

# ANIMALS AS FRIENDS

AND HOW TO KEEP THEM

BY

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With a Foreword by  
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Sixteen Photographs &  
Twenty-two Diagrams

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# REPTILES

## 28. TERRAPINS OR WATER-TORTOISES

Order *Testudinata*, various families

*Distribution.* World-wide in temperate and tropical climates.

*Habitat.* On the edges of ponds, brooks, and rivers, and the salt marshes of the coast.

*Description.* 'Terrapin' is a general name for any true tortoise which is adapted for life in water. They are characterized by their broad, flattened shell, which is generally quite smooth. The hind feet are extensively webbed and terrapins are excellent swimmers. Very young ones are nearly always beautifully marked and coloured in intricate designs that resemble patterns of leaves and flowers.

Of the hundreds of species of terrapins sold from time to time in the pet shops, the following are perhaps the most common:

The *diamond-back terrapin* is used as a luxury food in America.

The *Amazon terrapin*, whose eggs are collected for the oil they contain. Bates in his book *The Naturalist on the Amazons* said that about forty-eight million eggs were destroyed annually for oil in the middle of the last century.

The *ornate terrapin* is a native of Central America and Mexico.

The *sculptured terrapin* inhabits North America from Ontario to Virginia, and is sometimes known as the wood turtle.

The *elegant terrapin* inhabits North America from the Mississippi basin, Iowa, and Ohio, southwards to Texas.

The *painted terrapin* so beautifully marked with red, the *wry-necked terrapin* with the elongated neck and decorated plastron or under-shell, and the *serrated* or *scriptured terrapin*, which has the most beautifully decorated plastron of all.

*Length of Life.* Here are a few records: European pond-tortoise, probably 120 years; speckled terrapin, over 42; other species, between 20 and 40.

*Care and Food.* Terrapins will eat almost anything. Snails, young crawfish, minnows, frogs, tadpoles, and all sorts of aquatic vegetation, form their natural diet. In captivity feed them on bits of raw fish and meat, worms (they love bloodworms), and lettuce leaves. They will also take the green leaves of English frogbit, and their tank should always have some water weeds planted in it, such as *Anacharis*, which you can buy from any aquarium dealer.

One of the most amusing things about keeping these little animals as pets, is to watch them eat. How they squabble and fight over each morsel of food, swimming and diving dexterously from one side to another! They usually swallow their food under water.

*Housing.* If you keep your terrapins in a garden pond during the summer you must bring them in when the weather becomes cold or they may die. Sometimes they will bury themselves in the mud at the bottom of the pond, and survive the winter, but it is much less risky to keep them indoors all the time.

A greenhouse is a good place in which to put them. They do well in a vivarium if it is provided with a small pond with shelving sides and a miniature island on which they can creep. Vivaria should be equipped with bark, stones, shrubs, or leaves, etc.

Cleaning out the pond must be done at least three times a week. If you cannot easily empty the container of water, siphon it or sop it dry with a sponge before refilling it.

*Cage Mates.* Terrapins can be kept together in numbers depending entirely on the size of the accommodation. They should never be placed with fish as they will certainly attack or

kill them, as it is their nature to seek fish as food. However, terrapins can be kept with salamanders, frogs, young alligators, and any reptile or amphibian which does well in moist warm surroundings.

*Behaviour.* Terrapins are lively, energetic, vivacious little creatures, but they are shy with human beings. To tame them requires continual gentle treatment and handling, especially at feeding time. If an animal associates you with good things to eat you are more likely to make it fond of you.

Raymond L. Ditmars says :

They may often be seen sunning themselves in rows on derelict timber, from which they tumble clumsily when frightened. Once in the water their broadly webbed feet take instant hold, and they scurry to the bottom where they hide in the aquatic vegetation. When they again approach the surface it is with the greatest caution. Only the snout and eyes are thrust above the water. In this position they paddle about inspecting the outlook until thoroughly satisfied that all danger has gone, when, one after another, they clamber on their favourite roosts for another sunbath.

In the winter they bury themselves under the mud and hibernate until the warm weather returns.

*Breeding.* Terrapins do not breed in captivity, and little is known about the breeding habits of most of the species. Mr. Hugh Smith has described the breeding habits of the scripted terrapin. It lays its eggs in June and July usually in some cultivated field about one hundred yards from the water. The bottle-shaped nest is usually made in sandy clay above high-water mark, the hole being dug out by the female with her forelegs.

An average nest is four inches deep and four inches wide. Up to thirty-five eggs are laid, and when the laying is completed the earth is scraped into and packed lightly over them. The terrapin raises herself up and uses her body as a mallet. Then she returns to the water. The young hatch in the autumn, but remain in the nest, hibernating until the following spring. On emerging they are the size of a two-shilling piece.

*Diseases.* Terrapins often suffer from eye disease when kept in captivity. This is caused by lack of sunshine and by foul water. The only cure is sunshine, cleanliness in the tank, a chance to

bury in some mud, while for local relief apply boric acid solution, collyrium, or other eye-wash gently in the eyes.

If the shells become soft this is also due to lack of sunshine and of mud, as well as of lime-building food. Soft-shell is almost impossible to cure, but the best thing to do is to feed with pond snails or fish, with the bones ground in, and try to provide direct sunshine.

*Handling.* When handling terrapins be careful they do not nip you, as they have very sharp mouths and are suspicious of strangers. Don't let them escape or you will have a job finding the little fellows again.

*Transport.* Terrapins can be easily carried about in a small cardboard box with ventilation holes.

*Cost.* Terrapins are fairly cheap to feed, as they have small bodies and require food only in small quantities. If you use scraps and dig worms for them the weekly upkeep is negligible.

#### DON'TS

*Don't* keep your terrapins in a dark place, as they need sunshine more than most animals.

*Don't* let them get cold.

*Don't* let their water get foul.

*Don't* keep them with fish.

#### READ

*Reptiles of the World*, by R. L. Ditmars (Lane).

*Reptiles and Batrachians*, by E. G. Boulenger.

## 29. LAND-TORTOISES

Order *Testudinata*, Family *Testudinidae*

Genus *Testudo*

*Distribution.* Tortoises are found in nearly all parts of the world. Those most commonly sold in shops are species from southern Europe.

*Habitat.* Land-tortoises live in the wild on vegetables. They prefer open country to thick woods, being most often found in sheltered valleys.

*Origin.* Tortoises are reptiles, and among the most primitive of living backboneed creatures.

*Description.* Everybody knows what a tortoise looks like. The shell is derived from two sources—the plates on its back from prolongations of the backbone, and on its belly from prolongations of the breast-bone. In male tortoises the under side of the shell is slightly concave, which distinguishes them from females.

*Length of Life.* The age of tortoises can be roughly judged by counting the number of rings round each horny shield. Each represents a year's growth. Thus you can judge your pet's increase in size by cutting out patterns of the shields formed in previous years and fitting them together to form a whole. Some long-lived land-tortoises are as follows: Carolina box tortoise, over 123 years; Seychelles giant tortoise, 28½ years; Daudin's giant tortoise, over 100 years; Marion's tortoise, 150 years; Galapagos (Charles Island) tortoise, over 100 years; Galapagos (James Island) tortoise, over 85 years; South European margined tortoise, 28 years; Iberian tortoise, between 102 and 125 years; Greek tortoise, 90 years.

*Care and Food.* Land-tortoises are entirely vegetarian. Give them greens, lettuce, peas, pea-pods, and strawberries from the garden, and they also like Virginia creeper—and rose leaves.

Bread and milk does them no good—cut out milk altogether and soak the bread in jam.

Tortoises will *not* eat slugs, and will not rid the garden of them. In fact, they should not be given the run of a garden if you value the plants in your herbaceous border.

They should always have access to a shallow bowl of water, which can be sunk in the ground.

*Housing.* European tortoises do well in an English garden during the summer. They can be given a small box filled with leaves, and an enclosure on the lawn made of wire-netting or boards about nine inches high. For winter housing, see under *Hibernation*.

*Bathing.* Land-tortoises like baths, and a newly bought one can be made clean by placing in a shallow basin of warm water for two or three minutes. Tortoises do not like dry skins, so they should also be allowed a bath on hot days in summer and after waking from hibernation.

Olive oil can be used for beauty treatment of their shells.

*Hibernation.* In nature tortoises bury themselves for the winter, and live on their accumulated stores of fat.

In captivity they can be allowed to do this, though if the ground is hard the owner should dig their burrow a foot deep.

If they come out while there is still a chance of night frost, they should be reburied every evening.

If you have a cellar to which the frost does not reach, you can stow your tortoise there in a box of earth.

If you have a greenhouse you can keep your tortoise warm and provide it with food. In this case it will not hibernate.

But do either one or the other and not a mixture of both. A half-torpid tortoise that is neither hibernating nor 'greenhousing' usually dies.

*Breeding.* Quite often tortoises lay eggs in captivity. These have a leathery shell, and in the Greek and Iberian tortoises are about the size of pigeons' eggs. In nature three or four are laid and buried in the ground.

Eggs laid in England are pretty certain to be infertile, but



LAND-TORTOISE



occasionally they hatch, and the young ones have been reared. Bury the eggs in damp earth and store in a hot linen cupboard. *Don't turn them.* After a month or more you may expect (with a good deal of luck) the young ones to hatch.

*Diseases:*

SYMPTOMS	CAUSE	METHOD OF TREATMENT
Worms appear in droppings	Internal round worms	Sprinkle one grain of santonin on its food once a week for up to six weeks
Round creatures found clinging to legs, neck, etc.	Ticks	Remove with tweezers, but if they hold too tightly apply a drop of paraffin to make them let go
Bleeding or broken shell	Injury or breakage	Wash with warm water, then friar's balsam. Don't let flies get to it. <i>Never use carbolic</i>
Shields peeling	Old age	Destroy if it will not feed for three months (except when hibernating)
Bleeding or broken limbs	Injury	Consult a vet
Sealing of eyes and mouth	After-effect of uncomfortable voyage or hibernation	Bathe with warm weak solution boracic acid
Sealing of eyes, discharge	Conjunctivitis	Bathe with warm water and smear with yellow oxide of mercury. Isolate animal
Blindness and encrustation of head	Necrosis	Make sure it is not conjunctivitis, then destroy animal <sup>1</sup>
Passing of slime with droppings, sometimes blood-stained.	Enteritis	Keep warm and out of draughts. Starve and give castor oil
Rapid breathing and froth on nose and mouth	Pneumonia	Keep warm, give plenty of water. Take to vet for saline injections
Lumps on neck	Tumours due to fungus	Leave alone unless obviously uncomfortable, when vet will operate. Don't operate yourself

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<sup>1</sup> The best and most painless method of destroying a tortoise is to inject thirty or more drops of chloroform under loose skin. A chemist or vet would do this.

*Transport.* Tortoises often come to this country in huge numbers, packed in barrels. Often this method causes parasites and diseases to spread, and fractures of shell and limb. So only buy an obviously healthy tortoise, which you may be sure has come under quite humane conditions. And if you are sending a tortoise anywhere by rail, pack it carefully in a wooden box, with perforated top, in a little bed of hay, and mark it: 'TORTOISE, THIS SIDE UP'; give it crisp lettuce for the journey. And if you are taking your tortoise about with you, it is always as well to mark your box in the same way, just to remind yourself.

*Cost.* Their food is cheap, though they cost a bit of time to look after.

#### DON'TS

*Don't* buy a tortoise unless you have a garden.

*Don't* fail to decide whether to let it hibernate or 'greenhouse.

*Don't* buy an unhealthy animal.

#### READ

*Reptiles of the World*, by R. L. Ditmars (Lane).

*Reptiles and Batrachians*, by E. G. Boulenger.

## 30. LIZARDS

### Order *Sauria*

*Distribution.* Almost world-wide.

*Origin.* According to geological evidence lizards are (among reptiles) comparative newcomers in the animal kingdom. No fossil lizards can be found in rock older than the Jurassic period.

*Habitat.* While the majority of lizards favour hot, dry climates, others are found in moist places, in trees, and some are almost marine animals. The huge marine iguanas of the Galapagos Islands live exclusively on algae (seaweed), and are often buried under the showering spray of waves.

*Description.* There are 2,700 species of lizards ranging in size from the giant Komodo dragon, which was only discovered twenty-five years ago, to a frail little creature barely two inches in length, which lives in the Sapo mountains of Panama.

All lizards are reptiles. If you were asked to tell the difference between a lizard and a snake the chances are you would say at once: 'That's easy! Lizards have legs while snakes haven't any.'

But it is not quite so simple as that. There are some lizards which have no legs. For example, the blind-worm or slow-worm is a lizard, although many people kill it, thinking it is a snake.

The two major differences which separate lizards and snakes are first of all that all lizards have eyelids, and secondly that with lizards the jaw-bone is fused at the chin while the snake has a flexible ligament there, which allows it to dislocate the jaw when swallowing an enormous meal.

There are three kinds of British lizard: the common lizard, the sand-lizard, and the slow-worm. Of these three the slow-worm is the only one which does well in captivity, the other two species rarely surviving a year after being caught. Because of this we

are only going to describe those lizards which from experience we know will do well as pets.

**SLOW-WORM OR BLIND-WORM** (*Anguis fragilis*). Common in Britain but unknown in Ireland. About a foot long. Males slightly smaller. The whole surface of the body is scaled and is usually coloured brown on the upper surface and black on the under. They hibernate from early autumn until May, when they emerge and pair. The young are usually born alive in August or September. They feed on spiders and earthworms, and dislike hot sun, and must be kept in a moist atmosphere. One lived for thirty-one years in the Hamburg Zoo, and another has lived for thirty-two.

**EUROPEAN GREEN LIZARD** (*Lacerta viridis*). Found in southern Europe and Persia. Very beautiful. Feed it on insects and worms. Must be kept warm. Will live six years or more in captivity.

**WALL LIZARD** (*Lacerta muralis*). As above. Length of life about four years.

**EYED LIZARD** (*Lacerta lepida*). SE. Europe and NE. Africa. Will live seven years on the average, though fourteen is recorded. Considered to be intelligent. Feed it on mealworms.

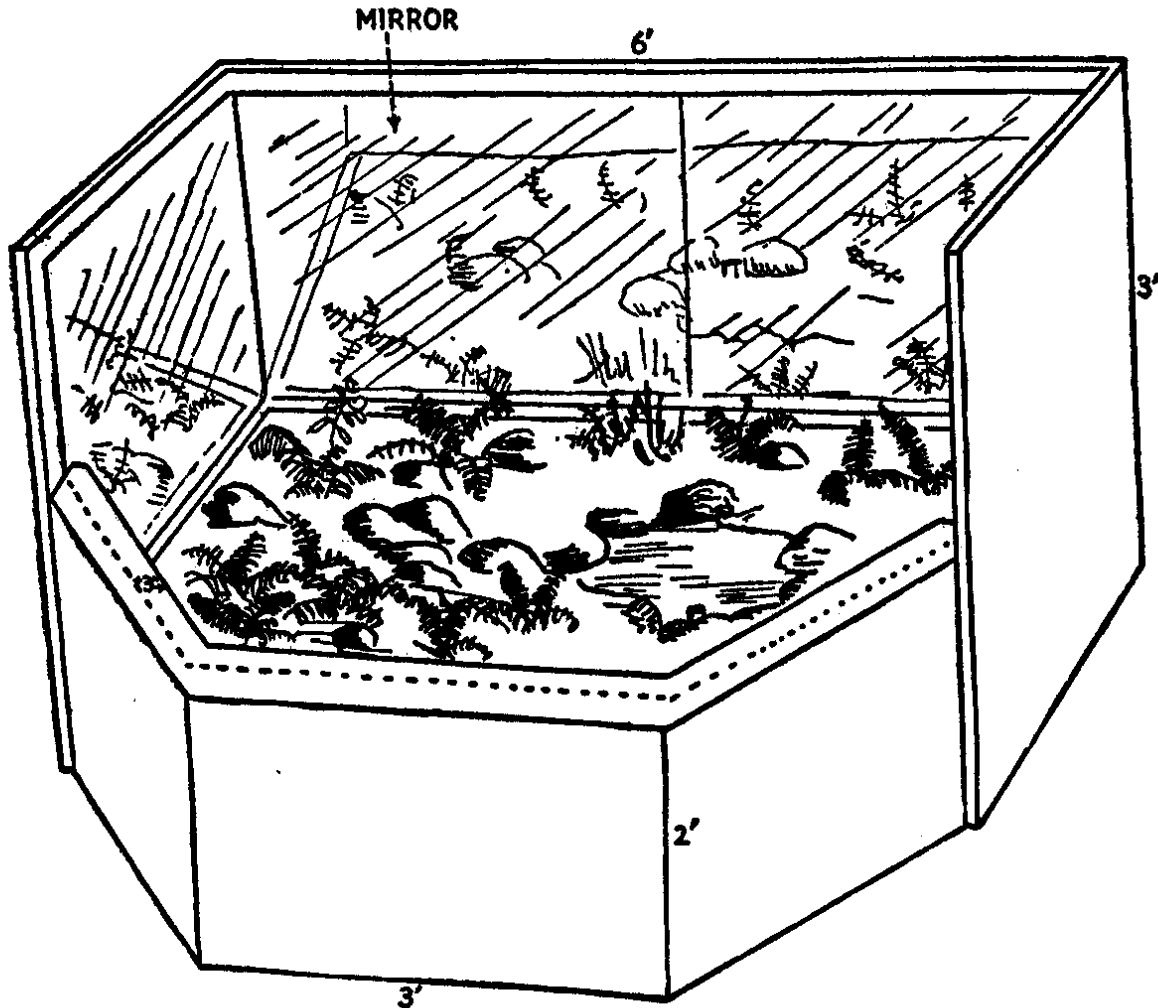
**CAROLINA ANOLIS** (*Anolis carolinensis*). Known also as the American chameleon because of its rapid colour change. Arboreal, must be given a branch to climb upon and be kept warm. Feed it on flies, insects, etc. Very pretty.

**HORNED TOAD** (*Phrynosoma douglassii*). Really a grotesque-looking lizard. Can sometimes be bought from animal dealers. The extraordinary thing about them is their ability to squirt jets of blood from their eyes when irritated or alarmed. Feed them on insects. They take water like chameleons in dew form, so must have a branch sprinkled with sweetened water. Found in North America.

**CUNNINGHAM'S SKINK** (*Trachydosaurus rugosus*). Found in Australia. Skinks are burrowing lizards and perhaps because of

this have a transparent window in the middle of their eyelids so that they can see without getting sand in their eyes. A Cunningham's skink lived in captivity for nearly twenty years.

BLUE-TONGUED SKINK (*Tiliqua scincoides*). Australian. Has lived for seventeen years in captivity.



INDOOR TERRARIUM

Note use of mirrors to give impression of space.

MONITORS (genus *Varanus*). Huge animals which should be kept warm and fed on frogs and rats. Have lived up to ten years.

ZONURES (genus *Zonurus*). Extraordinary-looking armoured creatures. Winifred Baker says the floor of the vivarium in which zonures are kept should be made from zinc or stone. If their feet continually rest on loose earth or grass their claws will drop off.

*General Notes on Lizards.* All lizards, unless otherwise stated, require warmth and sunshine. Do not allow any except the British species to hibernate, or it is unlikely that they will survive the winter. Give your pet lizards every opportunity to sunbathe, but see that the vivarium has plenty of rock caves, pieces of bark and moss, etc., for them to hide when they wish. They must always have water, and the plants in the vivarium should be kept sprinkled with water in case they wish to sip the dew. Feed them mainly on live flies, earthworms, and mealworms.

If you wish your British lizards to hibernate out of doors they must be given frost-proof retreats in winter. A box twelve inches square buried eighteen inches under some frost-proof material, such as earth or sand, will serve the purpose. If they come out on sunny days in winter they must be put back by hand or they may become torpid as the sun goes down and die of cold during the night.

If they are fattened up before the hibernating period they will need no food, but must have access to water all through the winter.

*Handling.* Grasp firmly and gently around the body near the front legs.

#### DON'TS

*Don't* pick your lizard up by the tail or it may come off in your hand. It will grow again, but it will never be so long or brightly coloured.

*Don't* let them get cold.

*Don't* forget that you can't cure a sick lizard.

*Don't* buy a lizard which drops or waggles its head when gently shaken.

#### READ

*Reptiles and Amphibians*, by Thomas Barbour (Houghton Mifflin, Boston).  
*A Beast Book for the Pocket*, by E. Sandars (Oxford University Press).

## 31. CHAMELEONS

Order *Sauria*, Family *Chamaeleontidae*

*Distribution.* Africa, the Mediterranean countries, India, and Ceylon.

*Habitat.* Chameleons are essentially arboreal animals, living mostly in trees or bushes with profuse foliage, and in moist localities.

*Origin.* Although commonly classed with lizards, chameleons are in an entirely different sub-order. There are about fifty species.

*Description.* The chief characteristic of the chameleon is the extraordinary long, worm-like tongue which it can shoot out of its mouth at an arrow speed in order to catch a fly. The tip of the tongue is club-shaped, and is coated with a sticky substance which successfully traps its prey.

The body is covered with tubercles or warty growths. Other peculiarities of chameleons are the toes, which turn in two directions and gives the chameleon a marvellous grasping organ; and the very odd revolving eyes which can each be moved independently of the other. Just try some time to roll your eyes in opposite directions, and you will have a wholesome respect for the chameleon's ability in this particular.

The head often develops ridges which make it look as though it were wearing a casque. The tail can grasp as well as the toes, and can be compared only to that of the South American monkeys in its prehensile ability.

Size varies according to species. The smallest is three inches long and the largest over a foot.

*Length of Life.* Very short-lived. They rarely survive more than six months in captivity, though a South African chameleon lived for at least six years in a Southampton household.

*Food.* Chameleons live on insects, and their favourite food is flies. In captivity they must be fed on any insect you can catch.

live dung-beetles, mealworms, and a small lizard or mouse once a week.

*Bathing.* Chameleons enjoy being sprayed with water, which must always be of the same temperature as the room. This is best applied with a 'Flit gun.'

*Housing.* Chameleons can be kept with tree-frogs in a moist vivarium at a temperature of sixty degrees. They, too, enjoy climbing and must be equipped with either a plant or a jar of leaves.

*Behaviour.* When you say the word 'chameleon' you at once think of its ability to change colour to match its surroundings. Chameleons can change colour, but this is by no means so marked as among certain lizards. Most chameleons are apple-green in daylight, but during the night this colour fades to a greyish white. When angry or mating they change colour more rapidly. They are sluggish in temperament, and it is surprising to witness the speed and rapidity with which they seize their food in contrast. They become sleepy towards evening, and sleep soundly all night.

They are the shortest lived of all reptiles, but are popular as pets. The Egyptian Expeditionary Force of 1914-19 kept hundreds of them, and many of them were marked with regimental numbers. It used to be said that the English battalions owned as many chameleons as rifles.

In captivity the female is apt to get egg-bound and die.

*Breeding.* The mating season is September. Eggs take about one hundred and thirty days to hatch. The South African dwarf chameleon does not lay eggs, but brings forth its young alive (this species does best in captivity). The chameleon takes about a year to attain its full growth.

*Handling.* Chameleons can become quite tame, but they do not enjoy being handled any more than lizards.

*Cost.* If you catch insects yourself the upkeep is very low. They can usually be bought only in the spring months.

READ

*Reptiles and Batrachians*, by E. G. Boulenger.





GRASS-SNAKE

## 32. SNAKES

### Order *Ophidia*

*Distribution.* Over all parts of the temperate and tropical zones of the world, save a few islands. Occasional examples extend further northwards; thus the grass-snake and viper extend into Siberia. On the whole, in common with other cold-blooded land vertebrates, snakes are absent from any part of the world which is frozen for a definite season.

*Habitat.* Snakes are adapted for life in all kinds of habitats, ranging from seas and swamps to trees and deserts.

*Origin.* Snakes are reptiles, and originated from a four-limbed reptilian stock at the same time as lizards, about eighty million years ago. To-day the two thousand species of snakes fall into eleven families.

Although four of the seven families we have mentioned are poisonous, there is a large majority of non-venomous species of snakes. Of all species only one-eighth are poisonous, and of this eighth only just over half are capable of killing a healthy man. The harmless colubrid snakes have a wider distribution and greater numbers than any other family.

*Description.* Snakes have always been objects of loathing and terror to many. Hence many exaggerations about their habits, structure, and powers. Snakes are descended from reptiles with limbs; the limbs have been mostly lost and the body elongated; more and more vertebrae, with, in most cases, appropriate ribs attached, have developed, and locomotion is produced by the wave motions of the rib muscles.

The limbs have either been completely lost, or, in the case of the hind limb, have been reduced to external vestiges, as in boas and pythons, or internal ones, as in many poisonous snakes.

Snakes have often been thought to 'bite' with their tongues. This is, of course, not so; all snakes have teeth and bite with these.

In non-venomous snakes the teeth are solid; in 'back-fanged' snakes there is a pair (or pairs) of fangs in the back of the upper jaw, with a groove along which poison is introduced into the victim.

Cobras, coral-snakes, and sea-snakes (*Elapids* and *Hydrophids*, very poisonous) have grooved fangs in the front of the upper jaw. In many cases the groove is closed over to form a canal.

In vipers, pit-vipers, and rattlesnakes (*Viperids* and *Crotalids*, poisonous, found in the Old and New World) the fangs are huge, and fold up when the jaws are closed. In these the poison canal is more highly developed and, running almost down the middle of the fang, has lost its likeness to the groove from which it has been developed.

*Size.* The Malayan reticulated python is undoubtedly the largest kind of snake. The record seems to be about thirty-three feet long; in the Zoo there is one nearly as long to-day. It weighs about three hundredweight.

The anaconda of South America may reach a length of twenty-five feet (absolute record), but Dr. R. L. Ditmars's offer of a thousand dollars for a skin over forty feet long has never been claimed (nor ever will be).

The smallest snakes, when full grown, are about six inches long, and can glide through a hole about one-eighth of an inch in diameter.

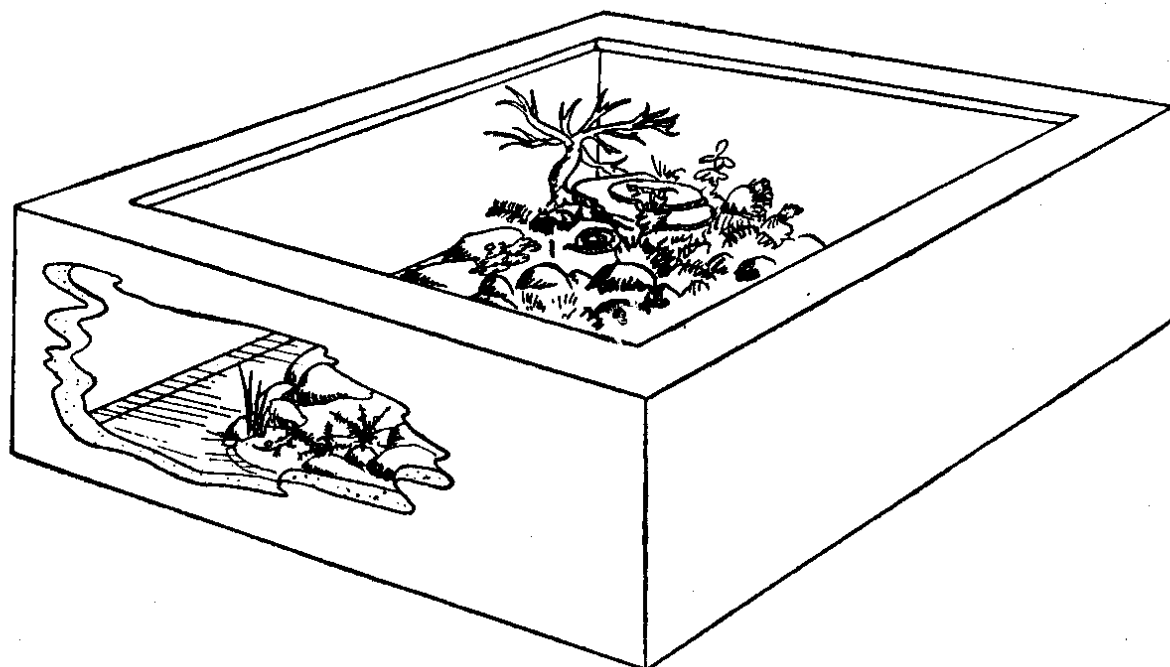
*Length of Life.* Records: Anaconda, 29 years; European leopard-snake, boa-constrictor, 23; reticulated python, 22; long-nosed viper, about 22; five other species over 20.

*Housing.* The treatment of our snakes varies so much according to your own resources, and to the kinds of snakes you wish to keep, that it is impossible to generalize in the way we have been able to do, for instance, about weaver-birds.

European snakes can, of course, be kept quite well in captivity, in a sheltered garden in England, provided they are given a good terrarium. On the whole it is best to select your stock from among the moist-land species, unless your terrarium is to be big enough to accommodate the dry-land ones as well.

Suitable examples will be given in the list of snakes at the end of this general summary.

A terrarium to suit moist-land snakes need not be large. It can be dug in a garden and concreted within a few days. The centre should be in the shape of a mound, and this can be surrounded by a concrete ditch filled with water, and retained by an outside wall with a right-angle inward overhang, though



GENERAL DESIGN FOR VIVARIUM

this need not be nearly so high to keep the snakes (and other inhabitants) in; 2 ft. 6 in. is a good height (measured from outside) as people can lean on it and will think twice about climbing over and disturbing the inhabitants.

If dry-land snakes, like vipers and smooth snakes, are to live in your terrarium, you want to make a well-drained mound, with stone slabs and planted heather, where they can burrow and bask. Sand can be freely used. Let the slabs slope to the south, and be large and fairly thin; they will thus get the sun's heat, retain it, and transmit it to the vipers basking on top or resting below.

Pythons, and other tropical snakes, including the most poisonous ones, have, of course, to be kept in special heated and safe indoor

dens. In the reptile house at the Zoo such snakes are divided from the public by thick plate-glass, which they cannot (or will not) break, and from their keepers by iron doors (quick-acting for large pythons), which in the poisonous snake dens are high up in the back wall. The snakes can be noosed with special poles and leathers let down from above.

*Food.* Snakes are all carnivorous, and feed, according to their size, on insects, amphibians, reptiles, birds and their eggs, mammals, and other forms of life. In captivity their prey can (in spite of many statements to the contrary) almost invariably be given dead.

*Cage Mates.* It is an almost universal rule to segregate your species of snakes. Even within the same species, cannibalism is common where size is different. Vipers and grass-snakes can live without intervention if their terrarium is big enough, and in the wild different species, such as the American (harmless) black snake can live quite amicably with others, such as the (poisonous) rattlesnake group.

*Breeding.* Most snakes lay eggs. In those which live in temperate countries, and which spend the winter in partial hibernation, or, at all events, retirement, mating usually takes place in spring, when many snakes can sometimes be seen coiled together.

Other snakes are viviparous, that is, the young do not have to go through an external egg stage. A few are ovoviviparous, the young hatching a few minutes after the eggs are laid. Boas are viviparous, and often breed at the London Zoo.

#### *Handling.*

Constrictors (Boids). Are all right when small, but their constricting powers increase out of direct proportion to their length. If you have a ten-foot boa, one day you may find that your attempts to show off your patent necklace to your friends have unfortunate results. If they do, dislodge the tail rather than the head and unwind from the tail end. After a python has reached twenty feet it takes about one man to every eighteen inches to move it without the risk of its getting a coil round something or somebody.

Non-poisonous (Colubrids). On the whole easy to handle.

Just behind the neck is the best place. Some, for example grass-snakes and their allies, produce a noxious exudation if not used to being handled.

Poisonous. Never handle (or keep) front-fanged poisonous snakes without expert advice, and, if possible, training. There are plenty of noose gadgets used; and many are quite excellent for handling in the reptiliary or collecting in the field. If you are set on keeping poisonous snakes you must learn the job yourself; don't let our advice be treated as encouragement. Even the London Zoo, where every precaution is taken, and every antidote is kept, is not entirely free from accidents.

Here are some snakes that people keep:

1. GRASS-SNAKE. *Natrix natrix*. Europe

*Colour.* Olive or green-grey. Black spots. Pale, often yellowish 'bib,' which partly encircles neck forming typical 'collar,' which serves to distinguish it (among other characteristics) from the adder.

*Length.* Females up to 6 ft. 8 in. (Sardinia, Sicily, etc.), in Britain record 5 ft. 10 in. (Wales). Males rarely over 3 ft.

*Life.* Up to 9 years.

*Housing.* Likes moist terrarium.

*Food.* Always a difficulty in captivity. Should be kept supplied with plenty of young frogs. Almost impossible to get it to take any other form of food.

*Remarks.* Often called 'water-snake' or 'ringed snake.' Swims well.

2. DICED WATER-SNAKE. *Natrix tessellata*. Europe and Asia

*Colour.* Yellow, grey, or pale green, rows of small square spots in alternation.

*Food.* As Grass-snake.

*Remarks.* Often sold as grass-snake. Easy to keep. Never bites.

3. AESCULAPIAN SNAKE. *Elaphe longissima*. Europe and West Asia

*Colour.* Smooth scales, brown body, shining surface like varnish.

*Food.* Eat young mice—or, more usually, not at all.

*Remarks.* Do not live well in captivity. Bite.

4. LEOPARD-SNAKE. *Elaphe situla*. South Europe and West Asia

*Colour.* Brown, with reddish saddle-shaped markings.

*Length.* Seldom more than 3 ft.

*Life.* Up to 23 years.

*Remarks.* As under 3.

5. FOUR-LINED SNAKE. *Elaphe quatuorlineata*. South Europe and West Asia

*Colour.* Pale brown, four longitudinal dark bands.

*Length.* Up to 6 ft.

*Food.* Frogs and small mice.

*Remarks.* Rare, but a good pet.

Feeds well. Does not bite.

6. DARK-GREEN SNAKE. *Coluber jugularis*. Europe and South-west Asia

*Colour.* Greenish olive, or brown.

*Length.* Up to 6 ft.

*Food.* Takes baby mice and frogs in captivity.

*Remarks.* Does fairly well in English climate. A good swimmer.

*Viper Bites.* People sometimes get bitten by vipers. Adults usually do not suffer, but the bites are really harmful to children and sometimes even fatal.

1. Apply a tourniquet—twisted handkerchief, bootlace, or rubber tube, above wound. Relax this for a few seconds every ten minutes.

2. Lance the bite, as deep as it goes, with a sharp knife sterilized in a flame.

3. Rub in crystals of permanganate of potash.

4. Send for a doctor.

5. Keep the patient quiet.

6. *Never* give stimulants.

7. When doctor comes he may inject Pasteur Antivenin ER (the right kind for vipers). This can always be obtained from Allen & Hanburys Ltd., 7 Vere Street, London, W.1 (MAYfair 2216).

READ

*Snakes*, by F. W. FitzSimons (Hutchinson).

*Snakes of the World*, by R. L. Ditmars (Macmillan).

*Reptiles of the World*, by R. L. Ditmars (Lane).

# AMPHIBIANS

## 33. NEWTS (OR TRITONS)

Order *Urodela*, Family *Salamandridae*

Genus *Triturus*

*Distribution.* Newts are found all over the three great continents of the northern hemisphere, but they are much more abundant in the Old World than the New. They are the only members of the family *Salamandridae* (which includes the salamanders) inhabiting Britain.

*Origin.* Newts can be distinguished from the true salamanders by their compressed tails and their permanently aquatic mode of life.

*Description.* Three species of newts are found in Britain: the crested newt (*Triturus cristatus*), the palmate newt (*Triturus palmatus*), and the common smooth newt (*Triturus vulgaris*).

Of the foreign newts which can be bought in this country the following are the most hardy:

The Japanese newt (*Triturus pyrrhogaster*), which is about four inches long with a brilliant carmine belly.

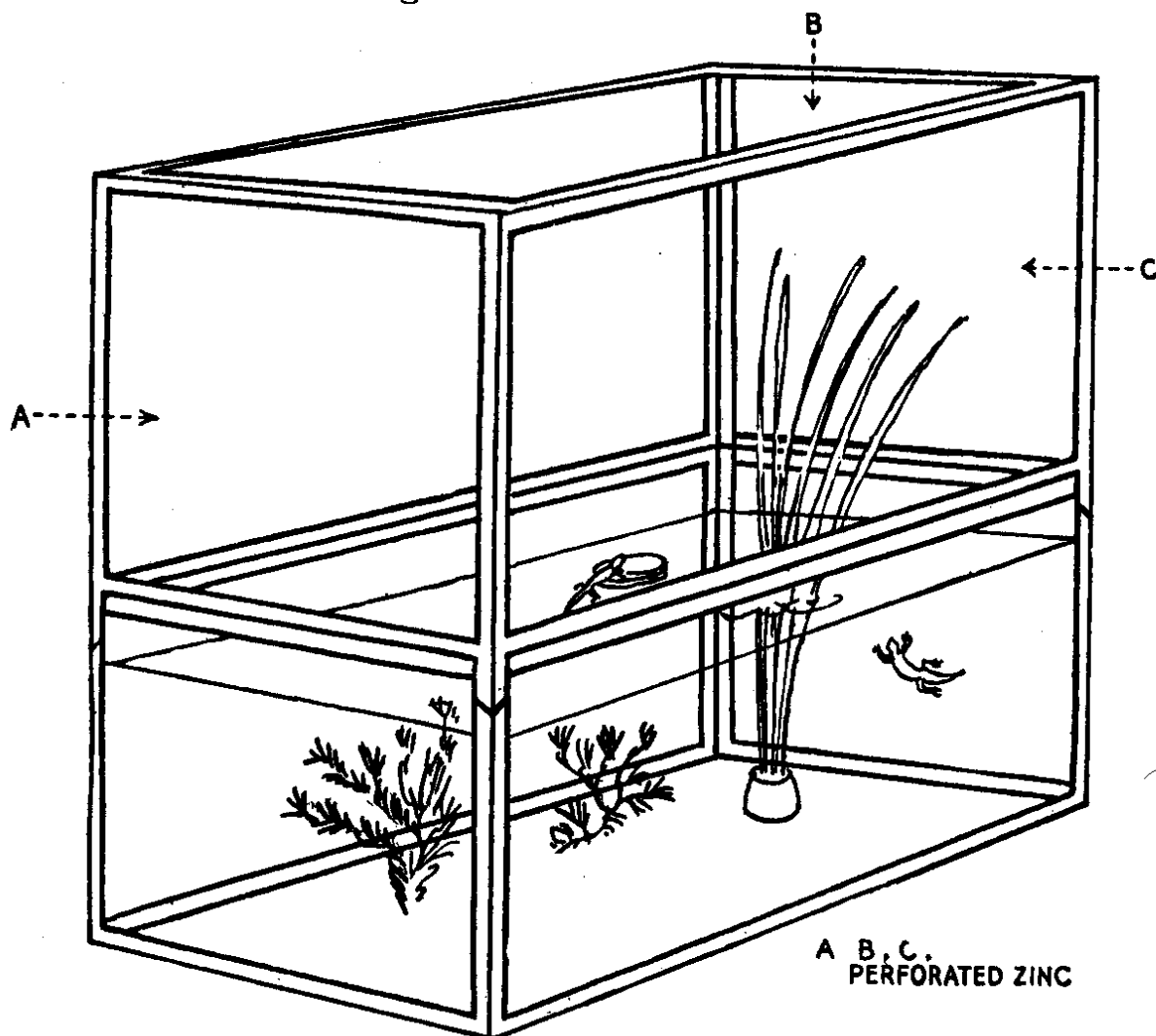
The Alpine newt (*Triturus alpestris*), about the same size as the Japanese newt, with a yellow or orange belly.

The marbled newt (*Triturus marmoratus*), a very beautiful creature, about six inches long—coloured dark green with brown or black mottlings, and with a conspicuous crest in the male.

The Californian newt (*Triturus torosus*), which grows to about seven inches in length, and is coloured brown above and yellow below.



The crested newt is by far the handsomest of all the British newts, and can be recognized by the saw-shaped crest along the back. In the males the crest is scalloped. Both sexes have orange under-parts marbled with black. They are about five inches or more in length.



FRESH-WATER AQUARIUM

Note high cover to prevent newts escaping  
(If newts are to be kept a shelving beach should be added.)

*Length of Life.* Records: Crested, 28 years; hybrid crested and marbled, 17 years; palmated, at least 12 years; smooth, 8 years; Japanese, 25 years; Californian, 21 years.

*Care and Food.* Grown newts can be fed on water fleas, small earthworms, tadpoles, dead flies, aquatic insects, chopped shell-fish, and ground beef heart.

*Housing.* Newts do best in a large tank about 20 in. by 15 in., which should contain well aerated water. Cork islands on which they can land and a small rock to hide under are essential.

The best plants to grow in a newtry are Canadian pond weed and water crowfoot.

*Cage Mates.* Newts can be kept with small terrapins, pond snails, and caddis larvae. Large diving beetles should not be admitted, as they cause a good deal of trouble in a newtry. Do not keep newts with fish.

*Behaviour.* Newts are not very intelligent pets, but they are easy to tame, move gracefully and prettily, and are a pleasure to watch. They are remarkable for their buoyant movements under water.

*Breeding.* Most of the newts described here will breed in captivity. All newts attach eggs singly or in batches to the leaves of submerged weeds or to stones. The marbled newt guards her eggs by coiling her body around them.

The larvae hatch in from ten to twenty-one days, according to species and the temperature of the water.

When the larvae hatch they should be placed in a separate tank and fed first on small water fleas and finally pieces of earthworm.

The larvae have external gills like tadpoles. Some species lose their gills in two months, others not for several years.

If you wish to keep them in the tadpole stage their development can be retarded indefinitely by placing them in cold, flowing water.

*Diseases.* Fungus is the commonest newt disease. Treat with paraffin and avoid overcrowding.

*Handling.* Young newts die if they are handled too much, but the crested newt is easily caught with a net if you have sharp eyes and look in your nearest weedy pond in springtime. Dangle a worm on a bit of string to entice the newt towards you and there will be no difficulty in netting it.

*Cost.* Weekly upkeep is very low if you catch insects and dig worms for your pet.

## DON'TS

*Don't* keep your newt in an uncovered place. Unless gauze is spread over their living quarters they may vanish to appear mysteriously in your piano. (This was the experience of one of the writers recently.)

## READ

*The Aquarist and Water Life.*

## 34. SALAMANDERS

Order *Urodela*, *Salamandridae* and other families

*Distribution.* Over nearly all the northern hemisphere.

*Origin.* Salamanders are tailed amphibians which probably evolved along with their near relatives, the newts, during the tertiary era. They are not related to the lizards. Lizards are scaled reptiles with claws. Salamanders have neither scales nor claws, and are not reptiles.

*Habitat.* Most salamanders live in moist shady places near water, but there are some species which remain in mountain brooks all their lives and never go on land.

*Description.* The Japanese salamander is the only species which attains a great size and may measure as much as four feet. The smallest salamander, a minute creature about one and a half inches long, is found in the forests above Vera Cruz in Mexico.

The common or spotted salamander (*Salamandra salamandra*), which is the kind commonly on sale in pet shops in this country, is about six to eight inches long. As the skin is rich in poison glands the salamander has few enemies, for the conspicuous yellow and black of its skin act as warning colours to other creatures. The tongue, which is rather large and nearly oval, is free at the sides and partially behind.

*Length of Life.* Up to 55 years (giant Japanese salamander), 29 years (hellbender), 24 years (spotted salamander).

*Care and Food.* Earthworms are the salamander's favourite food, and after rain they frequently appear in large numbers to seek worms in the damp, loosened soil. They have a habit of shaking the worm as a terrier shakes a rat before eating it. They also eat flies, gentles, and in captivity ground beef.

If you can possibly manage it, store some earthworms for the winter menu. Worms will keep for some time in boxes of damp earth in a cool room.

*Housing.* In the summer salamanders can be kept in a garden rockery provided they are not exposed to the direct rays of the sun, but the best type of accommodation for them is an indoor vivarium kept in a cool room. They require a damp atmosphere, as their skin must remain moist if they are to thrive, and you must sprinkle the plants or branches of leaves in the vivarium with drops of sweetened water for them to sip.

*Cage Mates.* E. G. Boulenger pointed out that they do well in captivity if only three or four are kept together. If a lot are kept they very soon become covered with fungoid growths from which they never recover.

*Behaviour.* Salamanders are shy, nocturnal animals, and usually hide all day behind rocks or moss in the vivarium. At night they will come out and look for food. Under favourable conditions they will hibernate for at least part of the winter.

It is hard to realize that these harmless creatures have been credited with all sorts of supernatural and evil powers. Pliny goes so far as to say that 'of all venomous animals it is the salamander that is the most dangerous, for it is able to destroy whole nations.'

The ancient alchemists said that the salamander lived in fire. They saw that the other elements, the air, the earth, and the water, were inhabited, so they set their fancy to work to make an inhabitant of fire, and thus to people every part of nature.

Not only did they claim it lived in fire but that it fed upon flames! Some of this superstition was believed in even so recently as 1716. The Royal Society published in their *Philosophical Transactions* of that year that a salamander cast into the fire 'swelled presently and then vomited a store of slimy matter which did put out the neighbouring coals.'

The only grain of truth in the superstition concerning the salamander is the fact that when the poor creature is in despair it exudes a considerable quantity of poisonous secretion, a characteristic which it shares with the toad and many other amphibians. If the muscular pressure becomes extreme tiny jets are squirted from the skin glands.

*Breeding.* Under favourable conditions salamanders can be bred in captivity. The breeding habits differ according to the species, but in nature the common or spotted salamander descends to the water in the springtime to give birth to her living young. Ten to forty tadpoles are born measuring under an inch in length. The tadpoles spend the first six months of their lives in the water.

They should be fed at this stage on water fleas, and they will also eat some of the plant food growing in the tank.

When the young ones come inland they measure about two to three inches, and the typical bright orange and black colouring begins to appear. They are adult when four years old.

The Alpine salamander (*Salamandra atra*) produces only two young at a time. They are born in a fully developed state, and can breathe in air from birth.

*Diseases.* If the salamanders become injured and develop fungus soak the injured parts in paraffin for a few minutes, rinse with clear water, and give them some mud in which to recuperate and rest.

*Handling.* Salamanders are slow-moving creatures as a rule. They should not be handled too much as the warmth of your hand may dry the skin.

*Transport.* As Tree-frogs.

*Cost.* Weekly upkeep is negligible if you are industrious enough to dig worms.

#### DON'TS

*Don't* believe the old superstition that salamanders like heat or fire.

*Don't* keep them in anything but a cool moist atmosphere.

*Don't* overcrowd or they will develop fungus.

#### READ

*The Aquarist.*

## 35. AXOLOTLS

Order *Urodela*, Family *Ambystomidae*

*Ambystoma tigrinum*<sup>1</sup>

*Distribution.* The adult tiger salamander is widely distributed in North America. It is only in Mexico (an arid country unfit for normal amphibian life) that the larva remains in its permanently undeveloped state.

*Habitat.* Chiefly in the large lake surrounding Mexico City.

*Description.* For many years axolotls have been sold as food in the markets of Mexico. The amphibian is fat, nearly a foot long, with a smooth shiny skin spotted or blotched with yellow. The very large head has three pairs of feathery external gills.

Until the middle of the last century it was thought that axolotls could never become land animals, and that they were fitted only for life in water. No one dreamed that they were any relation to the tiger salamander. Axolotls become sexually mature during their larval life, and breed regularly in the gilled stage.

But experiments made in Paris and elsewhere proved that the axolotl could be forced to metamorphose, and the characteristics soon developed which proved that it was after all only a Peter Pan of the amphibian world, but a Peter Pan which could reproduce its kind in the waters of Mexico, without growing up. One curious point about the artificially produced adults is that they never breed.

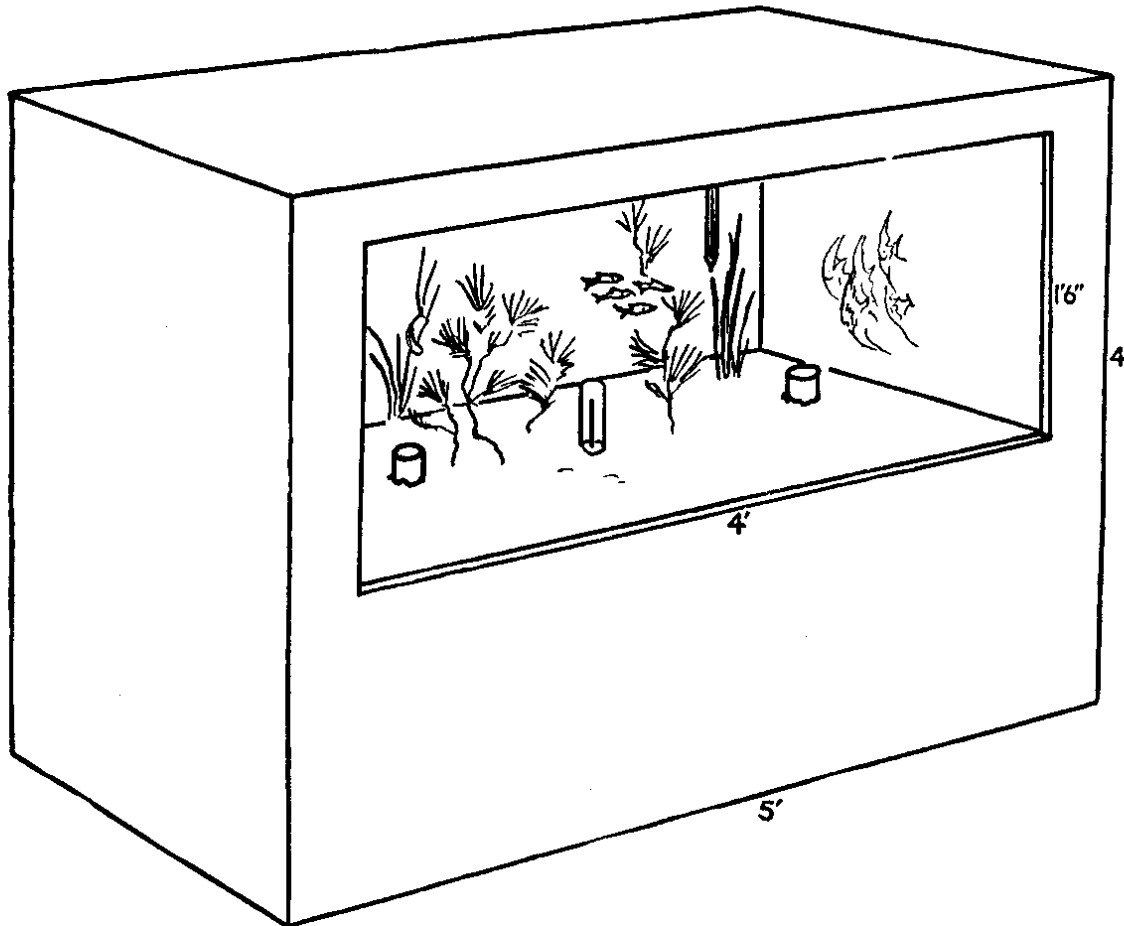
*Length of Life.* Certainly ten; twenty-five years recorded.

*Care and Food.* Axolotls should be fed on small slugs, small earthworms, small newts, tadpoles, raw meat, and fish. Gently waggle the food (in tweezers) in front of them so that it appears to move. Do not try to give them more than they will readily take every other day.

<sup>1</sup>Axolotl is the name for the larval form of the tiger salamander.

*Housing.* They can be kept either in an aquarium or in a vivarium equipped with a large tank.

They blunder about so that the plants provided soon become broken and die, unless put in small pots of earth where the roots cannot be damaged.



TROPICAL AQUARIUM

Note the thermostat in the centre and the heaters at the sides.

*Cage Mates.* Are best kept by themselves as they have been known to attack and kill fish and newts.

*Behaviour.* Axolotls are sluggish, slow-moving creatures, but can be easily startled, and may panic after sudden movements or loud noises near their tank. If you wish to make them metamorphose you must take one not more than five inches long and by degrees force it to use its lungs. Before doing this, however, feed it well. Gradually reduce the water until the axolotl becomes used to the changed conditions.



Fifteen days after being forced on to dry land the axolotl will metamorphose and become a salamander.

*Breeding.* Axolotls breed quite readily in captivity. The eggs, numbering about one hundred, are usually laid in early winter or spring, and are attached in bunches to the leaves of plants. They hatch in from ten to twenty days, according to the temperature. There is a curious point about inducing them to breed in captivity. If they are kept at first in a small tank containing vegetation, then changed to a larger tank containing growing plants, they will almost always breed.

The young larvae should be fed at first on daphnia. Later they will take worms.

*Cost.* The albino form is most expensive. Weekly cost of feeding low if you catch worms and tadpoles for them, and add a few scraps of raw meat from the kitchen.

#### DON'TS

*Don't* let food decay in the water.

*Don't* keep with fish or newts.

#### READ

*Reptiles and Batrachians*, by E. G. Boulenger.

## 36. FROGS AND TOADS

### Order *Anura*

*Distribution.* World-wide except for the Arctic regions.

*Origin.* The first land animals were descended from amphibians. But the frogs and toads of to-day, although the most successful of all modern amphibians, do not resemble the ancestral types. They are highly specialized for a jumping and insect-catching life.

*Habitat.* While frogs are found in wet or marshy ground, and toads on dry ground, both must return to the water to breed. Like most amphibians, frogs and toads need a certain amount of moisture, for they suffer if their skins become dry, as part of their breathing is done through their skins, and not all with their lungs.

*Description.* There are at least sixteen hundred species of frogs and toads, ranging in size from the Goliath (discovered twenty-five years ago in the sluggish streams of French West Africa), which is as big as a good-sized terrier, to the minute Cuban species no bigger than a postage stamp.

Most frogs are semi-aquatic animals, coming to the surface of the water to breathe and to catch flies and other insects. But a few species are permanently aquatic, such as the flabby, sprawling frog which inhabits the deep Indian lakes, and rarely ascends from the depths.

Every one knows what the common toad looks like, but there is a termite-eating toad, with a great obese body and degenerated eyes, which spends all its time seated in a gallery of some termite nest in South America, snapping up the busy termites as they go about their work.

Some frogs and toads have poisonous secretions in their skin glands. This makes them unpalatable to other animals, and so protects them from being preyed upon.

But men have used these secretions for purposes of their own. The most remarkable is carried out in Brazil, where artificially coloured parrots are made. If a common parrot's green feathers are pulled out and the skin rubbed with a certain frog, the feathers come yellow when they grow again. But there is absolutely no truth in the old superstition that toads will give you warts if you touch them with your hand. This is ridiculous. A toad is one of the most harmless creatures in the world, and gardeners should bless the day they take up residence behind the cabbage stalks, for they spend their whole time destroying insect pests.

Apart from their different ways of life toads can be readily distinguished from frogs by their very squat appearance, the warty skin, and the shorter hind legs.

*Length of Life.* Some long-lived toads and frogs are as follows: North American bullfrog, over 15 years; Surinam toad,  $4\frac{1}{2}$  years; fire-bellied toad, 20 years; yellow-bellied toad, 6 years; green water-frog, 4-5 years; South American giant toad, 7-8 years; common toad, 36 years (this figure is not verified, but 18 years has been recorded); European midwife toad, 5 years.

*Care and Food.* Frogs and toads will only eat moving food, so it is useless to offer them dead flies. They are purely carnivorous, eating worms, slugs, moths, grubs, beetles, caterpillars, snails, and other small creatures. A large toad will even eat a small mouse if it can get hold of it. Toads hold the food in the hand while eating. (Toads also eat their skin after casting it. But this can hardly be considered an important part of their diet.)

If you wish to keep toads in a cage you must buy mealworms or catch cockroaches for them in winter. In some laboratories maggoty meat or fish is hung above the froggery so that the grubs fall down to the animals below.

*Housing.* If you decide to keep frogs or toads you must first make up your mind whether you will keep them free in the garden or enclosed in an outdoor or indoor vivarium.

If kept free they can catch most of their own food, and will hibernate during the winter. A tame toad can be kept under an

inverted flower-pot in the garden during the hibernation period, which is usually from October to April. After a warm April shower it will awaken, cast its old skin, and eat the discarded 'coat.'

If kept in a vivarium remember they must not be put in direct sunlight. They require a lot of moisture (which can be kept up by sprinkling the moss or turf floor of the vivarium every day), and also hiding-places such as bits of bark, stones, and so on.

Frogs must have water in which to swim. On no account must their water be contaminated with zinc or other metals. It is perhaps best, if you have no space for a frogery, to allow your young frogs their liberty after they have changed from the tadpole stage.

*Cage Mates.* Bullfrogs and edible frogs can be kept together as they are both large, but it is unwise to keep them with smaller species. They can also be kept with slow-worms. In a large outdoor vivarium mud frogs, fire-bellied toads, yellow-bellied toads, midwife toads, and natterjacks can be grouped together.

Do not keep any frogs, except tree-frogs, in small indoor vivariums. They are such agile jumpers that in a small space they will inevitably bruise their noses against the walls of their cage. The bruised noses usually develop gangrene and death ensues.

They can also be kept with newts, salamanders, and lizards of the same size.

*Behaviour.* Toads and frogs are fond of raising their voices. Their singing can vary from the loud call-note of the natterjack toad (by far the loudest voice of any British toad) to the bell-like note of the midwife toad.

Some frogs can even sing under water, but it is usually only in the breeding season that the calling is at its height. Any one who has lived in the country must know that it is one of the signs of spring when frogs begin to call from their marshy homes.

In this country toads usually hibernate during the winter. They are nocturnal in their habits, and are seldom seen by day.

The females are usually much larger than the males, and can

be recognized in this way. In spring male frogs have a warty protuberance on the 'thumb.'

*Breeding.* The common toad lays two thousand to seven thousand eggs in two strings ten to fifteen feet in length in the water of stagnant ponds at the end of April or beginning of May. These are usually wound round water weeds. In ten days' time the larvae appear and, after hanging to the jelly they have emerged from for a few days, they fasten themselves to the under side of water weeds. At this stage they feed on vegetable matter in the water. They begin to change in a month, and fifty days after the eggs were laid the hind legs begin to show. At this stage they should be given chopped egg or worm. In eighty-five days they have turned into toads and leave the water.

Toads are not full grown until they are five years old.

The common grass frog spawns in February or March, and goes through all the same stages, but fewer eggs are laid, and they are not deposited in strings, but in large spherical masses. Tadpoles should be fed on water weed in their first stages, and later on bits of meat. If not given the right food they will never become frogs, and it is possible to keep them in an undeveloped state indefinitely.

The midwife toad is remarkable for its quite different breeding habits. After the female has laid her eggs, the male takes charge of them. He winds them round his thighs, and carries them around with him for three weeks. Hiding under stones during the day, and seeking for food at night, he manages to keep the eggs at the right temperature until the time comes for him to go to the water. Here the young tadpoles hatch.

Even more odd are the breeding habits of the pipa toad. This triangular-shaped, grotesque beast is found in South American swamps, and unlike any other amphibian goes not to water but on land to breed. The eggs are deposited on the *back* of the female, which becomes spongy and softened to retain them. Here they remain until the young complete their development, going through the tadpole stage within the egg.

Fable describes how the goddess Minerva sprang full grown

from the head of her father Jove. In the 'pipa toad fable is outdone by the young emerging from the mother's back.

*Diseases.* Fungus should be treated as in salamanders. Paraffin and mud baths seem best for all amphibian skin troubles.

*Handling.* Don't handle any amphibian for long. Remember the difference in your temperatures.

*Transport.* A ventilated cardboard box lined with damp moss is the best way of transporting frogs and toads.

*Cost.* The weekly upkeep in summer is low. If you do not allow them to hibernate in winter you must buy mealworms and gentles for them.

#### DON'TS

*Don't* keep an active little frog in a small box.

*Don't* allow the water in their swimming tank to become foul. Sediment should be siphoned off at least once a week.

#### READ

*The Frog Book*, by M. C. Dickerson (Doubleday, New York).

*Toads and Toad Life*, by Jean Rostand (Methuen).

## 37. TREE-FROGS

Order *Anura*, Family *Hylidae*

*Distribution.* Tree-frogs are found in nearly every warm part of the world. There are over one hundred and fifty species, but those most commonly kept in captivity are the European tree-frogs, White's green tree-frog, the golden tree-frog (both from Australia), and the Florida tree-frog.

*Habitat.* Tree-frogs are nearly always found in wooded, moist places. Like all amphibia, they are cold-blooded animals, and because of this cannot endure high altitudes or severe cold.

*Description.* Tree-frogs lay their eggs in water, and there the young pass through the tadpole stage. They differ from common frogs, however, because they are adapted to tree life, and are equipped with special characteristics such as adhesive pads on their finger-tips, and protective coloration.

More people have heard tree-frogs than have seen them, for they are only active at dusk and can conceal themselves so cleverly among the leaves and bark that it takes a very keen-sighted person, who knows what he is looking for, to spot one. However, their song is heard and recognized in many parts of the world, and varies according to species, from the sound of a purring cat to that of a distant cow-bell. Most tree-frogs are accredited with being fairly reliable barometers because they are said to chirrup most heartily before storms.

The females do not sing so loudly as the males. When singing the throat sac dilates until it becomes almost as large as the entire body. The noise usually recurs at intervals of two seconds, and when the song dies away the throat sac collapses like a pricked balloon, leaving the tree-frog with a very wrinkled throat.

The commonest colour is green, but this can change with great rapidity to match their surroundings.

They are active, agile little creatures, and extremely pleasant to keep as pets.

Tree-frogs breathe through their skin, which has to be moist, so they cannot live in dry places. Remember this, when equipping their cage.

The European tree-frog is about two inches long; other species are smaller, while White's green tree-frog is about four inches long.

They can see best at a distance of two or three feet, and it is a breath-taking experience to watch their aerial leaps for food.

*Length of Life.* Tree-frogs are fairly long-lived animals. They may live for about six to ten years in captivity, but one White's green tree-frog lived over twelve years at the London Zoo, and one in Paris lived for sixteen years.

*Care and Food.* The natural food of tree-frogs is insects of various sorts, and in captivity they should be fed on earthworms, mealworms, flies, beetles, moths, and caterpillars. They love green-fly, and in the summer will help you to keep these pests off your rose bushes.

They will sometimes take scraps of raw meat pressed round a string and dangled in such a way as to appear alive. They will not eat food that does not move, so all things given to them must do so.

*Housing.* Tree-frogs should be kept in an indoor vivarium at a constant temperature of 60° F. The floor of the vivarium should be covered with moss and kept damp, and the tree-frogs must have a plant of some sort on which to climb.

The easiest way of providing a plant is to put a branch of some kind of tree, such as laurel, in a jar of water. Laurel will last about a month before renewal is necessary. Any plant will do, provided the leaves are strong enough to support their weight.

*Cage Mates.* Tree-frogs can be kept in numbers together, depending on the size of their cage, and will also do well with any other reptiles or amphibians which require a moist atmosphere.

*Behaviour.* Wonderfully fearless leapers.

Tree-frogs usually hibernate during the cold weather, but in captivity it is best not to allow them to do this. They thrive if



kept under summer conditions during the winter. The one difficulty is, of course, food. Insects are hard to come by during the cold weather, but if you consult your local fish-bait dealer you can get a supply of gentles from him. They have very keen sight and hearing, and can hear sounds varying in pitch from fifty to ten thousand vibrations a second.

*Breeding.* Each species has a different breeding habit, but they do not breed in captivity. One species carries her eggs in her mouth. Another, the tree toad, *Phyllomedusa*, lays its eggs in a nest of leaves on a branch overhanging the water. At the appropriate time the bottom of the nest gives way, launching the larvae into the water. The tadpole stage usually lasts three months. Eggs are also attached in small groups singly to grass, or plant stems on the water surface. They hatch on the second or third day. In three weeks the tadpoles have budded their hind legs.

*Handling.* Do not handle tree-frogs if you can avoid doing so, as it only upsets and frightens them.

*Transport.* They should travel in small, dark, ventilated, cardboard boxes lined with damp moss.

*Cost.* European tree-frogs can be bought fairly cheaply. White's tree-frog and the golden tree-frog are more expensive. Weekly upkeep very low if you catch insect food.

#### DON'TS

*Don't* let tree-frogs get too hot or too cold.

*Don't* let them live in dry surroundings.

*Don't* offer any other than live food.

#### READ

*Reptiles and Amphibians*, by T. Barbour (Houghton Mifflin, Boston).

*Reptiles and Batrachians*, by E. G. Boulenger.