to the point of starvation.

With herbivorous reptiles there is a tendency in some zoos to overfeed on fruit. This can cause a calcium/phosphorus imbalance which in turn may result in skeletal and shell deformities. At Taronga one of the reptile keepers daily spends up to an hour searching out selections of edible herbage for our large collection of Iguanid lizards and tortoises. Fruit feeding is restricted to twice weekly. Finely chopped mixed vegetables, insects and canned pet food is also fed on occasions and, so far, we have not had the need to add any vitamin or mineral supplements to this varied diet.

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The administration of drugs should be carried out only under the supervision of an experienced veterinarian, as disturbances to the intestinal micro-organisms as well as other unwanted side effects can result from incorrect dosage.

An outbreak of necrotic enteritis at Taronga Zoo was the major cause of reptile death in 1979. The animals appeared healthy right up to the point of death (Reddacliff). This disease is often prevalent in reptile collections and at Taronga we have learnt to live with it in the belief that complete eradication is practically impossible. Prophylactic measures such as the administration of the drug 'Emtryl' in the drinking water is carried out to control any fresh outbreaks and a disinfectant footbath is used before and after entering our reptile pits to prevent any spread. The protozoan trichomonad organism responsible for the disease was believed to have originated in a collection of blue-tongue lizards housed in an outside pit. Quite possibly inadequate drainage in this pit facilitated the spread of the flagellate protozoans.

The parasite snake mite, once an absolute scourge in zoo collections if it got hold (necessitating the use of toxic chemical solutions) is now comparatively simple to eradicate with the advent of Pest-strips.

One cannot overstress the importance of observation to the reptile keeper. A change in the behavioural pattern of a captive reptile may signify many things: ill health, territoriality, readiness to mate, endo- or ecto-parasites or perhaps nothing more than preparatory behaviour in a gravid animal. Gaping and wheezing may indicate respiratory infections or mouth canker, both of which can be fatal if not treated early. Twitching or continuous soaking in a water dish may indicate the presence of snake mites which can cause fatal septicaemia.

Faeces should also be examined. Colour, composition and smell can all give vital clues to bacterial protozoan and parasitic infections. For instance, bloody faeces may indicate enteritic infections, while greenish faeces may indicate the presence of salmonella organisms. Faeces should never be runny or slimy, but firm with a white semi-solid area. Reptiles, particularly snakes, which seem more rounded out than normal may be gravid or constipated. Careful palpation will usually indicate which condition is present. Any intestinal blockage can be dealt with by massaging the snake in warm water or by the cloacal administration of liquid parrafin.

Conclusion

Finally, as one who has worked with zoo reptile collections for many years, I find it heartening to see that the standard of reptile keeping has increased dramatically in the last few decades. Keepers of all sections and departments are no longer willing to accept as best zookeeping concepts that were part of yesteryear.

The problems associated with maintaining a healthy zoo collection are being challenged and overcome.

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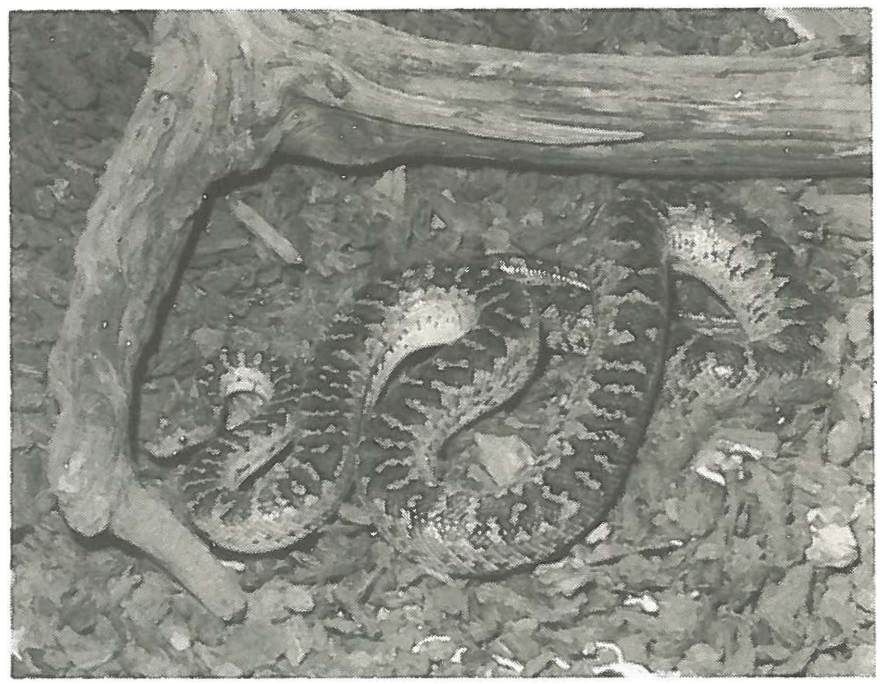
Originally published in the Australasian Society of Zoo Keeper's magazine 'Thylacinus', this edited version of 'Problems Associated with Maintaining a Healthy Zoo Reptile Collection' is printed by kind permission of the author.

The Ragged Island Boa, *Epicrates striatus mccraniei*

by Scott Allen

Description

The Ragged Island Boa is a moderate size Epicrates. Adult females reach about two metres in length, although the males are somewhat smaller. The dorsal colour consists of pale grey-brown with a series of 75 to 100 dark brown to almost black angulate blotches. These blotches are usually separated by one to three scale rows but a few blotches may be fused. The ground colour lightens somewhat on the flanks with some brown flecking. The ventrum is pale creamy grey with no pattern. Labials are pale yellowish grey.



Epicrates striatus mccraniei
Photo: W. Maxwell

Habitat

This boa is found in the Ragged Island Chain of the Bahama Islands, West Indies. The Ragged Islands are generally very dry. Most specimens on Little Ragged Island have been caught in the vicinity of a small swampy area and in a section of deteriorating rock walls.

Biology

Almost nothing is known of the biology of this subspecies in the wild. Small birds and rodents probably make up most of its diet as well as appropriately sized amphibians and lizards, particularly for juvenile specimens.

Captive Husbandry

My snakes did well in a 100cm x 75cm x 75cm wooden cage with a glass front. Newspaper was provided as a substrate and various types of hide boxes, including cereal boxes and large pieces of tree bark, were provided though seldom utilized when the cages were occasionally misted. Heat was provided by a single 40W or 60W incandescent light bulb, depending on ambient temperature. A plastic water bowl, large enough for the animal to soak in, was provided. This was only utilized on occasional summer days when daytime cage temperatures exceeded 34 degrees C. The snakes were maintained in separate cages with a 12:12 day/night cycle at a temperature of 27 degrees C day and 22 degrees C night plus or minus two degrees. They fed well on mice and appropriate sized rats. One female ate thawed chicken wings once. The snakes showed no preference for either live, dead or thawed frozen food. Like many insular Epicrates, this form is quite aggressive, particularly while feeding.

Breeding

A group of 2.5 wild caught individuals has been maintained in captivity since 1981. Various regimes have been tried to induce breeding such as day/night cycling, changing humidity levels, temperature fluctuations etc. but so far there have been no definite breedings. In the last year some courtship activity was observed and at last one definite copulation in early July 1989.

Acknowledgement

My sincere thanks go to Tom Huff of the

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Reptile Breeding Foundation for the loan of specimens and to Dr. R. W. Murphy of the Royal Ontario Museum for commenting on this paper.

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The Care and Breeding of the Dwarf Rattlesnake, *Sistrurus miliarius* (Linnaeus, 1766)

by Hans Esterbauer and Horst Rosenegger

Introduction

The two genera of Rattlesnakes Crotalus (Linnaeus, 1758) with 27 partially polytypic species and Sistrurus (Garman, 1883) with 3 partially polytypic species are inhabitants of the New World and belong to the family of Pit Vipers (Crotalidae) which are so feared throughout America and Asia.

In their lifestyle and method of reproduction as well as their build and their highly developed venom mechanism, the Pit Vipers are very similar to the Viperids but are far superior to them in having an additional sensory organ between the eye and the nostril. By means of this organ, which is separated into an inner and outer pit by a membrane containing numerous nerve endings, they can detect temperature variations of 0.003 degrees C. By this means, even in total darkness, they can track their warm-bodied prey.

These reptiles received their common name of Rattlesnakes because of a horny appendage which vibrates sideways. This 'rattle' consists of residual sections of previous sloughs. The rattle is sounded when the snake feels threatened or when it is about to attack. It is vibrated so quickly that it produces quite a loud noise.

Of all Rattlesnakes the Dwarf Rattlesnake, Sistrurus miliarius has the characteristics which make it suitable for life in a vivarium - as far as venomous snakes should ever be kept in a private collection!

This Dwarf Rattlesnake reaches a length of 45-60cm and is very attractively coloured. The ground colour is mainly a blue-grey with a row of light or dark brown to black markings along its back accompanied by a row of dark markings along the flanks. These markings are opposite one another. In addition there may also be smaller, less significant spots. The head is very significantly marked with two wave-like bands which stretch from the neck to the snout where they join.

The range of distribution extends from Florida to southern Missouri. The preferred habitats of this venomous snake are usually dry places. They can be found in dry grassy hollows on the prairies and at the edges of forests where they hide under pieces of wood, bark or loose stones.

In its infancy Sistrurus miliarius feeds mainly on cold-blooded prey such as amphibians and lizards but it will also eat insects. As they get older their eating habits change and they go over to warm-blooded prey. Small rodents, mice and voles etc. form the main part of their diet.

The main method of hunting for S. miliarius is to lie in wait for its prey. If a prey animal comes within striking distance it is quickly seized and bitten

and the deadly venom injected. The snake follows the scent of the envenomated animal and when it is dead it is then swallowed. The Dwarf Rattlesnake will, however, eat dead mice which, for example, have been killed by traffic. (Schwammer, 1983).

Although the strong haemotoxic venom of Rattlesnakes is greatly feared, it is doubtful whether a bite from S. miliarius would be fatal to a human being. Even half-grown cats and rabbits have survived the venom of this snake (Sochurek, 1946).

On the 24th July 1985 Horst Rosenegger of Steyr, Austria received two 20cm long specimens of S. miliarius which had been captive bred. The animals, which are a pair, are housed in a vivarium of 145 x 50 x 60cm. The furnishings consist of a climbing branch, two philodendrons and a water container. The substrate consists of a mixture of leaf-mould and peat in a 1:1 ratio. A heating pad below the vivarium is controlled by a thermostat and keeps the temperature at around 26-28 degrees C. At night the temperature is reduced by one or two degrees C. From 7.30 am to 8.00pm the vivarium is lit by a 60W fluorescent tube. The relative atmospheric humidity is kept around 45-60%.

Because the snakes would not eat voluntarily they were force-fed with nestling mice. After around one and a half months they began to eat and each animal was given one mouse a week. Once a month the mice, which the snakes killed themselves, were injected with 15ml of a multivitamin preparation.

Sloughing generally takes place every two to three months and the skin usually comes off in one piece. To assist sloughing the atmospheric humidity is slightly increased by spraying the philodendrons regularly. Up to February 1986 the Rattlesnakes grew considerably. Whilst the male measured around 59cm the female was only slightly smaller.

Although the pair were not subjected to a particular day/night rhythm and were not hibernated, at the end of April 1986 the female stopped eating and on the 20th June 1986 gave birth (ovoviviparous) to eleven young snakes measuring from 10 to 13cm. Of the eleven young, two were unable to free themselves from the foetal membrane and died shortly after birth.

There was an accident when the young were removed; Rosenegger was bitten on the left ring finger by the mother. Immediately after the bite terrible pain was experienced and the finger felt that it would burst at any moment. Finger, hand and lower arm began to swell and, after eight hours, their circumference had doubled. Rosenegger was treated after fifteen minutes at a nearby hospital and, after corresponding local and general therapy, his condition improved and the oedema in the area of his right hand was reabsorbed. He was able to return home on the 23rd of June. The treatment was continued with 'Heparin' ointment and alcohol poultices.

The young snakes spent their first few weeks in a plastic vivarium measuring 30 x 18 x 20cm. For adequate ventilation, minute holes were drilled in the cover. The substrate was a mixture of leaf-mould and peat. The furnishings were completed by a small rock and a few pieces of bark. This vivarium was placed in the vivarium of the parent animals. A week after giving birth the adult female S. miliarius ate a mouse. The young were fed with nestling mice and crickets. As a result of this feeding a further accident occured; on the evening of the 6th July one of the young sank one of its fangs into Rosenegger's right index finger. Because of the dim-



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inutive size of the snake he paid no attention to the bite although at the point of the bite a painful oedema immediately occured. Within four hours of the bite the swelling of the right hand and lower arm was enormous and the lymph nodes of the right armpit were badly swollen. In addition there was a general feeling of illness with vomiting, stomach pains, debility and diahorrea. The following morning the victim was taken to hospital and treated in the intensive care unit. He was treated with alcohol poultices and was given intravenous injections of 'Solo-Dacorti' and 'Tavegyl'.

After the symptoms of illness had disappeared the swelling subsided and the laboratory tests showed no evidence of damage to coagulation and haemolysis. The victim was allowed home on the 8th July. This and the previous accident serve to underline how dangerous keeping venomous snakes can be and how relevant details of the effects of envenomation are.

The young were reared without any problems. After they had been force-fed several times the young began to eat voluntarily and by the middle of July all the young had sloughed.

Rosenegger thought he knew that S. miliarius are only mature at two years old and was therefore amazed when they reproduced at the age of eighteen months. It is also common opinion amongst Austrian herpetologists that an ideal breeding ratio is three males to one female. This widespread opinion can now also be laid to rest as a result of this example.



Young S. miliarius Photo: H. Esterbauer

On the 2nd November Rosenegger was able to observe another two-hour copulation. From March 1987 the female increased visibly in girth and on the 15th March gave birth to six young and four completely underdeveloped embryos. One of the young died at birth and two others a day later. Three young survived and soon started eating. They developed very quickly.

Although Sistrurus miliarius is extremely suitable for keeping in a vivarium, it should not be forgotten that this venomous snake is very irrascible and aggressive and possesses a highly effective haemotoxic venom so that keeping these snakes should only be done with extreme care and caution and, of course, with an official licence.

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This article 'Die Zwergklapperschlange Sistrurus miliarius (Linnaeus, 1776) - ihre Haltung und Zucht' originally appeared in the West German magazine 'Sauria' (March 1988) and is reproduced here by kind permission of the author. Translated from the original German by John Hackworth.

Chrysopelea ornata

by Lee Bowler



Chrysopelea ornata Photo: Michael Connolley

The genus Chrysopelea (The Flying Snakes) is represented by five species that are found mainly in forest regions throughout South East Asia, southern China, Sri Lanka and Indonesia. The five species of this unusual genus are all, as their name implies, highly arboreal: they spend most of their time in trees, only occasionally venturing down to the ground. Presumably, observing these graceful snakes in the wild would be far from easy.

My experience with this genus is limited to my one captive bred hatchling Chrysopelea ornata which I have had for about one month. Although I have only had the snake for a short time I have gained a lot of knowledge and made some observations.

Chrysopelea ornata is the most widespread of the genus growing to an average length of around 150cm. Its colouration is a background of green with each individual scale edged in black. The scales are smooth to the touch and number 17 at mid body.

When the name 'flying snake' is mentioned most members of the general public have images of snakes flying through the air in Asian forests. In fact the snake does not fly at all in the proper sense of the word. It actually glides for short distances from branch to branch by flattening its body to make an aerodynamic concave shape and leaping in a swift, explosive action. This method is obviously most effective when used from a high

branch to a lower one at an angle of 45 degrees.

I have heard that Ornate Flying Snakes are quick to defend themselves when not handled delicately and calmly. However, my hatchling, although very nervous and alert, has only ever bitten once. It much prefers to emit a small amount of smelly fluid from its vent which, in the first few weeks, brought my hands up in blisters. Either there was an irritant in this fluid or I was allergic to it but I no longer have this unpleasant skin reaction when handling the snake so, presumably, I have become used to it. I would be interested to hear from anyone who has suffered a similar reaction.

Although opistoglyphous (rear-fanged) the snakes' venom is said to have no affect on humans so it is probably specialized for its prey which consists of small lizards, small rodents and frogs. As little is known about the venom of rear-fanged snakes it probably pays, as with any snake, to treat them with respect.

My young snake is, at present, housed in a small clear sandwich box container with a paper substrate, a hide box, a small water bowl and some plastic foliage.

During the day the snake remains in hiding but it has been seen in the early morning and evening exploring its surroundings. The cage is heated from underneath to a temperature of approximately 27 degrees C, falling by two or three degrees at night. A relatively high humidity is maintained in the cage.

The snake, which is approximately 30cm long and about as thick as a biro refill, has never been seen drinking from its water bowl but has been observed more than once drinking water droplets after its container has been sprayed.

My snake requires force feeding and this takes quite a bit of time and patience. In the wild it would prey upon young lizards and as I cannot get these it has to be force fed as even day-old pinks are too big. The force feeding operation is carried out twice weekly. First the snake is caught and held in my left hand with my thumb around the neck region to keeps its head still. A small, round-ended plastic rod is inserted into the side of the low-slung mouth. The rod is pushed gently into the mouth until it reaches the other side and the snake opens its mouth fully. With the assistance of a willing mother, a mouse tail or limb is placed in its mouth and very gently pushed into the throat with the rod. Finally the neck region is massaged until the item travels down to the stomach. Recently I have found that the snake has a preference for small frogs these are placed in the mouth and given a little helping push. The snake then swallows them although occasionally I find it necessary to massage the snake's throat.

As the snake grows larger it will, hopefully, take pink mice and be rehoused in a tall upright vivarium with plenty of real plants.

C. ornata is occasionally bred in captivity with mating taking place around June. My snake was bred by Frank Schofield from a pair of wild-caught adults which have produced three clutches so far. The six to twelve eggs usually hatch within 70-92 days when incubated at 30 to 31 degrees C.

In conclusion, I would say that from my experiences so far I can definitely say that flying tree snakes are very pretty, interesting captives but take a lot of care and patience and are not really a snake for the beginner.

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Spinal Lumps on a Corn Snake Part II

by Ivor Henderson

Further to my article in Snake Keeper Volume 3, Number 8, in which I briefly described the condition of my male Corn Snake (Elaphe guttata guttata) which had developed a series of prominent lumps along its spine I can now update the situation as follows.

The snake is now 59cm (23") in length; the lumps start 6.5cm (2.5") from the head and extend to the tip of the tail. The lumps appear to be situated on the joints of the backbone and have become more prominent.

The snake's movements are now severely restricted; only the area not affected by the lumps moves in a normal snake-like manner. One morning I found the snake in what must have been a very uncomfortable position. For some reason he was unable to move from this position but after I moved his body into a straight line he slithered off to his retreat.

Since the lumps started to progress along the spine I have occasionally offered the snake a live 2-3 week old mouse as food about once a month to see how he coped with constricting his prey. In the beginning this was done quickly but awkwardly. As the lumps progressed, constriction became more difficult until the stage was reached where the snake could no longer kill its prey. (These tests were done under my supervision to ensure that the mice did not suffer and, where necessary, the animals were removed and humanely killed immediately.)

When the snake feeds it is noticeable that the lump nearest to the head becomes larger; this causes the snake difficulty in swallowing his food, which sometimes takes as long as fifteen minutes. I became aware that swallowing was painful for the snake and, as a result, I have reverted to feeding him pinkies.

The snake lives in a vivarium measuring 1.2m x 45cm x 45cm with four other Corn Snakes. The temperature ranges from 27 degrees C (81 degrees F) at the hottest end down to 23 degrees C (73 degrees F) at the coolest. Initially, the snake would move around regulating his own temperature but, as his condition worsened, he remains in the cool area possibly indicating that heat irritates his disorder.

During the night when the temperature drops to 20 degrees C (68 degrees F) throughout the vivarium the snake comes out and wanders around the vivarium with the other snakes. The only difference between his behaviour now and that before the lumps developed is that he will not climb the logs or branches from which he has fallen so often.

I have wondered if the rise in the vivarium temperature in the morning is in any way connected with some of the wierd positions in which he has been found as he was always found 'stuck' in these positions in the hottest part of the vivarium.

The snake's condition appeared to deteriorate recently and I thought it best that he be put to sleep by a local vet, a plan for which my young children regarded me as a monster. Watching the snake move and eat in comparison to the other snakes can only be described as pitiful and his breathing is, at times, reduced to short sharp breaths, giving me the impression that he may have been starting to suffer pain or possibly about to die naturally.

However, on Sunday the 17th September I took the snake to the IHS Open Day at Great Barr, West Midlands. The snake was taken there in a Hagen tank and on the way it seemed to come into a second life, being alert and energetic. I believe this was again due to the lower temperature and I have reduced the vivarium temperature by 2 degrees C which suits all the occupants.

On the 20th September the snake was taken to a local vet to be put to sleep and X-rayed but, after discussing the case with the vet, the snake was granted a reprieve. From the results of the X-ray it would seem the snake is suffering from a form of arthritis which has caused the joints to fuse together. It is similar to the condition which affects humans except that the snake does not have the inflamation beforehand. Due to the fusion of the joints the spine is not as flexible at the lumps as it should be and, as larger food items pass the lungs, the snake must feel very uncomfortable. The snake will have to

be fed pinkies probably for the rest of its days but otherwise it should, hopefully, lead a happy life.

I would like to thank those people who phoned or wrote to me offering help and advice regarding my previous article. Many thanks also to veterinary surgeon Mr Carpenter for his time and patience in trying to understand the problems with the snake.

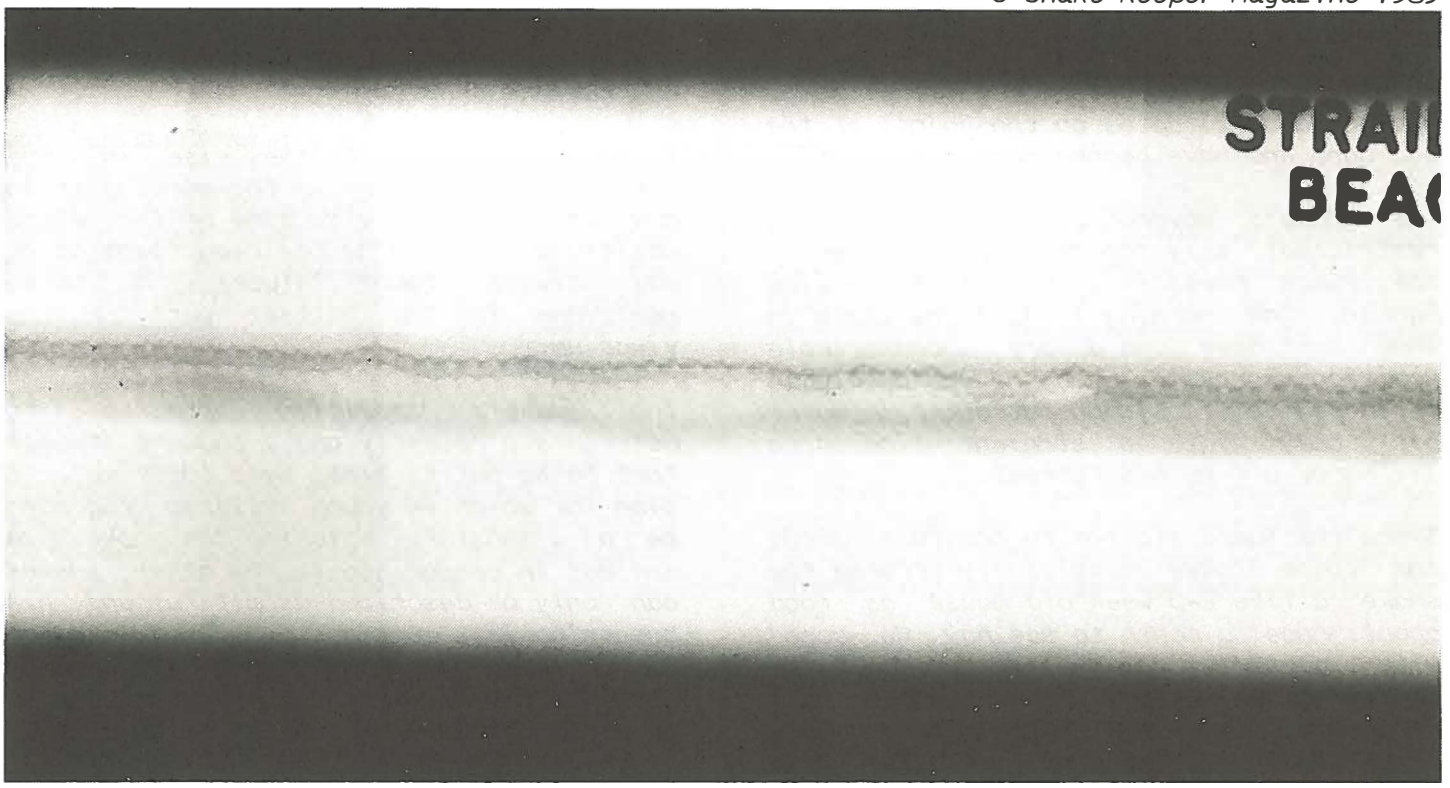
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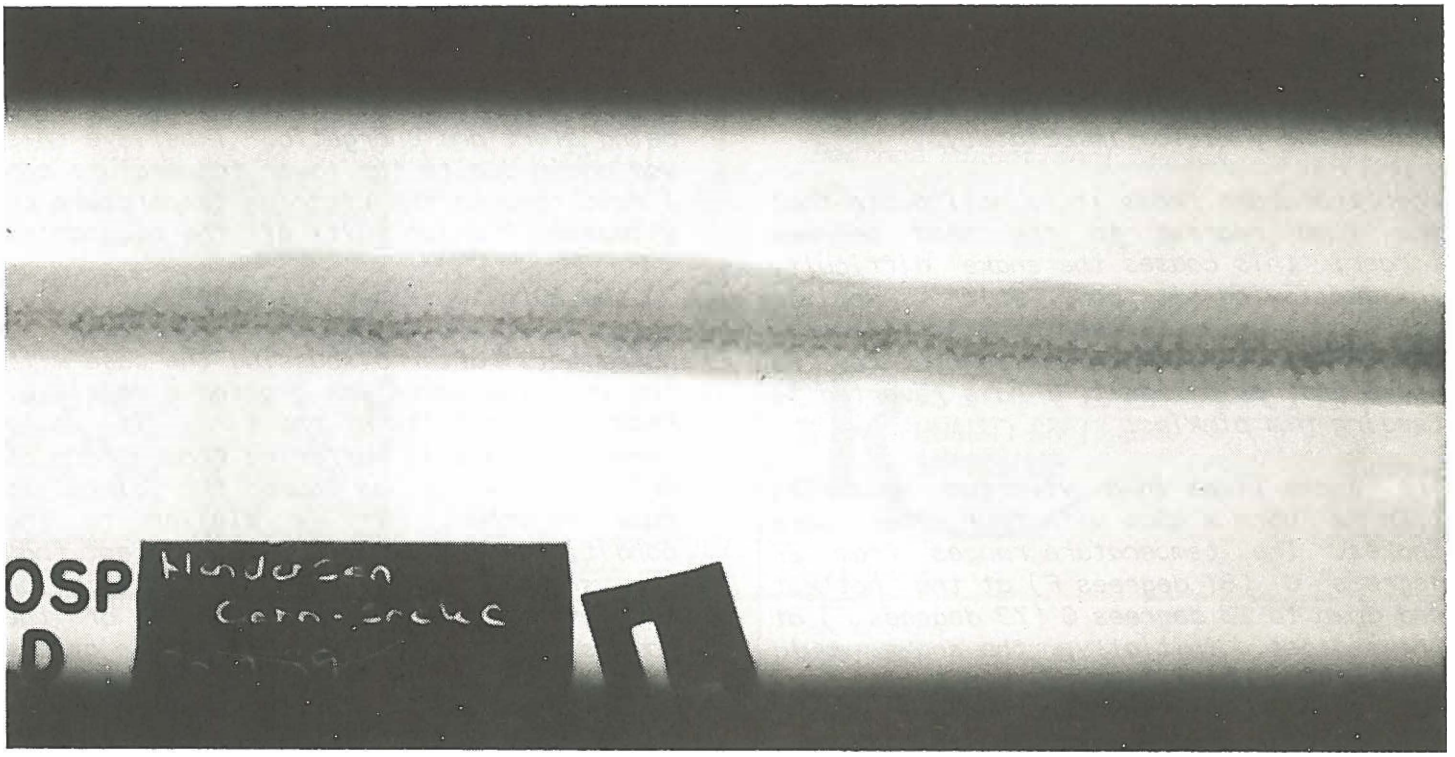
Key to X-ray prints

Top: Side view of snake with head to left. Lung visible as a light area. Spinal kinks are quite prominent.

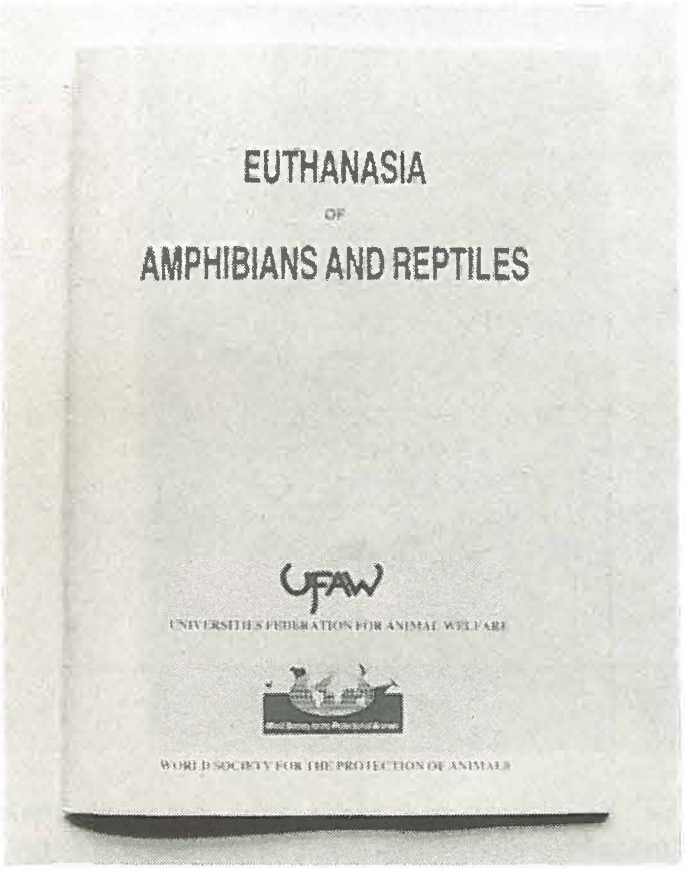
Bottom: View from above with head to left.

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Book Review



EUTHANASIA of AMPHIBIANS and REPTILES

Published by Universities Federation for Animal Welfare (UFAW) and World Society for the Protection of Animals (WSPA).

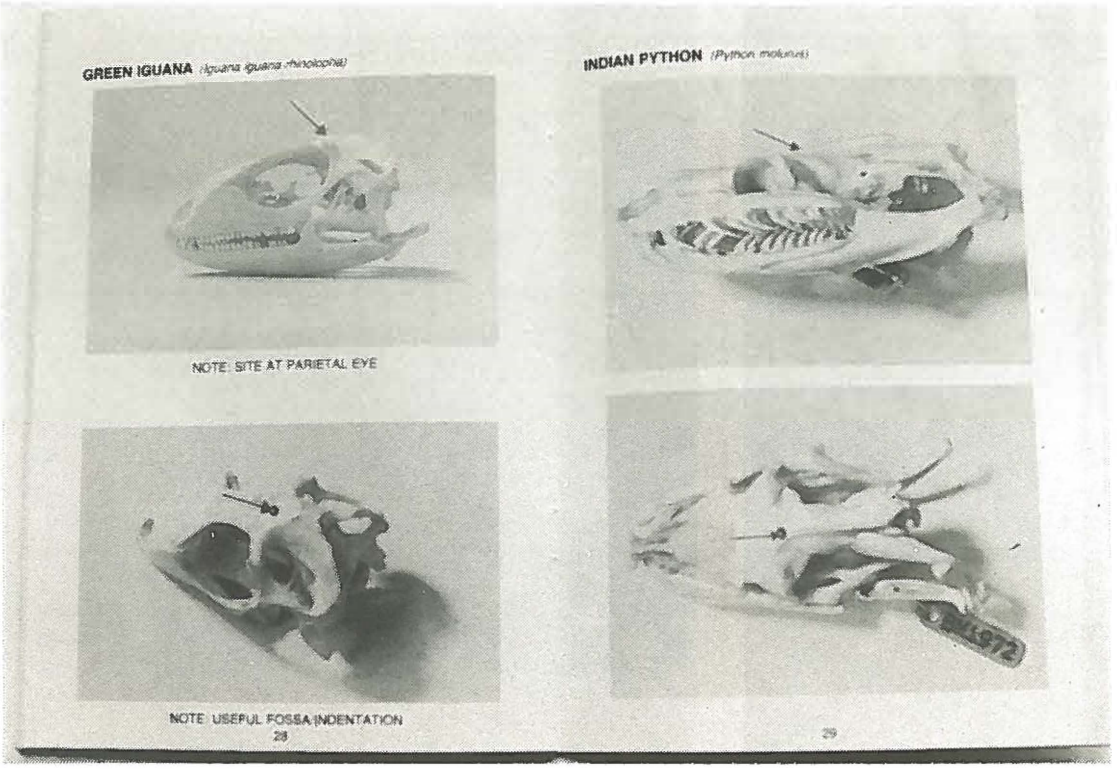
ISBN 0 900767 46 4 *£6.25 inc. p&p*

The Universities Federation for Animal Welfare is a science-based educational charity concerned with the welfare of all animals. The Federation aims to improve the well-being of animals, to reduce the infliction of pain or distress and to ensure that, when necessary, animals are killed humanely.

'Euthanasia of Reptiles and Amphibians' is the report of a Joint UFAW/WSPA Working Party prepared by J E Cooper (Veterinary Conservator, The Royal College of Surgeons of England), R Ewbank (Director, UFAW), C Platt (Scientific Consultant, WSPA) and C Warwick (Consultant Herpetologist). The report reviews some of the biological and practical considerations relevant to the killing of amphibians and reptiles and attempts to make clear recommendations for more humane methods.

The report examines the various ways of killing amphibians and reptiles covering chemical and physical methods. The physical methods discussed include concussion, shooting, electrocution, hypothermia, hyperthermia, decapitation and exsanguination (severing of the blood vessels).

In cases where euthanasia is to be practised by physical means, an appendix of drawings and photographs (see below) provides guidelines for points of aim.



The book is available from: UFAW/WSPA, 8 Hamilton Close, South Mimms, Potters Bar, Herts EN6 3QD at £6.25p (including postage & packing).

Photo: A. Crabtree
Copyright UFAW/WSPA

The International Herpetological Society Open/Sales Day 1989





On the 17th September the International Herpetological Society held their first Open/Sales Day at Great Barr, Near Birmingham. The event was a great success with approximately 400 enthusiasts attending.

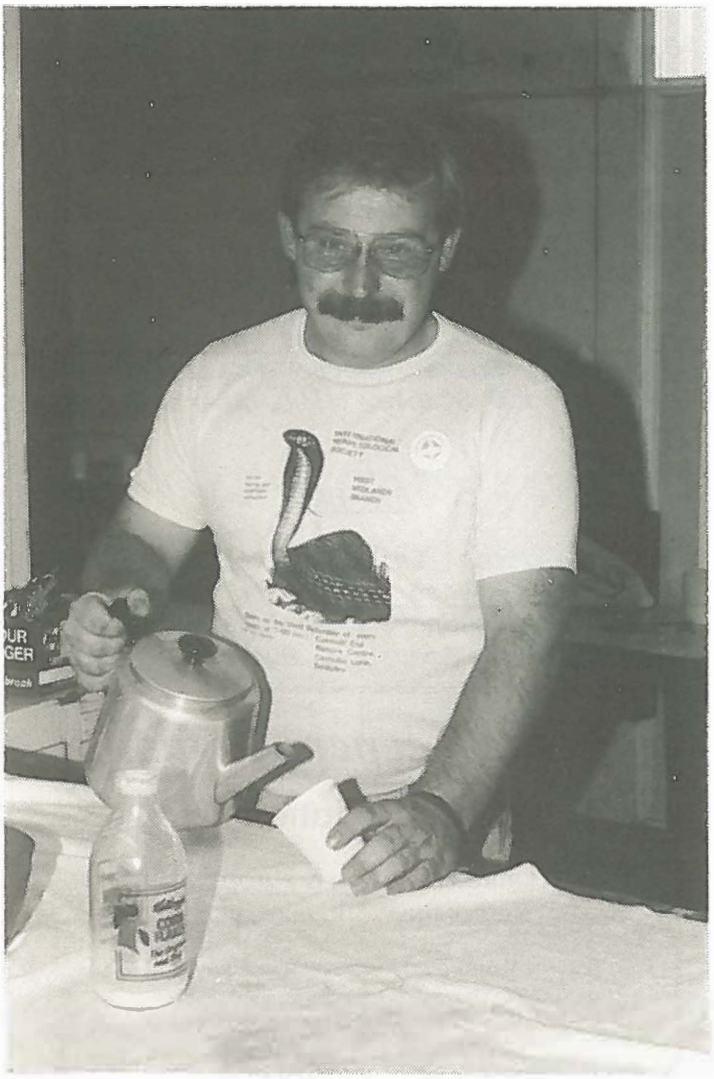
Left: IHS Chairman Dr. John Tranter (right) and Secretary Tony Mobbs (who organised the event virtually single-handed) have good reason to be pleased.

Below: Snake breeders Ann Clegg and Kim Loader setting up their stall after travelling up from London.





Above: The IHS stall proved very popular with many new members joining.



Below left: "Anyone for tea, peeps?" Recently returned from a trip to Greece, IHS Vice-Chairman and Journal Editor Kevin J Hingley coped admirably with the visitors' demands for refreshments.

Photographs by Lesley Close

FROZEN FOODS

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Gerbils	35p
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FOR SALE

Quantity of frozen rabbits and chickens. Rabbits (4-5lbs) £2.50 each. Chickens (4lbs) £1.50 each. Phone (0334) 78176 (Fife). Buyer collects.

Yearling Carolina Corn Snake. Male, 3'. £40. Telephone (0705) 815271 (Portsmouth) or (0394) 276155 (Felixstowe).

A pair of Red-tail Boas. 4 to 5' in length. Feeding well on dead rats. With vivarium, £250. Telephone (097) 888 364 (North Wales).

Three adult Whites Tree Frogs (One male, two females) for sale. £50 or exchange for Glass Lizards. Telephone Chris Nutt on Chalfont St. Giles 3258 after 6pm.

Female Indian Python. Two years old. Feeding on frozen rats. Approximately 7'6" long. £130 with vivarium. Telephone Paul on (0489) 783021 (Southampton).

One pair of unrelated adult albino California Kingsnakes. Three years old. £250. Telephone Colin Clark on (0763) 248344.

Two Checkered Whiptails (Cnemidophorus tesselatus). Parthogentic, £64 for both. Trinidad Chevron (Psalmopoeus cambridgei) large male, offers. Phone Simon on (0263) 734117 between 6pm and 10pm (Norfolk).

200 Red worms £2.40 plus 60p 1st class postage. David Silvester, 188 Wrens Hill Road, Wrens Nest Estate, Dudley, West Midlands DY1 3SF.

Attractive Grey Rat Snake hatchlings (Elaphe obsoleta spiloides), £20 each. Telephone Roger Grenville on (08444) 6867.

Please mention Snake Keeper when replying to adverts. Thank you.

WANTED

Dice or Viperine Snakes and contact with anyone with experience of keeping or breeding Natrix species. John McCann, 44 Southmead Road, Allerton, Liverpool L19 5NB. Telephone (051) 427 0952.

Large snakes, anything considered. Also female Boa constrictor constrictor suitable for breeding purposes. Must be 3+ years old, light and have attractive saddle markings. Phone Simon on (0263) 734117 between 6pm and 10pm (Norfolk).

Adult male Haitian Boa (Epicrates striatus striatus) and juvenile or long-term captive Royal Pythons (especially large or well-marked specimens). Telephone (0474) 832929 (Kent).

Female Russian Rat Snake (Elaphe schrenckii schrenckii). Prefer adult. Telephone Andy Mawe (0482) 668002 (Humberside).

Female Hog Island Boa. Contact John on (0203) 365631 (Coventry).

BOOKS

100's of books on fish, reptiles and amphibians, cats, dogs, birds, bird-watching and poultry. Free catalogue. Bures and Son, PO Box 377, Coulsdon, Surrey CR3 1YU. Telephone (0737) 556139.

POSTCARDS

Colour postcards featuring photographs by Chris Mattison. No. 1 Western Diamondback Rattlesnake. No. 2 Emerald Tree Boa. Pack of 10 (five of each card). UK & Europe £2 including p&p. Overseas (airmail) £3 or US$4.80. Snake Keeper Magazine (Postcards), 159 Stanley Hill, Amersham, Bucks HP7 9EY.

PEN-PALS

Correspondence wanted with other snake keepers. Please write to Simon Rouse (Norfolk) c/o Snake Keeper Magazine, 159 Stanley Hill, Amersham, Bucks HP7 9EY.

Snake Keeper Magazine

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