Most of this issue consists of a paper by Dr. Elkan. It is well realised that this very specialised work will only interest a section of our members, but the journal is open to accept papers such as this, as well as those concerning the life history or keeping of the animals in captivity. The importance of the paper can be judged by the fact that its publication has been made possible by a generous grant from the Royal Society, which the Society gratefully acknowledges.

HERPETOLOGICA. Members' attention is called to this publication, which is the journal of the American Herpetologists' League. This journal contains papers on very many aspects of American herpetology and will be of interest to those members not already acquainted with it. Enquiries should be sent to Chapman Grant, Rt. 1, Box 80, Escondido, California, U.S.A.

PARASITES. Dr. Elkan is interested in the parasites of amphibia, and would be grateful for any specimen which may die in the collections of members. These should be sent direct to him, but members who intend to co-operate are advised to write to him for instructions wich may help him in his work.

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CONTENTS

Contributions should be addressed to the Editor, A. d'A Bellairs, St. Mary's Hospital Medical School, London, W.2 Articles should be typed in double spacing on one side of the paper only. Figures should be drawn in Indian ink on plain white paper.

Contributors will be supplied with 25 reprints of their articles free of charge; additional copies may be ordered at cost price.

NOTES ON THE REPTILIAN FAUNA OF THE KASTELA, DALMATIA

By

TIMOTHY J. HUNT

There are few lists of the reptiles recorded in Dalmatia and the aim of this condensed paper is a contribution to our existing herpetological knowledge of this area, the region investigated being typical of Dalmatia.

The region lies between the coastal towns of Split and Trogir and extends seven kilometres inland. This area roughly etched in limestone, may topographically be divided into three distinct tracts.

1. A narrow coastal strip occupied by many villages and extensively planted with grape vines, the remains of a polje, the lower parts of which have been drowned by the sea.
2. A "coastal ridge", probably an anticline built by early complex folding and faulting, rising abruptly to seven hundred metres and descending gradually inland. It is uninhabited and uncultivated.
3. A polje, or "valley" resulting from subsidence of ground following underground solution. Typical karst scenery with few cultivated areas and small scattered villages are found here. The inland border of this polje rises to the main ridge, which extends beyond the region investigated, to form part of the coastal Dinaric Alps.

The nomenclature adopted in this paper is that as revised by Mertens & Müller (1940). There are two additions to this former work made in line with increased knowledge in recent years. The addition of a subspecies *Lacerta melisellensis gracilis* Radovanović, 1951, (*L. fiumana gracilis*), and the use of trinominal nomenclature in the specific name of *Testudo hermanni hermanni,* Gmelin, as there is now a subspecies, *T. hermanni robertmertensi* Wermuth, 1952.

Contrasts are frequently made with specimens collected in other coastal areas of Yugoslavia to exhibit the great diversity that is present with certain reptiles.

The primary reason for the investigation of this region was to study the tortoise *T. h. hermanni* and the reptiles recorded in this paper were collected or observed while engaged in work on the former.

SAURIA

Geckonidae

Hemidactylus turcicus turcicus (Linné)

Many specimens of this coastal species widespread in this region of the world, were collected in the higher parts of the Kozjak area. One, found in the Gaj area, was engaged in eating an adult specimen of *Lacerta melisellensis fiumana.* It was uncertain as to whether the gecko had killed it, for a large part had been consumed. This species confines itself to the dry areas of the region. The largest specimens measured 8·3 cms. and 9 cms. male and female respectively. Their pale brown dorsal surface provided excellent camouflage among the sunburnt vegetation.

Tarentola Gray.

Tarentola mauritanica mauritanica (Linné).

This species of which three specimens were collected in the Traccanica area, has not previoulsy been recorded in the region investigated. The specimens collected here differed on minor points of colouring from those collected in the Zadar region in Northern Dalmatia. The Kastela specimens had very dark streaks on the lateral sides of the head in contrast to the Zadar specimens which had light stripes. The average length was 13·5 cms.

Lacertidae.

Lacerta Linné

Archaeolacerta Mertens.

Lacerta oxycephala Duméril & Bibron.

Numerous specimens of this locally common species were observed, and seemed to have no preference for any particular habitat, being found both in woodland and exposed areas; but they were not to be found further than six kilometres (four miles) from the coast.

Lacerta mosorensis Kolombatović.

Confining themselves to the higher parts of the region, usually above 580 metres, five specimens were recorded. Variations in the colour of the dorsal surface from a dark grey to a dark green, are very pronounced in this species. One juvenile specimen was of an extremely dark colour in comparison with that of the adults. Many local races of this lizard are to be found as it is an intermediate species.

Podarcis Wagler.

Lacerta muralis muralis (Laurenti).

Although a widespread species in Europe, this lizard is not abundant in this region in comparison with other species of *Lacerta*. Three specimens were recorded in the coastal strip, while several were observed near the town of Split.

Lacerta melisellensis fiumana Werner.

A number of specimens smaller than specimens of the subspecies collected in the Zadar region of Northern Dalmatia, were observed and collected in the Kozjak area. The largest specimen, a male, measured 17 cms. in length.

Lacerta melisellensis gracilis Radovanović.

Recorded previously on the island of Ciovo, the type locality, by Radovanović, (1951), two male specimens were collected three miles north of Trogir during the recent investigation. They measured from snout to vent 97 mm. and 100 mm. with a tail length of 143 mm. and 147 mm. respectively. This subspecies is closely related to *L. melisellensis kammereri* Wettstein, the latter being found on the island of Mali Barjak. *L. melisel-*

lensis gracilis differs from other members of its genus in being of considerably smaller size. The largest specimens recorded are those from the type locality by Prof. Radovanović, where the male attained a total length of 164 mm. and female 140 mm. Colouration as with the majority of *Lacerta* provides excellent camouflage, the dorsal surface being a dark brown colour intermingled with a greenish-brown on the anterior region of the trunk and the dorsal surface of the pectoral limbs. Males may be recognised by the orange to orange-red ventral scales, and females by the greyish colouration of these scales.

Zootacta Wagler

Lacerta viridis viridis (Laurenti).

Abundant locally, specimens had little preference for particular habitats, being found in both wooded and parched areas. The males were noticeably smaller than the females.

Algyroides Bibron & Bory.

Algyroides nigro-puncatus (Duméril & Bibron).

The colouration of this species, found in the Kozjak and Radozac areas, varied considerably. Those found in the former area had a brownish-red dorsal surface while specimens of the latter area had no trace of red in their colour. This ground colour is perforated by dark brown or black spots. The length of the specimens varied from 66 mm. to 52 mm.

TESTUDINES

Testudinidae

Testudo Linné.

Testudo hermanni hermanni Gmelin.

Large numbers of this species were observed in the lower parts of the region and were of greatest abundance in areas furthest from human settlements. Courting behaviour was noted in a few cases, but the majority were engaged in feeding heavily on young plants. They would retire during the early afternoon under the low shrubs and dry grass, emerging in the evening to resume feeding.

SERPENTES

Colubridae.

Coluber Linné

Coluber gemonensis (Laurenti).

Seven specimens recorded in the region investigated were all found in parts which afforded protection in the form of low, dense shrubs under which they would retreat when disturbed. One large female specimen, 128 cms. in length, when disturbed revealed freshly-turned grass under

which lay five eggs 2 cms. below the surface of the heap of dry grass which was accumulated under a bush.

The eggs measured 2·7 mm. × 1·5 mm., 2·8 mm. × 1·7 mm., 2·8 mm. × 1·9 mm., 3·2 mm. × 1·7 mm. and 3·4 mm. × 1·8 mm. It was difficult to ascertain whether the eggs had been laid recently although three were partially moist.

Coluber najadum (Eichwald).

Unlike *C.gemonensis* three specimens of this species were collected within 30 metres of each other in the locality of Blaca, in open ground where the sun provided an excellent basking place. These specimens made little attempt to retreat quickly when disturbed and seemed of placid disposition. The largest measured 63 cms. (female), in length and the other two 58 cms. (male), and 53·5 cms. (female).

Elaphe Fitzinger.

Elaphe longissima longissima (Laurenti).

Only a few specimens were collected, the majority being females, in a wooded area. It is understood that this species, which is widespread in Europe, is of frequent occurrence in the region but retreats during the warmest days.

Elaphe quatuor-lineata quatuor-lineata (Lacépéde).

Familiar on the lands bordering the Adriatic Sea, eight specimens, which included only two males, were collected. There was evidence to show that a pair were in the act of copulation when disturbed. Both were excessively entangled in each other's coils and had some difficulty in freeing themselves quickly. The largest male and female measured 21·2 cms. and 36·7 cms. respectively in length.

Elaphe situla (Linné).

The areas of dominant red colour on the dorsal side of this species enabled seven specimens to be identified. Three were found in low shrubs and a fourth in a burrow with a young *Testudo h. hermanni*. The lower parts of the body in all the specimens were almost completely black, being far darker in colour than specimens of the same species collected in Istria. The largest specimen measured 103 cms. (male), and the remainder between 46 cms. and 84 cms. in length.

Coronella Laurenti.

Coronella austriaca austriaca Laurenti.

Specimens normally inhabit open ground but retreat under cover during the warmer part of the day. All five specimens recorded were found in the cooler and sheltered places. The largest measured 72·1 cms. (female).

Natrix Laurenti.

Natrix natrix natrix Linné.

Six specimens were collected in the dryer parts of the region. One juvenile, measuring 12·6 cms., found in a rock crevice displayed "false death" when caught and continued this pretence for a few minutes remaining limp no matter what stimuli were applied. The largest specimens, both males, measured 128 cms. and 84·7 cms. in length.

VIPERIDAE

Vipera Laurenti.

Vipera ammodytes ammodytes (Linné).

There is some doubt regarding their being recorded previously in this part of Dalmatia. It is known that this species is abundant in the Zadar region and even more abundant in the regions south of that investigated. Two specimens were collected. One was revealed by the very loud hissing noise which it produced in defensive posture of an "S" shape, with its head thrown back ready to strike. The golden honey-coloured iris of its eye contrasted with the grey dorsal surface and the characteristic zigzag dark brown markings. The second specimen, a female, with a darker coloured iris measured 58 cms. The male which measured 61 cms. The female, with a light greyish dorsal ground colour was found on a short, stunted grape vine in the narrow coastal strip.

ACKNOWLEDGEMENTS

The author is greatly indebted to Prof. Rob. Mertens and Dr. Heinz Wermuth who have given every possible assistance and to Prof. Milutin Radovanovic for answering persistent enquiries. The facilities offered by Dr. W. C. Osman Hill and Mr. J. C. Battersby are greatly appreciated and the assistance given by Miss Mary Thompson.

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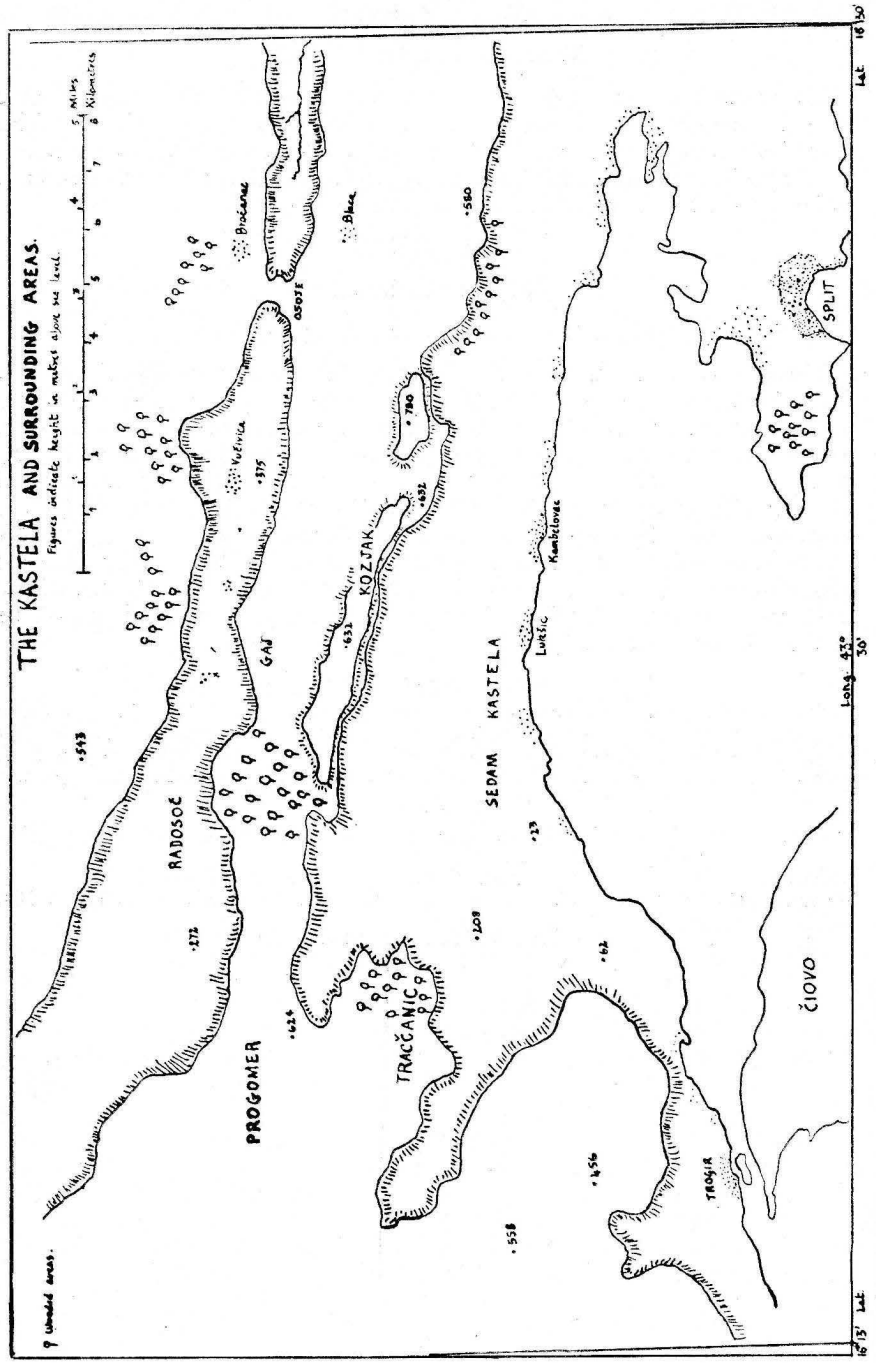

OBSERVATIONS ON ZONURES AND GECKOS IN CAPTIVITY

By

ROBERT BUSTARD

(1) THE BIRTH OF THE ZONURE (*Cordylus polyzonus*)

A number of *Cordylus polyzonus* were received from South Africa during April 1955. This lizard measures about 7 inches, is very agile and apt to be nervous, initially at least. It is light-brownish in colour. These specimens came from Namaqualand where they spend most of their time hidden in fissures in the rocks. They are to be found sharing these retreats with such other lizards as the Armadillo Zonure (*Cordylus cataphractus*) and the Giant South African Gecko (*Pachydactylus bibroni*).

On arrival one *C. polyzonus* was dead in the container and as a newly-born baby was present it was at once apparent that it died after giving birth. The baby was housed in a special vivarium, where it fed well on gentles, at a temperature of 75°F. to 80°F.

It was noted that two other adult females were gravid, and at 8.20 p.m. on April 25th two baby *C. polyzonus* were noticed in the vivarium. Both were removed and put with the other baby. Here it should be noted that this pair and the other baby were all almost exactly 3½ inches in total length.

At 8.35 p.m. on the same day a third baby was noticed, and it was assumed that it had come from the other gravid female—the two gravid specimens being housed by themselves. No more young were born. Thus it would appear that *Cordylus polyzonus* do not always have two young as, in this instance we had two females having only one young each (unless the other could have been eaten, the chance being so slight that it was discounted) and one female having two young.

All these babies were very active soon after birth and fed quickly. They were considerably paler than the adult at birth but darkened within 24 hours. (For comparison with birth of the Black Zonure (*Cordylus cordylus niger*) see *Brit. J. Herpetol.*, Vol. 2, No. 1, pp. 8-9).

The colouration of the young did not resemble the adults which are of a uniform light brown stone colour, but had dark markings forming delicate patterns on a paler background.

Here it should be mentioned that Zonure families are easier to rear than many other tropical lizards, because they are, of course, viviparous, and the difficulty of incubating eggs does not arise. Equally important, they have few babies (one or two usually) which are of comparatively large size—about half the length of the adult. They are, therefore, at birth able to cope with adult gentles, bluebottles, etc., so cause no feeding difficulties.

Two of the three females which had young died, but one survived — one that had only one baby—and at the time of writing (March 1956) is still in good condition.

(2) Defensive attitude assumed by the Armadillo Girdled Zonure (*Cordylus cataphractus*).

Dr. Rose in his excellent work, "*The Reptiles and Amphibians of Southern Africa*", mentions the defensive attitude assumed by these Zonures and includes a good illustration. (See pp. 152–153.)

It would appear that many authorities in Britain, at least, were dubious of this trait in *Cordylus cataphractus*. I have been unable to find any record of anyone in Britain observing this. Having kept numbers of *Cordylus cataphractus* at various times without ever witnessing this defensive role, it was indeed very interesting to observe one evening (November 21st, 1955) that a small *Varanus salvator* had grabbed one of these Zonures by the neck with the intention of eating it. The Zonure, which was a young specimen, immediately assumed the defensive attitude. That is, it curled up, grasping its tail in its mouth thus protecting its soft belly, and at the same time forming a circular ball which the Monitor was unable to swallow. On being freed it immediately made off, but on being handled it again assumed this defensive attitude.

It is interesting to note that two days later (November 23rd) an adult *cataphractus* assumed the defensive attitude each time it was handled. The above two instances are, however, the only occasions on which this has been observed.

In view of the dubiety at present current in Britain as to whether this attitude is adopted by these Zonures—owing to the fact that apparently no one has witnessed it here—I am very pleased to be able to corroborate Dr. Rose, although I should say that at no time did I consider his statement to be inaccurate.

(3) A Gecko Community

A number of *Hemidactylus brooki* which came from Ceylon were installed in a vivarium (20 in. x 20 in. x 20 in.). *H. brooki* is an interesting small gecko, a good climber, and can scale a vertical sheet of glass with ease. The average size of the specimens under consideration was 8 cms. This gecko which originally inhabited West Africa has spread, mainly by human agency, to cover a large part of the world's tropical areas. As well as the specimens from Ceylon, examples of this species from Sudan were in the collection, but this note refers to the specimens from Ceylon.

The geckos were received during March, 1955. Greatest activity was noticed during the evenings and provided one remained absolutely motionless in a darkened room—the only light coming from the vivarium, which was well lighted—the communal life could be observed. The light in the vivarium did not in any way prevent their activities as the data given below will show. On March 23rd I noticed two geckos copulating at 1 p.m. at a temperature of 80°F. The male was over the female's back and was holding her by the left forearm. A struggle ensued, after which they remained stationary for about three minutes, and after a further struggle they separated.

On March 26th a gravid female gecko was found dead and the cause was considered to be "egg-binding", i.e. the gecko had carried its eggs too long and was, for some reason, unable to lay them. On March 27th I was again lucky enough to be able to watch a pair of geckos copulating. In this instance the male was holding the female by the throat. The time was 9 a.m., temperature about 70°F., and copulation lasted four minutes.

During early April activity greatly increased and, here it should be stated that the average day temperature was about 80°F., rising to about 90°F. in the late evening and never falling below 60°F. at night. One male gecko became particularly tame and nightly took up a position high at the back of the vivarium from where he used to call, and then start parading around, looking for a mate. Considering that the total complement was about fifteen geckos, of which about ten were females and at least half of these either gravid or re-growing tails, and therefore normally unwilling to mate, it became increasingly difficult for him to find a mate. On this particular evening (April 4th), he had been searching for over an hour when, at 9.47 p.m., temperature 80°F., he saw a small male gecko grab a large female gecko by the neck. A great struggle ensued and after a minute —at 9.48 p.m. they settled down on a log and entered into copulation. They were in this position when at 9.50 p.m. the larger male referred to above noticed them. He hesitated, obviously sizing up the situation, called (which is usually accompanied by movements of the tail like an excited cat), and then strutted down the side of the vivarium, chased off the small male and entered into copulation with the large female. However, she had apparently had enough and they soon broke up. The male, frustrated, attacked another female gecko which was re-growing its tail. The male grabbed her at the base of the tail but let go almost at once. This male, and the small male previously referred to, spent the rest of the evening unsuccessfully looking for a mate. In all I observed four complete matings—of which the duration of actual copulation was usually about three minutes. This was preceded and followed by a struggle. The male held the female either by grasping the forearm or the loose skin at the throat in his mouth.

These geckos were fed almost exclusively on bluebottles, and they thrived well on this diet. By this time several of the geckos were due to lay their eggs and there were a few cases of special interest which are mentioned here. A case of "egg-binding" has already been discussed, and it would appear that this takes place when the specimen concerned is in unsuitable surroundings, or has just been introduced to the vivarium. In this instance it was the latter case. Female geckos take great care in selecting a good site for the eggs and unless they are conversant with their surroundings they are unable to do this. No more cases of "egg-binding" were recorded.

During early May a clutch—which consists of two eggs—was laid under a piece of bark resting on the moss covering the floor of the vivarium. The actual egg-laying took place in the early evening. The eggs when first laid are soft but in a short time harden, having a calcareous and brittle shell unlike many reptile eggs which have a parchment-like or leathery shell. The eggs were actually deposited on the moss, but when the bark was moved for a moment for examination the female scuttled off, returning shortly

to pull small fragments of moss over the eggs. Two hours after the actual egg-laying the eggs were difficult to see, and unless I had known their exact position I would possibly not have noticed them. On examination the following morning the eggs were completely hidden by a layer of moss fragments and the female had moved off. Other eggs were laid sometimes under the bark and sometimes on the sand under the moss. On one occasion an egg was left lying on top of the moss. The eggs were left where they had been laid in the hope of incubating them, but after a week one of the eggs had completely disappeared and after a further week the second egg vanished. Although the cause was not obvious at the time, it was suspected that they had been eaten and this was later verified. Geckos are not so innocent as they might appear and can swallow very large prey. I have one instance of a four centimetre gecko being eaten by an adult *H. brooki* although it was not digested properly. I suspect the culprit in both cases was a large male *H. brooki* from the Sudan.

On July 17th I noticed a gecko egg lying on the moss. It was removed and the following day a careful examination of the vivarium was made for further eggs. Three more were discovered. This time it was decided not to leave the eggs to the mercy of the adult geckos and a small box, 5in. x $3\frac{3}{4}$in. x $1\frac{3}{4}$in. in which a layer of sand was placed on the bottom (sand being a good conductor of heat) and a layer of moss was put on top, was used as an incubator. The eggs were then carefully put on top of the moss, care being taken to see that they were kept in exactly the same position in which they had been found—that is, they were not rotated as, of course, this is fatal to the reptile embryo. The box was placed in a vivarium in which the temperature fluctuated from about 75°F. to 90°F. Occasionally the eggs and the surrounding moss were sprinkled with water, but in view of more recent experience this does not appear to be essential. The actual date on which these particular eggs were laid was not known, but most probably it took place towards the end of June.

Little difference was noticed in the eggs as time progressed although they darkened slightly in colour. On August 21st one particularly friendly female which was gravid and due to lay soon was observed in the morning and again in the late evening. (I was away from home all day.) I was most surprised to see in the evening that the gecko was minus its tail and that the eggs had been laid. An examination of the vivarium the following day showed the egg-shells under a hollow log. They were soft and sticky with liquid adhering to them. Being conversant with the ways of these geckos I found it easy to reconstruct what had happened—probably the eggs had been eaten by another gecko and the shells rejected. From the fact that the egg-shells were soft it would appear that the eggs had been eaten immediately after they were laid. It was thought that the female had lost her tail as a result of an attack by the other gecko while she was still at work covering up her eggs. As has already been mentioned, these geckos often spend several hours covering the eggs after laying. During this time they seem unwilling to leave them and if disturbed, soon return to complete their work. After the eggs have been covered however, the female shows no further interest in them.

Another gravid female was removed and put in a vivarium by herself and the two eggs were laid on August 27th under a log. One, which had been laid against the log, was unable to expand, and it hardened, causing a hole in the side. This is yet another hazard which the eggs have to run as any such egg will not, of course, hatch.

On the evening of August 30th when showing the eggs in the incubating box to a friend I at once noticed a broken egg-shell and saw a baby gecko lying on the moss near the shell. It would appear that it had only recently hatched, the time being 8.15 p.m. At 8.45 p.m. on again examining the box I saw there were now two eggs broken and two babies running about. The second baby was observed to slough at about 9 p.m. From further babies hatched it appears that they usually slough about half an hour after escaping from the egg, that is, after a rest following the struggle to escape from the egg. The babies were removed and housed in a special vivarium where they fed well on fruit flies and grew quickly. Total length at birth was about 25 mm.

The incubation period of *H. brooki* at a temperature of 75°F.–90°F. would appear to be about two and a half months.

Glenorchy, 14 Argyle Street, Maryfield, Dundee, Scotland.

ON KEEPING AMPHIBIANS

By

E. Elkan

It is pathetic to see how the various hobbies which deal with livestock imported from tropical countries resemble each other. As in the realm of cacti so in that of amphibians there are those who grow them in specially constructed houses and those less fortunate ones who have to be content with the window sill or with a small corner of their study. As in cacti so in amphibians the owner tries and tries to make his guests as comfortable as he can within the limits of space, purse and opportunity, yet, just as some cacti will never flower, so some amphibians will never breed in captivity. It all depends how rigidly specialized they are and how close we can come to their requirements.

Sometimes we may, from overseas, get a specimen we have never kept before and whose requirements we do not know. A newt, for example. Has it just left the water or is it just ready to return there? A frog, does it like an occasional bath or is it entirely terrestial? The simple answer to such a situation seems to lie in the construction of a cage with both "land" and water, but if only one of the two is needed, what a waste of space, and we have so little space anyway.

In the large cities where every square yard costs a thousand pounds we build skyscrapers. On our study table, already overcrowded to the last inch, something similar can be done in the way of a land-and-water cage which does not encroach on the available space more than the cage itself would, anyway. The idea is to have the "land" above the water instead of by the

side of it. This can be done in several ways. In either case an aquarium is needed. In the case of one of the 12 in. x 12 in. x 24 in. variety a number of small but equal supports made of wire or stone are distributed on the floor. The height of these supports will determine the depth of the water. On these supports is placed a sheet of slate or asbestos-concrete which does not cover the whole floor but leaves the animals room to get to the water if they want. The sheet of slate can be covered with soil or moss, or better, small flower pots with *Tradescantia* can be distributed on it. The lid can be made of perforated zinc or, where a high degree of humidity is required, of glass. *(Fig. 1)*

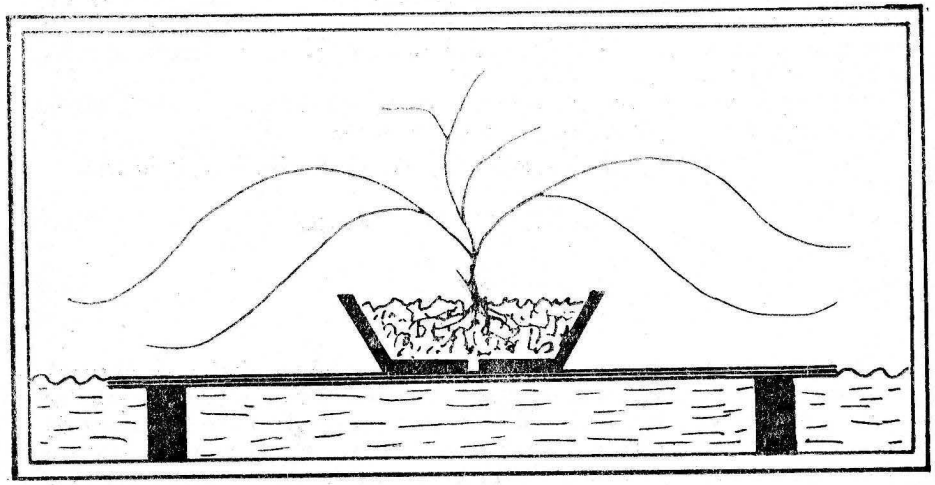

FIG. 1

For tree frogs which require a large plant in the neighbourhood of water, a cage can be constructed covering three-quarters of a small aquarium, leaving a shelf big enough to support the "tree". *(2)* The aquarium is on the side of the gap filled with stones, leaving enough space to allow for access to the water. The shelf is covered with gravel and/or moss. The plant can be *Philodendron* or any other of those plants now offered for indoor decorative botany. Food is introduced through a sliding door at the top. The water can, where necessary, be kept at a certain temperature by means of a very small (25–40 W.) immersion heater/thermostat. I have for the last year brought up a little crowd of *Gastrotheca* in such a cage and the results seem to be satisfactory. The cage itself was made of aluminium angle (obtained secondhand from a garage) bolted together with 4 B.A. brass bolts to avoid rusting. Only for the glazing was outside help required. The material allows every scope to the experimenting handy amphibian herpetologist.

62 Woodhall Gate, Pinner, Middx.

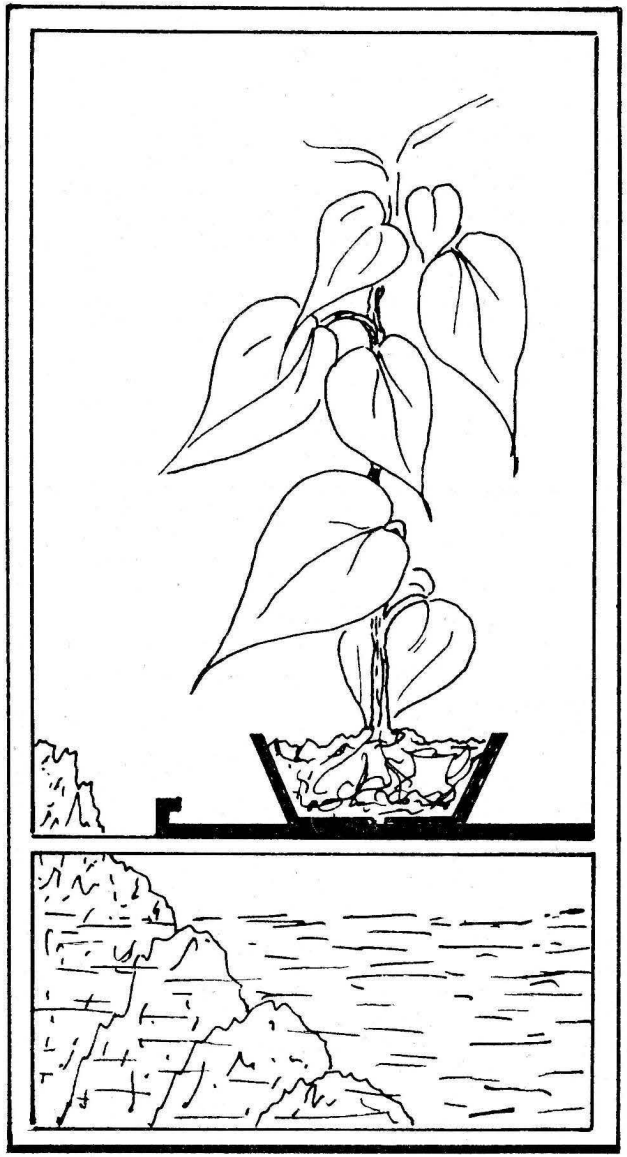

FIG. 2

HINTS ON REARING CROCODILIA IN CAPTIVITY

By

G. F. Boyce

Whilst it is generally accepted that crocodilians are the easiest of reptiles to keep in close confinement, it is not such a simple matter to ensure that these creatures develop normally and remain free from rickets.

The author submits the following information, based on his own successful methods, for the benefit of any reader who may contemplate keeping these extremely interesting animals.

When newly imported into this country the majority of this group of animals vary in age from three weeks to three months, are comparatively weak and most unlikely to receive the amount of direct sunshine to which they would normally be subjected. How then does one overcome this difficulty? For those who have access to ultra-violet or infra-red lamps much can be done with these appliances. In the author's opinion these are not necessary as the whole problem can be solved dietetically.

A 24 in. x 12 in. x 12 in. aquarium is sufficient for a specimen 8 in. to 15 in. long. Water to a depth of four inches is added, furnishing consists of a piece of rock the upper surface of which should stand well clear of the water; this is used as a basking platform by the inmate. An immersion heater should be added of sufficient wattage to maintain a water temperature of 80°—85°F. A standard aquarium shade can be fitted and a 40 watt bulb inserted above the rock. In a set-up with such high temperatures it will be found that the creatures, for crocodilians, will be reasonably active and always hungry.

Food should be given daily or twice daily if possible, and should consist of earthworms, mealworms, raw fish and horseflesh (the author does not consider there is any danger from overfeeding). This diet should be augmented by the addition of halibut liver oil and calcium phosphate, the oil being fed in capsule form inserted in the meat or fish and the whole covered with calcium phosphate. It is essential to feed both commodities together as calcuim is only assimilated in the presence of fat.

The following amounts of oil and phosphate have proved the most successful:—up to the first six months in captivity one oil capsule three times per week with calcium on all the food they will take at that particular time; six months to one year, one capsule twice per week plus calcium; one year to two years, one capsule once per week and calcium. At each period the temperature can be progressively lowered until a range of 70°—75° F. is reached.

After this treatment it will be found that the framework of the beast will be quite robust with sturdy limbs and thick tail base and no "rubbery" bones.

67 Nimrod Road, London, S.W.16

OBITUARY

Jack Lester

John Withers Lester—Jack as he was known to all his friends—died on August 1st, 1956, at the early age of 47 after a long illness. He will be missed by many, for he had a host of friends.

Jack was educated at Wrekin College, Salop, and on leaving school entered the Bank of British West Africa where he served for several years. It was there that he started his zoological career, collecting live animals of all kinds which he later presented to the Preeseley Zoo at Paignton. Later on he joined the Staff as Curator. During the second world war he served in the Royal Air Force and at its termination came to London to join the staff of the Zoological Society as curator at the reptile house. Reptiles and amphibians then became his special interest, but he was fond of all animals and to collect them for the Society went on many expeditions, three to Sierra Leone, one to the Gold Coast, one to Uganda and one to British Guiana.

He was a first-rate and tireless collector and his wide knowledge of animals in their native haunt was of the greatest value to him in his work. Having caught his animals, he took the greatest care to see that they were properly caged and fed until they reached their final destination. In that way he added to the Society's collection many animals that they had not had before. He was a delightful companion, both in the field and at home, always cheerful, always interested in his work and always ready to give help when it was wanted, for he had a most generous nature. Those who knew him will miss him greatly.

M. A. S.

REVIEWS

FROGS OF SOUTH-EASTERN BRAZIL by Doris M. Cochran.
U.S. National Museum Bulletin No. 206, 1954 (1955) : XVI + 423, 34 plates.
(For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.—$2.00).

South America's herpetofauna must surely be regarded as not a minor nightmare for the systematist in spite of the valuable contributions already made in the form of small monographs on families and genera. Attacks have been launched from time to time on the systematics of the amphibian denizens of limited geographical areas—for the most part coastal areas—without much disturbance of the void which exists in our knowledge of the salientian inhabitants of the continent as a whole. Dr. Doris M. Cochran, the distinguished herpetologist, has tackled with resource and care the complex assemblage of frogs occurring in south-eastern Brazil — Minias Gerais, Rio de Janeiro and Sao Paulo—and she has done more than justice to her subject. She has had at her disposal for examination and photographing many of the types in European and American Museums and has had the enviable advantage of observing the species in the field. These benefits, together with discussions with other eminent herpetologists, have contributed in a large measure towards the success of the monograph. There are full accounts of the characters of an example of each species, notes on habits, habitat and call and keys to most genera, particularly useful being those to the Leptodactylid genera and also to *Bufo* and *Hyla*. There are numerous line drawings in the text which are good and most useful; the reproduction of the photographs is disappointing.

CREATURES OF MYSTERY by Gray Meek.
Published by the author in Macon, Georgia, at $3.00.

The number of monographs dealing with single reptilian species must be very few so the production of a 260 page book almost entirely on the Diamond-back Rattlesnake should be a welcome addition to herpetological literature. Yet this is a disappointing book. The author says it is not a scientific work, but much of it is of scientific value and should those who choose to go among the rattlers become better acquainted with their habits the "information should make it possible to avoid much danger."

One would suppose from this introduction that the following pages would contain detailed accounts of the snake's life history and habits. But this is not so; in fact, the longest chapter in the book is on hypnotism. That snakes have hypnotic powers has probably been postulated ever since man first met snake. The reviewer has neither wish nor qualification to support or refute these beliefs, merely wonders how prolonged discussion on the subject will lead to a better understanding of the ways of "America's most deadly internal foe" and lay the "groundwork for his possible extermination."

As the author continually reverts to this and other beliefs, including the swallowing of the young by the mother, the text is confused and, at times,

irritating to read. There is, indeed, much interesting information but it is most difficult to find. One would be more readily inclined to accept the author's conclusions if he did not expose himself to criticism on other points. In one short chapter he states that snakes have legs but that these are "tucked away beneath the skin" and only apear when the snake is exposed to heat or crushed by an automobile. Surely these are the hemipenes which are frequently extruded when the pelvic region is injured? If the author had consulted an anatomist before publication mistakes like this would not have appeared.

All through the book there is a constant antagonism between the author, basing his work on the observations of laymen, and those he scornfully calls "college-trained herpetologists". Is it not in the field of ecology and general natural history that lay naturalists and scientists have most reason to work together? One cannot but feel that some discussion between them would have produced a book much more valuable to both parties.

But let me not suggest that the book is not worth reading. Many of the stories are delightful, especially that telling of the child who, each day, took a cup of milk to a rattler living in the basement. Best of all are the tales of "Uncle Dave" who, to avenge the death of a son and attacks on two others, declared total war on the rattlesnake.

J. I. M.

THE REPTILE WORLD by Clifford H. Pope.
363 pp. with 221 photographs. Routledge and Kegan Paul. London, 1956.
Price 50s.

The appearance of a new book on reptiles, especially one so good as this, is an uncommon event, and the publication in this country of Clifford Pope's *Reptile World,* which was issued in the U.S.A. in 1955, is very welcome. This book is, by and large, in the tradition of Raymond Ditmar's *Reptiles of the World,* but is much more informative and rather more technical, although the treatment is essentially of a popular character. It contains a good many recent observations, such as an account of what are now realised to be combat dances between male snakes (previously regarded as a courtship ritual), and a good description of the different types of ophidian locomotion.

The book deals with all the living reptiles, which are described systematically, group by group, with a useful bibliography at the end of each main section. The Old World reader may perhaps feel that the American fauna is slightly over-emphasised. The fossil history of the four surviving orders of reptiles is briefly discussed, and one feels that a slightly fuller account of the distinguished Mesozoic history of the reptiles would have been useful.

Perhaps the most noteworthy features of the book are the splendid and numerous photographs which have obviously been carefully selected and are of very great scientific value. These pictures in themselves will ensure the book's future as a standard work on the natural history of reptiles for many years to come.

A. d'A. B.