SNAKE KEEPER

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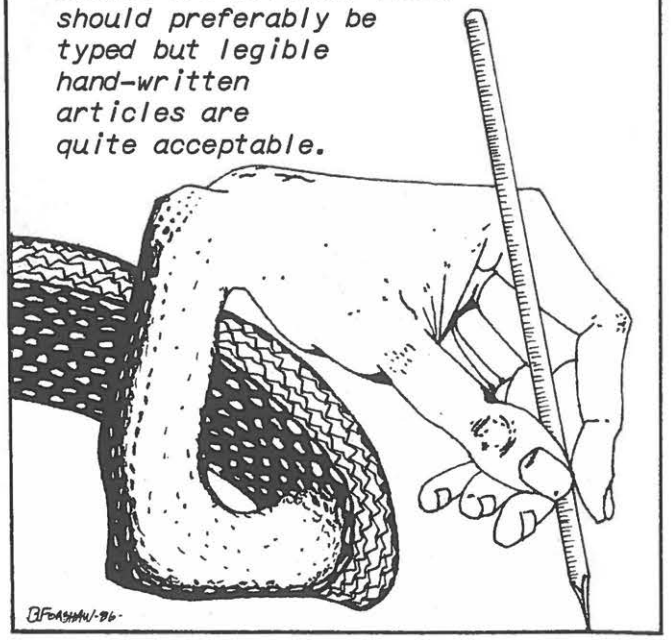
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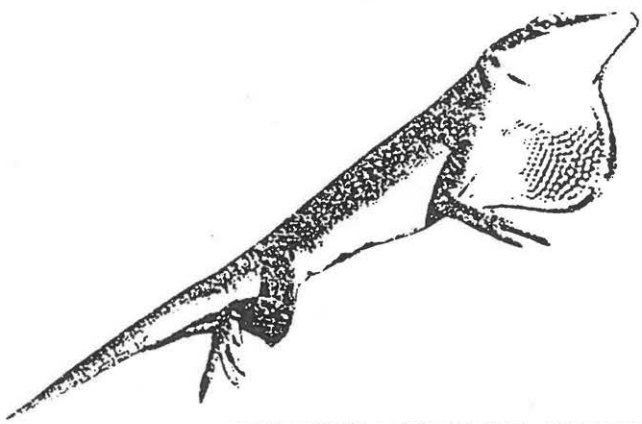
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Corn Snake, Elaphe guttata
Collection of C & M Martin.
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GENESIS BEFORE EDEN: OPHIDIAN EVOLUTION

by Dr. G.M. Evans

As the cartoon in issue one suggested, a body design involving no locomotor appendages and devoid of many of the other typical vertebrate characteristics, does not indicate the likelihood of a particularly successful or diverse group, on first analysis. However, the humour of the piece lies in the fact that we all know, as snake enthusiasts, the falsehood of this basic premise. Humour aside though, the whole question of the origin of this particular group of squamata remains largely speculative. The palaeontological evidence is sketchy, with the first positive find of boid type remains in the Upper Cretaceous deposits of Argentina. Lower Cretaceous rocks have yielded bones of serpent-like forms, but the poor preservation of the skulls makes definitive distinction between true snakes and snake-lizards impossible, although there is some evidence to suggest an even earlier origin, back in the Jurassic. The fossil record being so patchy, we must inevitably study living forms to gain any information. What is almost certain is that snakes arose from some form of lizard stock.

Different snake species resemble each other remarkably closely, and have shown adaptive radiation to aquatic and arboreal modes of life, with little signficant modification of their basic body form. This evolutionary adaptability contrasts sharply with other legless reptiles, which are generally limited in both habits and habitats. Moreover, genetically, the snakes are a fairly close bunch, with much greater chromosomal similarity than is to be found amongst the lizards.

Although there are a number of legless lizards, representing various families, none has any close ancestral affinity to the snakes despite the nearness of their external appearance. (Some, notably the Australian flap-footed lizards, Pygopus lepidopus and Lialis burtoni, mimic the serpent body plan extremely closely indeed.) Opinions differ widely as to the most likely candidate for ophidian ancestral lineage. There are three popular contenders: platynotid lizards, ancient burrowing forms, and postulated aquatic reptiles similar to those of the dolichosaur group.

As a group, the platynotid lizards (containing the Helodermatidae, the true monitors, Varanidae, and the earless monitor, Lanthanotus borneensis) show typical body elongation, with the additional possession of a forked and retractile tongue. Lanthanotus also has a particularly well developed intra-mandibular hinge and tiny eyes protected by mobile lids, the lower part of which form a transparent spectacle. However, as opponents of this theory point out, no known member of this group, extinct or extant, shows marked limb reduction, despite their otherwise snake-like characteristics.

The argument in favour of the burrowing ancestry hypothesis is supported by the evidence of convergence of other fossorial animals. The humble earthworm for example, an annelid burrower, shows adaptions to its mode of life which mark it out distinct from its marine relatives. Gone are the paired parapods (paddle-like appendages) of the free swimming polychaete worms, and gone also, significantly, are the image-forming eyes of the likes of Nereis. Burrowing lizards like the slow worm, Anguis fragilis, and members of the skink family likewise exhibit limb reduction or, in extreme cases, no limbs at all.

Reduced importance of the eye characterises many sub-terranian creatures, and investigation of the serpent eye reveals certain uniquenesses of structure, consistent with ancestral degeneration. The ophidian eye is focused by the movement of the lens itself, a method unusual in reptiles. The retina contains cones of unusual design, and it seems likely that these visual cells themselves were derived from rods. Moreover, lizard eyes are protected from excessive light by yellow retinal droplets; the lens is clear. Some of the diurnal snakes protect their eyes under the same circumstances by the provision of a yellow lens. The theory goes that the distant ancestors of snakes burrowed, reducing the need for the efficient lizard eye, which degenerated over the years. When they re-emerged, they regained the need for effective vision, building up a functional organ from their inherited, and

largely vestigial, structures. Inevitably, this resulted in the unique arrangement found today.

In addition, this re-emergent burrower story is supported by certain anotomical features: the skull arcade is absent, as is the eardrum. These modifications are also shown by the majority of fossorial lizards, though since they are also present in non-fossorial animals, with normal eyes and legs, these alone cannot be considered conclusive.

The account of snake origin involving aquatic ancestors has been advanced as an alternative explanation of the gross morphology of the group. The over-all modifications of the basic reptilian quadruped design can be regarded, at least in part, as not inconsistent with adaptive changes for life in water. These early members of the snake evolutionary line are supposed as similar to, and possibly relatives of, the dolichosaurs of the Lower Cretaceous, though this, clearly, is hypothetical.

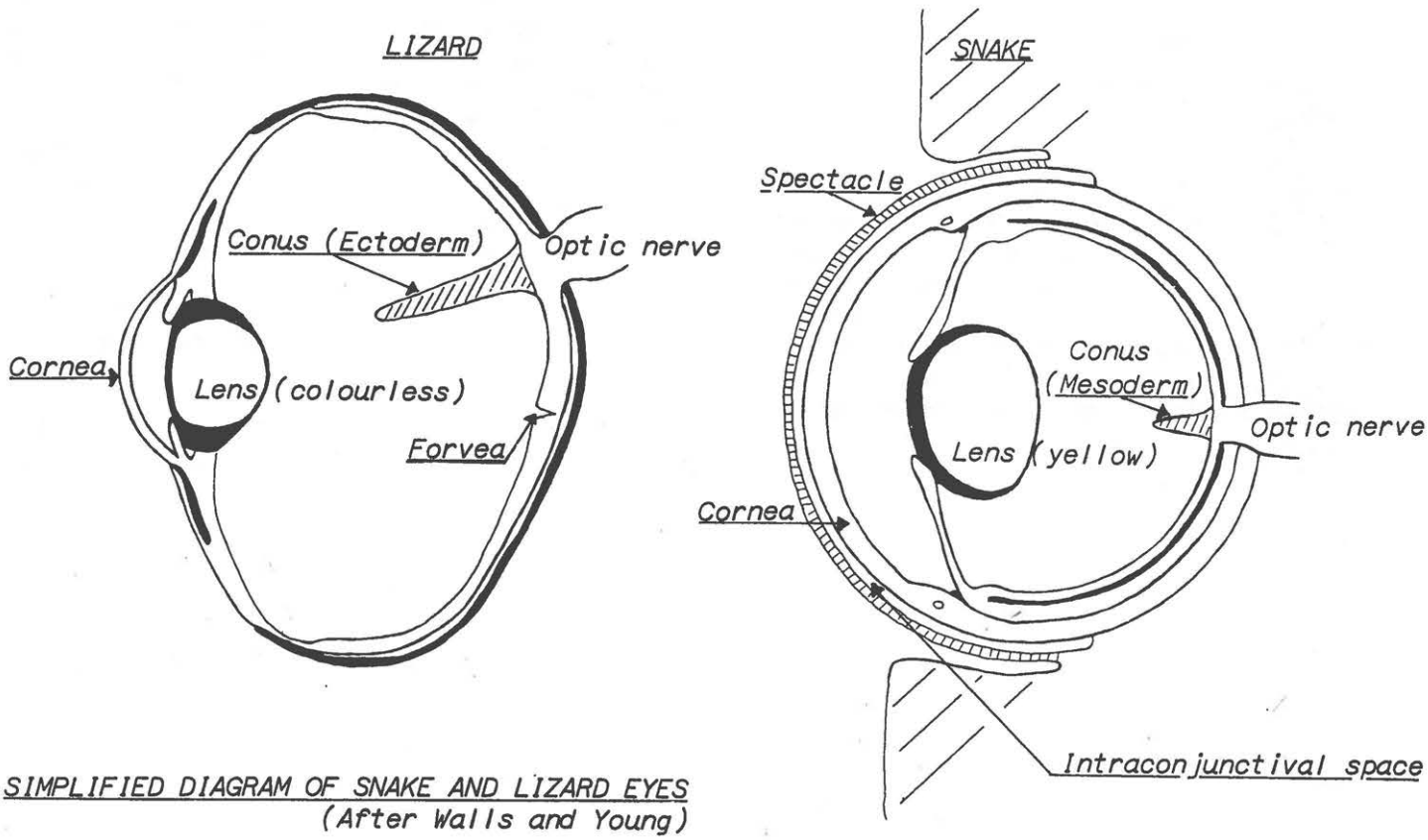
Lanthanotus, a little known and apparently unremarkable lizard, provides, in many ways, a confluence of all these prevailing theories. For one thing, it is a platynotid, and a burrower, although admittedly, not a highly specialised one.

Secondly, it is particularly fond of water, at least in captivity, swimming with serpentine undulations of its body (which is interesting since it is a close relation of the extinct dolichosaur group). Thirdly, there are the aforementioned anatomical similarities between this animal and the snakes.

Undoubtedly each of the suggested hypotheses has its attractive points, and each its vehement proponents. Inevitably, when dealing with a story more than 100,000,000 years old, much of what is relevant has, long since, been lost in the mists of time.

Retinal studies, thus far, belie any suggestion of special affinity, and it has been suggested (by Underwood) that the snakes owe their origin to a group of burrowing lizards which split off from other lizard families in very ancient times. The eye morphology of Lanthanotus, though, remains as yet largely undescribed.

Until this is rectified, or some lucky find is made, I suspect this whole question will remain one around which evolutionary biologists will continue to theorise. For the time being, at least, there is no answer.



SIMPLIFIED DIAGRAM OF SNAKE AND LIZARD EYES
(After Walls and Young)

SNAKES OF THE GENUS ELAPHE
THEIR CARE AND BREEDING IN CAPTIVITY, PART 3

by Kevin J. Hingley

Introduction

So far this series of articles has covered the North American Rat Snakes. Part one dealt with the various subspecies of Elaphe obsoleta and Part Two concerned the remaining North American forms; E.guttata, E.vulpina, E.subocularis, and E.triaspis.

In Part Three I shall discuss the European and Eurasian forms of Elaphe. It is unfortunate that the European Rat Snakes rarely appear on dealers lists in the U.K. Most often they are seen offered for sale in Society newsletters, either as adults, or as captive bred youngsters; these young may have been bred from adult stock collected by the vendor whilst on holiday abroad, and brought back to the U.K. under licence from the Dept. of the Environment and the country of origin.

In captivity they require the same basic husbandry as their closely related N. American forms, although captive breeding does not appear to be an easy task, and when captive breeding has been achieved the young are said to be difficult to rear. This article will deal with the following forms; i) The Aesculapian Snake, E.longissima; ii) The Leopard Snake, E.situla; iii) The Four-lined Snake, E.quatuorlineata; iv) The Ladder Snake, E.scalaris; v) Dione's Snake, E.dione and vi) Hohenacker's Rat Snake, E. hohenackeri.

E.longissima

The Aesculapian Snake is probably the best known form of Rat Snake on the European continent and it has the widest geographical distribution of the European forms. This is said to have been brought about by the advance of the Roman Empire throughout Europe, the Romans once having worshipped the snake in honour of the god of medicine; Aesculapius. Even today, many hospital buildings have a statue of Aesculapius holding a staff with one or two snakes entwined around it.

Adults of this species are highly variable in colour, and may be olive, olive-brown, and grey-brown; black individuals have even been reported. Some specimens may also display four faint stripes. Typical specimens are olive coloured above, often with yellow and/or white flecks. The upper labials are yellow, as are the chin, throat and abdomen. There is often a dark streak on the head tapering off behind the eye. Average adult size appears to be around 140 cm, although the species is known to reach 200 cm.

The youngsters are similarly coloured, although moderately to heavily blotched, and the yellow colouration, particularly in the region behind the head, is more intense. The layman or novice can be forgiven if they confuse the young with those of the Grass Snake (Natrix natrix); however, Grass Snakes do not have yellow abdomens, nor do they display the keeled edge to the ventral scales as the Aesculapian Snake does. The dorsal scales of the Aesculapian Snake are smooth; the Grass Snake has keeled dorsals.

Husbandry

In the natural state E.longissima displays a preference for dry regions - woodland, dry slopes, walls and ruins. It likes to climb so a branch should be part of the vivarium furnishings. Cage size should be 120 to 150 cm x 90 cm x 60 cm, and I would recommend newspaper as a substrate. A suitably sized bowl of drinking water will be necessary, as might a hide-box of some description. Temperature should be maintained at 75 to 80 degrees F (22 to 25 C) during the summer months, followed by a drop in temperature during the winter. Some individuals may require a period of complete hibernation if breeding is to be achieved, particularly specimens from the north of its range. Diet consists of rodents and birds when adult, although the young are known to eat lizards and baby mice.

Breeding

Mating activity usually occurs in April and May, the gestation period lasting 6 to 8 weeks before the eggs are laid. Clutch size is variable, 6 to 20 according to Mattison (1982), 6 to 8 being reported by Werb (1979,1982). Werb also states that at a temperature of 25 degrees C incubation lasts for 47 to 49 days.

Hatchling size varies between 20 and 30 cm, and several authors mention lizards as the diet of juvenile E.longissima,

although most captive bred young can eventually be persuaded to accept small mice. Should any of the young refuse to feed voluntarily, the method of assist feeding detailed in part 2, concerning breeding of the Corn Snake (E.guttata) can be applied to this, and any other, species of Elaphe.

E.situla

The Leopard Snake has to be the most attractive form of European Rat Snake, bearing a superficial resemblance to the Corn Snake. It is not a large species, and most specimens measure less than 100 cm. A recent report by Achilles Dimitropoulos of the Goulandris Natural History Museum in Athens lists the Leopard Snake as the second most threatened species of snake in Greece due either to illegal killing or over-collecting, even though it is one of the many species there that is supposed to be protected by law.

Its availability in the U.K. is rare and the few specimens that may be available each year usually command a fairly high price. Like the Corn Snake, the juvenile pattern is retained throughout its life, and typical specimens have a ground colour of cream, buff or yellow, with a dorsal pattern of black-edged red or brown spots, which may be partially divided in the centre forming a 'dumbell' configuration. There are a series of smaller, similarly coloured spots along both flanks. The head is often marked with black lines, one running across the top of the head between the eyes, and continuing behind each eye to the rear of the upper jaw. These 'typical' specimens are often referred to as E.situla var. leopardinus (Terentev & Chernov, 1949, in Mattison, 1982).

The other variety of Leopard Snake is referred to as either (i) -situla (Terentev & Chernov 1949), or (ii) -var. quadrilineatus (Boulenger, 1913 (also in Mattison, 1982)), the latter name being most applicable as the blotched markings have been replaced by longitudinal stripes. As there are no geographical or scalation differences between the two forms, they are referred to as 'varieties' as opposed to subspecies, and Mattison (1982) reports that both forms can be present in a single clutch of eggs.

The Leopard Snake is essentially terrestrial in its habits, showing a preference for dry regions, usually less than 500 metres above sea level. The adults feed on small rodents, the young are said to feed on lizards. It appears to have a smaller natural range than E.longissima, E.scalaris and E.quatuorlineata. Its European range extends from Istria in the north of Yugoslavia, along the Dalmatian coast, through Albania and Greece to the Aegean, and includes S.Italy, E.Sicily and Malta. Outside Europe its range extends into Asia Minor and the Caucasus.

Husbandry

There is very little evidence that the Leopard Snake breeds well in captivity, although it can be maintained quite successfully. Being a small species of snake it is probably better suited to a small vivarium, i.e. 75 x 45 x 45 cm, and a 'semi-natural' set-up may be beneficial. By this I mean the use of newspaper as a substrate, with an arrangement of small rocks so that there are plenty of suitable hiding places. A water bowl is necessary, and a branch is optional. The temperature should be 25 to 28 degrees C during the summer, with a slight drop in winter (22 to 25 degrees C).

Breeding

As previously stated, there is very little evidence that this species breeds well in captivity. It can only be assumed therefore that its breeding cycle is similar to other European species of Elaphe. It is known that only a small clutch of eggs is laid (2 to 7) and that incubation takes 60 to 70 days. The hatchlings measure 20 to 25 cm.

E.quatuorlineata

The Four-lined Snake is the largest of the European Rat Snakes, reaching lengths of 250 cm. There are three recognised subspecies; E.q.quatuorlineata, E.q.sauromates and E.q.muenteri. A fourth subspecies, E.q.praematura, is now considered to be synonymous with E.q.muenteri.

The nominate subspecies, E.q.quatuorlineata, is said to be the largest of the three and of the remaining two subspecies E.q.sauromates retains the juvenile pattern of dark blotches in the adults. This subspecies and the Cyclades Four-lined Snake (E.q.muenteri) are regarded as generally being smaller than the nominate form, although all three would appear to have similar habits and habitat preferences. A separate species of days gone by, the Amorgos Rat Snake (E.rechingeri) is now considered to be a colour variation of E.q.muenteri, which also hails from Amorgos.

All three subspecies are highly variable in colour, and Arnold and Burton (1978) are quite descriptive, differentiating between the forms that occur in the Western regions (regarded as Italy, Sicily, W.Balkans, S.W.Bulgaria, Greece and the Cyclades) and those of the Eastern regions (N.E.Greece, European Turkey, Bulgaria and Romania). However, the range of the Four-lined Snake extends further than this, being found in the Ukraine and S.W.Asia.

Specimens from the west are said to be yellowish, pale brown or grey, with four dark lines running the length of the body and a dark streak behind the eye. The venter is yellowish, with or without some darker markings, although the underside of the tail is usually darkly marked (E.q. quatuorlineata).

The description of the eastern specimens also applies to E.q.sauromates, in that the adults retain the blotches normally associated with juveniles, although with age it is possible for the ground colour to darken sufficiently so that some adults appear to be uniformly coloured above. The ground colour of the juveniles is normally lighter than the adults, and the blotches, (both dorsal and dorso-lateral) are well defined in very young specimens, and gradually fade with age.

The Cyclades specimens, E.q.muenteri, are noted for their smaller size, and are said to develop the striped pattern at an earlier age than the nominate subspecies. Werb (1983) states that his observations would appear to confirm this. Some juveniles may also be of a paler general colouration.

Husbandry
By all accounts, the Four-lined Snake adapts to captivity far more readily than other European species so there is more information available on its captive husbandry and reproduction. Large specimens will of course require a large vivarium (120 x 90 x 60 cm), newspaper substrate and possibly a branch. The water bowl should be fairly large as many individuals are said to have a preference for damp or humid areas in the wild state, and one authority states that in the wild it is only seen on overcast, muggy days.

Diet comprises small mammals and birds (and their eggs). Young specimens also include a high proportion of lizards in their diet, although in captivity they will accept small mice. Temperature should be maintained at 25 to 28 degrees C in summer, with a drop of about 5 degrees C during the winter.

Breeding
In accordance with other European species, natural mating activity occurs around April or May, although Werb (1983) gives an account of mating in early June. The gestation period lasts for approximately 8 weeks, with eggs being laid in June, July or August. The clutch size is variable, 6 to 10 being the usual number, although smaller and larger clutches have been reported.

Incubation of the eggs takes from 54 to 70 days, depending upon the temperature throughout the incubation period. The hatchlings are normally quite large (30 to 40 cm) and there is evidence that most hatchlings will feed voluntarily after they have completed the neonate slough.

E.scalaris
The Ladder Snake, so called because of the pattern displayed in young specimens, occurs throughout Portugal, most of Spain, the Mediterranean coast of France and also on the island of Minorca.

There is some variation in the general colouration, and adult specimens may be yellow-orange, yellowish-grey or mid-brown. The 'ladder' pattern of juveniles (comprising a series of 'H'-shaped markings which may or may not be connected) fades to become two dark lines running along the entire dorsum. The abdomen is whitish or yellowish in colour, with moderate to heavy black markings. The average adult size is 120 cm, with 160 cm given as the maximum size.

Husbandry
Unfortunately, this is another European species that is rarely seen in captivity in the U.K., although I dare say it can be maintained quite easily. An important factor to consider may be its temperature requirements. Being a more north westerly species it will probably fare a little bit better at slightly lower temperatures than the southern European forms, and perhaps 22 to 25 degrees C would suit this particular species. In the wild it is found in a variety of habitats - dry scrub, woodland, cultivated land, etc.

It would also appear that the Ladder Snake has a more varied diet than the previous three species, with the adults including

lizards in their diet, as well as rodents, birds and eggs; the young are said to feed predominantly on lizards and insects (grasshoppers). It is considered to be an aggressive snake and will hold its ground against would-be attackers and predators. A medium to large cage is required (up to 150 x 60 x 60 cm) with newspaper substrate, a hide box, water bowl and the optional branch.

Breeding

I have been unable to find any information on captive breeding of the Ladder Snake, and only one report of clutch size, presumably concerning wild specimens, (8 to 10 eggs). One has to assume that the breeding cycle of the Ladder Snake is similar to the other European Rat Snakes, in particular the Aesculapian Snake, E.longissima, whose range overlaps with the Ladder Snake in N.E.Spain and the Mediterranean coast of France. Werb (1985) states that four hatchlings in his possession fed voluntarily, on pink mice presumably.

Summary

Before moving on to the two remaining forms (E.dione and E.hohenackeri - both considered to be Eurasian species), perhaps a summary of the European forms is necessary. Due to their seeming lack of availability in the U.K., there appears to be little interest in both the natural history and captive maintenance/breeding in this country.

'Off the record' discussions I have had with some commercial importers of reptiles have led me to the following conclusions as to why these species are not offered for sale on the scale of other species, such as the North American Rat, King, Garter and Water Snakes, and of course the ever popular Pythons and Boas.

In business terms (i.e. profit), it seems that the European Rat Snakes are not a viable proposition. There are several explanations for this. Insufficient numbers collected for export means that freight charges greatly reduce the profit margin. Certain countries of origin offer either complete protection to these species, or will only grant licences for the export of small quantities of these species at any one time. Once again, this becomes a less than viable proposition for the commercial importer. Alternatively, it may be due to the reluctance of the D.O.E. to issue import permits to commercial importers.

I should point out at this stage that whilst I do not condone the import/export of any animals 'en masse', I feel that some relaxation of the present rules and regulations would allow serious minded herpetologists to obtain these species a little more readily, and at a reasonable price, without the market becoming flooded with wild caught specimens.

It is evident that these species can, and have been, both successfully maintained and bred in captivity, and Werb has contributed greatly with his findings, having had experience in the field as well as with captive specimens.

Eurasian forms

The Eurasian Rat Snakes, also referred to as Asia Minor or Caucasian Rat Snakes, are very unlikely to be encountered in private collections in the U.K., and once again there is very little information readily available for them.

E.dione and E.hohenackeri are both small species, most adults reaching a size of 80 cm or so. Of the two, E.dione has the greatest geographical distribution, and occurs from the south of the Ukraine to China. It is found in a variety of habitats up to 3500 metres above sea level. In its diet it includes small mammals and birds, other reptiles and amphibians.

A typical specimen is buff coloured, with four darker coloured broad lines running along its length. There are also small, still darker coloured blotches on these broad lines. The head also bears markings, similar to those seen in other Elaphe species. Breeding takes place in late spring/early summer, with 5 to 16 eggs being laid in July/August.

E.hohenackeri has a more confined range; Asia Minor, N.W.Iran and Transcaucasia. Occasionally specimens are found in East Caucasus, and a separate subspecies, E.h.taurica, has been described, occurring in the montane regions of southern Lebanon.

Typical specimens (E.h.hohenackeri) are pale grey in colour, with a series of small blotches along the dorsum, usually brown in colour. These blotches may be in pairs (separated) or united to form a larger single blotch. A series of even smaller blotches appear on the flanks. Breeding appears to be in line with other S.E.European forms, with up to 7 eggs

being laid in June/July.

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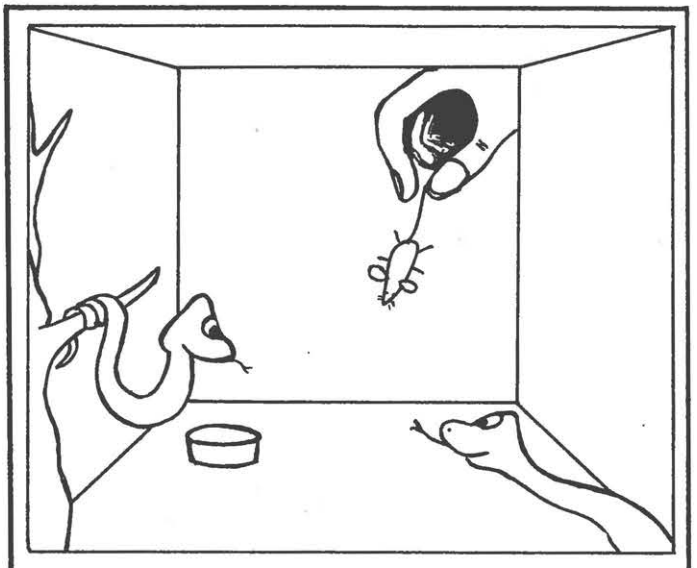
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COMPETITION RESULTS (ISSUE ONE)

Main competition:
1,a. Sagittarius serpentarius is the Secretary bird.
2,b. Python curtis should read Python curtus.
3,b. Bothrops atrox is known as the barba amarilla.
Winner and only correct entry,
S.J.Sudlow, Wolverhampton, W.Midlands.

Junior Snake Keeper Competition:
1 - C, 2 - D, 3 - F, 4 - A, 5 - B, 6 - E.
Winner, B.I.P.Fox, Driffield, Yorks.



Every now and then I get this overwhelming desire for Black Forest Gateau

CHELTENHAM SNAKE KEEPERS

CHRIS AND MARCIA MARTIN

Cheltenham, seven miles north-east of Gloucester; the birthplace of Gustav Holst: residential town favoured by retired civil servants and army officers. Not far from its famed racecourse lies the home of Chris and Marcia Martin.



Chris and Marcia are well known in snake keeping circles and kindly invited us to visit their home. They started keeping snakes about eleven years ago after buying a baby Boa in a local pet-shop. They have both been interested in reptiles since their early childhood.

From the initial Boa, their collection rapidly increased to include a Reticulated Python, a Yellow Rat Snake, a Cook's Tree Boa and many more. They reached a stage where they felt that they were not achieving anything and so decided to concentrate on particular species. As the collection at that time included colonies of Indian Pythons, Boa Constrictors and Corn Snakes, they decided to specialise in these. A colony of Great Plains Rat Snakes was added later.

About five years ago one of their Corn Snakes laid nine eggs and Chris and Marcia were suddenly catapulted into the world of breeding. The snake had been sexed six weeks prior to this event by an ex-curator of a foreign snake park and identified as male.

On entering the Martin's home you immediately become aware of the intensity of their enthusiasm. No cages tucked away in back bedrooms here; the snakes live as part of the household and cages abound in the living room.

We were immediately whisked upstairs to view the massive home of their equally massive female Indian Python, Python molorus bivitattus. Chris described the cage and its contents. "Eight feet long, four feet wide by three feet tall, the tank can be split in half giving two compartments of four feet by four feet by three feet. The idea behind this arrangement is that if the female has a clutch of eggs the tanks can be partitioned off and this keeps the males separate from the female. If you let the male go with the female when she lays her eggs, quite often the male will intertwine with her and cause problems with the actual incubation of the eggs. So it's best to keep them separated. The female is eleven years old, fifteen feet long and she has been breeding now for the last five years and lays, on average, forty to forty-five eggs per clutch. These take about sixty to sixty-five days to hatch. The female lives with two males, each approximately ten feet long. The females weight is about sixty to sixty-five pounds and the males weigh about seventeen pounds each."

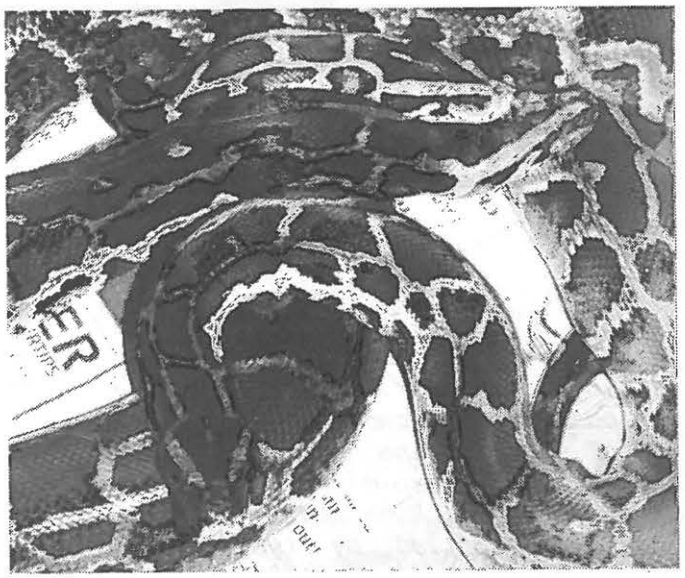


Male and large female Indian Pythons

Chris and Marcia have very strong views on setting up a vivarium correctly. They have obviously spent, and continue to spend, a lot of money on the maintenance of their snakes. Chris explained how the snakes were kept warm. "The heat in this large cage is supplied by two, 250 watt, infra-red heaters controlled by two electronic thermostats. Our Burmese

pythons are kept at 80 to 85 degrees F. Downstairs, the Boa Constrictors are kept at 90 degrees F and the Corn Snakes are heated to around 80 to 82 degrees F."

Photoperiod plays a very important part in the Martin's snake breeding philosophy and Chris explained the reasoning behind their views. "The time clock controlling the photoperiod is on the side of the tank and, of course, you have got to have one if you want to breed successfully. If the snake comes from a climatic condition where there is a photoperiod, she and the males have got to know when spring has arrived to breed. There is not much point in laying a clutch of eggs in autumn if winter is just around the corner, because the eggs haven't got a chance of surviving and the babies haven't because of a lack of prey, so that's why you need to control the photoperiod accurately. When the female was only four or five years old she kept having phantom pregnancies. She would get fat, curl up, and keep twitching but she would never lay. Yet within four months of controlling the photoperiod she had her first clutch of eggs. Naturally with other species, like Boa Constrictors, you don't need to control the photoperiod because coming from, more or less, the equator there is no photoperiod and they will, or can, breed all the year round. They have no set times because it's always summer and therefore, they don't have to worry about the seasons. Don't forget that Indian Pythons, in some regions, will hibernate. I don't hibernate any of our stock because it can be done solely on photoperiod. It gets a bit laborious, when you have a large number of tanks, going round, week after week, changing the timers by a quarter of an hour per week."



Indian Pythons, female and two males

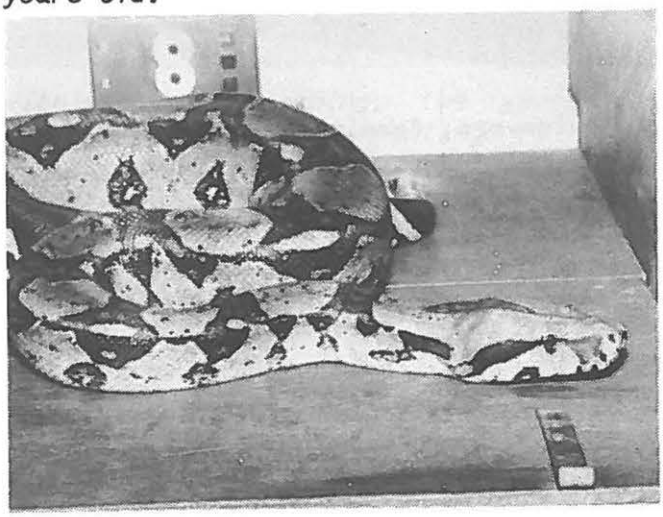
The Indian Pythons are kept on a substrate of newspaper as are all the snakes in the collection.

Hide boxes and clean glass fronts to the vivaria are frowned upon by the Martins, and we discussed these points whilst viewing the rest of the collection downstairs. Our tour continued with another Indian Python, the daughter of the female upstairs. Chris described the tank and occupant. "She's three and a half years old and just over ten feet in length. Hopefully she will be breeding in about 2 years time. Some people breed their snakes too early. Quite often you will hear reports of Corn Snake's eggs being retained and 95% of the time the females involved are two years old or younger. It seems that snakes over two and a half years old rarely retain their eggs. In my opinion it is important to remember that wild rats or mice are different from the captive bred variety. They are in much better condition and probably contain about the same food value as five wild specimens. Snakes that are fed on captive rats and mice grow too quickly compared to their sexual maturity. In the wild the snake would grow at a slower rate and therefore mature more slowly. In the unnatural conditions that we keep them in they get out of balance. I don't plan to breed from any of our Pythons or Boas until they reach the age of five, and well over two years for the Corn Snakes."

All the tanks, which, incidentally, open from the top rather than the front, were designed by Chris and built by his father. Chris feels that it is very dangerous to have sliding glass fronts as the occupants of the cage can easily be damaged, often fatally, by a moment's lack of concentration when closing the door. Chris said. "No matter how quick and alert you are, the small snakes can move so fast that they can be half way out when you are closing the door and you cannot stop, your reactions are not quick enough. There is another reason for the top opening lids. It may seem silly but snakes don't seem to worry so much about what happens over their head. If you create a nice safe environment where they know nothing can get to them they feel much safer and consequently less stressed. This is why the glass fronts are not clean. I very rarely clean them. If a snake strikes at a cage front in a zoo, the keeper will usually powder the glass with french chalk. The public can still see the snake but the reptile can see a barrier and is

happy. You must remember that all snakes are wild animals and have the instincts of wild animals. Moving on to hide boxes, the temperature is usually lower in the box and if the snake is not at the right temperature then it gets digestion problems, this can lead to stress and bacterial infection and possibly death may follow. I try to make the tank a big hide box in itself so the snake feels secure. A snake's number one priority is to be safe. It does not matter what the temperature is in a tank, because if the snake has a choice between being secure and cold or warm and vulnerable, it will always choose to be cold and safe because tomorrow it might be able to find a hide place that's warmer."

Moving down the room we came to another tank and Chris described the occupants. "This tank is nine feet long by two feet by two feet. It holds the Boa Constrictors. It can be split into two sections. One section measuring six feet by two by two and the other section is three feet by two by two. In the large section we have three female Boas. The darkest snake is Abigail. She breeds very well and her next clutch is due about mid-April. Abigail usually breeds every ten to fourteen months. We think that she is about eight years old although it is difficult to be exact as we acquired her as an adult. The two smaller females are her daughters from previous breedings. They are one and a half and three and half years old.

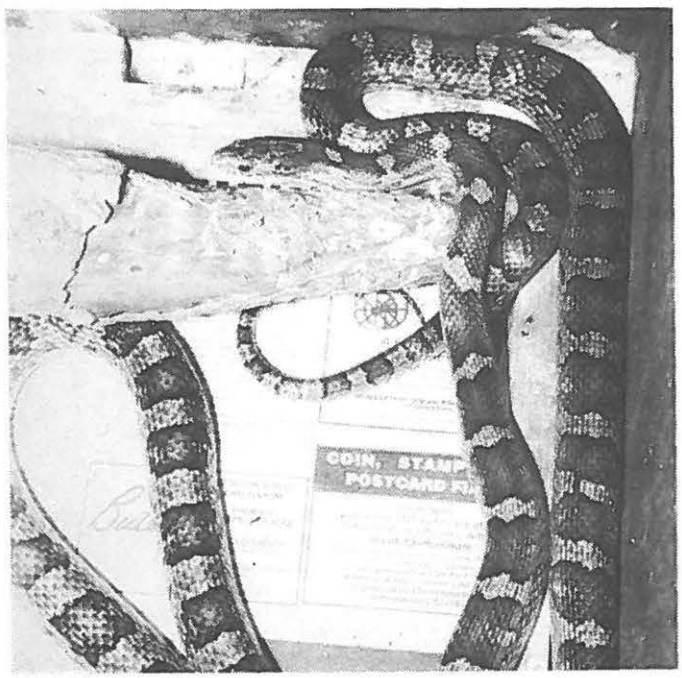


Guinevere, female Boa Constrictor

The other section contains the three male Boas. One of the males is about six and a half feet long; he is the first one we bought. Then there is a seven year old. As far as we know these two are the only imported snakes that we have in our collection. Finally, the smaller male is one that we bred ourselves. He is probably the father of the clutch Abigail is expecting now. A lot of people frown on in-breeding like this but, providing it is only done for one or possibly two generations, it is not too bad. The Boas photoperiod is set for 14 hours day and 10 night and this remains constant throughout the year."

The next cage we came to contained the Great Plains Rat Snakes and Chris explained about the problems they have with breeding these snakes. "This tank is four feet by two feet by two feet. These snakes bred last year for the first time but we are now unable to obtain an unrelated male and it looks as though we will be unable to breed these any longer. We are thinking about doing a permissable cross i.e. Corn/Great Plains. We could introduce some Corn Snake blood into them and get around the problem. I think that if we really wanted to try, we could get some imported males but there is always a very great risk of bringing disease into our collection and we don't want to take the chance. Although there are British bred males in the country they all come from the same source - Don Reid at the Cotswold Wildlife Park."

Finally, we came to the Corn Snake's home and Chris explained the set-up. "This tank measures four feet by two feet by two feet. The temperature is about 82 degrees, the same as the Great Plains Rat Snakes. In this tank we have one very elderly female which breeds like a rabbit. She often double-clutches in a year.



Corn Snake, Elaphe guttata

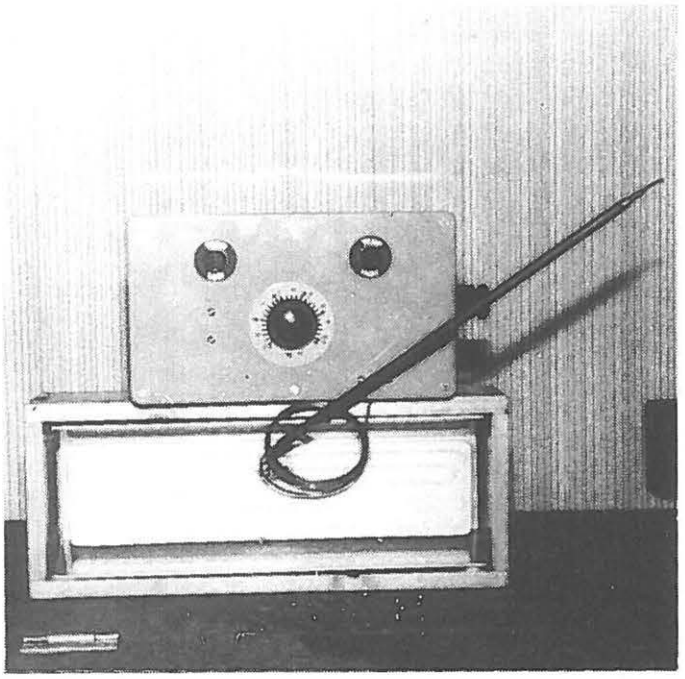
She shares this tank with two sons and a grandaughter. This colony will be split up this year. As far as breeding is concerned all I do is control the photoperiod, no hibernation. I find that they need about sixteen hours of daylight to become sexually active. I've also found with these snakes that the female will choose the male she wants."

After our guided tour, we sat down with one of the many cups of tea kindly made by Marcia during the afternoon, and Chris answered various questions.

For cleaning the inside of the cages a 40 to 1 solution of Savlon is sprayed around the cage which is then wiped.

When their female Indian Python lays her eggs they are not removed but left with the mother. There are two reasons for this. Firstly, Chris feels that the Python would attack him if he tried to remove the eggs and, secondly, to avoid any stress to the snake. About three days before the eggs are due to hatch, the snake leaves them and they are put into a hatching tank. Whilst the snake is incubating the eggs, the cage is sprayed three times per day with tepid water.

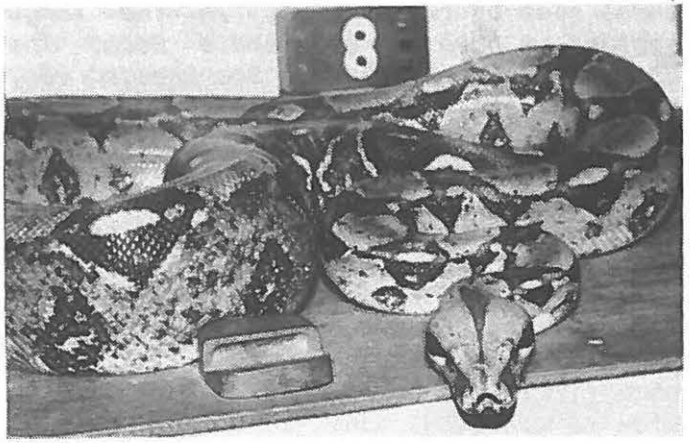
As a natural progression from breeding snakes, Chris and Marcia have started to supply equipment for captive maintenance. They were horrified to discover that some people purchasing their snakes intended to look after them without the proper equipment and they now recommend, and supply, the essential items.



EPA Thermostat and infra-red heater

The first item is the heater. This is a 250 watt infra-red ceramic type with optional wooden surround. The price is £17-25p for the heater and the surround is an extra £2-25p. Chris can supply smaller ratings on request, but pointed out that many people buy a low wattage heater in the mistaken belief that they are saving money. However, as the snakes grow and bigger quarters have to be provided, the heater usually has to be replaced with a more powerful version.

The second important item is the thermostat. The Martins can supply two types, the electronic UNO NOVA at £14-17p and a mechanical one, the EPA at £19-95p. The latter is an industrial unit used in chicken houses. It is designed to handle up to 3000 watts and is accurate to one degree C. In addition to the above they supply True-lite and U.V. tubes and starters. Although the heaters and thermostats can be posted, the tubes must be collected.



Guinevere, female Boa Constrictor

Many people may find the Martins' views controversial, but I remain impressed by their enthusiasm and commitment. In terms of heating and lighting, they have obviously spared no expense to set up and maintain their vivaria.

Chris and Marcia are willing to answer questions and offer advice about snake keeping and breeding. If you write, please enclose an s.a.e. Their address is:

18 Ballinode Close
Cheltenham,
Glos. GL50 4SQ
Tel: Cheltenham 573477

The Martins have written several articles for SNAKE KEEPER and the first of these will appear in issue 4.

JUNIOR SNAKE KEEPER

The Grass Snake
by Lee Bowler

Damp grass, rivers, ditches and ponds are the home of the Grass Snake, Natrix, natrix, one of Britain's three species of snake.

The Grass snake is small, averaging 24 to 36 inches in length, whilst 48 inches would be considered a maximum. It is a rather fast moving, non-aggressive snake which hides from humans; you are lucky if you see one.

The Grass Snake preys on water-living animals like frogs, tadpoles and fish. It also eats slugs and worms.

The snake is dull in colour. The olive-green background is marked with a series of greenish-black spots along the side of its body. The most prominent distinguishing marks are two yellow-orange blotches on either side of the neck.

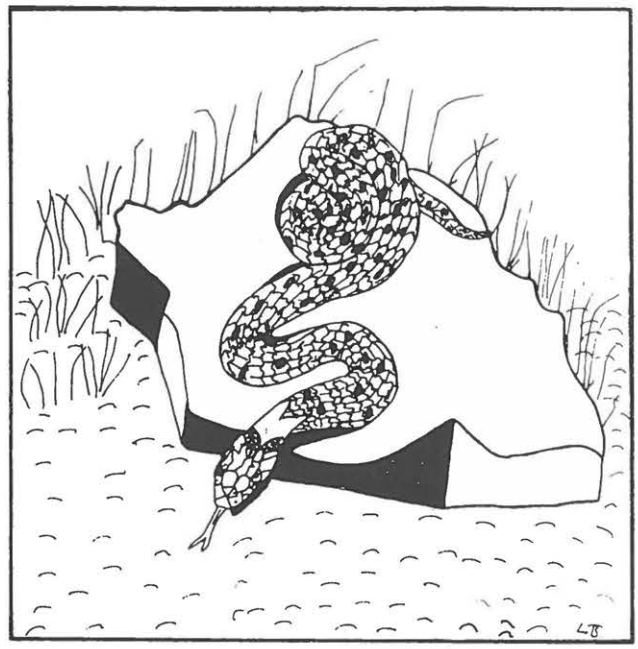
This snake is oviparous, laying its eggs in June or July in rotting vegetation. This is ideal because the heat incubates the eggs and helps them to hatch. Hatching takes place in August or September. The young are identical to their parents and measure about seven to eight inches in length.

Within days of hatching, the young shed their skin and start hunting for their first prey, tadpoles, small frogs, worms and fish.

The Grass Snake hibernates in the winter months, starting in October, under a log or rotting tree stump or in a crevice in an old wall.

The snakes awaken in late March or early April in time to mate and start feeding again.

In the wild, their life-span is about nine years providing they survive attacks by their enemies which include hedgehogs, badgers, birds and man.



The Grass Snake, Natrix natrix

JUNIOR SNAKE KEEPER COMPETITION

This month's competition is a simple code breaking problem. The following numbers:
12 19 13 24 19 20 8 7 6 22 24 7 19 6
represent the words BOA CONSTRICTOR.
The number 12=B, 19=O, 13=A and so on.

Which snakes do these numbers represent? A certain amount of guesswork is involved.

a) 22 20 2 22 13 20 5 15 7 9 19 20
b) 13 20 13 24 19 20 2 13
c) 12 19 19 10 8 4 13 20 1
d) 12 4 17 23 21 6 13 22 7
e) 1 6 23 23 20 10 13 10 12 13
f) 21 22 20 1 24 19 12 6 13
g) 1 13 12 19 19 20 25 22 5 23 6

Answers on a postcard, please, to our address on page three. The winner will be drawn from the correct entries received by the closing date of 31st March 1987. The winner, who will receive a copy of SNAKES OF THE WORLD by Chris Mattison, will be notified by post.

JUNIOR SNAKE KEEPER

Articles of any length by Junior Snake Keepers are welcomed and should be clearly handwritten or typed.



An account of the Boa Constrictor Imperator with special reference to temperament

by L.P. Jarvis

Over the last eighteen years I have always kept Boa Constrictors in my collection, as well as other species. During the summer of 1982 I purchased a large female Central American Boa of about nine feet in length from a dealer in London.

The original price was £110 but due to its irascible nature the dealer was having difficulty in selling it. After a long session of bartering with him, I purchased the snake for £45. All the available literature describes the irascible temperament of this snake and I bought the Boa to observe this description at first hand. This particular specimen was wild caught and had been in captivity for only a few weeks. The snake was bagged up, money changed hands, and I set off for home with my new captive.

As I did not want to take any chances of being bitten or injuring the snake I untied the bag and placed it in the cage thus allowing the snake to leave the sack at its leisure.

A few hours later I looked in on the snake. As soon as it saw me it struck with jaws agape. There was a loud bang as it hit the glass cage front. It immediately recoiled with its mouth open and hissed very loudly. The noise was similar to someone pouring cold water on to the hot-plate of an electric cooker. Obviously I had to check the snake's mouth for possible injury.

I slid the glass door back very slowly and distracted the snake's attention with a padded bamboo cane. With careful timing I gripped the Boa behind the head with my left hand and, supporting the body weight with my right hand, I lifted the snake from the cage. With some relief I was able to observe that no damage had been done. I replaced the snake in the cage and left it to settle down for a few days.

To prevent the snake from damaging itself by further strikes at the glass, I placed some newspaper over the front of the cage. It had become apparent that any movement outside the cage caused the Boa to strike.

Two days later the snake's mood had not changed. A friend gave me a large rabbit which I killed and placed in the cage. The Boa showed no interest in the rabbit. I half expected this but left the rabbit with the snake and quietly retired from my snake house for a few hours.

On my return the rabbit had gone and the Boa was peacefully coiled up in the corner with a large lump in its stomach. I was very relieved.

Faithfully, the snake fed every three weeks in the same way on one dead rabbit each time.

Many attempts were made to tame the snake, often resulting in bleeding hands. I eventually reached the stage where I could let her crawl around my shoulders peacefully, as long as I did not make any sudden movements. Unfortunately she never became as docile as the other five Boas in my collection, these being mainly Constrictor c. constrictor.

This particular Boa certainly lived up to its reputation for irascibility but, on reflection, if it had been bred in captivity it would possibly have been a more docile snake. I think it would be unlikely to find any adult Boa Constrictor that was not of an irascible nature in the wild as any snake incapable or unprepared to defend itself is surely not going to survive for very long. But as adult Boas are rarely imported, due to their unviability from a dealer's point of view, there will always be an element of doubt.

NEXT MONTH:

Beginning with Indian Pythons.
The use of Hydrogen Peroxide to cure mouth rot.
Snakes of the genus Elaphe, Part 4
Unexpected Garter Snakes.
Learning the hard way!
Notes on the Boa Constrictor.

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