



## PICK OF THE PETS

### NO. 1. THE SALAMANDER

*A New Series by Alfred Leutscher, B.Sc., on  
Reptiles and Amphibians for the Beginner*

**P**ETS which are long lived, hardy and resistant to illness, easy to feed and not too much trouble to keep, are far more rewarding to a beginner than the more showy and temperamental kind. There is plenty of time for these later on when one has gained more experience.

A hardy favourite which makes a good beginning to the vivarium hobby is the European Salamander (*Salamandra salamandra*), known for centuries as the legendary Fire Salamander. Records of the life span in captivity go up to 30 years, and the salamanders in my own collection are still going strong after 10 years. Frequent appearances at lectures, aquarists' shows and on T.V. have not disturbed their health and equanimity.

Normally docile and entirely harmless, this attractive, slow moving little creature seems ideally suited to life in the confined space of a vivarium. From personal experience I find that an aquarium, being watertight and easy to move about, makes just the right kind of container for salamanders.

To prepare this home, first line the floor of the aquarium with about two inches of well washed gravel or aquarium sand. Next, scoop out a hollow near the viewing side and line with large stones or rocks. Fill this with clean water to create a miniature pond.

Continue filling until the water saturates the surrounding sand to just below the surface. On this place a further layer of loamy soil, mixed with leaf mould, which will soon absorb moisture from the underlying sand, and provide an excellent medium in which to grow shade and moisture-loving plants, such as mosses and ferns. Other plants may be chosen from a nurseryman's catalogue. The plants are set in the soil and anchored with stones.

In the spaces between are built hiding places

for the salamanders which prefer to retire during the daylight hours. These little retreats can be made out of pieces of curved bark, broken flower pots and flat stones raised on supports. Bark and stone with moss already growing on them should be looked for in the countryside. For a while it may be necessary to top up the 'pond' until the water settles to a steady level.

A home like this can go on for years with little attention. To retain a humid atmosphere, to keep out dust and prevent the creatures from escaping, the tank should be covered with sheet glass raised on corner supports just clear of the top. Salamanders feed on almost anything small which moves, and will take Earthworms, slugs, beetles and caterpillars, also bits of raw meat waved about close to their heads.

#### Breeding Possibilities

Frequently they breed in captivity. The male, in a clumsy courtship, attempts to clamber on to the female's back. He is recognized by the more swollen cloacal region at the base of the tail. The female has a brood of gilled babies laid in water. To produce her family, often quite a large one of 20 or more, she takes a kind of hip bath in shallow water.

The gilled babies, not unlike larval newts, should be removed and reared separately in shallow, well matured water, on Infusoria and *Daphnia*, or gnat larvæ. They transform into baby salamanders in about 10 weeks and feed on minute insects, tiny Earthworms and slugs, to which can be added the well-known *Enchytraeus*, or White Worm.

A tastefully planted tank of green plants displaying brightly coloured yellow and black inmates in pleasing contrast can make a very attractive ornament in a shaded drawing room.



ways by which dechlorination of water may be carried out, and a few of these methods are safe to use where fish life has to be considered.

One of these is by passing the water through an *activated carbon* filter, but, for the aquarist, perhaps the most convenient method may be considered to be the addition of sodium thiosulphate to the water. This may be done by dissolving one ounce of sodium thiosulphate crystals, (Hypo) in one pint of warm water. One teaspoonful of this solution will be sufficient to treat three gallons of aquarium water.

Water treated by this method will be ready

to receive fishes after one hour has elapsed. A further method of dechlorination is to aerate the water in the aquarium vigorously for about four hours before fishes are introduced. Thus the danger of residual chlorine to fishes may easily be eliminated.

As the danger lies in the sudden introduction of fishes into a tank containing freshly drawn mains water the wise fishkeeper, when exhibiting some of his finest specimens, will not hesitate to pre-treat the water in his exhibition tank by one of the methods outlined above. Mere topping up in an already established aquarium cannot be considered as creating a hazard.

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## ANOLIS LIZARD FROM CAROLINA



Photograph  
G. S. C. White

by **MARY E. WHITE**

**T**HE Anolis Lizard from Carolina and Florida (*Anolis carolinensis*) makes a very attractive pet, particularly for the herpetologist who has not much room available. If several are kept together, their lively habits and the endless skirmishes between the males,

make them a source of great interest and amusement. They have a rather supercilious way of regarding their owner which is most entertaining.

Their body length is about 2½ in., the tail being almost twice as long as head and body.

It is difficult to realize that these small and delicate looking little lizards belong to the same Family as the great Iguanas. However, in some ways they are curiously alike. The head bobbing for instance, which is characteristic of the males belonging to this Family, is seen in miniature with the Anolis Lizard.

One great attraction of this *Anolis* is the ease with which it changes colour. In this respect they rival the Chameleon, and are sometimes known as "American Chameleons". They are, in fact, not related to the true Chameleon. Their colour ranges from pale biscuit through the browns and, when sleeping or dead, they are a delicate shade of pale green with white underparts.

They are also able to achieve green and brown patches, or one half of the body may be green and the other brown. Owing to this colour changing it is almost impossible to recognize any particular individual, unless it has some deformity which marks it from the others.

The males have a dewlap which is erected in courtship or combat by means of a rod of cartilage in the throat. The magnificent dewlaps of the Iguanas are also extended in this way. The *Anolis* cannot hope to compete with their large relatives, but their little dewlaps have the added attraction of flushing a bright red colour. This gives them their alternative name of Red Throated Anolis.

Another feature of these fascinating lizards is their ability to run up any smooth vertical surface, including the glass sides of a vivarium. This means that a close fitting lid must be used or they will easily escape. Anyone who has chased one of these small, agile creatures will know how difficult they are to capture.

To see them at their best a rather tall vivarium is the most suitable. Furnished with thin branches and a broad leafed plant, or sprays of leaves, a very attractive arrangement can be made. I use Rhododendron sprays as these are long lasting in water and make excellent sleeping quarters for the *Anolis* who love to lie enfolded between the broad leaves at night.

One word of warning—do not use these leaves if any herbivorous lizards are included. Rhododendron is poisonous to vegetable-eating creatures. Some form of heating is necessary during the greater part of the year—a daytime temperature of about 75 deg.F. being most suitable. This can drop lower at night. Anolis Lizards love to bask beneath the light of an electric bulb.

Most authorities on these lizards advocate the spraying of the vegetation to provide moisture, as for Chameleons. I get better results with *Anolis* and Chameleons by keeping the vivarium quite dry, but fixing high in the branches a shallow water dish, kept brim full.

The lizards will drink from this, whereas they would refuse water on the ground. Keeping the vivarium dry avoids any trouble that may arise from overhumid conditions.

*Anolis* are very easy to feed. Plenty of variety is a great essential to health as with all lizards. Soft bodied insects are liked best; caterpillars, grubs, spiders and flies being preferred to mealworms, which have hard bodies. Flies have to be the mainstay during the Winter months, and these can be hatched in relays from fishing gentles.

Sometimes a search in the garden shed and other odd corners will reveal a number of hibernating spiders, etc. These should be used to vary the rather monotonous diet which is unavoidable during the long Winter months. If a good variety of insects is fed to the *Anolis* in the Spring and Summer, they should be fit enough to survive the monotony of the Winter diet.

Anolis Lizards have the curious habit of eating their skin when it is being shed. They appear to enjoy this skin which is sloughed almost in one large piece, splitting down the middle of the back. The lizard performs this operation as quickly as possible, being very conspicuous at this time. In the wild state they must be in great danger from predatory creatures during the sloughing. This would account for their rather apprehensive manner during the performance.

#### Suitable for a Community

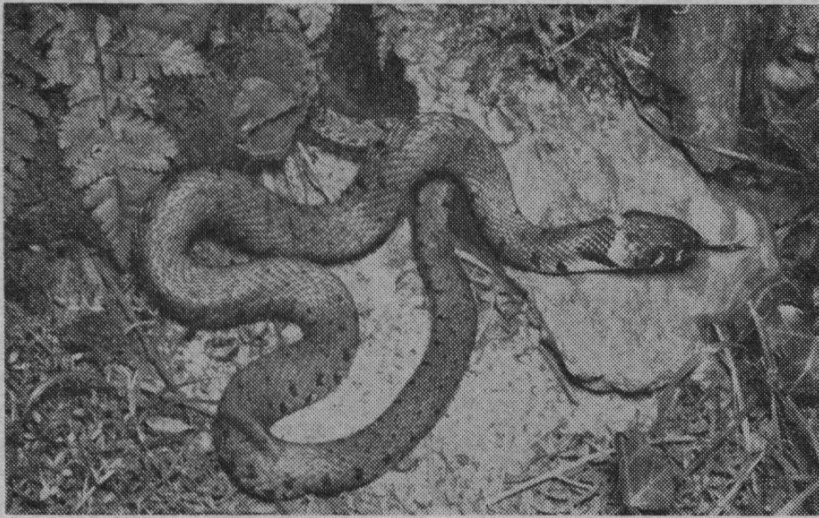
*Anolis*, being non-aggressive, can be kept with other small lizards if desired. Mine were kept for some months with a young Chameleon. At first they were very wary of this larger creature with the long tongue, keeping well out of range. They soon became bold, however, and feeding time was a problem. The Chameleon, being the slower and more delicate, was offered the choicest insects in a glass jar. The *Anolis* became so cunning that they would slink up and snatch food almost from the Chameleon's jaws or, darting quickly into the jar, would seize a succulent morsel and scurry away with it.

In their wild state, eggs are laid in June or July. Usually two in number, they are rather soft shelled. Newly-imported specimens will often produce eggs, laying them in the most odd places. I have found them sticking on the glass sides of the vivarium. I have never been successful in hatching them so far.

*Anolis* are not easy to photograph, being too active for one thing and blending so well with their surroundings that it is difficult to get a good picture.

There are many species of *Anolis*, all most attractive, but this common one from Carolina is the most likely to be obtained.





## PICK OF THE PETS

### No. 2. THE GRASS-SNAKE

by ALFRED LEUTSCHER, B.Sc.

**S**NAKES have a fascination all their own. Whether a person likes, hates or fears them he is almost certain to be curious. Much of this curiosity can be satisfied by keeping a harmless and hardy snake.

Our native Grass-snake (*Natrix natrix*) should fill the bill as it is easily tamed, quite inoffensive and easy to keep. It may be caught wild in this country or bought from a pet shop. The latter specimens are usually the Continental variety imported from Italy.

A snake's health may be largely judged from the condition of its skin. This should be dry and soft to the touch and reveal a kind of grape-like bloom shining through the normal colour. The skin should also slough cleanly, almost in one piece. Blemished or patchy skin arises where the creature has dirty or wet surroundings. The snake then appears bedraggled, sloughing is interfered with, and bacterial colonies rapidly invade the scales and mouth, causing sores and swellings. The snake goes off its food and wastes away. To avoid this condition it is a good idea to keep the snake's cage perfectly dry, the only water being contained in a shallow bowl.

The home can easily be made out of wood and glass. Construct a box frame of one inch supports, two feet square by 18 in. tall. Fill in the sides and front with sheet glass, the back with boarding, and the roof with perforated zinc into which is fitted a small trap door. Through this door food can be introduced or the pet removed. The snake will also stand less chance of escaping should the door be left open.

This box cage fits on top of a wooden tray, about six inches deep, filled with dry material such as broken peat, leaf mould or sand. On to this mixture scatter clumps of dried moss or leaves, a few branches, a flat rock to make a sunning platform, and a clump of dried heather through which the snake can crawl when in the act of sloughing. The water bowl in one corner will be used for drinking, also for an occasional bath, especially before sloughing.

A simple hiding place can be made out of a cave of rockwork or some bark. If living plants are desired then these should be growing in their pots, placed in drip trays so as not to dampen the cage.

#### Easily Tamed

Grass-snakes will become very tame, even taking food (which has been freshly killed) from the hand. In nature they feed on cold-blooded prey for choice, such as frogs and toads, newts and freshwater fish. Sometimes fish in garden ponds are attacked. The Grass-snake is an expert swimmer.

Should the female be suspected of carrying eggs, a special incubator can be prepared. Place inside the cage a tin about four inches deep, filled with damp leaf-mould or peat, and remove as soon as the eggs are laid. Place the tin in a steady temperature of about 75 deg.F. The eggs should hatch in about 10 weeks.

In dull weather or poor Summers a suspended light bulb which hangs a few inches over the sunning stone will prove beneficial. Where a sunlit window space is not available, the light can be switched on when necessary.





The American Bull Frog (*R. catesbiana*) which grows to about 7 in. It is the species most commonly kept in Britain. Photograph by Robert Bustard.

## ***Keeping Bull Frogs***

Giants among this  
group of  
amphibians

by **ROBERT BUSTARD**

EVERY frog and toad collector at some time or other wants to keep Bull Frogs. They are giants among frogs and undoubtedly this is one of the reasons for their popularity. Another reason is the ease with which they can be kept in a vivarium where they feed well and will live for many years.

There are three species which are likely to be available from time to time. These are the Indian Bull Frog (*Rana tigrana*), the American Bull Frog (*Rana catesbiana*), and the African Bull Frog (*Rana adspersa*). They have several requirements in common, namely, that they like roomy vivaria which should be set up like a swamp and which should be heated, at least during the Winter.

The American Bull Frog is the hardiest in this respect as it is widespread in the United States and even occurs as far north as Southern Canada. This species can be hibernated during the Winter, if desired, a course which I do not recommend for the other two species.

Vivaria for these frogs must be roomy, as previously mentioned, and I suggest that an aquarium or other water-tight vivarium is used so that it can be kept humid, like a swamp, without difficulty. Nothing smaller than 24×12×12 in. should be considered, and the container should be larger if possible. I have kept adult pairs of *Rana tigrana* and *Rana catesbiana* in a vivarium of 36×20×20 in. dimensions and found this to be a suitable size for one pair.

If an aquarium is used, part of it can be filled with water and the other end can consist of damp mud with some moss and reeds or other marsh plants. A wall of stones can be built across the centre of the tank to keep most of the earth behind it.

Some herpetologists prefer to sink a large pie dish into the soil and use this as a pool.

Such a system makes for much easier cleaning out and it is simpler to regulate the degree of dampness of the surrounding soil. I prefer this method as the pie dish can easily be disguised and quickly removed and cleaned.

If the pie-dish arrangement is not used it means that the whole set-up must be disturbed in order to clean it out. Many collectors will dislike pie dishes or other unnatural objects in their vivaria and they would be well advised to make a small pond of concrete. This is easily done and, if it is treated before use to neutralize the alkalinity of the concrete, it will be perfectly safe. The pool should be of good size—at least large enough for both Bull Frogs to be completely submerged at the same time.

### **Indian Bull Frog**

We can now consider individually the species mentioned above. Comments on the African Bull Frog will be made in the next issue. First let us take the Indian Bull Frog (*Rana tigrana*) which commonly reaches 6 in. in snout-vent measurement and is said to even achieve 7 in. It is common in many parts of Eastern Asia. Above, the coloration is olive brown with darker markings. Below it is white. There is, of course, an intergrading on the sides where the general shade is greenish. This frog has a pointed snout.

Indian Bull Frogs are inclined to be nervous initially but, in suitable surroundings, they will soon settle down. If kept in an aquarium, the sides and the back of it should be covered over with cardboard or painted black as the



frogs will then have a feeling of security which they would never get if surrounded by glass on all sides.

The Indian Bull Frog is mainly aquatic and will spend long periods in the water. When out of water it will dig down into the mud until only its head is in sight and the colour of its back blends so well with the surroundings that it becomes very difficult to see.

The Indian Bull Frog has powerful hind limbs and can jump for very long distances. It has been said that it can jump as fast as a man can run and this is possibly true over short distances. I once had a specimen escape, and the speed with which it traversed the length of a lawn—in several tremendous leaps following immediately after each other so that it hardly appeared to touch the ground—was quite incredible.

These large frogs are quite capable of swallowing a fully-grown mouse—which is true of all the Bull Frogs mentioned. They will also take Common Frogs or large Earthworms and have insatiable appetites.

I have always kept my Indian Bull Frogs heated in the Winter—at a temperature of 65-70 deg.F. Heating is not necessary in the Summer but, if during cold spells they go off their food a little, heat can be supplied.

#### American Bull Frog

The American Bull Frog (*Rana catesbiana*) has much in common with its Indian relative. Like it, this species is largely aquatic and spends most of its time in the water or within easy reach. There are records of specimens living for years down wells where they were obliged to remain constantly in the water.

They achieve a size of about 7 in. The male has a pair of internal vocal sacs. In *Rana tigrana* these are external. In *Rana catesbiana* the tympanum is very large, the colour above being olive brown with darker markings and spots dark brown or black. Below, it is yellowish white with brown markings, notably on the throat.

*R. catesbiana* requires exactly the same treatment as *Rana tigrana*, and will eat precisely the same food. In a wild state ducklings are said to be eaten, and small snakes are also often taken. It is relatively hardy and can be hibernated if in good condition, although I prefer to keep my specimens warm during the Winter. Like *Rana tigrana*, it is a wonderful jumper.

*Rana catesbiana* is undoubtedly the Bull Frog most commonly available in Britain and is very popular as a pet. I think its large size is one reason and the fact that it is hardy. Its popularity is sufficient to recommend it as a very desirable vivarium inmate.



## Fish Philately



### Pennant Coral-fish

**S**PECIES in the Family *Chaetodontidae*, the Butterfly Fish, are mostly small and brilliantly coloured. The teeth are small and bristle-like, the dorsal fin is continuous and scaly and the ventral fins have one spine and five rays. The natural habitat of these fishes is rocky pools, pearl banks, and coral reefs in clear waters.

Apart from *Chaetodon*—the principal Genus—the Family includes *Heniochus*, to which Genus the species illustrated here belongs. It is the Pennant Coral-fish (*Heniochus acuminatus*, *syns. H. macrolepidotus* and *Chaetodon acuminatus*), whose popular name derives from the greatly-elongated fourth dorsal spine and attached membrane. The snout is somewhat elongated into a tube-like form with the jaws at the tip.

This fish, which reaches a length of 10 in., is coloured pearly white, with dark purple vertical bands and bright yellow on the pectoral, dorsal, anal and caudal fins.

The stamp on which the Pennant Coral-fish is depicted is the turquoise blue 1-escudo value from the beautiful series issued in 1951 by the Portuguese colony of Mozambique in East Africa. Each stamp in the set portrays, in natural colours, a different species of sea-fish from the coastal waters of the Indian Ocean.

• JOHN WAKEFIELD





water and take away any surplus detritus and humus.

If the bottom deposits smell strongly, then there is no alternative but to take up all the plants, clean the pond and re-plant. It is to be expected that the mud on the bottom will smell a little "watery", in which case a flush through with mains water will prove beneficial.

Check on the slow-growing plants to see that they have enough room and are not being choked, and rigorously pinch back the coarser types to prevent them overrunning all else.

Water-lilies should receive attention at this stage for, after three or four years unchecked, they, too, tend to spread and choke one another. If the rootstock has more than three

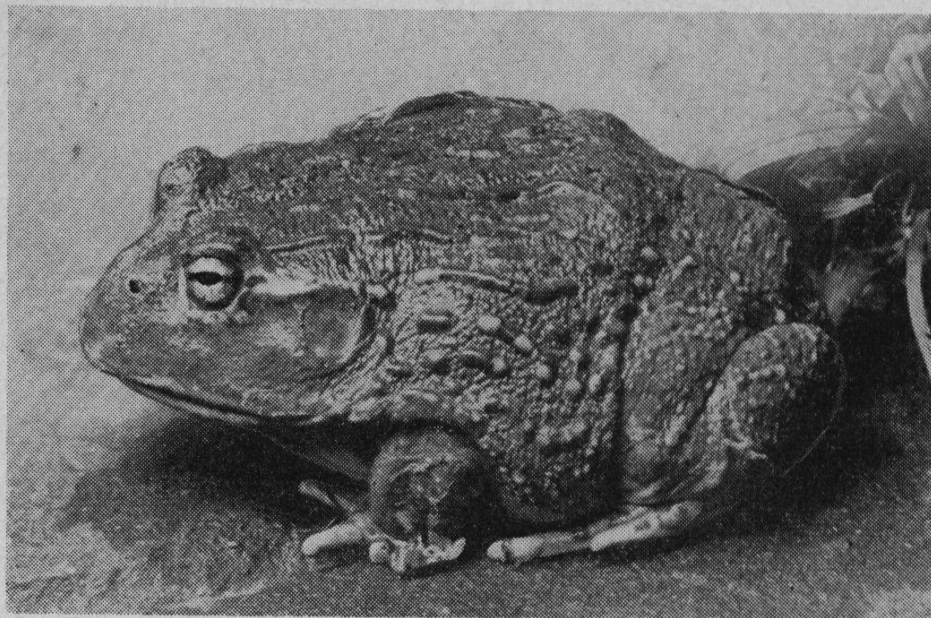
crowns, the latter can be separated into pairs by severing the parent stock with a spade and re-planting.

At this point it is also a good idea to remove some of the larger sucker roots and wash away the adhering mud as this mud is often anaerobic and poisonous to the fish. If you are only interested in the lilies, then the mud can remain.

There is an old idea that ponds look after themselves and need no attention. If yours is larger than half an acre, there may be some truth in it, but if it is a small, decorative garden layout like hundred of thousands of others all over the country, a little attention, as I have briefly outlined, will bring big dividends and an attractive, healthy pond.

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## AFRICAN BULL FROG



*"Life gets tedious," seems to be the view of this well-fed African Bull Frog as it looks out on the world at large. Photograph by the author.*

by **ROBERT BUSTARD**

**T**HE African species, *Rana adspersa*, is undoubtedly my favourite Bull Frog. This is because it has a broad head and not a pointed snout. It is often referred to as a "box-headed frog". The mouth is huge as is the frog itself which reaches a snout to vent length of fully 7 in. Specimens in good condition are so fat that they are nearly "round" and a 7-in. specimen would measure between 5-6 in. in breadth!

This frog is very attractively marked, being a fine dark green colour above with ridges or

folds of raised skin running down the back and along the sides. Small sections of these may have creamy markings. The sides give way to a yellowish colour and, below, the frog is creamy white.

The underside of the throat has greenish-brown markings and, in the region where the limbs join the body, the colour is orange-brown. This is most noticeable with the forelimbs and these markings can be seen from the side. The ground colour of green can vary from pale to dark green or grey-green since this



frog, like most others, can vary its colouring considerably.

Small specimens are particularly pleasing, having a fine bright green colour. They become duller as they grow older but are still very attractive.

In this species the hind limbs are small and largely hidden by the layers of fat. The forelimbs are more noticeable. This species is, therefore, not able to make the tremendous leaps of the other species, but can make short jumps which are good for so bloated a creature. It is not an active species.

At the time of writing I have two specimens of African Bull Frog which I got soon after they had metamorphosed and were then only about 1½ in. long. They fed very well on gentles, bluebottles and worms and now, 18 months later, the larger is almost six inches.

They have tremendous appetites and I have found that they can be trained to take raw meat. This is a great advantage as they would otherwise go through very large quantities of worms. I cut the meat into long, thick strips and one or two strips last my specimens for a week. Alternatively they can be given several small pieces.

These strips of meat are moved about at first but after the frogs have been given the meat diet for several weeks they recognize the food without it having to be moved.

Once a week I put their meat meal beside the pool and it is usually eaten at once. If not eaten immediately, it is always gone by the morning. As a change they get bluebottles, gentles (about 100 each at a time) and large Earthworms.

These African Frogs of mine go through a regular cycle. They feed, spend a day or two

in the pool, then burrow down in the mud for several days. They then reappear or I dig them out. I keep my specimens at about 70 deg.F. and do not hibernate them. They make charming pets which are very easy to keep.

Regarding food, it is very interesting to find that this species will eat raw meat which is not moved. It is common knowledge that many frogs and toads will take strips of raw meat if they are moved about like worms, but until recently it was considered that they only recognised food by movement. In view of my experiences here this would appear to be doubtful. Dr. Walter Rose has referred to the trait in *Rana adspersa*.\*

I have made no mention of the vocal ability of the Bull Frogs in this article or in my previous one in the February issue. All three species which have been referred to can give very lusty "bellows", and the cry of *Rana adspersa* is almost human. I was most surprised to find the volume of sound that a specimen less than 2 in. could produce. Whenever disturbed they cry loudly.

I had promised to demonstrate this to the local Naturalist Society and duly took along my specimens. Imagine my embarrassment when no amount of encouragement would induce them to show any vocal ability! Strangely they have been mute ever since.

I have always been very keen on Bull Frogs and hope that the information given here and in the last issue will enable others to derive the enjoyment from them that I have had. They are certainly well worth keeping.

\* *British Journal of Herpetology*. Vol. 2, No. 3, p. 60

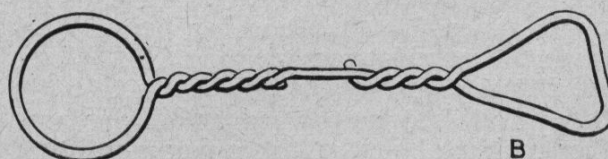
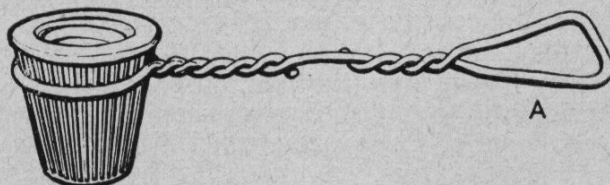


### DRIED FOOD MEASURE

**H**ERE is an idea that could help the beginner to avoid overfeeding his fish with dried food.

Take the plastic cap from a toothpaste tube and wash it thoroughly. Then, using rubber-covered wire, make a shape as shown in diagram B. Slip the cap into the ring of wire.

The toothpaste tube cap then forms a measure with which the same amount of dried food can be given for each meal.—(L. BARBER, Tamworth, Staffs.)







Photograph by G. Kinns

## PICK OF THE PETS

### No. 3. THE COMMON TOAD

by ALFRED LEUTSCHER, B.Sc.

SOME of the points looked for in a pet are its attractiveness, interesting habits, hardiness and tameness. A toad has all of these. It is true that this kind of amphibian would hardly win a beauty prize—judged by human standards—but beauty, after all, is only skin deep. Its attractiveness lies in its friendly disposition, placid nature and, in time, a tameness which is most unusual for an animal from the wild.

The Common Toad (*Bufo bufo*) is not often offered for sale, but may be found almost anywhere on the mainland of Britain, in the Channel Islands, and over much of Europe. It is more likely to turn up in sheltered places in wooded country, and will often wander into gardens.

An understanding gardener will welcome it as a useful ally in the war against insects. A garden toad will spend weeks, even months, in the same area, returning each morning to the same flower-pot, rock garden, tree root or hole in a wall. The "toad in a hole" is no misnomer.

#### Toads at Liberty

Our befriended toad may be kept loose in a greenhouse, shed or conservatory, merely given a little shelter against the daylight hours and hot sun. It will well repay its board by catching insects. Indeed, a housewife might use an obliging toad by placing it in the kitchen or pantry should ants become a nuisance! These form a favourite meal of toads.

The homing habit of toads make them very suitable as pets, since the vivarium need not be

large. A cracked aquarium would do, or a box cage with glass front.

Cover the floor with a liberal depth of well broken leaf-mould or peat moss. This will readily absorb and retain moisture, and provide the kind of soft ground into which toads like to burrow. On it, one can grow a selection of mosses and ferns, and those kinds of potted plants which tolerate indoor atmospheres.

#### Hiding Place Required

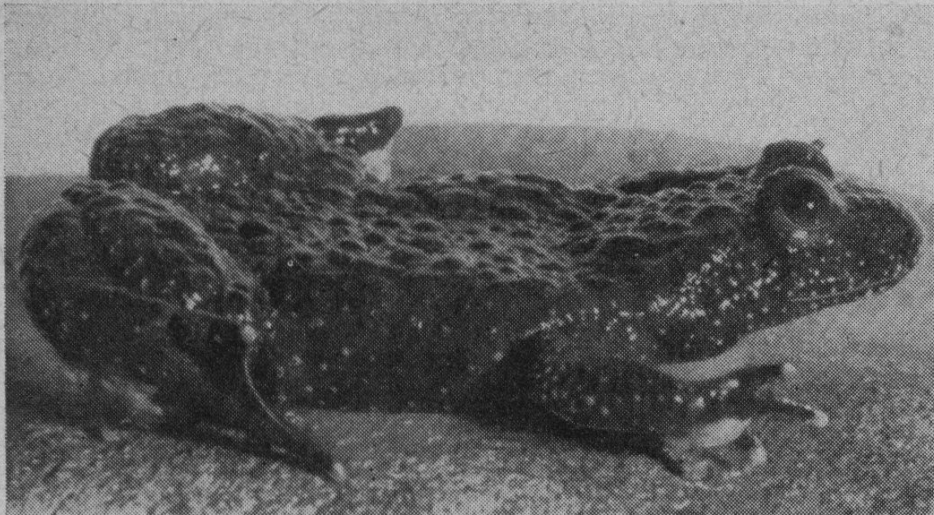
When not looking for food, a toad will usually retreat to some dark, hiding place. This can be provided by using a flower pot split longways, and laid down in a corner on its side. Alternatively, make a cave of rock-work, with some flat bark as a roof.

In another corner sink a shallow pie dish into the leaf-mould, and keep filled with fresh water. A toad will occasionally take a bath, sometimes sitting in the water for hours. This is its way of drinking, since the mouth is never used for this purpose, or it may be a sign that the toad is about to slough its skin. The water helps to soften it.

The sloughing can be an amusing sight to watch. By pushing and scraping with its fingers and toes, the toad slowly works its skin off its limbs and over its body. The skin is then rolled into a ball on the head, and finally swallowed.

Another dish may be used to hold a supply of food. Almost any small, live animal will be eaten, so long as it moves. The head suddenly swivels round and the toad's eyes stare fixedly at the moving fly, mealworm or beetle. If too





*Yellow-bellied Toad in typical defensive position with feet raised. Photograph by Neave Parker.*

## PICK OF THE PETS

### No. 4. YELLOW-BELLIED TOAD

by ALFRED LEUTSCHER, B.Sc.

WHEN I started my present reptile and amphibian collection shortly after the last war, specimens were hard to come by. Material in the shops was in short supply and, because of an import ban, almost impossible to bring into the country unless one had contact with an overseas visitor who could bring in stock with his luggage.

In 1947 a parcel reached me from Czechoslovakia. A friend on a business trip had brought a small collection of species from his neighbourhood. This included 10 lively little Yellow-bellied Toads. Today all 10 are still alive and well, housed in a 2ft. aquarium which is their permanent home.

The Yellow-bellied Toad (*Bombina variegata*) is found over most of Western Europe, from Holland to Italy, and eastwards to Central Germany. Here it gives way to its more easterly cousin, the Fire-bellied Toad (*Bombina bombina*), which continues eastwards to the Urals. The former is more frequently imported into this country.

#### Small and Semi-aquatic

Both these social little toads, no more than two inches long, are semi-aquatic. They prefer a marshy home and spend much time splashing about in shallow, often muddy, water. When still, they are difficult to detect because of the dull grey or darker body colour.

However, disturb one, and a curious thing happens. The body is flattened, the back arched, and all four limbs are raised and twisted in such a way as to expose the bright under-

parts. In the Yellow-bellied Toad these usually range from pale yellow to orange, and in the Fire-bellied species from orange to red.

This sudden appearance of bright colours is intended to serve as a warning to any incautious enemy which might try to catch one. This would be unwise since the skin of these toads is poisonous and highly distasteful, and can cause a painful sensation on the delicate surface of the tongue and mouth.

#### Colour as a Warning

Such "warning colours" are widespread in Nature. For instance there are the bright colours of the stinging wasp, the evil-smelling skunk, the distasteful salamander and the venomous Coral Snake. All carry the "keep off" badge.

The kind of home in which my Yellow-bellied Toads live resembles a miniature swamp. The aquarium floor is covered with a layer of gravel. Each corner is enclosed by a low wall of brickwork behind which is packed a further layer of loamy earth. The centre is kept filled with about an inch of water and contains small islands of rocks.

The corner areas of earth are constantly kept damp by the water which seeps in, and makes ideal beds for growing small ferns and moss. Moss also grows naturally on the rockwork and on pieces of curved bark which act as hiding places. Glass raised on corner supports covers the aquarium, and helps to keep in the moisture and prevent escapes.

Except for watching the water level, keeping



the glass sides clean and adding another plant where one has died, this vivarium has not been disturbed since it was built up 10 years ago.

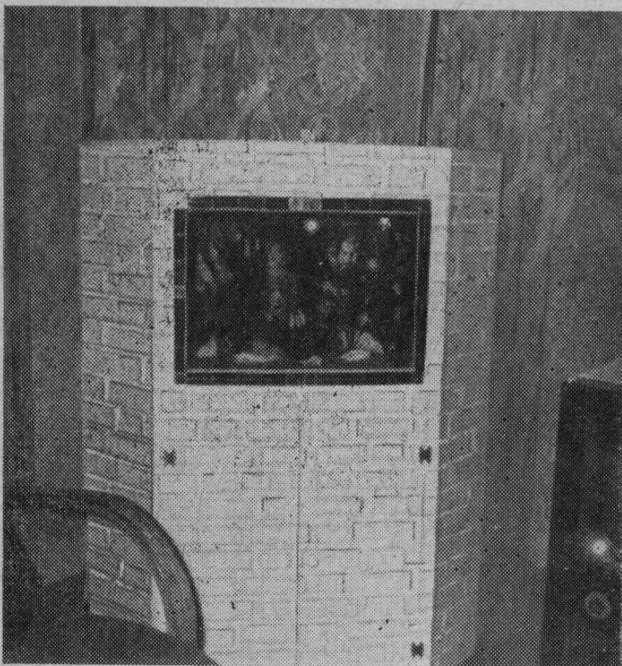
The toads are now delightfully tame as well as inquisitive. As soon as movement is detected they become alert, and the first one to move sets all the others going. They leap across to the source of movement and may even attempt to bite one another in mistake for food. It is amusing to hold one's hand over the water and wriggle the fingers. The toads leap violently upwards in their attempts to catch the large "worms".

Food given to them is varied and consists of almost any small live animal. Insects, slugs,

spiders, mealworms and small earthworms are all eaten with equal relish. I have never seen them actually catch prey under water, although this has been suggested.

They have bred on a number of occasions. Breeding is a protracted affair, from March onwards, and small clumps of spawn are left in the water after a short mating. During amplexus the males give a plaintive little cry. In Germany they name this little toad the "Unke" from its call.

It should be possible to keep these hardy little amphibians outdoors in an enclosed marsh-garden which has a shallow pool. Being diurnal, they can be seen during the daytime.



**A**N effective corner unit to house a  $24 \times 15 \times 12$  in. tropical aquarium is now installed in the living room of John Harding's home in Chingford, London, E.4.

The cabinet is of simple construction, the supporting wood frame being of  $1\frac{1}{2} \times 1\frac{1}{2}$  in. and  $1 \times 1$  in. timber, faced with hardboard. The corners are angled and on the right-hand side is a small door giving access to an outside fitting thermostat and the aerator. Beneath the tank is a deep cupboard.

The hardboard panelling is faced with a self-adhesive plastic sheeting of grey brick design and the actual aquarium rests on a wooden shelf.

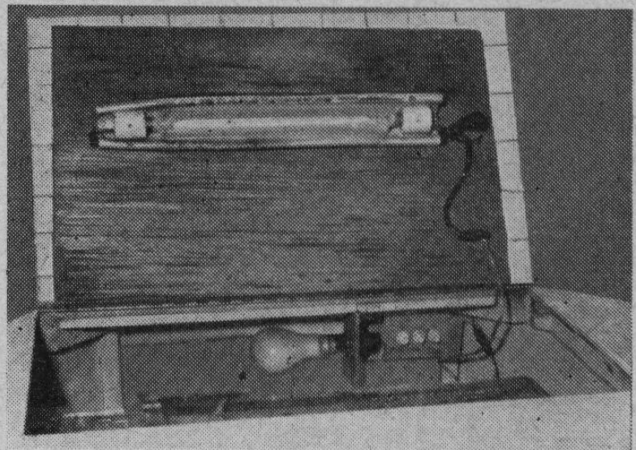
Dual control lighting gives two effects. The wooden top cover of the tank lifts to reveal a tungsten striplight which is switched on when the fishes are fed but for general illumination at other times a light bulb, level with the top back angle iron of the tank, is used. This

## Corner-unit Tropical Aquarium

bulb gives moderate illumination to the water surface but its main function is to throw a shaft of light down the outside back of the aquarium and so highlight artificial "rocks", made of cork, which are positioned in the cabinet behind the aquarium. An impression of depth is thus achieved when the tank is viewed from the front.

Further refinements include press-button switches for separate control of the strip lighting, bulb lighting and the two aquarium heaters (each of 75-watts capacity). Around the front edge of the tank is coloured, mirror-glass strip, giving a pleasing finish.

*Lid of the aquarium cabinet lifted to show the dual lighting system and press-button control.*





The roof is then laid across so that one can see through the arch.

Now introduce the pair of fish and very soon they will don their breeding colours and, shortly after, start digging pits in the sand. A few days later they are likely to spawn inside the archway, usually on the inner face of one of the upright walls, but, no matter if it is under the roof, careful observation will reveal the eggs, without your having to disturb the tank.

#### Taking Out the Parents

Once spawning is completed remove both parents. Then take away the two parts of the archway that are unwanted and turn the portion on which the eggs are adhering to face you. Place an aerator so that the rising bubbles

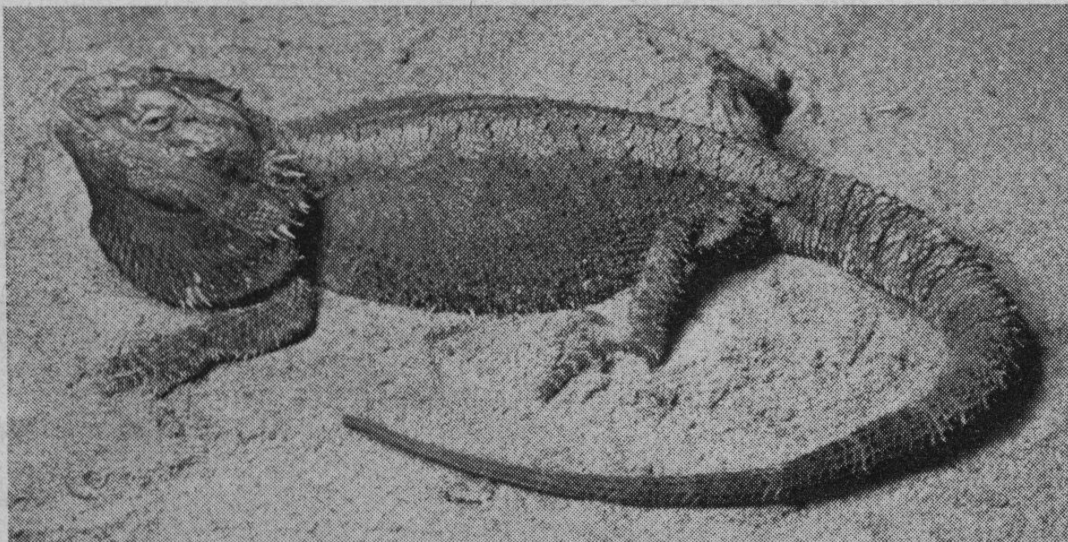
pass close to but not against the eggs. Add the five drops of methylene blue, as described earlier, and wait.

Do not feed the fry until they leave the sand and swim freely through the water; then give them newly-hatched Brine Shrimps, or Mikro-worms. Do not feed Infusoria.

With the Egyptian Mouthbreeder it is only necessary to keep a few fish of the species together in a community tank and, when a female is seen with enlarged jaws, to catch her gently and place her in a separate breeding tank. Do not feed her until she has hatched her eggs. She will not eat until then. Once she allows the fry to swim out of her mouth she may be caught and returned to her former home. The babies will take newly-hatched Brine Shrimps or Mikro-worms and small quantities of good, fine grade dried food.

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## AUSTRALIAN BEARDED DRAGON



*A weird lizard species well suited to vivarium life*

by **ROBERT BUSTARD**

**A**USTRALIA has many fascinating forms of animal life which are found nowhere else in the world. This is because its continent was separated from the other land masses at a comparatively early stage in the development of animal life. Many reptiles are included in its unique fauna and the Bearded Dragon (*Amphibolorus barbatus*) is one of the more unusual.

This bulky lizard has a total length of about 18 in. of which the tail accounts for some

10 in. It has a very large head with a huge mouth and the throat region is covered with small spines from which it derives its common name.

When the lizard is angry or frightened its mouth is opened to its fullest gape and the beard is erected. At the same time the region of the beard tends to change to a blackish colour while the rest of the creature becomes a light brown shade. This contrast in coloration, combined with the orange interior of





*Bearded Dragon in a threatening position with beard erected and mouth open. The tree-stump situation is typical. Photographs, R. Bustard.*

the mouth, must make the Bearded Dragon appear very fearsome to any small adversary.

Such a display of anger is not entirely bluff, although the lizard doubtless appears much more fearsome than it really is. Wild specimens will hiss and jump for distances of foot or more and bite their foe.

The general colour of the Bearded Dragon, which is variable, is greyish or blackish brown, brownish or yellowish, with or without darker markings. Ventrally it is paler. The shape of the body is depressed and this is accentuated when the lizard is annoyed. At the edge of the body there is a row of spines and the spines on the back are keeled and variable in size. The limbs are well built and end in sharp claws which enable the animal to climb tree trunks. In a wild state it often ascends tree trunks and stumps where it likes to rest in safety several feet above the ground.

#### **An Insectivorous Diet**

Like most of the *Agamidae* Family, to which this lizard belongs, it is insectivorous and, being large, has a good, healthy appetite. I feed my specimens on as wide a variety of insect life as possible but, of course, the main standbys are mealworms, gentles and blue-bottles.

Bearded Dragons are not savage or fierce lizards in the vivarium. Their behaviour is largely pretence due to fear, and they very soon become tame and make good and unusual pets. In a short time they will enjoy climbing on their owner and will only show fear when they are placed on the ground. In fact they become so tame that it is often difficult to get them to raise their beard!

The vivarium for Bearded Dragons should be roomy and 30×18×18 in. is a suitably sized container for a single specimen. The vivarium should have a good layer of sand on the floor and stout branches should be provided for the lizard to climb and lie along.

A small water dish for drinking purposes should be provided and also a feeding dish, so that the food does not escape before it is eaten. The temperature should be kept at 75-80 deg.F. throughout the year by means of electric light bulbs. These can be suspended in reflectors from near the top of the vivarium and so arranged to beam the heat downwards. At night the temperature can safely fall to 55-60 deg.F.

Although rather expensive to buy, Bearded Dragons are well worth a place in the vivarium and they have always been one of my many lizard favourites.

They can be kept with other large lizards, and I have had specimens which "palled up" with Iguanas, and eventually were allowed to stay with them. Others have got on well with large Australian skinks like the Stump-tailed Skink and the Blue-tongued Skink.

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## **Slow - growing Cryptocoryne Species**

**by Dr. H. C. D. de WIT**

**S**O far as is known, only two species of *Cryptocoryne* occur in New Guinea. For this reason, that great island is considered to be the south-eastern boundary of the area of distribution of the whole *Cryptocoryne* Genus.

It must be realized, however, that there is a possibility that some more species of *Cryptocoryne* will be discovered in the dark and shadowy forest marshes of New Guinea although, on the other hand, it is evident that by far the largest number of species occur on the Asiatic Continent (India, Burma, Malay Peninsula, Thailand and S. China) and the adjacent islands of Ceylon, Sumatra and Borneo.

*Cryptocoryne versteegii* Engler is known only from New Guinea, where it was discovered by Mr. G. M. Versteeg, on Lorentz River, South New Guinea, in June 1907. It was subsequently described by A. Engler, the famous German systematist and director of the Botanic Gardens at Berlin in 1910.

*Cryptocoryne versteegii* is often seen in



water-bird, in the digestive tract of which it then lives. Eggs pass outside the bird's body in its droppings and hatch out near the water into the free-swimming larval stage.

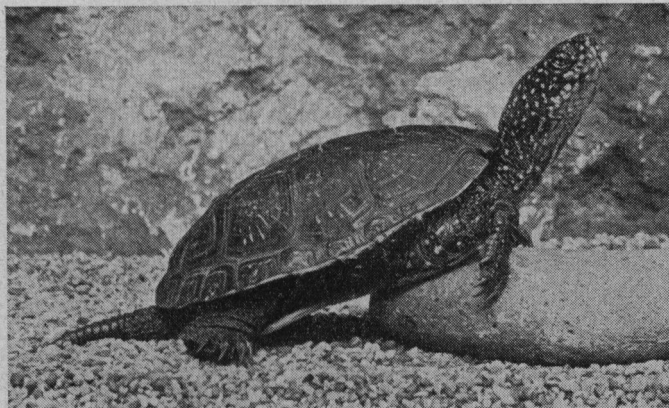
Not all Flatworms live as parasites; some are free-living creatures and among these are the various species of Planarian, common in all fresh waters. They vary in length from about  $\frac{1}{4}$  in. to  $1\frac{1}{4}$  in. and are all dark in colour with the exception of *Dendrocoelum lacteum*, which is milky-white.

They generally live on the underside of stones or leaves, although they may sometimes be seen crawling rapidly over the bottom of a pond or even on the underside of the surface-film. They lay their eggs attached to stones or leaves. Any small form or animal life is taken for food and the planarians protrude a tube-

like pharynx from the underside of the body along which the food passes. This is well shown in the illustration.

Planarians are often unsuspected enemies of the fishkeeper for, being largely nocturnal in habits, they remain out of sight during the day under stones or leaves but at night sally forth to devour fish eggs or even, it is reported, fish fry.

A thorough sterilizing of stones and plants introduced from the wild is the best preventive of planarians. I am not aware of anything that can be done to prevent the entry of parasitic flatworms to aquaria or ponds but, when they are detected, prompt measures in isolating affected fish will prevent the unloosing of the immense numbers of eggs that are such a characteristic feature of these parasites.



*The European Terrapin (Emys orbicularis).* Photograph by L. E. Day.

## PICK OF THE PETS

### No. 5. EUROPEAN TERRAPIN

by ALFRED LEUTSCHER, B.Sc.

FOR hardness and long life among reptiles, also ease of care and feeding, a terrapin is hard to beat. There are many records of their life span in vivaria exceeding 50 years. And yet many herpetologists seem to have difficulty with this kind of pet and find that it can become afflicted with certain ailments.

These are due to a number of causes. The two main troubles are lack of natural sunlight and a shortage of calcium in the diet. In Nature, terrapins or pond-tortoises—called pond turtles in America—spend much of their

time basking out of water. Their tastes in food are also very wide.

Blindness and deformity, due to vitamin deficiency, may be avoided by giving sunlight. The remedy is obvious. Shell softening can be counteracted by giving shell and bone matter with the food. Pieces of raw fish (fresh or salt-water), pond snails, and cuttlefish bone grated on to the food are all very good.

Apart from this, the main foods given to my terrapins consist of pieces of raw liver, Earthworms and various water insects. I find that an occasional liver oil capsule wrapped up in a



piece of meat is taken without trouble, and helps to maintain good health. Incidentally, some species will eat water plants and fruit.

It is quite true that some terrapins are more easily kept than others. Tropical kinds, for instance, need rather special care and extra warmth. This also applies to most North American species. Although their Winters are more severe than ours, one must remember that the Summers over there are much warmer and more reliable. Let us face it—Britain is not noted for continuous warm and sunny weather, and a run of poor Summers could upset a terrapin's health. Some keepers guard against this by giving their pets an occasional tonic under the ultra-violet lamp.

For real toughness and tolerance to our climate, even when kept outdoors, the European Terrapin (*Emys orbicularis*) is about the best. It is on sale most Summers and usually comes from Italy. At one time this species existed in Britain. It has died out here, or rather been driven out, by the altering climate.

The critical time in a reptile's life is the so-called incubation period, during which there must be a minimum temperature for the egg to hatch. This can no longer be guaranteed and, even if the European Terrapin breeds over here as a pet, it is doubtful whether the eggs will hatch unless given special care.

Adult European Terrapins do very well, and I have kept specimens in the garden pond all the year round. They have hibernated many times at the bottom, often covered for weeks under the ice. Partial respiration is said to take place through the lining of the cloaca.

I once had a specimen which became so tame

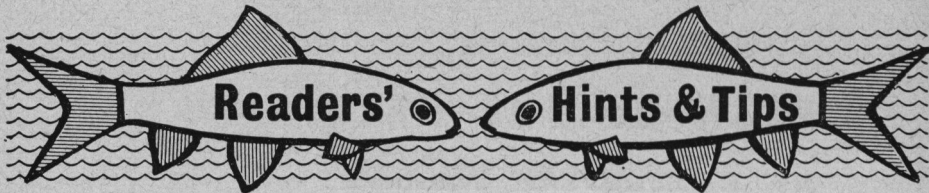
that it would swim across to be fed by hand. It had the freedom of the garden but never wandered far from the pond. The dog and cat used to play with it, and I have even seen a sparrow perch on its shell, pecking at the algae which had grown on it! The Goldfish were never molested. I imagine that it was so well fed that the effort to chase a fish was too much for it.

If healthy and given the opportunity, terrapins will feed voraciously, eating many pieces of meat or worms at one meal. With my European Terrapins I adopt the practice of giving two big meals a week. Young specimens are best fed daily and kept indoors under artificial heat (a suspended light bulb) unless the weather is warm and sunny.

For a simple indoor home an aquarium can be used. The floor is covered with the usual sand or gravel, heaped up at one end to give some land space, or this can be made into islands by using rocks.

A depth of about four inches of water is sufficient. This should contain some floating plants, such as Duckweed or Crystalwort. *Salvinia* also looks very attractive. The reason for the plant introduction is that terrapins like to get under cover when in the water, merely pushing out their heads to look around.

If a garden enclosure is to be used it should contain a shallow pool of water. A sunken bath or sink would do, provided that the terrapins can climb out. The simplest kind of surround to erect is wire netting fixed to stakes which must be bent inwards at the top, since these animals are good climbers.



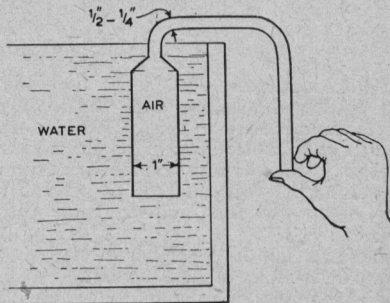
#### STARTING UP A SIPHON

**I** FIND the following method of starting a siphon both effective and easy and it avoids getting mouthfuls of water when the tube is sucked in the normal manner.

The apparatus is quite simple and consists of a tube about 1 in. diameter connected to another one of about  $\frac{1}{2}$  in. -  $\frac{1}{4}$  in. diameter.

The wider tube is placed in the water until the top is just below the water surface. One's finger must be kept over the end of the thin tube whilst this is being done.

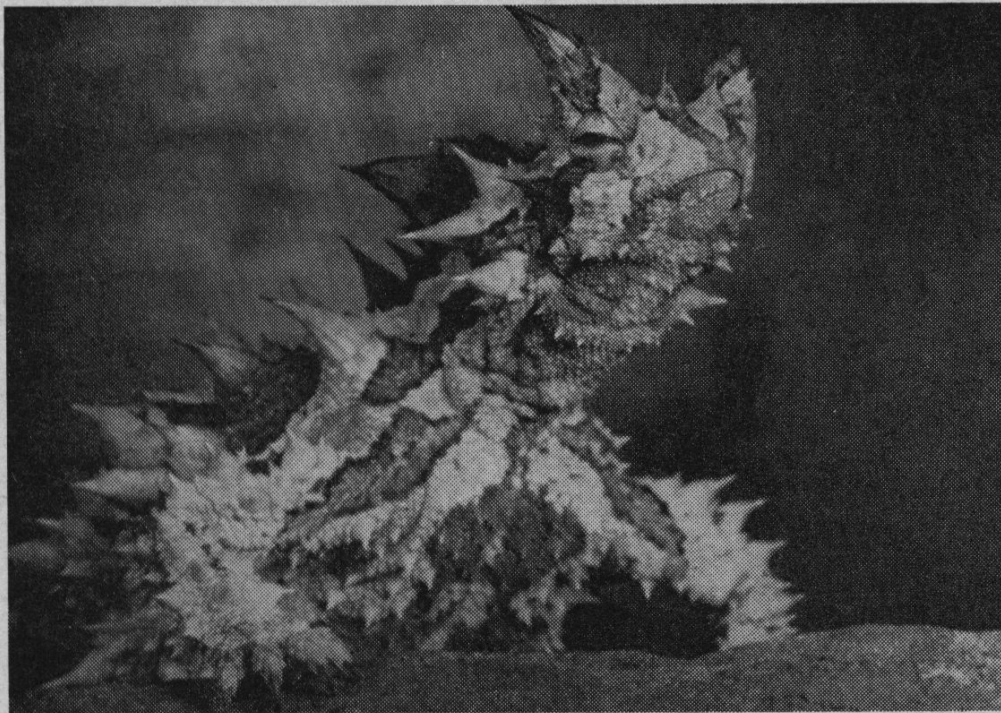
When the finger is taken away water flows into the thicker tube, rushes up the thin one and starts the siphon working.—(P. GALTON, London, N.8.)



10s. 6d. is paid for each hint received from a reader and published in FISHKEEPING.



# AUSTRALIAN MOUNTAIN DEVIL



*Pattern of life of this grotesque,  
ant-eating lizard*

by JOHN WARHAM

IN 1840, John Gould, "father of Australian Ornithology", exhibited a strange, grotesque creature to a meeting of the Zoological Society of London. This was a lizard, but one quite unlike anything the members had previously seen. The most obvious peculiarity was the way in which the whole of the upper parts, the flanks and tail were covered with a series of cone-like warts from each of which a stout and very sharp spine arose.

A large spine also grew over each eye giving the animal a rather horned appearance and even bigger spines protruded from two rounded bosses on the shoulders.

## A Type of Dragon-lizard

This creature proved to be an aberrant member of the large and mainly oriental Family of Dragon-lizards (the *Agamidae*), a group which includes many remarkable animals including the famous "Flying Dragons" of Indonesia.

Dr. Gray, of the British Museum, who named Gould's new discovery, placed it in a Genus of its own; impressed apparently by its bizarre appearance, he called it *Moloch horridus*.

In its native land the animal is essentially an inhabitant of the dry, sandy interior but it is also quite common in the settled wheat-growing areas of southern Australia. Here it is popularly known as the Moloch or Mountain Devil.

## Smaller Males

These animals generally measure from 6-8 in. long, males being appreciably smaller than the females. Otherwise both sexes look alike. Not only is the back spined (as can be seen from my photograph) but even the feet are covered with smaller warts and their attendant spines.

In addition, the whole of the skin covering the upper parts is as hard as a coat of mail—a spiny armour for protection against enemies.

Much of the Mountain Devil's active life is spent in the open where there is very little cover but, despite this, it has not retained the quicksilver-like agility customary among lizards. Although the Mountain Devil can move fairly quickly in hot weather, it is very easily captured—you simply pick it up!

In its sandy environment the Mountain Devil



needs protection from birds like hawks and eagles, from lizards like the big perenties (Australian Monitors), and from mammals such as the marsupial cat, the dingo and the introduced fox. The continued existence of the lizard, despite its sluggishness, shows that it has some way of surviving such perils.

### **Purpose of the Spines**

It has been suggested that one purpose of the spines is to give their owner an unnatural silhouette and shadow which hides the animal's true nature from the air. The broken outline is thought to aid concealment just as military installations in the last war were provided with false shadows to lessen the chances of detection from aircraft. It is significant that, despite the Mountain Devil's small eyes, a recent observer notes that its distance vision is very acute, the animal being able to spot a high-flying bird almost invisible to the naked eye.

Like some other Dragon-lizards, the colouring of the Mountain Devil varies according to its background. The usual pattern is orange-yellow banded with chocolate—an attractive and unusual combination.

Animals from hotter areas are lighter than those from dark soil districts. Individual specimens have the ability to change their colours to a certain extent although an animal brought from a light, sandy area, where it is hot, to one with a darker soil can always be distinguished by its colour from the animals native to the dark soil area.

### **Kept in Australia**

Some new facts on the ways of Mountain Devils are revealed as the result of the work of an Australian naturalist who has studied these lizards over a period of six years. They are easy to keep in semi-captivity in Australia since, although they have a very specialised diet, eating only a limited variety of small ants, such ants are very numerous and an old meat bone readily ensures a continuous supply "on tap" for the lizards' requirements.

The Australian observer, C. C. Sporn, found that captive individuals, like wild ones, were inactive during the colder and wetter Winter months and ate very little during this time. With the coming of warmer weather, however, they begin to move around and to feed. To do this they sat beside a trail of ants and mopped them up one by one with their tongues. The insects were taken at a rate of 20-30 each minute and, as a meal lasted for from 1-1½ hours, some 1,200-1,800 ants were taken at a sitting.

Any animal occupying so arid a habitat as that chosen by the Mountain Devil must be

able to exist for long periods without water. Doubtless much of the lizard's moisture requirements are obtained from the ants on which it preys. Nevertheless, like most reptiles, it does take some water, not only by absorption through the relatively soft skin of the belly, but also by drinking. Mr. Sporn notes that, after Summer rain, it will lick the wet sand and lap up water droplets from the surface of fallen leaves.

Much has been revealed on the breeding cycle by this recent study. Mating was first seen in mid-April, preceded by much excited bobbing of heads, but "nesting" did not take place until November. The male, of course, took no active part in the latter operation.

Nesting consisted of the excavation of a tunnel about 1½ ft. long ending nearly a foot below the surface. The female dug by scratching backwards several times with one foot, followed by more scratching with the other foot on the same side of the body. She then changed to the other side of the body and continued like this using one foot at a time and each one in turn.

### **Nesting Period**

At her first attempt she took three days to complete her tunnel, but the following year only two days were needed to tunnel, lay the eggs and replace the soil.

The female produced six or seven eggs to the clutch, apparently all laid over a single night and filling in began the following morning, the soil being raked back using one foot at a time and the material being rammed home tightly by butting with the head!

The lizard was very careful to destroy all traces of her activities, scratching around so that the surface was level and apparently quite undisturbed.

The eggs were then left to their own devices and hatching took place 13 to 18 weeks later, provided that they were not destroyed by adverse weather. The shorter incubation periods coincided with hot and dry weather.

### **Hatching Size**

The newly-hatched Mountain Devils measured about 1¼ in. long. They appeared to have forced their way to the surface unaided, emerged looking like miniature editions of their parents, and began to feed on their first day of life.

Their growth was quite rapid and skins were shed first when about nine months old and again at about 11 months, whereas the adults cast their skins about once yearly, usually at the end of the Summer. At 12 months the young lizards were about five inches long and well on the way to maturity.



## IN THE SWIM

Diamond Tetras · Spraying with  
Insecticide · Journey to the Continent ·  
Learning by Experience · Show  
Ideals · Big New Plant House

● **Cover fish.** Diamond Tetras (*Hemigrammus pulcher*) are not one of the most easily spawned of the aquarium-kept Characins, but they hardly come in the really difficult-to-breed category. For decorative effect, they look best in a shoal and are entirely peaceful, growing to some 1½ in. long.

A black wedge-shaped marking adorns the rear part of the fish's body, and above this mark is a light streak. *H. pulcher* has a certain superficial resemblance to the Beacon Fish (*Hemigrammus ocellifer*), but the body shape of the Diamond Tetra is more pleasing and its black tail marking is considerably larger.



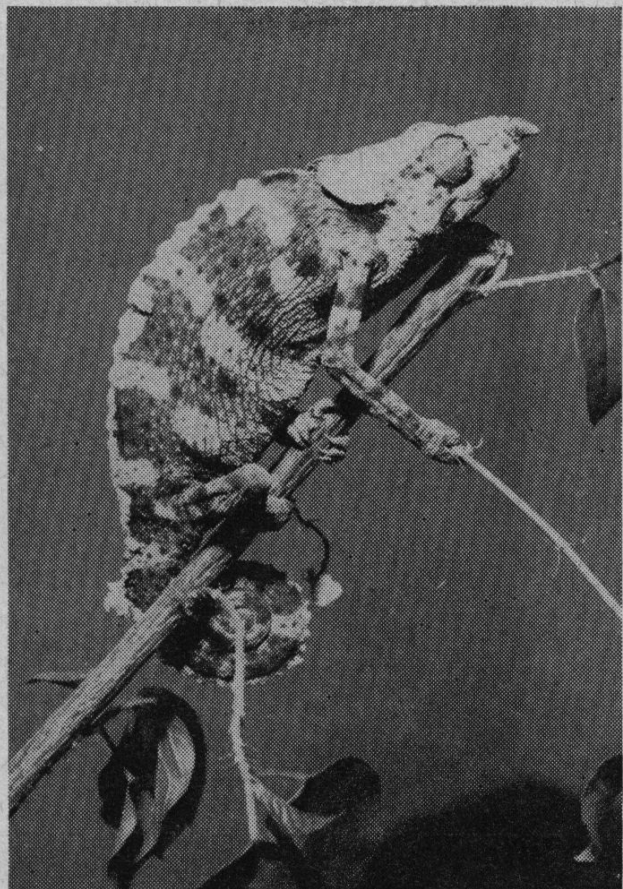
● **Indirect effect.** Some ten to twelve years ago we, and the aquatic press generally, publicised the fact that the highly effective D.D.T. sprays could prove lethal to fishes if allowed to contaminate aquarium and pond water.

That fact is now well known but sympathetic to the direct poisoning of fishes is insect depopulation of D.D.T.-treated, natural waters. The result can be that insect-eating fishes in treated districts are deprived of their main food supply.

The problem has to be faced, especially in tropical lands, where wide areas are treated with D.D.T. of a strength not sufficient to kill the native fishes but enough to destroy troublesome insects.

The unintentional secondary result can be starvation of the fish because their normal food source is cut off.

Philip S. Corbet, writing in "Nature", makes the point that, before extensive control measures with insecticides are put into force, surveys of the scheduled area should be made, otherwise many little known or undiscovered animals might be indirectly eliminated.



● **Young arrival.** One of the recent newcomers to London Zoo is the five-inch long Meller's Chameleon pictured here. It arrived by air from Africa as a gift from veterinary surgeon, Dr. W. M. Fitzwilliams, now serving in Nyasaland. The creature is just a baby at present but it could grow to 18 inches.

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eggs will shower down. This procedure will be repeated until the sides of the female will be observed to be flat once again. Immediately at the cessation of the spawning act, the three brood fish should be removed.

Although the Blind Cave Fish cannot see, it can sense the presence of food, and this naturally includes the eggs. The thick mat of *Myriophyllum* will act as a deterrent, but the fish are very wily and will make a meal of any eggs that they can root out. The female should once again be segregated from the males in preparation for spawning once again in two to three weeks.

#### Eggs Non-adhesive

The *Myriophyllum* should be gently shaken and removed, and as the eggs are non-adhesive this can be done without any difficulty. As the eggs of the Blind Cave Fish are very prone to fungus, enough methylene blue to colour the water a robin's-egg blue should be added. If the plants are left in, they will rapidly disintegrate.

In approximately 24 hours you will be able to notice small white fish bobbing up and down, much like the bubbles in a glass of champagne. Occasionally they will cling to the sides of the tank, but by and large they will continue their bobbing motion until they are free-swimming in another 48 hours. Once they assume the more usual parallel swimming position it is necessary to begin feeding them. They are of a sufficient size to commence feeding newly hatched Brine Shrimp immediately; infusoria would be a starvation diet.

They are the most prodigious eaters of any fish that I have seen. The fry will eat shrimp until they have the appearance of nothing more than a huge distended orange belly. The shrimp can be varied with various small dry foods.

#### Remove Them Rapidly

With such appetites they naturally grow very rapidly. Before long they can eat sifted *Daphnia*, chopped worms and the larger dry foods. There always seems to be a handful of babies that grow faster and much larger than their brothers. These should be rapidly removed and placed in tanks by themselves as they can be observed gobbling up the smaller fish whenever they happen to bump into them. Oddly enough, the fry seem to have the appearance of eyes; the rudimentary eye does not grow over until they are several weeks old.

Unfortunately the Blind Cave Fish is very susceptible to chill and will invariably become infected with White Spot as a result. Once these little organisms become imbedded in their skin, it is very difficult to effect a cure. Fungus and death often follow unless a strong salt bath and a temperature of 90°F proves effective.

# PICK OF THE PETS

## No. 6. SMOOTH NEWT

by ALFRED LEUTSCHER, B.Sc.

THERE is something particularly attractive about the movements of a Newt as it rises to the pond surface with graceful undulations of its tail, gulps in a fresh lungful of air, then sinks slowly to the bottom. This is the moment when the experienced Newt catcher plunges in his net, catching this little water sprite unawares, so adding another prize to his collection.

How many Newts, I wonder, have been caught each year by eager youngsters and the not-so-young? Just for the fun of it I sometimes catch and release Newts by using the traditional method of worm and cotton. No hook is required; the Newt grabs the worm, hangs on, and is easily lifted out of the water.

#### Closely Allied Species

Everybody must know what Newts look like, yet few people seem to be aware of the great interest they can give by merely placing an aquarium at their disposal. Here is a delightful little water animal which can be shared alike by aquarist and herpetologist. The three British species are closely related, and belong to the Genus *Triturus*. In these Newts a crest is developed by the male and used in courtship during the breeding season. In a general way their habits are similar.

The largest, called the Great Crested or Warty Newt (*Triturus cristatus*), is somewhat patchy in distribution and may take a bit of finding. The tiny Palmated Newt (*T. helveticus*) is also somewhat local, but usually turns up, I find, on acid soils and in mountainous country. The medium-sized Common or Smooth Newt is to be found in most areas and will often appear in a garden pond soon after it is built. This is because Newts do a lot of walking about, especially at night, during the late summer and autumn. Hibernation, too, is mostly done on land. Newts were probably in the area before the pond was built, and with approaching spring make for the nearest water. This is essential, since the eggs hatch into tadpoles with gills.



If a pond dries up or is filled in, Newts will depart, and for this reason a pond-lover is doing them a real service if he is willing to tolerate their presence at the expense of a few fish fry. A garden pond is indeed a sort of nature reserve for these little water visitors.

In addition to our own Newts, there are two other near relatives occasionally imported from the Continent. One is the Alpine Newt (*T. alpestris*) and the other the very handsome, greenish Marbled Newt (*T. marmoratus*). In all five species an interesting courtship takes place. A male will approach a female, then go into an elaborate dance in which the body is arched and raised on to the toes. The tail curves to one side and commences to quiver in peculiar fashion. It has been seriously suggested that this movement sets up a water current, so that perfumes from the body glands of the male are gently wafted towards his lady-love!

The important contribution of the male, however, is a tiny, whitish object laid on the bottom, called a *spermatophore*. This is a mass of wriggling sperm cells held onto a sticky base. The female finds this, presses it to her cloaca with the hind feet, so that the sperms ascend into her oviduct to fertilize the internal egg cells. Later, at her leisure, she climbs among water plants to lay single eggs here and there on the leaves.

#### Leaf Folded Over

She carefully holds a leaf in her feet, lays a jelly-covered egg on it, then folds over the leaf for protection. A single female can lay as many as 300 eggs in one season. All the above can be watched at close quarters in the aquarium by setting it up as a coldwater fish tank. Two things, however, should be borne in mind. First, use suitable plants with leaves on which eggs can be laid. The popular *Egeria* (old name *Elodea densa*) is excellent. There is also the Water Starwort and Willow Moss (*Fontinalis*).

Secondly, make sure that the water is not straight from the tap but is well matured, and the older the better. Fresh tap water, especially hard water, affects newly caught Newts, and in a few days the colours fade and the crests of the males diminish in size. When laid, the eggs should be removed by snipping off the leaves and transferring them to a nursery.

A large but shallow bowl containing about three inches of well-matured water would do, and the more microscopic life it contains the better. The babies will thrive on this. Later, as they grow in size, food like *Daphnia* and other small water animals can be given.

Young Newts with developed lungs should leave the water in about 2½-3 months' time. Give them a small island on which to crawl. Also, keep the dish covered with glass or they will surely climb out, even by crawling up

vertical glass. This also applies to the adults, and an escaping Newt quickly dies from exposure in the dry indoor atmosphere.

A useful land platform for the aquarium is a piece of slate supported on an upturned flower-pot so that it lies almost awash. On this place some growing moss and cover it with a piece of curved bark to form a shelter. This method adds little weight to the aquarium, and is economical on space.

When quite at home out of water once more, the Newt colony can be transferred to the kind of vivarium described for Salamanders in an earlier article. This also applies to the young,



Photograph by Wm. J. Howes, F.Z.S., of a male Common or Smooth Newt (*Triturus vulgaris*).

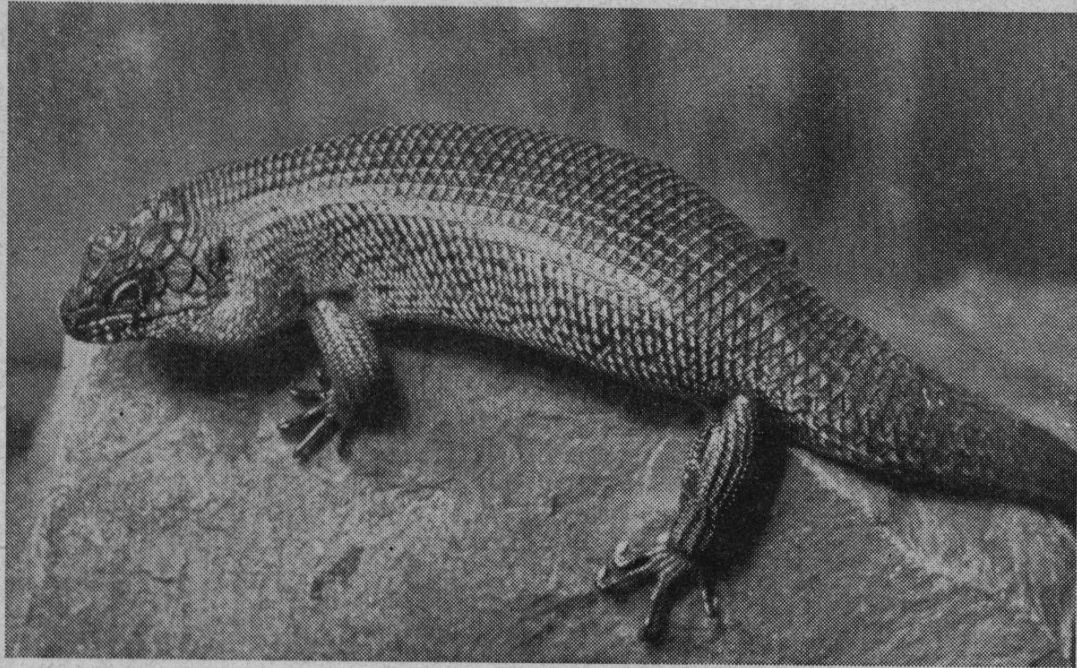
but they should be kept apart to avoid cannibalism. Babies will take White Worm, greenfly, very small Earthworms and tiny pieces of meat. Adults will consume almost any animal food of suitable size.

#### Encourage Hibernation

A final warning. Newts kept active throughout the winter usually show no inclination to breed the following spring. To get them into breeding condition it appears necessary for them to have a period of rest at a low temperature—in other words, a hibernation. For this the vivarium should be stored in a shed or kept in an unheated room during the winter months, taking care to avoid frost.



# LARGER AUSTRALIAN SKINKS



Cunningham's Spiny-tailed Skink (*Egernia cunninghami*). Photograph by the author.

*Easily accommodated in vivaria  
of reasonable size*

by **ROBERT BUSTARD**

**A**LTHOUGH most keepers of lizards start their collections with species of small size, sooner or later they realise that the larger lizards make the most satisfactory pets. The small species, generally speaking, tend to be insectivorous and need variety in their food thus entailing considerable time spent in looking after them.

On the other hand the larger species are usually fruit, vegetable or meat eaters, require less attention, and are definitely much longer lived than their small relatives.

## A Varied Selection

In my own collection I have lizards of all sizes and types but I think most collectors will agree that the ideal pet is one which does not need much attention but which is always there when one wants it. Such a pet does not suffer if neglected for several days but, on the other hand, it will enjoy that little extra tit-bit or attention, such as hand-feeding, when time or opportunity permits.

The larger Australian Skinks fall into this category. Australia is the main stronghold of the skinks, of which there are about 600 species found in tropical and sub-tropical countries

all over the world. In Australia they reach their greatest size.

Three Genera of these large skinks are nearly always obtainable in this country and respective species are the Blue-tongued Skink (*Tiliqua scincoides*), the Stump-tailed Skink (*Trachysaurus rugosus*), and Cunningham's Spiny-tailed Skink (*Egernia cunninghami*).

These lizards have several requirements in common. They all need moderate heat throughout the year, since none of them should be hibernated. I keep my specimens at 75-80 deg.F. (day) and this can safely fall to 50-60 deg.F. at night. The Blue-tongue and the Stump-tail come from semi-desert areas, the Spiny-tailed Skinks from more rocky districts.

I recommend that the vivarium for these lizards should be at least 24 in. × 12 in., and preferably 30 or 36 in. × 15 or 18 in. when adult specimens are kept. The vivarium depth need not be great since they are not climbers, with the exception, to some extent, of the Spiny-tails (*Egernia*). I have made vivaria from ex-W.D. angle-iron frames. To do this I make the ends and base of wood and the front, back and lid of glass. The lizards can, however, be just as easily accommodated in a vivarium consisting of a wooden box with glass front.



Further details are mentioned when the actual species are discussed.

### Cunningham's Spiny-tailed Skink

This lizard, belonging to the Genus *Egernia*, differs basically in temperament from the placid Blue-tongued and Stump-tailed Skinks. It is not found in sandy areas but tends to occur in its native Australia in rough places where rocks abound. *Egernia cunninghami*, the species to be described in detail, can be taken as typical of its Genus and is the only species commonly available in Britain.

I have found these lizards to be of a nervous and suspicious nature, although this does not extend to many other species of Spiny-tailed Skinks which I have kept from time to time. This I consider is due to their habit of living in rocky districts and plunging into crevices in the rocks whenever a potential enemy approaches.

They are constantly on the alert and, although easy to keep and making attractive exhibits, they seldom become so tame as the Blue-tongued and Stump-tailed Skinks which can be handled from the start.

A large adult has a girth of about six inches and a total length of 12-14 in. They have very strong jaw muscles and a wild individual can inflict a rather painful (but not at all serious) bite.

The colour is a dark glossy brown and the scales are all strongly keeled, the spiny ridge projecting backwards. The spiny nature of the scales is much more noticeable on the tail and, when the lizard runs into a crevice between two rocks, it fills its lungs with air and the spines tend to hold it in position so that it is very difficult to dislodge. This trait is easily demonstrated in the vivarium.

The floor of the vivarium can be covered with sand on top of which dry moss can be placed here and there, if desired. Rocks and rocky hiding places should be arranged. A water dish is essential.

### Fruit and Meat Diet

As regards food, I give my specimens chopped banana and raw meat mainly. They will also take gentles and mealworms. They should be given a good feed every other day. It will not take long to judge the appetite of a new arrival and supply food in the correct amount.

Cunningham's Spiny-tailed Skink is a hardy species which will live for a great many years in vivaria. Owing to its more nervous disposition and spiny nature—which makes one loathe to handle it—and the fact that its large claws, very necessary to a climbing animal, can inflict nasty scratches on one's hands

quite accidentally, I do not favour it so highly as the other types. I prefer to wear gloves when handling untamed specimens of this Genus.

I have always had some of these lizards and several of its sub-species, some of which are much more docile and less spinose, in my collection for many years now.

These large lizards make very satisfactory vivarium inmates and the Skinks as a group take well to vivarium life. The Blue-tongued and Stump-tailed Skinks, to be described in my next article, are among my favourite reptilian pets.

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## Marine Aquarium Keeping

# WHELKS AND SEA-SLUGS

by J. S. VINDEN

**T**HE Common Whelk (*Buccinum undatum*) is the largest of the carnivorous univalves of our shores for it can reach a length of some six inches. It is an interesting, but not as a rule long-lived, aquarium animal. It is not likely to be found between the tide marks, and must therefore be obtained by means of a dredge, or purchased from a fisherman or Marine Biological Station.

In an aquarium it must have plenty of space and clean, well aerated water. In the natural state these whelks feed on scallops and other molluscs and, moreover, eat a lot of them, so in the aquarium they must be well provided with food which may be fresh fish, crab, mussel or any uncooked mollusc. Any food that is stale will be rejected.

The eggs of the whelk are laid in masses that are often cast up on the shore. These egg cases bear a superficial resemblance to small bath sponges. Although each egg mass contains hundreds of eggs only a few reach maturity, for the others are used as food by the young whelks that hatch first.

Such an egg mass may be put in the aquarium and the successful survivors, when they eventually put in an appearance, are fairly well developed and have a shell consisting of three coils. The whelk, like the periwinkle, has an operculum, or door, to close the mouth of the shell.

and, at this stage, feeding was started with liquid fry food. I noticed that although the parents had not discriminated between the two spawning media, the fry showed a distinct preference for hanging on to the nylon wool. After four days the young fish were free-swimming and, at this time, Mikro-worm was introduced as an additional food.

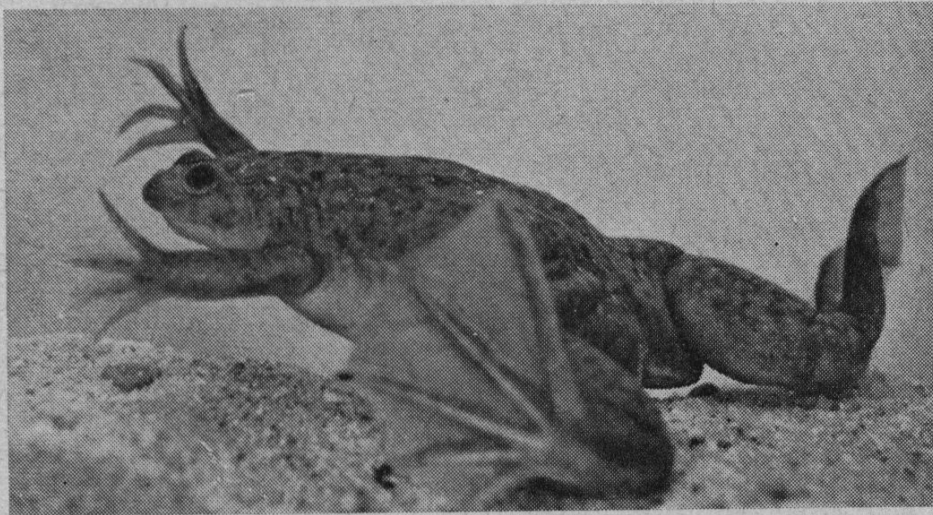
After the fourth day Brine Shrimps were fed and, at ten days, the young fishes were taking shape. At this stage I added fine sifted dried food to the diet and finely sieved wheat-germ dried food.

The dust-like food was blown on to the surface of the water from a plastic bottle with fine holes drilled in the cap which enabled me to blow the food into a plastic feeding ring floating and anchored to the front glass at the centre of the tank. Heavy feeding at this time resulted in fouling the immediate front com-

post, but this thin layer was easily removed and replaced with carefully added new compost. Slowly too, this area was filled to full gravel depth.

When three weeks old the fry were in various sizes and about 50 of the smaller ones were discarded. The spawning media were removed and boiled ready for immediate further use. The rear half of the tank was set with *Cryptocoryne* plants to give a more pleasing appearance.

When six weeks old the fry were obviously recognizable as Nigger Barbs, and a further weeding out was made to leave about 60 fish. These were split into two equal groups and one batch was transferred to another similarly-sized aquarium. Their diet then became the routine adult foods of Dwarf White (Grindal) worms, *Daphnia* and a mixture of proprietary dried preparations.



G. J. M. Timmerman  
photograph of a Clawed  
Frog kept in an aquarium.

## PICK OF THE PETS

### No. 7. THE CLAWED FROG

by ALFRED LEUTSCHER, B.Sc.

**T**HROUGHOUT practically the whole of Africa south of the Sahara there dwells, in suitable places, a group of amphibians under the name of *Xenopus*. The best known species is *Xenopus laevis*, the Clawed Frog.

*Xenopus* means "strange foot" on account of its large and powerful, webbed feet, and *laevis* means "smooth". Slippery as an eel, this aquatic creature is almost impossible to hold.

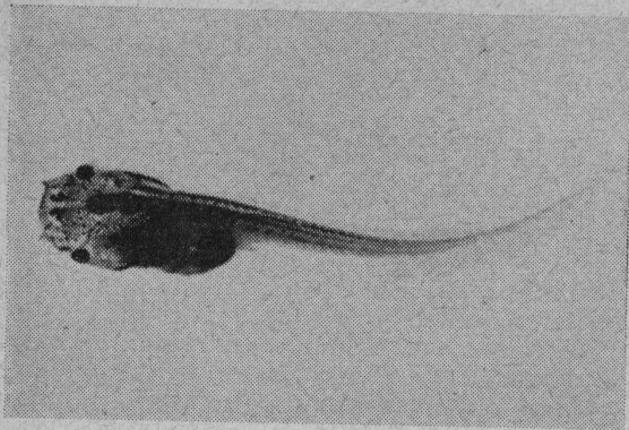
Together with the even stranger Surinam Toad of South America, the *Xenopus* frogs belong to the most primitive group of *Amphibia*, called the *Aglossa*. They have no tongues and use their forelimbs with curious spread-out

fingers to spoon food straight into their mouths.

Because of their primitive nature these amphibians have been of considerable help to biologists in piecing together the relationships which exist between the *Amphibia* and their ancestors, the fishes. In many ways they are fish-like. Perhaps the main claim to fame of *Xenopus* is in the medical field. For some years now it has been used in the laboratories for the famed pregnancy test.

Only after this was discovered, and many of these useful amphibians were bred artificially, did specimens appear in pet circles. Although





*A tadpole of Xenopus laevis. These little creatures can be fed on Infusoria and algae with the addition of a mash made from boiled nettles and spinach.*

a tropical species, *Xenopus* is remarkably resistant to cold, and I have successfully kept it through the Winter in an unheated greenhouse with temperature well below 40 deg.F.

Normally it lives well if kept indoors between 60 and 70 deg.F., so that heated water is not essential. A coldwater tank of matured water would do quite well. Only the stronger aquatics should be planted, since *Xenopus* is an energetic swimmer and will soon uproot and damage any delicate plants.

#### Easy to Feed

Feeding presents no problem. To a basic diet of Earthworms and raw meat can be added almost any kind of small water animal. Even garden insects can be dropped in occasionally. To put it mildly, this accommodating pet can be used as the "dust-bin" of the collection. Needless to say, no other small water animal, fish included, is safe from its clutches.

*Xenopus* becomes very tame, and will soon rise to the surface for food taken from the fingers, even leaping half out of the water to secure an elusive meal. In Africa it serves a useful role in catching mosquitos and their larvæ. Occasionally it will wander from one water patch to another, so it would be wise to cover the aquarium in case it should attempt to leap out. It would then rapidly die from exposure in the dry atmosphere of an indoor room.

#### Method of Breeding

Normally the Clawed Frog does not breed naturally in this country. In the tropics it buries into the mud and aestivates during the dry season. With the onset of rain the mud slacks, or vleis, quickly fill up, and within hours the frogs emerge to start breeding. This gave a friend of mine an idea.

He kept a pair of *Xenopus* in a half-filled

tank, fed them well for about a week, then suddenly added some water plants and topped up the water level with a rose spray to simulate a rain shower.

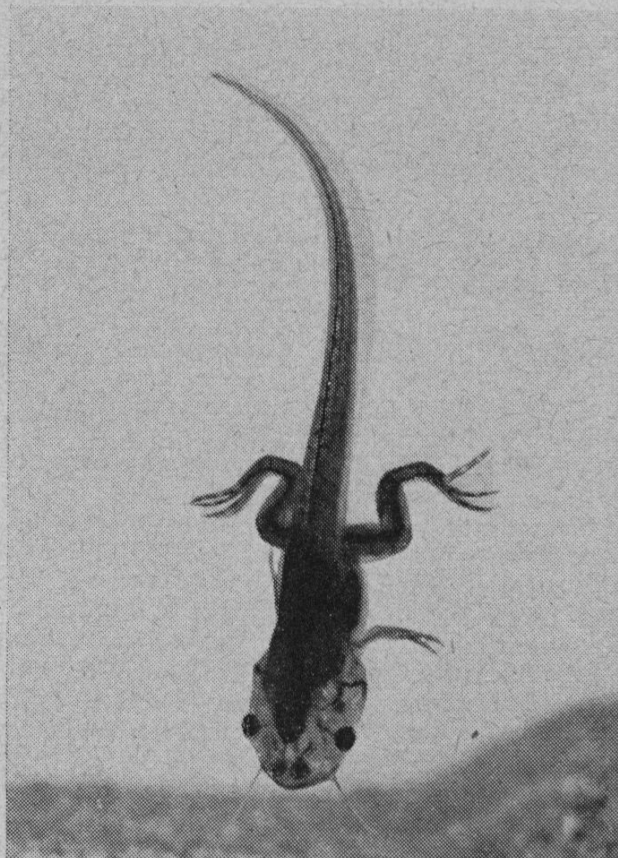
Within minutes the frogs had paired, and next day the tank was full of eggs sticking to the leaves and glass. It is a well-known fact that at exhibitions Clawed Frogs will often pair off due to the change of water and surroundings.

#### Movement of Tadpoles

*Xenopus* tadpoles are strange, transparent little creatures, which "hover" in mid-water, their bodies at an angle with the tail quivering rapidly. They are filter feeders, that is, they strain microscopic life from the water as it passes over their gills. A good diet for these youngsters is plenty of "green water" containing algæ and Infusoria. To this can be added some boiled spinach or young nettle leaves ground into a fine mash. As young frogs they may be given the usual live fish-foods such as *Daphnia*, *Tubifex* and White Worms.

*Xenopus* has deservedly been called the water clown of the aquarium world, because of its antics and curious attitudes. For this reason alone it makes an interesting addition to the hobby.

*The Clawed Frog tadpole at a more advanced stage with limbs forming. G. J. M. Timmerman photo's.*





man-made lakes, they are now common in the dry zone.

*Rasbora daniconius*, of course, is the most ubiquitous fish in the fresh waters of Ceylon and it is felt that its most suitable habitat is the dry zone. With the exception of this fish, most of the species in the first list are found only in the dry zone, rarely elsewhere unless transported specially by human agency into lakes, ponds, etc. outside the region.

Introduced by the Department of Fisheries, and now widespread in the dry zone, is *Tilapia mossambica* which is fast reaching pest-proportions. Many years ago some *Osphronemus goramy* escaped into a major river from a pond in Peradeniya Botanical Gardens, Kandy. These have since established themselves very well in the lower swamps, tributaries and backwaters of this river and spread over a vast area. They are now considered a growing and important freshwater fishery, which the Department of Fisheries is encouraging by stocking, pond-raising and distributing to farmers all over Ceylon.

The typical dry-zone fishes, as mentioned before, are hardy, fast-breeding, fast-growing and voracious. They range in size from the diminutive *Barbus ticto ceylonensis* to the huge *Ophiocephalus marulius* which reaches 10 lb and the *Wallagonia attu* Catfish which often exceeds 40 lb!

Many of the dry-zone fishes are harvested each year during the drought and sold as food. Some, like *Barbus sarana*, *Ophiocephalus striatus*, *O. marulius*, *Wallagonia attu*, *Glossogobius giurus* and *Osphronemus goramy*, are good sporting fishes sought after by anglers.

Suitable for the average aquarium are all the smaller ones, but most attractive is *Barbus ticto ceylonensis* which differs slightly in size and colour from the more familiar *B. ticto* of

India. The Ceylon strain sports a rosy pink on its body scales in the male during breeding time, and has, in addition to the two main dots, several smaller black specks in the central body region.

*Laubuca laubuca* is a recently exported Danio-like blue fish which is hardy, easily bred and peaceful. Its maximum size is three inches. *Amblypharyngodon melettinus* is a pure silvery fish with large eyes and very little appeal. It superficially resembles a Tetra but is related to the Carp Family. The species is very hardy, eats anything, is peaceful but has never been bred. *Esomus danricus* is well known; it closely resembles *Rasbora daniconius* in general colouring and shape but has longer fins and the characteristic long barbels. It is fast-moving, extremely hardy, easily bred and peaceful but not gaudily attractive.

The Snakeheads, represented by three species, are, together with the Catfish and Eels, capable of hibernating in moist mud over a period of drought, to almost the same degree as the African Lungfish. All the others perish in total drought but can survive in incredibly foul and concentrated waters till the rains come, living on a starvation diet and often breathing air from the surface.

The temperature range for dry-zone fishes is from 75 to 95 deg.F. and occasionally even higher. They can withstand pH variations from 6.5 to 7.2 but more gradually. Overcrowding them does not present very great risks. They eat almost anything alive or dead but prefer livefood.

The Gobies, Catfish and Snakeheads, as well as the larger Barbs, prefer live, small fishes or even dead ones. The Labeos eat algæ and the Giant Gourami feeds on aquatic vegetation, jungle fruits and flowers. Small insects and insect larvæ form the diet of the smaller Barbs. Cannibalism is common.

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## **Blue-tongued and Stump-tailed Skinks**

**by ROBERT BUSTARD**

**T**HE Blue-tongued Skink is one of the largest of its group, adults measuring between 18 and 24 in. in total length. The tail accounts for only about a quarter of this length or a third at the most. Its body is elongated and the head large.

As can be seen from the photograph this lizard, like the Stump-tailed Skink, has very small limbs in relation to its size. This feature is characteristic of the *Scincidae*, many members of which are totally limbless. The

coloration is variable, consisting of dark brown or black markings on a pale or dark grey, or even yellow-brown, ground colour. The ventral surface can be greyish, whitish or pale brown and not infrequently it is tinged with salmon pink.

In my opinion the more attractive specimens are those offering the most contrast, being pale grey with dark black markings. As can be seen from the photograph this colour arrangement can be very pleasing.



The Blue-tongued Skink is one of the best-natured lizards I know. I always have several in the collection—they live for many years and become very friendly.

Young specimens are sometimes rather "wild"—they puff themselves up, opening their mouths and hissing—but they very soon become tame. They are intelligent lizards, easily won over by a piece of ripe banana or a strip of raw meat which they will eagerly accept from the fingers.

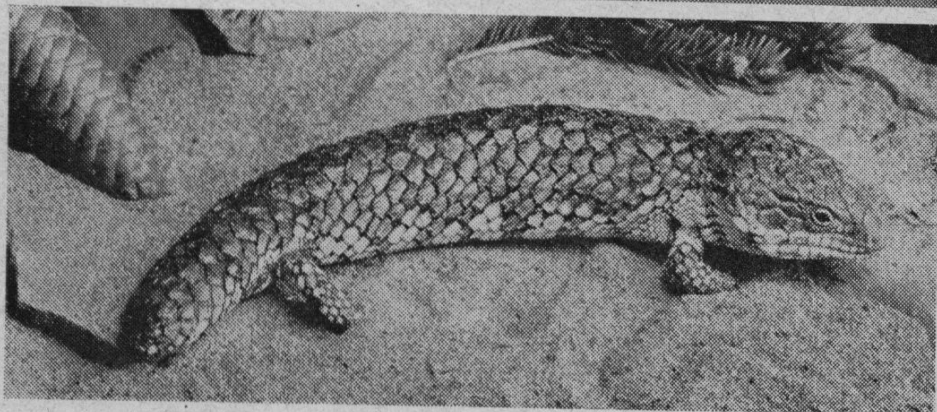
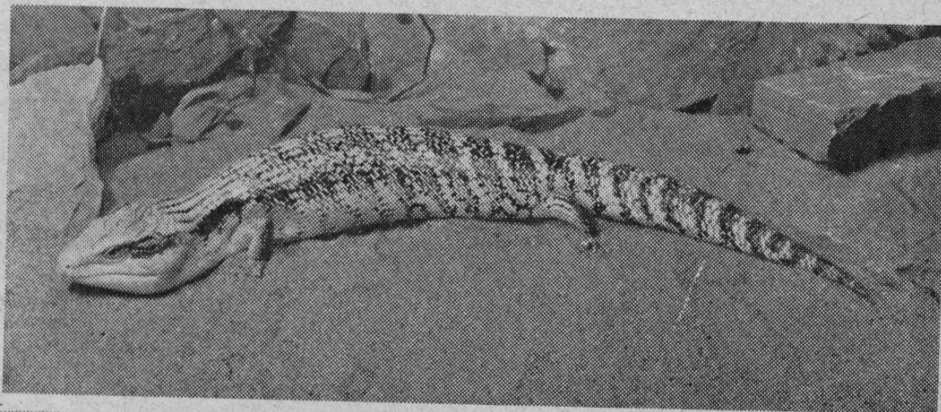
Their huge blue tongue (from which they derive their common name) is much in

fat and lazy (if well cared for) to pursue such small food and their small legs and heavy bodies do not make them very agile.

They have a sweet tooth and like any ripe fruit; they are especially fond of banana. My largest Blue-tongue (23 in.) consumes a whole banana at one meal. They are also fond of raw meat which should be cut into strips for them.

I feed my specimens every other day, and one should not worry if they go off their food occasionally, especially during the Winter months.

*Right: Blue-tongued Skink (Tiliqua scincoides), a long-lived species in the vivarium. Robert Bustard photographs.*



*Left: Stump-tailed Skink (Trachysaurus rugosus), another lizard that is recommended for beginners to lizard keeping.*

evidence when the lizard is feeding or drinking. This species is strongly recommended for its hardiness and docility and it is a firm favourite among collectors.

The sturdy Stump-tailed Skink reaches a total length of 12- to 13 in. Its tail is very short and fat, and the creature is covered by thick scales so that it resembles a long fir cone. The general appearance is clearly shown in the photograph.

I strongly recommend this species also, and both it and the Blue-tongue make ideal introductions for the beginner to the keeping of sub-tropical reptiles.

The following remarks on feeding and housing apply equally to the Blue-tongued Skink, which lives well in company with the Stump-tail. Young specimens will accept the usual animal food—gentles, Earthworms, mealworms, etc., but adults are generally too

The vivarium should have a good depth (about 3 in.) of sand on the bottom. A water dish must be present at all times as they drink considerable quantities. I provide hiding places made out of slabs of log and pieces of bark nailed together. In these warm, dry conditions many species of cacti flourish and, if the sturdier species are planted, the vivarium can be made very attractive indeed.

#### **Easy to Keep**

These large Skinks are costly to purchase initially, but I have found that, in the long run, they are much cheaper than smaller lizards. This is because, if kept in the simple surroundings described and provided with adequate warmth—75-80 deg.F. by day and 50-60 deg.F. at night—they are very hardy and will live for many years. They quickly get to know their owner and become very friendly.