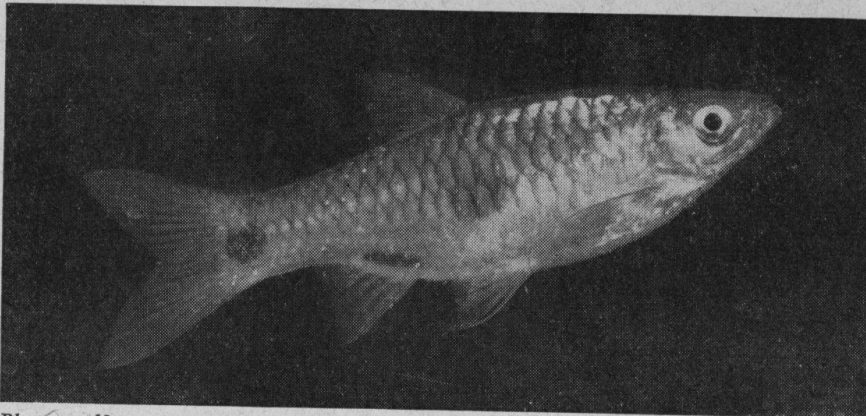


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Herpetology Extracts

Know Your Fishes

No. 48

Yellow Rasbora (*Rasbora elegans*)

Photograph]

[L. E. Perkins

AMONG the larger Rasboras, which are generally of unspectacular colour, the Yellow or Elegant Rasbora stands apart. Whilst not startlingly shaded the elusive tints it does show make it a fish of significance. And it grows to an appreciable length—up to five inches in aquariums. Distinguishing features are a dark mark on the centre of the side beneath the forepart of the dorsal fin, another more roundish dark area at the tail base

and, on the body at the anal fin base, a thin, black line.

The body is a matt grey basically with the back reddish-purple and the sides mauvish-yellow. Individual scales, particularly on the upper two-thirds of the body, are lightly edged with charcoal grey. No colour is particularly brilliant so that the general effect is pastel suffusion.

Fins are clear of colour except for the base of the dorsal which is brownish-yellow, the tips of the tail

fin lobes which are touched with black and the anal fin which is yellow in male specimens. This colouring in the anal fin is a fairly reliable sex distinction but some authors record another indication in that male fish have a longer lower lobe to the caudal fin.

The fish is peaceful but, if there is any show of temperament, it is in the female which may occasionally become belligerent. Its safe temperature range is 70-80 deg.F., with 78-80 deg. desirable for a breeding attempt. Spawning are only rarely achieved in aquariums and largish tanks are required freely set with fine-leaved plants, such as *Myriophyllum*. Spawning procedure is similar to that of the Barbs.

The species is found in streams on the Malay Peninsula and nearby islands (including Borneo) where its numbers are large. Feeding *Rasbora elegans* presents no problems; it will take dried preparations but should have periodic feeds of livefood such as *Daphnia* and also access to reasonable supplies of algæ.

The species' two common names, Yellow Rasbora and Elegant Rasbora, are rarely used and it is generally sold under its scientific title. Class: Pisces. Order: Ostariophysi. Family: Cyprinidæ. Genus: *Rasbora*. Species: *R. elegans*.

African Hinged Tortoises

Easily-cared-for Pets in the *Cinixys* Genus

By Audrey Noël-Hume, B.Sc.

FOR the herpetologist interested in tortoises but possessing only a moderately sized garden and an income to match, the three members of the *Cinixys* Genus, known popularly as the African Hinged Tortoises, are an ideal choice. These creatures are moderate in size, cheap to maintain and relatively easy to obtain. Many specimens are imported annually by dealers but it is also possible to obtain them direct from professional animal collectors who work in Africa. Prices vary around £3 but really first-class specimens may be slightly more.

Comparison with New World Species

These tortoises are distinguished from the American Hinged or Box Tortoises by the presence of a strip of ligament between the seventh and eighth marginals and not, as in the American species, across the plastron. The African Hinged Tortoises can thus only enclose the tail and the hind legs, whereas their American counterparts can enclose head and fore-legs as well. In fact the *Cinixys* seem to make little use of this defensive weapon and both in specimens kept by me and in others in the collection of the

Zoological Society of London the hinge would appear to have become rigid and incapable of being used.

The maximum shell length attained by any *Cinixys* tortoises is about 14 in. but such specimens are exceptional and the average adult size is between 8-10 in. The problem of sex determination in land tortoises would seem to need more attention that it has hitherto received, but until this is done the rule of a long tail in male examples and a short tail in females must be accepted.

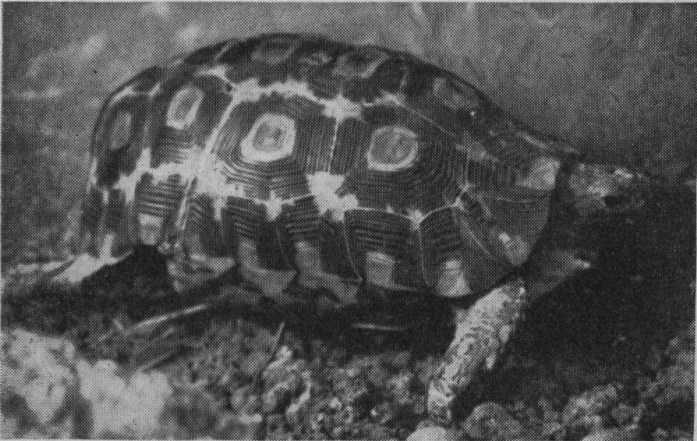
The most common and, in my opinion, the most attractive members of this group is *Cinixys erosa*, the Eroded *Cinixys*, also known as Schweigger's Hinged Tortoise. It is to be found in all the hot rain forests of West Africa from Gambia in the north to the Belgian Congo in the south, but it is possible that the distribution is much wider than these limits would suggest. It is easily distinguished from the other two members of the Genus by the shape of its carapace, which is flatter in appearance, by marginals which are "flared" at the head and tail and by a forked projection on the plastron. The latter provides both a rest for the head and a fine offensive weapon against other tortoises; when

pushed under the plastron of an antagonist it acts as a perfect lever for turning the offender over. Unfortunately my *Cinixys erosa* uses it with complete lack of discretion and frequently tries to overturn my Leopard Tortoise whose weight exceeds 30 pounds

The shell coloration is generally a dark brown in adults but may be considerably lighter in young specimens. One of the most outstanding features of the Eroded *Cinixys* is the attractive colour of the skin of the body and the head. This is a pale whitish-yellow and forms a perfect contrast for the large and almost human blue eyes present in most specimens. These eyes are very expressive and are capable of clear vision at comparatively great distances. All the *Cinixys* have long, lean legs and walk in the jerky manner associated with clockwork toys but nevertheless they can outstrip most tortoises of a similar size should they wish to do so.

Bell's Hinged Tortoise

The second member of the *Cinixys* Genus, *Cinixys belliana*, or Bell's Hinged Tortoise, lives in areas not covered by dense tropical forest in a belt of land stretching right across Africa from Abyssinia to Gambia and as far to the south as Natal and Angola. Unlike the Eroded *Cinixys*, this tortoise has an extremely narrow carapace with almost vertical marginals and the projection of the plastron, though still present, is blunt ended and not forked. The shell colourings are extremely varied and range from a uniform dull brown to elaborate striped and blotched patterns on a dingy yellow ground. The skin is generally a dull shade of brown, while the eyes are similar in tone but

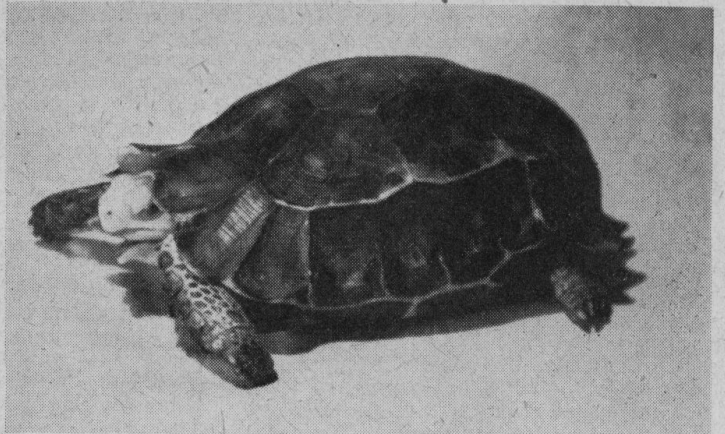


quarters by a hot water storage cylinder for a daily meal and a session under a sun-ray lamp and, unlike the larger tortoises, these species need little room for exercise when indoors.

I have always found the *Cinixys* very easy to feed and with the aid of a friendly greengrocer this can be a fairly inexpensive matter even in the depths of Winter. Over-ripe tomatoes and bananas, unfit for human consumption, are certain favourites and, together with a few lettuce leaves, a grated carrot and any scraps of tinned fruit, will form an acceptable and nourishing diet for them. Like all tortoises from tropical areas, these reptiles drink a relatively large amount of water each day and it is essential that a clean bowl of it should always be kept within their reach.

The *Cinixys* seem to have outstandingly good memories and, if water and food are always put in the same place, they soon learn where to find them. My *Cinixys belliana* lives entirely in the garden and on the ground floor of the house from May to September each year but as soon as she is transferred to her Winter quarters on the first floor she goes at once to her regular feeding place. The best time for feeding in the Summer seems to be in the early morning and again just before dusk for the *Cinixys* retire to sleep later than the temperate species of land tortoise.

Some of the older books on tortoises refer to the *Cinixys* in general, and to *Cinixys erosa* in particular, as being particularly shy and stupid reptiles. At least so far as my own specimens are concerned these accusations could not be substantiated for they are very friendly and quite unafraid



Photographs]

[I. Noël-Hume

Left, female Bell's Hinged Tortoise (*Cinixys belliana*) with carapace length of 9½ in. Above, male Eroded *Cinixys*.

lack the almost human appearance of those of the Eroded *Cinixys*.

The third and the most uncommon member of the *Cinixys* group, *Cinixys homeana*, Home's Hinged Tortoise, is believed to come from the same areas as the Eroded *Cinixys*. It is very dull in colouring and it may be that the difficulty in seeing it is the main reason for the scarcity of specimens. It is easily recognized by its silhouette which resembles that of an upturned rowing boat. Both shell and skin are brown in colour and the head is less pointed in shape than in the other members of this Genus.

During the Summer months when the air temperature exceeds 65 deg.F. the *Cinixys* can safely be given the run of a well-fenced garden. They will not attack plants and are content to spend much of their time sleeping in a shady spot. Although I would never advise allowing tropical tortoises to sleep out-of-doors as a regular practice, I have, on exceptionally hot, dry nights allowed mine to share the chalet-type houses used by the Mediterranean tortoises.

During the Winter these *Cinixys* need a minimum temperature of 65 deg.F. and full protection from draughts. In periods of extreme cold my specimens only leave their

of humans or other animals. Whilst one is loath to apply the adjective "stupid" to any creature, I think there are many species of tortoise which have a better claim to this description than the *Cinixys*.

Displays of Temper

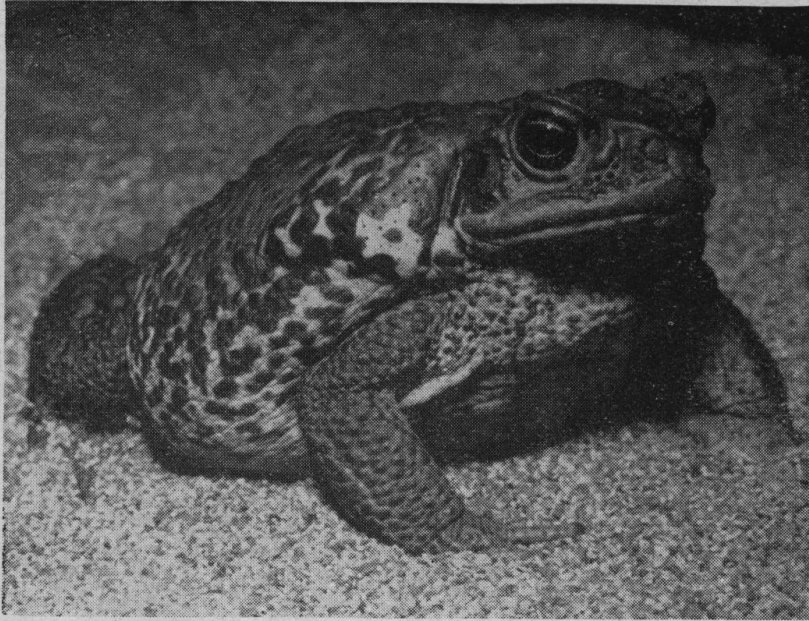
The main fault of African Hinged Tortoises is an unfailing bad temper and lack of patience. Should another tortoise knock against them, take their place at the hot water cylinder or fancy a bite or two of their food they will attack the offender with surprising fury. Many times I have had to intervene in such contests to avoid damage to limbs or shields and the clash of shells sometimes re-echoes round the neighbourhood when the garden is the battle field. On the occasion when my Brazilian Giant Tortoise sprayed the *Cinixys erosa* with two jets of water from his nostrils, the latter chased him around for nearly an hour!

Although the *Cinixys* are relatively hardy, I have found that they are all liable to minor eye troubles, most of which are quickly remedied by bathing with a five per cent solution of Protargol.

the old water in the new set-up, and then gradually add fresh until they are in normal tap water again.

A word on temperature. I generally keep and breed *Aurolare* between 72 deg. and 75 deg.F. I do not think they like very high temperatures. And finally a hint about peat. People often ask me how I get it to sink. It is just a matter of soaking it long enough. I half fill a bucket with agri-

cultural peat and fill up with water. This I leave for about a week or ten days, with a stir every day to ensure that it is all well soaked. After this time you will find that sufficient has sunk to the bottom of the bucket for your use, so after skimming off what still floats, wash the remainder well and put into your tank. There is no need to throw away the flotsam, after more soaking it will do for the next spawning.



Magnificent Marine Toads

(*Bufo marinus*)

By Kenneth Blackwell

The Giant or Marine Toad, a creature with a fascinating expression. Its body is brown with yellow markings, although there may be considerable variation.

[Photograph by L. E. Perkins]

GIANT TOAD or Marine Toad are the names by which *Bufo marinus* is usually known. Attaining a length of approximately 6 in., this near-relative of our common Garden Toad (*Bufo bufo*) is truly a giant. It is, in fact, one of the largest-known true toads in the Genus *Bufo*.

The most noticeable feature, with the exception of its size in general, are the enormous parotid glands, situated behind each eye. The parotid glands contain, and secrete, a white poisonous fluid which is dangerous to mammals and birds. Specimens in vivariums do not secrete this fluid readily.

Appealing Appearance

From the anthropomorphic viewpoint this species is truly a "Wind in the Willows" toad of "Toad Hall", having a somewhat benevolent facial expression. The black pupil of the eye is surrounded by a beautiful yellow-green iris. Body coloration, in general, is brown of varying shades, surmounted by light, almost yellow, markings. The underside is a dirty white colour, sometimes spotted with light brown. These toads are very variable in colour and the description must be regarded as a very general one. The distribution of *B. marinus* extends from Texas southwards to the most southerly tip of South America.

Despite its large size this toad makes an ideal inmate for the larger-sized indoor vivarium; indoor, because of the necessity for a higher temperature. The toad is primarily nocturnal, and a vivarium in a shaded situation, with subdued lighting, is desirable. The vivarium is best furnished with a layer of peat or moss, and a dish of water, which can easily be removed for cleaning. A suitable retreat, such as an upturned flower-pot with a portion of the side missing or a curved piece of bark, is absolutely necessary as the toad must have a hiding place, in order "to feel quite at home".

During the greater part of the day the toad will remain in hiding, awaiting the introduction of food or, if the situation is suitably darkened, lying in the dish of water.

The Marine Toad can hop, yet frequently it moves by the shuffling gait so well known in the Natterjack Toad (*Bufo calamita*). Having shuffled from its retreat in search of food it will, if not used to the introduced hand, retreat backwards until in a position from which it can view the intruder.

Means of Defence

Cryptic coloration is certainly part of the toad's natural defence, for when disturbed with a bright light, it crouches low and stills all movement. There is yet another means of defence and this is the "blowing up" of its body until it looks even larger than usual. Such a defence mechanism is usually resorted to if danger is particularly imminent. Should these two means of defence fail, and the toad is roughly treated, the parotids come into action, as described earlier.

The Marine Toad will take almost any small *moving* animals. Occasionally it can be encouraged to take dead food by holding this in a pair of long-handled forceps and gently moving it within the toad's range of vision, releasing the food the moment the toad's tongue flashes out. This same problem occurs with other amphibians and some reptiles.

Fish Capers

THE owner of a seawater aquarium had some Gurnet in a large tank. He noticed one particular fish had outstanding "personality", as it came to his hand to be fed and "tickled". Then, one day, when it kept getting in the way, the fish allowed him to pick it out of the water and throw it across the tank; to his surprise, it promptly scurried back for more! It seemed to enjoy being thrown, and after that it made a regular habit of coming to be "played with". Even fish seem to have their "kittenish moments"!—JOAN BLEWITT COX.

Tea-chest Vivarium

An Easily-made Indoor Enclosure for Reptiles

By D. O. Carr

BEING rather short of space for new additions to my collection of reptiles some time ago I decided to try to convert two tea-chests into vivaria. These have now been in use for a considerable period and I feel it is safe to say that they have filled the bill admirably. No doubt others would care to try fitting some up, especially as it is so simply done, with no intricate woodwork involved.

The first thing needed is, obviously, a tea-chest; this should preferably be a new one and an undamaged one at that. If possible, it is as well to obtain one of the large ones that have the slats down the sides and round the bottom as these are a far stronger job. After stripping out all the tissue and lead foil lining, the box is laid on its side, and a start can be made in fixing the front frame which will hold the glass and lamp fitting.

As there would appear to be various sizes of chests on the market, I will not give specific measurements but just the placing of the various pieces of wood. Reference to the diagram will help.

Materials Required

First of all, two pieces of tongued and grooved boarding 5 in. wide by $\frac{1}{2}$ in. thick are screwed along the top and bottom (B and C). The piece B has the tongue planed off and is screwed at either end, so that it is flush with the top edge of the box, the groove pointing downwards. The piece C, also with the tongue planed off, is screwed in a similar way flush with the bottom edge of the box. Before screwing B and C into position it is as well to bore the ventilation holes and tack pieces of perforated zinc over them on the inside. This saves work later on.

The pieces marked A are lengths of lathe cut to fit snugly between B and C. They are screwed, using countersunk-headed screws, flush with the sides of the box. It will be found that these more or less coincide in thickness with the groove of B.

When B and C, also the pieces of lathe A, have been fitted, two further pieces of lathe D are cut to fit along the length of the side, to give a neater finish.

A piece of window glass is now cut to fit the frame so formed, the measurements being D to D \times B to C + $\frac{1}{8}$ in. It is inserted up into the groove of B, and rests along the top of C. To stop the glass from being pushed out, a thin slat of wood, E, is glued along the front edge of C. In this connection, care should be taken that the glass is not a tight fit between B and C. There should be enough "play"

Hybrid Vigour in Fishes

(Continued from previous page.)

young for the market. Then, like the producers of hybrid corn, he would be selling a very uniform stock of good, fertile fishes and maintaining the parent strain from which to go on producing this stock indefinitely.

Variation in tropical fish is usually much smaller than in many domestic animals or plants and so purchasers of hybrids will not be disappointed by finding that their breeders are giving a lot of runts or useless progeny. On the other hand, within a few generations it must be expected that other strains would have to be crossed with them to prevent degeneration. That is where the originator of the hybrids, maintaining his parent stocks intact, would score, for he would be able to go on producing vigorous crosses indefinitely as long as his parent strains were sufficiently fertile to keep going.

for it to be lifted up into the groove of B to enable it to be withdrawn over E.

To lift the glass out a small suction disc, such as is supplied for aquarium thermometers, is applied to the bottom edge of the glass, in the middle. The glass can then be lifted up into the groove, out over slat E, and lowered, when the top will slide out. When in position, the glass is held in at the

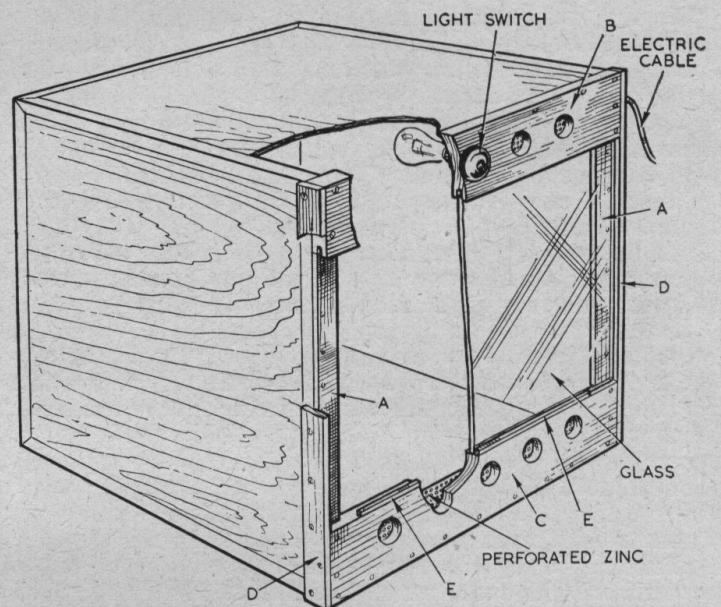


Diagram showing how a tea-chest may be converted into a vivarium by inserting a glass front and a light-bulb.

bottom by E, and at the top, by that small part of it which projects into the groove of B.

All that now remains to be done is to fit a batten lamp-holder in the inside at the top, preferably at the back of the middle of B. This is connected to a switch, which can be situated on the outside of B opposite the lamp. The lead to the mains is run along the inside and brought out near the top, as shown in the diagram. Make sure that the cable is a tight fit in the hole, to prevent the egress of small snakes or lizards. It will be found that a 60-watt bulb will give a temperature of 60-70 deg.F., depending on outside conditions. As a refinement a thermostat can be used in conjunction with a higher wattage bulb to give a more even temperature.

A coat of bitumastic or other waterproof paint round the bottom, and white or cream paint for the rest of the interior, gives the vivarium a bright appearance. To show it up well, dark green or black paint should be used for the outside of the case.

A word of warning—some may be inclined to use the grooved wood for sliding the glass in from the side. It is as well not to do this, as besides a fair amount of room being needed for this manœuvre, the grooves will ultimately become clogged with sand, etc., which will cause the glass to jam and could result in accidents.

The total cost of such a vivarium should not come to more than about 15s., although a lot depends on the price of the tea-chest, and this seems to vary.

South African Lizards Make Attractive Pets

The Skinks and Zonures Are Easily Accommodated in a Simple Vivarium

By Robert Bustard

SOME of the most attractive semi-tropical lizards come from South Africa. Although, since 1945, more and more imports of reptiles are arriving to meet the ever-increasing demand, the South African species are somewhat neglected. This is unfortunate because many of the lizards can be kept with a minimum of attention. This is beneficial from the reptile-keeper's point of view as the ideal specimen is one which at the same time is interesting and does well under vivarium conditions.

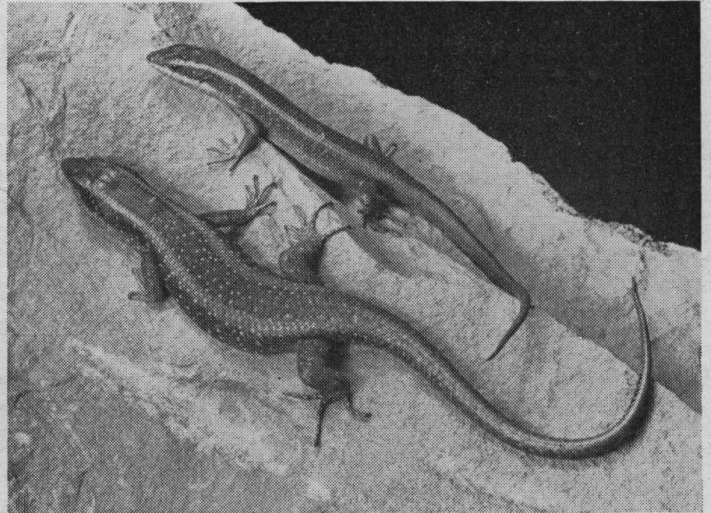
Two groups of South African lizards, coming from sandy and rocky areas, fill this role admirably and are the subject of this article. They are the small insectivorous Skinks and the rock-loving Zonures.

Skinks and Zonures

The Skinks are beautifully marked in varying shades of brown. One species, which has always been a favourite of mine, is the Three-striped Skink (*Mabuia trivittata*). It is about 8 in. in total length, the limbs are small and there is little neck region (as is the case with many Skinks). The tail is long and tapering. There appears to be considerable difference in the length of the tails, as specimens with original tails—that is tails which have not been broken and regrown—may have a total length of ten inches, whereas other specimens may measure eight inches, the difference being due entirely to the length of the tail.

Another Skink which is unfortunately seldom available is the Speckled Skink (*Mabuia homolocephala*). The typical form has a bright lateral orange stripe and its ground colour is pale brown. Like the fore going species, its underside is pearly-grey. The general outline is similar to *Mabuia trivittata*.

Zonures inhabit rocky and desert areas and are frequently very spiny. This is a protection against snakes and other enemies. The tails, in many cases, are very heavily armoured and the thick body plates prevent loss of moisture due to



Photographs]

[R. Bustard

The Kenya *Mabuia* Skinks thrive in vivariums and should receive the same treatment as the Speckled Skink (*M. homolocephala*) which is insectivorous in its feeding.

In this category we find a pale-brown species, *Cordylus polyzonus*, which is occasionally available. This Zonure is apt to be rather nervous.

The Black Zonure (*Cordylus cordylus niger*) and the Reddish-brown Zonure (*Cordylus cordylus*) occur mid-way between the lightly-armoured and the heavily-armoured species. Both do very well in vivariums, taming very quickly and making intelligent pets. In these two species the tails are spiny. They are frequently available in this country and both are well worth while obtaining.

It is now many years since I had my first Black Zonures and I recall vividly the interest I felt when I bred this species for the first time. Zonures are viviparous, which means that they give birth to fully-formed live young which are able to take care of themselves at birth. They usually have one or two babies at a time, which are about half as long as their mother, that is, approx. 3 in. They are perfect replicas of their parents and, being a good size, can often be reared successfully on gentles, small mealworms and flies. In *Cordylus polyzonus* the babies have an attractive pattern of dark brown on a pale stone background.

In my opinion the most beautiful species is the Blue-speckled Zonure (*Cordylus caeruleopunctatus*) which is very rare, being found only in the Montagu Pass, South Africa. Its throat and part of the underside is bright orange-red and the blue speckles, from which it derives its name, give it a most delightful appearance.

The largest Zonure is the Great Girdled Zonure (*Cordylus giganteus*) which attains a length of 15 in. and is the most heavily armoured species. Closely resembling it in outline, but exactly half its size, is the Armadillo Girdled Zonure (*Cordylus cataphractus*). This species is orange coloured and does very well in vivariums where it looks like a miniature prehistoric monster.

The Armadillo Girdled Zonure appears to be very conscious that the armour plating does not extend to its underside, and to protect this area and prevent it being eaten by snakes it has developed a most interesting trait. On being



The Reddish-brown Zonure (*Cordylus cordylus*). It is another lizard native to S. Africa and is long lived. Its tail is spiny.

evaporation, which is very important to a desert dweller.

They show much diversity in coloration—one species is grey-brown, another is almost jet-black, a third is reddish and yet a fourth, orange. Zonures can be very active and this is true, especially of the less-heavily armoured species.

attacked it immediately curls up into a ball, grasping its tail in its mouth, and it retains this position very determinedly on being handled. I first read about this habit in Dr. Walter Rose's admirable book "The Reptiles and Amphibians of Southern Africa", but had never witnessed it personally. There appeared to be much doubt in this country as to whether this actually happened or not, and I was very pleased one day last Winter to observe a specimen immediately assume this defensive position on being attacked. When rescued it at once made off, but, on being lifted up, it again curled itself up.

All these Zonures (with the exception of *C. giganteus*) will live in harmony with the aforementioned Skinks. A suitable collection would be Striped Skinks, Black and Red-brown Zonures and, perhaps, an Armadillo Zonure.

The vivarium should have a good layer of sand at the foot and stones arranged so as to provide hiding places and basking sites. A small water dish for drinking purposes and the addition of some decorative cacti completes the simple set-up. These lizards do not hibernate and will remain active throughout the year. They require some heat, and do best at about 75-80 deg. F. The best method of heating

is by electric light bulbs which provide bright light as well as heat, and are cheap and easy to install.

I keep all my Skinks and Zonures in this way, and many have lived for years in artificial light, and produced young in season. The light should be switched off at night when the temperature can fall to 55-60 deg. F. About 10-12 hours of heat daily appears to be ideal.

I feed my specimens on as varied a diet as possible. This consists basically of flies, bluebottles, gentles and mealworms. Occasional moths, caterpillars and other insects are relished. A spider is considered a real tit-bit by a Skink or Zonure, as is the case with many other lizards.

They do very well in the simple surroundings suggested above, and provided they are kept warm and given a varied diet, there is no reason why they should not live for a long time, and, possibly, breed. I have bred many of mine and, with patience, the young can be reared.

These South African Skinks and Zonures are so easy to keep that it is a great pity that they are not more plentiful in British vivariums. To anyone able to obtain them, and they are quite often available, I recommend them as attractive, easy to keep and with a charm all their own.

COVER
FISH
SPECIAL

Jack Dempsey Cichlids

Advice on Keeping these Fishes which Have Bold Colouring and Soon Become Quite Tame

By Peter Hewitt

THE Jack Dempsey (*Cichlasoma biocellatum*) is one of the larger members of the Cichlid Family, attaining a length of 7-8 in. when fully grown. Its habitat is Central South America. The body of the adult fish is a dark olive colour, heavily patterned with iridescent scales in shimmering greenish-blue. This pattern is carried on to the anal, dorsal and caudal fins and there are two ocellated spots, one half-way along the body and the other on the caudal peduncle. The dorsal fin is lined with an orange-red. When adult, the male develops a humped-shaped nape to its neck which is not present in young fish.

From the show point of view the Jack Dempsey is an excellent fish as, when fully adult, the colours become established and do not fade if the fish is disturbed or when there are fluctuations in the water and temperature. It is a very hardy species. Provided it is kept in reasonable conditions it will live quite happily in an aquarium for 8-10 years and will become extremely tame. It is a prolific eater and should be fed mainly on livefoods such as Earthworms, chopped liver or chopped heart, although it will also accept most dried foods. Owing to its size, a tank for it should be at least 36 x 15 x 15 in. and it is quite useless to introduce plants as the Jack Dempsey will uproot them.

The breeding procedure is extremely interesting and, for breeding purposes, the tank should be set with about 1 in. of compost on which are placed several rocks and a flower-pot on its side. The pair of fish should be put in the tank and heavily fed. Very shortly the pair starts cleaning the flower-pot and small breeding tubes are seen protruding for about $\frac{1}{8}$ in. near the anus of the fish. During this period the male becomes extremely vigorous and vicious; the female is driven round the tank, taking refuge behind the rocks.

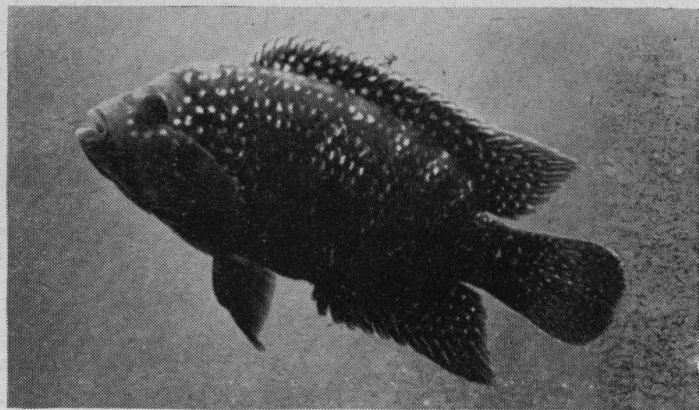
When the flower-pot has been completely cleaned the female deposits her eggs on the inside and they are immediately fertilised by the male. The number of eggs varies between 200-800. The fish take it in turns to guard the eggs and ensure that the water circulates over them by fanning

them with their pectoral fins. After 2-3 days the parents start preparing a shallow pit in the compost and then remove the eggs to this pit.

The eggs hatch in the pit and are removed every few hours to another depression, at the same time the parents appear to clean the fry in their mouths. After about a week the young fish start emerging from the pit and keep in a tight shoal by the parents who catch any stray youngsters in their mouths and carry them back to the centre of the shoal.

At this period small screened *Daphnia* or Brine Shrimps should be offered and, at the end of a further week, the babies are large enough to take medium sized *Daphnia*, chopped White Worms, shredded Earthworms, etc. They can be left with the parents for a period of 5-4 weeks before they are in any danger. There is no difficulty in raising the fry; the only problem confronting the aquarist is that of tank space, as very quickly the fry will grow into good sized fish and must be transferred to more roomy quarters.

Although, as its name suggests, the Jack Dempsey is a pugnacious fish and is not a good occupant for the community tank, it is well worth keeping for its beautiful colour, interesting breeding habits and tameness.



G. J. M. Timmerman photograph of an adult Jack Dempsey.

Experiences with Guernsey Green Lizards

Three *Lacerta viridis* Specimens Successfully Acclimatised to Life in an Outdoor Vivarium

By K. Jolly

IN the *British Journal of Herpetology* for September, 1949, there is an article entitled "The Reptiles and Amphibia of the Channel Islands and their Distribution". Beneath the heading "Guernsey" three species are listed: the Slow-worm (*Anguis fragilis*), the Common Frog (*Rana temporaria*) and the Green Lizard (*Lacerta viridis*). It was the remarks on the Green Lizards I found interesting, particularly when I arranged a July holiday in Guernsey a couple of years ago. As a boy I had kept as pets either the Jersey or Continental variety of the Green Lizard and, at the time, they had given me much pleasure. So much so that years later the prospect of seeing the species in its natural haunts greatly appealed to me.

My chances of doing so may be judged from the Journal's information. This was as follows: "Green Lizard (*Lacerta viridis*). Found in Guernsey by Sinel and others forty years ago and earlier, having apparently been introduced from Jersey. By 1902 it had apparently become very rare, but is still to be found around Fermain Bay. Said to have been fairly plentiful there a few years ago. Also known at Vallette Cliffs".

The Lizards Located

As it happened, we found the Green Lizards at Fermain Bay on the steep hillside above the cliffs and managed to bring three home with us, an adult and two young specimens. These latter were brown in colour but one had an underlying suffusion of green, the other tending more to a reddish tint. The white or light yellow lines were definite on each. Between the lines was a number of black or dark brown blotches. All three lizards were of a daffodil yellow on their undersides. The adult specimen was the usual delightful green shade on his upper parts.

How we cared for the lizards in the early stages may be of interest. Some weeks before we started our holiday I ordered a 4 ft. × 1 ft. × 1½ ft. aquarium. This was waiting for us when we returned home. It was a simple job to make a cover for it out of a wooden frame and a length of muslin. Furnishing the tank with sandy earth, bark, broken flower-pots, rocks and a dead tree branch I placed it on some bricks in the garden and then introduced the reptiles to



[Photographs]

[N. Pinn

The author's two male Guernsey Green Lizards photographed in the well-arranged garden vivarium where they thrived.

their new but temporary home. Their water for drinking was provided in a saucer.

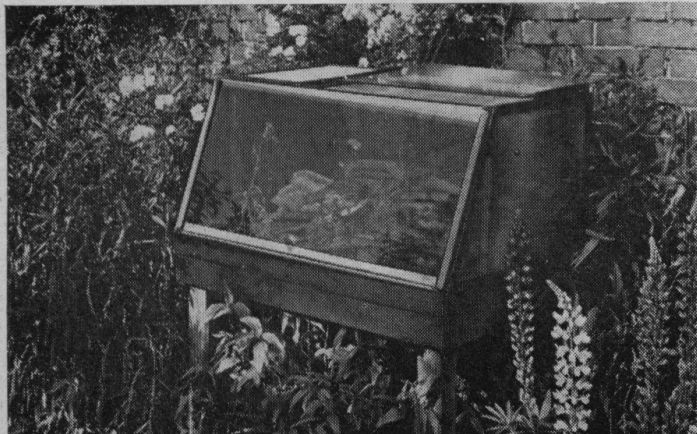
They soon took to feeding regularly. In these first days I gave them Earthworms, wood lice and flying ants. The flying ants were very plentiful for a few days in August as they emerged from their nests and were greatly relished. When I had made a sweep net I was able to collect many species of spiders from the hedgerows. These were also enjoyed. On other excursions we collected grasshoppers, some of them being of a large, brown, wingless species and all found a permanent place on the lizards' menu.

As soon as I was able, I built a vivarium. This was of the following dimensions and construction. The base was made of tongued-and-grooved pine boards finished to overall measurements of 3 ft. × 2 ft. Along each side was fixed a board making it into a tray of about 3 in. deep. At each back corner was fitted an upright 1½ ft. in height. Inclined grooved posts were screwed at the front corners. The grooves were to hold the glass viewing panel that covered the entire front of the vivarium.

Roof Arrangement

A top frame was joined to the top ends of the four posts. This was divided into two portions; one, two-thirds of the area, was made to take a pane of glass that could be withdrawn, if necessary. In the remaining area was fitted a hinged door of perforated zinc which lifted upwards. The back and one end were covered by asbestos sheeting. The remaining end (the one farthest from the door) was of perforated zinc. On the inside of the asbestos walls I spread Scotch glue waterproofed with added bichromate of potash, and sharp sand was scattered on to this. When dry, it provided a surface over which the lizards could climb with ease.

The finished article was placed on a table against a wall of the garden facing south. Before arranging the rockwork, etc., two ¾-in. holes were bored in the base. Into each was pushed a glass tube until its top was flush with the wood.



A view of Mr. K. Jolly's vivarium which houses his Green Lizards. Its construction is described in this article.

The bottom of each tube was drawn out to a narrow neck to make the egress of any lizard by this way impossible. Into the top of each tube was fitted a shallow funnel of about 4 in. diameter. Over each was placed a flower-pot, so that its drainage hole was central over the funnel. By this arrangement I could have plants that could be watered in the vivarium, safe in the knowledge that any excess would drain away and not dampen the whole floor of the cage.

When putting in the earth, of which I used a great amount, I buried a wooden box in the middle of it. Inside this was a smaller box, half filled with straw and fitted in such a manner as to be surrounded by an insulating layer of air. A small entrance way was left and loose stones and rock were placed around this entrance so that the lizards could always reach it. I had in mind their forthcoming hibernation and wished to supply them with a frost-proof retreat.

A pool was made from a pie dish let in level with the surface of the earth and filled with washed gravel to over the top of its sides. The gravel was then pushed out from the centre. When water was poured in, a natural-looking pool was formed. It did not work very satisfactorily, however, for the reason that livefood often found its way into the water and drowned eventually, fouling the pool. The lizards, also, were responsible for introducing a certain amount of earth, etc. It was not until the Spring that I put all this to rights.

Having completed the layout I somehow caught the lizards and transferred them from the tank to the vivarium. Shortly after doing so the young one of a greenish hue shed its skin to reveal a brighter, more lustrous green, with many of its dark patches having disappeared or grown smaller.

When October came I put in large quantities of caterpillars of the large white butterfly and blowflies (these I was able to collect from a cellar). Mealworms were also offered as food and these latter were all I saw eaten and even then only one or two. I was perturbed as, from what I have read, it was essential to feed the lizards well to fatten them for their long retirement through the Winter months. To me their appearance was no different from what it had ever been.

On October 23, the lizards not having shown themselves for the previous three to four days, I accepted that they had started their hibernation and made preparation to transport the vivarium to an old lean-to greenhouse built into the angle of the end and side wall at the bottom of the garden. Unfortunately the heavy weight resulted in the rockwork, etc. being upset. I therefore dismantled the vivarium and found the lizards safe. The two smaller ones were curled up together deep down in the earth, which I found to be damp, possibly as a result of some overflowing of the pool. Both were covered in mud.

Prepared Site Ignored

The large green one, although rather torpid, sluggishly crawled out by himself. None had paid any attention to the little straw-lined box I had made for them. The problem was met by placing all three in a Kilner jar partly filled with straw. This was buried, without its top on, in the earth of the vivarium. The vivarium was covered by layers of straw and sacking.

It was not examined again until March 26 the following year when, to our joy, we found all three lizards had emerged and were resting on top of the earth very lethargically but apparently quite fit. To my eye there was no change in their appearance. They were no thinner as perhaps one might imagine they would be. Their skins, were possibly duller and more leathery looking, but as the two smaller ones were coated in dried mud this could be expected. These two had difficulty in opening their eyes and I sponged them with warm water.

For the first month after their awakening I kept them once again in the 4-ft. tank but this time in the kitchen

Fish Philately Ocellated Toby



THIS 30-centavo stamp, its lettering printed in red against a background of neutral grey, is another in the magnificent series of fish in full natural colours issued by the Portuguese East African colony of Mozambique in 1951.

The fish depicted is the Ocellated Toby (*Canthigaster margaritatus*), a six-inch long inhabitant of tropical coastal waters, coral reefs and pearl banks. Its colour is very variable, some specimens being brilliant, others insignificant and dull.

On the stamp, the body and tail of the fish are shown as warm red, with pale blue stripings on the upper parts and blue spots below. Fins are bright yellow. The dark eye-spot, or ocellus, is characteristic of the species.

The small Family *Canthigasteridae*, the Tobies, belongs to the Order *Plectognathi*, which also includes the Puffer, Trigger, Trunk and Porcupine Fishes. It comprises several small species of prettily coloured Globe Fishes, none exceeding six inches in length. As with the Tetraodonts, the Tobies have the teeth in both jaws, fused to form a sort of beak.

Canthigaster rostratus is found in West Indian waters, *C. solandri* (orange with blue spots) is abundant throughout the South Seas and *C. rivulatus*, around Japan.

John Wakefield

which receives a good measure of sun. To guard against frost I kept a shaded 25-watt lamp burning both day and night, for the first two weeks. For a week or just longer they did not feed but, as the temperature rose, they started. By digging in the garden I was able to find a number of beetle larvæ. These supplemented the usual fare which at this stage consisted of gentles, mealworms and Earthworms.

At the end of three weeks the first lizard started to slough its skin and by the end of the month all had done so; each took two days to complete the task apart from some skin on their tails. The small green one was now approaching more closely in colour and looks to the adult specimen, the dark blotches having diminished to mere vestiges of what they were. Although brighter looking, the brown specimen appeared much the same as it had done previously as did the large green lizard.

During their sojourn in the aquarium I was making certain refinements to the vivarium. I had removed the sliding glass top and replaced it with perforated zinc. I then fitted the glass in runners above the zinc so that it ran from back to front at a gentle slope; the idea of this arrangement was that in fine weather the glass could be removed altogether to permit good ventilation. On wet days it could be put in position as a roof, the water draining away over the front edge.

The pool was dispensed with entirely and replaced by an

automatic water provider. This was made on the same principle as those supplied for poultry. Into a log I let in a porcelain medicine measure of one teaspoonful capacity. Above this, fixed to an upright, by a metal spring clip, was an inverted test tube filled with water. This tube could be adjusted so that the mouth was just below the rim of the measure. When the water in the measure was over the mouth of the tube the water in the tube was kept there by atmospheric pressure. When, by evaporation or the lizards' drinking, the level fell below the end of the tube water was released to replenish the small reservoir. I have found it lasts about a week before needing further attention. It is not obtrusive and, if less attractive than a pool, is far less trouble.

A month after taking the lizards into the kitchen I put them outdoors in the prepared vivarium. The two green specimens (which we believed were males) now had clearly defined patches of green-blue just behind and lower than the angle of their jaws. In neither did it extend under the throat as is recorded for other varieties of *L. viridis*.

During May a certain amount of fighting took place between the two green lizards (the males). These two are, for most of the time, very friendly, basking together and generally following each other about but, on the odd occasion, when either took to closely examining the other, there would be a sudden vicious flurry, and the offending lizard would be thrown quite forcibly for some distance. These same attentions, when paid to the little brown specimen, did not follow the same pattern. She was often

only too anxious to escape from them after a short period. She never showed an interest in either of the males. All of these displays I believed to be in the nature of courtship and certainly the brown coloured lizard showed some fullness of body.

About this time large white butterflies were appearing in the vivarium. These were breaking free from the chrysalids of the caterpillars I had put in the previous Autumn. The butterflies were left alone by the lizards which was strange, as they are often quoted as being suitable food for *L. viridis* but then, in my experience, other foods recommended have also been without appeal to our three specimens, such as flies, moths and beetles. Other foods of a hard skinned nature offered—weevils, bugs, etc. have also, up to now, been rejected. The most enjoyed are smooth caterpillars of all types, flying ants (the large ones), grasshoppers, mealworms (despite the tough skin), gentles, larvæ of beetles, spiders, small wood-lice and Earthworms. It is sometimes said that Green Lizards can often be induced to accept Earthworms. I found they were taken straight away.

In conclusion I would affirm that these lizards are fascinating creatures to keep, but to anyone hoping to maintain *Lacerta viridis* I must be honest and say that the provision of food requires effort, but, once made, the reward is great. It is true to say that they can influence one's outlook. At one time it would have been difficult to believe I should ever visit my cabbage plants hoping to find them infested with caterpillars!

Moor Goldfish (2)

Spawning Times—Breeding Tank Size
—Useful Ponds—Keeping Full Records

By T. L. Dodge

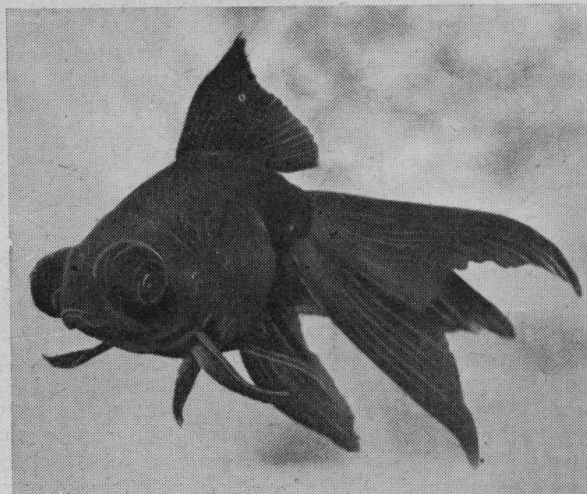
Photograph
[L. E. Perkins

COLDWATER fishes almost invariably spawn when the barometer is falling and there is a falling temperature and daylight. This is one of the reasons why spawning nearly always commences in the early hours of the morning, especially after a moonlight night which follows a sunny day. There are, of course, exceptions to this rule but observation will usually provide the answer. The water in the spawning tank should be clean and fresh. Fishes will rarely spawn in old or stale water.

If the fishes are kept in warm water throughout the year then spawnings become much easier because the above conditions can, to some extent, be artificially created. On the other hand, those same fishes will obviously enjoy a much shorter span of life than will their coldwater brothers and, unfortunately, will never thrive if kept in cold water. Although fishes will grow more quickly when kept in warm water it is not a bit of good trying to transfer such species to outdoor pools during the Summer. The water is usually around 60 deg. F. by such a time and that, added to the more natural conditions, in no way prepares the fishes for life in freezing water the following Winter.

Coldwater spawnings are more difficult because natural climatic conditions are the deciding factors and advantage must be taken when those conditions are recognised. This is not always possible for varying reasons. If the conditions arise in mid-week, when the breeder has to attend work, he is very lucky indeed if he can utilise them. The aquarist who boasts of his ability to spawn his fishes on any given day is an extremely clever person.

Moors, by reason of their hardiness, can be expected to



spawn earlier in the season than the Calico type of Twintail. Provided they are well looked after during Wintertime and sensibly nurtured for the forthcoming breeding season there is no reason why the first spawning should be later than the month of March.

Aquarium Sizes

The ideal size for a Moor spawning tank is, in my opinion, about 36 x 15 x 15 in. A tank of such a size can be kept clean and it provides a fair amount of water for a heavy spawning. Spawnings are best divided into two or more tanks, dependent upon the size of the spawning and the number of tanks available. Young fishes can be thinned out into further tanks when they are about three weeks old or about 3/4 in. in overall length. I find it expedient to apportion about 50 young fishes to each tank of the above size, gradually reducing the number per tank as their growth proceeds. Larger tanks are available once the youngsters are past the fry stage. Very large tanks are useful for Winter housing, but even more important are good, clean conditions and intelligent dieting.

After having taken great pains to ensure a good spawning and having tanks swarming with healthy young fry, the

Care of Snakes in Winter

Making a Vivarium to Provide Warm and Humid Conditions for Selected Snakes

By Dr. P. A. Zammit-Lewis

ALTHOUGH I had kept and bred animals of various kinds in the past, I never had the opportunity of keeping snakes until coming to England 18 months' ago. I found that the snake fancier in this country is faced with the problem of providing an adequately heated vivarium during Winter months. Where electric light bulbs are used to heat the vivarium, some form of shield to the bulb is required (usually perforated zinc) so that the snakes are prevented from coming into direct contact with the bulb.

Tubular heaters are satisfactory but cost more and, unless covered in some picturesque manner, look uninteresting and artificial. The same applies to the bulb and shield in that it spoils the natural appearance of the vivarium.

Temperature of Bathing Water

The maintenance of the temperature of water provided for drinking and bathing is also a problem, and after trying all sorts of experiments I have evolved a system which gives cheap overall heating for the snake vivarium. It is easy to install and is probably more efficient than most.

When constructing a vivarium the base should have a border of about 2½ in. all round. A tray of zinc or galvanized

bathing dish in the hole provided. The immersion thermostat should be placed so that it is as far away from the heater as possible, setting the former at 90 deg.F. (see diagram B).

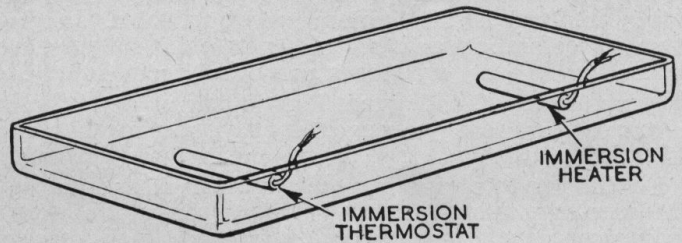


Diagram B. The tray to contain the water which is heated electrically and is covered with perforated zinc on which is spread a sheet of paper lightly surfaced with concrete.

As the water is heated up, the vapour penetrates the perforated zinc, paper and the thin layer of cement, thus creating a naturally warm habitat of about 78 to 80 deg.F. dispersed equally throughout the vivarium (5 cubic feet approx.) which is the average warmth required by snakes. Using this system the water in the dish is kept constantly warm by the circulating hot water in the tray. I have found that snakes have an affinity for warm water to which they go voluntarily during the moulting period, otherwise one has to keep supplying them with warm water and ensure that they go into it before it becomes cold.

Importance of Warm Water

Obviously if snakes were to go into cold water from a warm vivarium they would catch colds and would be liable to contract pneumonia for which there is no known cure. It is imperative that ventilation should be provided on top of the vivarium, amounting to at least 84 square inches. This is required to avoid excessive condensation.

This type of vivarium is especially useful for the various snakes that are used to damp surroundings, such as the constrictors (pythons, anacondas, etc.), and water snakes. I am at present keeping in my vivarium a Boa Constrictor, a Rainbow Boa, a red Rat Snake and a Chicken Snake. All are in good health.

It is my hope that the hints I have given will be of some benefit to reptile fanciers in maintaining healthy snakes under vivarium conditions.

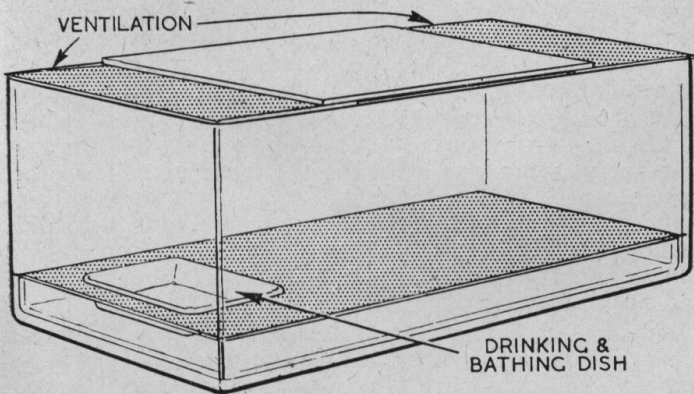


Diagram A. The completed vivarium for snakes showing the position of the tray which allows a degree of humidity to be maintained. Ventilation is supplied through the top.

iron 2 in. deep is made which should fit in the bottom of the vivarium as shown in diagram A. Cover the tray with a sheet of perforated zinc. To have good and simple heat conduction cover the sheet of perforated zinc with an ordinary sheet of paper. Then layer this with a very thin rendering of concrete preferably about 1/8 in. thick to make it look like an ordinary ground base. This sheet of perforated zinc should be fixed in a frame to facilitate easy removal when cleaning the tank without cracking the thin concrete layer. Cut a hole in the perforated zinc, large enough for a small dish for drinking and bathing (see diagram C).

All that is now required is an immersion heater of 60 or 75 watts and an immersion thermostat set at 90 deg.F. When all is ready fill the tray to within 3/4 in. of its top and place the immersion heater and thermostat in the water. Cover the tray with the frame and put the drinking and

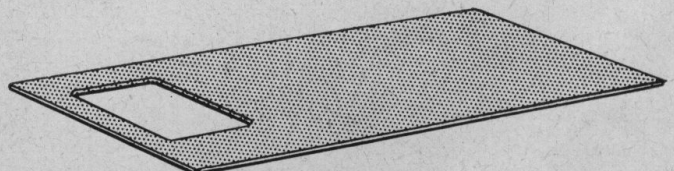


Diagram C. The top for the tray (perforated zinc and concrete) ready to be positioned in the vivarium.