

REPTILES AS PETS



Top Left : TREE FROG
GREEN LIZARD

Bottom Left : CRESTED NEWT

Top Right : EDIBLE FROG
SALAMANDER

Bottom Right : PAINTED TERRAPIN

REPTILES AS PETS

by

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Fishponds and Aquariums

Illustrations in line and colour by Littlewood-Moore

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CONTENTS

CHAP.	PAGE
INTRODUCTION	9
I GENERAL MANAGEMENT	12
II TORTOISES AND TERRAPINS	21
III LIZARDS	34
IV SNAKES	61
V FROGS AND TOADS	72
VI NEWTS AND SALAMANDERS	96
VII AILMENTS	111

ILLUSTRATIONS

FIG.	PAGE
1. A POPULAR TYPE OF VIVARIUM	12
2. ANOTHER TYPE OF VIVARIUM CONVERTIBLE FROM A FISH TANK	14
3. AN OUTDOOR VIVARIUM	16
4. GREEK TORTOISE (TESTUDO GRÆCA)	22
5. RADIATED TORTOISE (T. RADIATA)	26
6. GOPHER TORTOISE (GOPHERUS POLYPHEMUS)	27
7. CAROLINA BOX TORTOISE (TERRAPENE CAROLINA)	28
8. POND TORTOISE OR EUROPEAN TERRAPIN (EMYS ORBICU- LARIS)	30
9. PAINTED TERRAPIN (CHRYSEMYS PICTA)	31
10. ALLIGATOR (ALLIGATOR MISSISSIPPIENSIS).. .. .	32
11. GREEN LIZARD (LACERTA VIRIDIS)	35
12. EYED LIZARD (L. LEPIDA)	37
13. WALL LIZARD (L. MURALIS)	37
14. COMMON LIZARD (L. VIVIPARA)	38
15. SAND LIZARD (L. AGILIS)	40
16. BLINDWORM (ANGUIS FRAGILIS)	41
17. GLASS SNAKE (OPHISAURUS VENTRALIS)	43
18. FAN FOOT OR HOUSE GECKO (PTYODACTYLUS HASSELQUI- STII)	44
19. RED-THROATED ANOLIS (ANOLIS CAROLINENSIS)	47
20. CRESTED ANOLIS (A. CRISTATELLATUS)	49
21. COMMON SKINK (SCINCUS SCINCUS)	51
22. STUMP-TAILED LIZARD (TRACHYSAURUS RUGOSUS)	52
23. BLUE-TONGUED LIZARD (TILIQUA SCINCOIDES)	53
24. ARMADILLO GIRDLED LIZARD (CORDYLUS CATAPHRACTUS)	54
25. HORNED TOAD (PHRYNOSOMA CORNUTUM)	55
26. INDIAN MONITOR (INDOVARANUS BENGALENSIS)	56
27. CHAMELEON (CHAMÆLEO CHAMÆLEON)	57
28. GRASS SNAKE (NATRIX NATRIX)	64
29. VIPERINE SNAKE (N. MAURA)	65
30. DICE SNAKE (N. TESSELLATUS)	66
31. SMOOTH SNAKE (CORONELLA AUSTRIACA)	67

ILLUSTRATIONS

32.	GARTER SNAKE (<i>THAMNOPHIS SIRTALIS</i>)	68
33.	FOUR-LINED SNAKE (<i>ELAPHE QUATUORLINEATUS</i>) ..	69
34.	ÆSCULAPIAN SNAKE (<i>COLUBER LONGISSIMA</i>)	70
35.	AFRICAN PYTHON (<i>PYTHON SEBÆ</i>)	71
36.	COMMON FROG (<i>RANA TEMPORARIA</i>)	73
37.	EDIBLE FROG (<i>R. ESCULENTA</i>)	74
38.	LEOPARD FROG (<i>R. PIPIENS</i>)	77
39.	AMERICAN BULLFROG (<i>R. CATESBEIANA</i>)	78
40.	PAINTED FROG (<i>DISCOGLOSSUS PICTUS</i>)	79
41.	TREE FROG (<i>HYLA ARBOREA</i>)	81
42.	AMERICAN TREE FROG (<i>H. VERSICOLOR</i>).. ..	83
43.	COMMON TOAD (<i>BUFO BUFO</i>)	84
44.	NATTERJACK TOAD (<i>B. CALAMITA</i>)	86
45.	GREEN TOAD (<i>B. VIRIDIS</i>)	87
46.	MIDWIFE TOAD (<i>ALYTES OBSTETRICANS</i>)	88
47.	FIRE TOAD (<i>BOMBINA BOMBINA</i>)	90
48.	CLAWED TOAD (<i>XENOPUS LEVIS</i>)	92
49.	SURINAM TOAD (<i>PIPA AMERICANA</i>)	95
50.	CRESTED NEWT (<i>TRITURUS CRISTATUS</i>)	98
51.	MARbled NEWT (<i>T. MARMORATUS</i>)	101
52.	ALPINE NEWT (<i>T. ALPESTRIS</i>)	102
53.	AMERICAN NEWT (<i>T. VIRIDESCENS</i>)	103
54.	JAPANESE NEWT (<i>T. PYRRHOGASTER</i>)	105
55.	SPANISH NEWT (<i>PLEURODELES WALTLI</i>)	106
56.	SALAMANDER (<i>SALAMANDRA SALAMANDRA</i>)	107
57.	AXOLOTOL (<i>SIREDON MEXICANUM</i>) ADULT STATE	109

INTRODUCTION

THE title of this book might seem a little strange to many people. Reptiles as pets ! Surely, reptiles are the least tractable of creatures ? The very mention of the word " Reptile " has something sinister in its associations. It conjures up a vision of a creature loathsome to the eye, evil in intentions, and to be avoided at all costs.

But this is pure prejudice. It is a baseless assumption that reptiles are in any way repulsive, and is without any scientific foundation. True, one would not keep a venomous snake as a pet, though there are persons of exceptional skill and patience who have even " charmed " these dangerous creatures.

But the difference between a cobra and a grass snake is as great as that between a vulture and a canary, and while among birds and animals only a small proportion are suitable for a captive existence, it is poisonous snakes alone which are exempt among reptiles as pets.

Reptiles are not of great intelligence, but they have a lot more brains than many people give them credit for. Their appearance is often deceptive. The slow, ungainly tortoise seems the very essence of stupidity. Yet his brain is highly developed and among reptiles, the tortoise ranks as high as does the raven among birds.

Reptiles are the cleanest of all creatures in their habits ; they do not carry fleas, spread any diseases among human beings, nor have they any objectionable smell.

They have many other advantages as pets. In normal times they are very cheap to buy, most species costing only a shilling or two, and they can be kept with practically no expenditure at all. Some of them will not come to grief if they receive no food for days, or even weeks on end, as in the case of snakes. Fasting is quite natural to many reptiles.

Nevertheless, reptiles are perhaps the least understood of creatures as far as their wants in captivity are concerned. The

object of this book is to guide those who have no knowledge of reptiles in the right way to maintain in health and comfort the more commonly kept species.

Many reptiles fall into the hands of young people, and through wrong feeding or other mismanagement they do not live long. This is bound to create a feeling of disappointment, and also brings about the idea that reptiles generally are not suitable creatures for keeping in captivity.

With few exceptions this is not the case. Many reptiles are extremely long-lived, and it is not unusual for the ordinary garden tortoise to reach the age of twenty or thirty years. Frogs, toads, snakes and alligators are also long-lived and grow slowly under captive conditions.

Besides the fascination which reptiles have as pets, from their oddities, many are really beautiful creatures from the aesthetic point of view. As an instance the livid jewel-like green and blue of the Jersey Lizard may be mentioned. Some of the terrapins, or water tortoises are coloured in orange, scarlet and yellow, while many rich colours are found in frogs, toads, newts and salamanders. Many harmless snakes, too, are adorned with beautiful patterns laid on in rich hues.

Quite apart from the interest aroused in the keeping of reptiles, there is a very wide field for original work by the nature-lover among this class of animal life.

Though reptiles have been studied from the earliest times with a scalpel and a microscope, surprisingly little study has been made of their domestic economy and habits. The life-histories of many kinds are imperfectly known, and those who will take pains to observe and record the way their pets behave will do a lasting service to the course of natural history.

It should be explained that we have been using the word "reptile" in its widest sense. For there are two distinct classes of creatures—Reptiles and Amphibians.

Reptiles proper include snakes, lizards, crocodiles and tortoises, and these differ from amphibians in having the body covered with scales.

The main point of difference, however, is that all reptiles are born or hatched from eggs as miniature replicas of their parents, whereas amphibians have to undergo a change or metamorphosis.

INTRODUCTION

Amphibians is the name given to such creatures as frogs, toads, newts and salamanders, which have damp, naked skin, and no claws, as a rule, on their toes. They lay soft, jelly-like eggs, from which hatch larval forms—popularly known as tadpoles. These are aquatic, fish-like creatures, which only gradually assume the perfect state.

The ignorance of the general public as to the nature and mode of life of reptiles and amphibians has given rise to many odd superstitions concerning them. For example, it is frequently supposed by persons who ought to know better, that snakes *sting* by means of their long, forked tongue, which is protruded and vibrated constantly by the creature when on the move. This organ is, however, perfectly harmless ; it is the *fangs* which do the damage in venomous snakes.

The completely harmless salamander has suffered to an amazing extent in this way. It was quite generally accepted at one time that this amphibian was actually able to survive in the heat of a furnace ! The very word “ salamander ” is derived from a large poker which is unaffected by the heat of glowing coals ; and asbestos packing, meant to withstand heat, is labelled by imaginative manufacturers as “ Salamander’s Wool.”

Some country folk to this day believe that the toad is a deadly poisonous creature which spits poison. It is true that the toad has a scalding acid substance beneath its skin, but this is only used in defending itself from animals which would otherwise devour it. Thus, if your dog picks up a toad in his mouth, the poison is ejected, and the dog is glad to let the amphibian go. The human hand is quite unharmed, however much the toad may be picked up and examined.

Almost equally silly tales are told about the newt, frog and blindworm, which are not only completely harmless, but quite defenceless creatures. The only poisonous reptile found in Britain is the adder, and its bite but rarely has fatal effects.

CHAPTER I

GENERAL MANAGEMENT

BEFORE purchasing reptiles or amphibians of any kind, you must have a suitable place in which to keep them.

This simple truth is very often overlooked, particularly by the juvenile enthusiast, who eagerly purchases some fascinating creature from a pet shop without having the least idea of where to keep it.

Perhaps the reptile is given a quite unsuitable home, and in consequence pines away in a short time. This is unsatisfactory from the point of view of both the unfortunate victim and its well-meaning, but uninitiated owner !

Reptiles and amphibians can be kept satisfactorily indoors in small cages or "vivaria," as they are called, or in quite spacious enclosures in the garden.

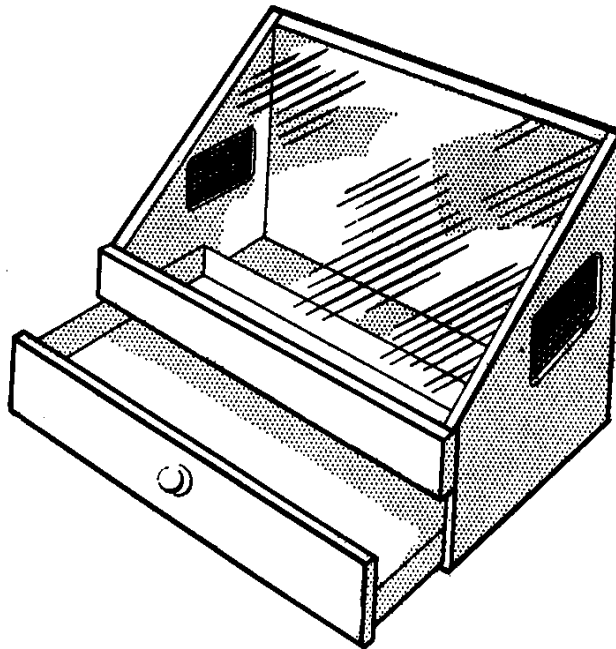


FIG. 1.—A popular type of Vivarium with tray and sliding glass front.

For the beginner, a small indoor vivarium is perhaps the ideal method of accommodating one or two specimens.

GENERAL MANAGEMENT

These can be purchased ready-made at pet stores, and are of several designs. The most popular is shaped like a school writing desk, with a glass lid. The material of which they are made is mostly metal, and the glass front lifts up or slides out for cleaning and fitting up the vivarium. Sometimes the back slides out also, to give easy access, and some models have the bottom constructed to hold water. This is a very useful addition if it is desired to keep such semi-aquatic creatures as newts, frogs and salamanders.

Air is admitted by a strip of perforated zinc at the sides. Just before the war this particular hobby was enjoying a great vogue, and dealers were offering most attractive types of vivaria suitable for every kind of reptile and amphibian.

At the time this book was written new vivaria were not very plentiful, and most enthusiasts had to make do with either second-hand ones, or those constructed themselves.

Anybody who is handy with tools can easily make quite a useful vivarium out of grocers' boxes. The bottom should be lined with sheet zinc, to prevent rot setting in.

The usual finish for small vivaria is white enamel inside, and some shade of green outside.

In any type of vivarium, the main requirements are a strong bottom, glass frontage to allow an abundance of light, and perforated zinc or similar material to give free circulation of air.

The various kinds of reptiles and amphibians differ so considerably in respect to their habits and natural environment, that if a collection of a number of different species of widely separated orders is to be kept, it will be found that one type of vivarium will not suffice.

Some species are champion climbers, for whom the laws of gravity do not exist ; others cannot even scramble up a short slope without as many set-backs as King Bruce's famous spider. Many species are quite hardy and can live out of doors all the year round, if they have suitable accommodation for hibernating during the cold months. Others are less robust, and only suitable for keeping indoors or in warmed green-houses.

A few species are particular in their choice of diet and will take only live flies. Some feed only at night and hide away in

REPTILES AS PETS

the day-time ; a number spend most of their time in the water, and others only enter it occasionally, or at certain times of the year.

All these things have to be taken into consideration when preparing a home for your pets.

The ordinary metal vivaria purchased ready-made will require little furnishing—indeed, they do not have room for more than a modicum of fittings on strictly utility lines.

The floor should be covered with sand, and a small porcelain pie-dish or bird-bath containing water sunk to the rim in this. A few pieces of virgin cork or bark may be arranged so as to form a small cavity for retirement. A covering of florist's moss is also very popular as a flooring for the vivarium. The actual furnishing will depend largely upon the kind of reptile or amphibian it is to contain. Snakes and lizards will require a much drier place of residence than salamanders, terrapins and the like.

A very attractive indoor vivarium can be made out of an old fern case, so popular in Victorian conservatories. These can sometimes be purchased in second-hand shops, or could be made by any handyman. A large angle-iron aquarium, even one which leaks too badly to be of any use for fishes, is also ideal for the purpose.

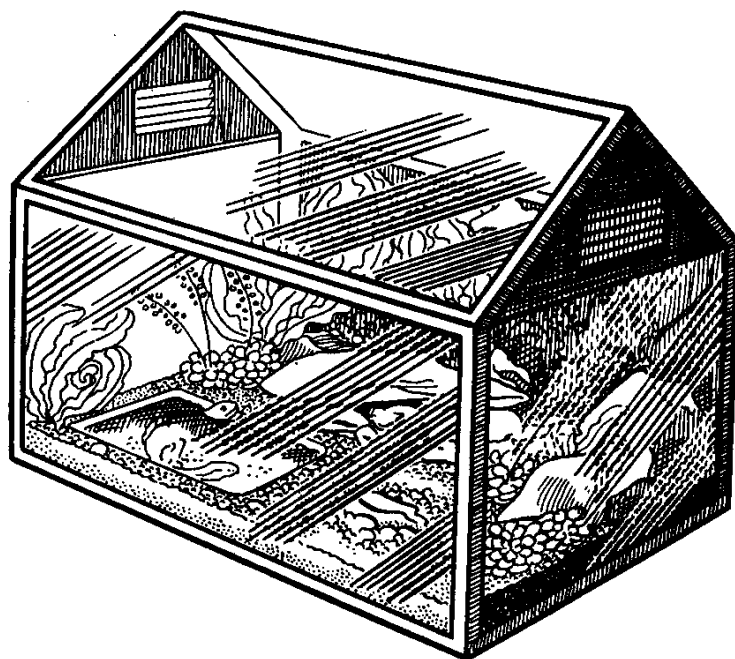


FIG. 2.—Another type of Vivarium convertible from a fish tank.

GENERAL MANAGEMENT

The bottom of the case or aquarium tank should have one or two holes bored in it for drainage purposes, or a small pipe could be fitted. A domed cover should be made, consisting mostly of perforated zinc for ventilation.

Suitable ferns can be planted in the case if so desired. In this instance the bottom should be covered to a depth of about two inches with coarse cinders, pieces of coke, pebbles, or stone broken up to the size of a walnut. On this foundation, which forms the drainage system, lay either a sheet of perforated zinc cut off to fit the inside of the case, or a layer of spagnum moss, or coco-nut fibre. The object of this is to prevent the soil being washed away when watering the plants.

The soil of the fern case is very important as the ferns will not flourish in any sort of earth. It is best to purchase properly prepared soil for fern growing from a horticultural dealer, but if you wish to make up your own compost, the following mixtures are to be recommended. (1) Two parts peaty soil, one part coco-nut fibre. (2) Equal parts coarse fibrous loam, peat, leaf-mould and sand, to which has been added small pieces of charcoal.

There are a great many varieties of ferns which will grow under such conditions as are found in an indoor vivarium, and all of them can be obtained from the leading horticulturists. Among the most popular kinds may be mentioned the Maidenhair (*Adiantum capillus-vernus*); any of the Spleenworts (*Asplenium*); the Haresfoot ferns (*Darvallia*); the Boss ferns (*Lastrea*); the Hart's Tongues (*Scolopendrium*); and many other evergreen species indigenous to Britain.

There are also many far more beautiful kinds. The Filmy ferns (*Hymenophyllum*) are especially suitable for growing in an all-glass vivarium, as they do splendidly in a close, moist atmosphere.

Not all sorts of reptiles will live happily in a continually damp atmosphere, but there are, fortunately, quite a few plants which are suitable for the vivarium kept under drier conditions than ferns will tolerate.

In a large, well-lighted vivarium such rockery plants as Houseleek (*Sempervivum*), which is not a bit like a leek, but more resembles a flattish cactus; the delightful Saxifrages, which includes the popular London Pride; the Stonecrops

REPTILES AS PETS

(*Sedum*), with their tiny, starry flowers which make such a bright show in the vivarium ; the Spiderworts (*Tradescantia*), and many others. The Spiderworts are exceptionally good plants for cases housing reptiles, as they grow without difficulty almost anywhere.

Where tree-frequenting reptiles and tree frogs are to be kept, Fuschias, Geraniums, Myrtles and Citrus trees should be grown in pots, and such reptiles as tree snakes and chameleons will delight in climbing and roosting in the branches.

Outdoor vivaria are also popular, and can be either simple enclosures or quite elaborate glass-fronted structures of wood or brickwork. For tortoises a portion of the garden fenced in with wire netting is all that is required.

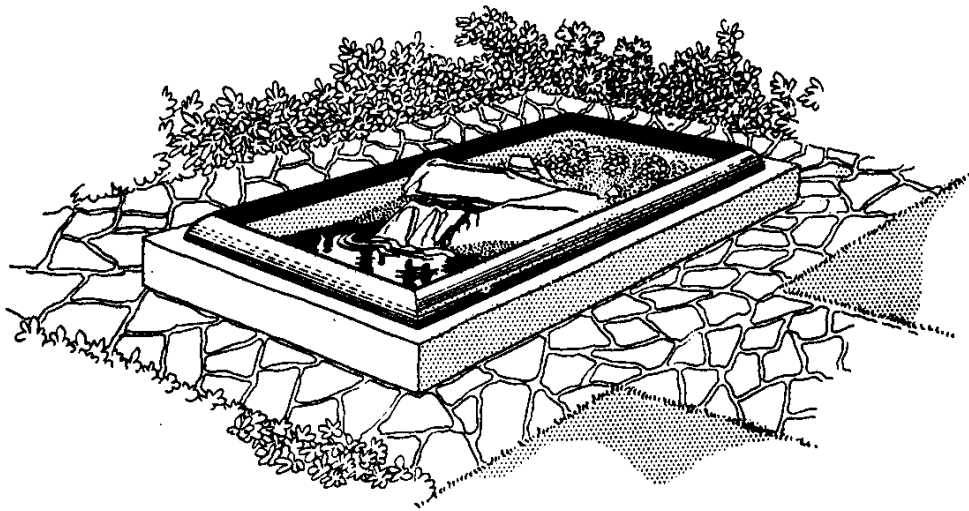


FIG. 3.—An outdoor Vivarium.

A more elaborate and very satisfactory place to keep hardy reptiles and amphibians in is an open-air reptiliary.

This simply consists of a rockery or rock garden and small lily pool combined, surrounded by an overhanging wall and moat which prevents the inmates from making their escape. This is the most natural way of keeping reptiles, and is a source of continual interest. Watching your pets in such a situation is as exciting as seeing them in their natural haunts.

The wall of the reptiliary can be built of old bricks, capped with breeze blocks, but if preferred it can be constructed of

GENERAL MANAGEMENT

odd bricks and granite slabs concreted together, the whole being washed over with cement and sand solution.

In this case strips of sheet zinc, about 6 in. wide, should be used to prevent the escape of the reptiles. These should be cemented lengthwise round the top of the wall, so as to form a continuous barrier. When the cement is firm and hard, the zinc should be bent over inwards slightly, to make it quite unclimbable. A coat of paint will make the metal more in harmony with the surroundings.

A moat is not really a necessity, though it is useful as a swimming pool and provider of water in the outdoor reptiliary. This should be made of cement prepared in the usual proportion of one part of Portland cement mixed with two parts of sand. A layer of stones and broken bricks should be placed in position before the cement is laid on, as this prevents earth sinkage and also makes the cement much stronger and less liable to crack up in severe frosts. Also it is a deterrent to the burrowing activities of rats.

One of the most important aspects of reptile keeping is that of successfully hibernating your pets.

Most reptiles and amphibians spend the cold months of the year in a torpid state, commonly known as hibernation. Some kinds, however, particularly those found in very hot and parched lands aestivate, which means that they are capable of suspended animation during the hottest and driest months of the year, becoming active only during the rainy season.

Hibernation in reptiles and amphibians is rather more complete than in warm-blooded animals, and during hibernation the respiration is very slow indeed, so that it appears to have stopped altogether. Digestion completely ceases, and the creature remains quite insensible.

It is best to allow hardy species to hibernate, as it is troublesome to keep them warm all through the winter, and at this season it is also difficult to maintain a supply of live foods.

But with tropical species, of course, warmth is essential. Such can be kept in a warm room, conservatory, or heated greenhouse if one is fortunate enough to possess such accommodation. The greenhouse must be really warmed by coke stoves, as the heat from an ordinary frost-proof type of oil heater is not anything like enough.

REPTILES AS PETS

Failing these, tropical reptiles and amphibians can be kept in a small vivarium placed directly over a small oil heater or oil lamp.

But by far the best way of keeping non-hibernating species is in an electrically-heated vivarium, with a 100-watt lamp or striplight for sunbathing purposes, as sold for the purpose by the specialist pet stores.

Such a vivarium will not need to be in use all the winter. On sunny days, the reptiles can be quite safely placed in an unheated vivarium in a sunny spot, such as by a window facing south, or even outside against a wall or other protection from the cold winds.

It is always advisable, however, to keep a thermometer in a vivarium placed outdoors, as the temperature falls with alarming suddenness directly the sun ceases to shine. No exotic reptile should be left in such a place unless one is at hand to keep watch.

Sun is the best possible tonic for all reptiles, and most amphibians like a certain amount of it provided it is not too hot. In winter one should take every opportunity to give tropical species a sunbath. It is surprising how warm the ordinary glass-fronted box vivarium will get if the sun is bright, even when the wind is keen.

One should never attempt to hibernate any exotic reptiles or amphibians, or they will certainly die.

Great heat is not necessary. I have kept the South African Armoured Lizards alive and healthy for four or five years in vivaria at a temperature round about 60° F. during the night, but they must have opportunities to bask in the sun's rays, when available, during the day-time, and be fed regularly with meal-worms.

Chameleons, too, need warmth in winter, and they need plenty of light as well.

The terrapins from warmer parts of the world, including the Spanish Terrapin and those from the Southern States of America, and South America, need warmth in the winter. They should be kept in a warm sunny tank and persuaded to keep feeding regularly throughout the winter.

European and other tree-frogs can be kept in a room where the temperature averages about 60° F. They feed during winter

GENERAL MANAGEMENT

at this temperature, but are not so active as in the warmer weather.

Most reptiles and amphibians commonly imported are able to hibernate successfully. For this purpose it is only necessary to remove water from the vivarium and put in a thick bed of dry leaves or moss, and place it in a garage or shed, which must be free from draught and damp. The vivarium should not receive the rays of the sun direct in the case of hibernating species, but it should receive normal daylight. Hibernating reptiles should not be disturbed in cold weather, but a watch must be kept for the time when they wake up in spring. They will then require water and food.

As a general rule most amphibians and some lizards will only eat live food, such as insects and their larvae, worms, slugs, etc.

Small earthworms are a very useful food, and are plentiful enough in most gardens, or they can be found in damp places by turning over stones, etc. A reserve supply should be maintained in a box or tin of damp earth for use when it is not easy to find them, such as during hot, dry spells in summer.

The small red worms found in manure heaps and decaying vegetation should not be used, as they are distasteful.

Mealworms are the main stand-by. These are the larvae of a beetle found in flour mills, and are not difficult to breed, or you can buy them from pet stores.

If you wish to breed them, buy a stock and place them with some bran and stale dog biscuits in a tin. This should have small holes for ventilation punched in the top. The insects will feed on the dog biscuits, which should be soaked occasionally, as moisture is necessary for mealworms. The worms, which are really the larval stage, change into pupae, and do not move in this state. Then the beetles hatch out and are very active, so see that the lid is on firmly.

The beetles mate and the females lay their eggs. For this purpose, put a layer of sacking on top of the meal mixture. The eggs are laid between the folds of the sacking. It is best to put the pupae in a separate box, away from your stock containing worms. Only the worms, especially when they have just moulted their skins, are of any use in feeding your pets.

Gentles are the maggots of the blowfly, and they can be

REPTILES AS PETS

purchased from dealers in anglers' requirements, as they are used as live bait. They can be bred by hanging up a fish-head in an old meat safe or some such place, and a box of fine sawdust put underneath to catch the maggots. If a few blue-bottles are put into the cage they will breed quickly enough in summer.

Live flies are eagerly accepted by most kinds of reptiles and amphibians. These can be easily caught during the summer with the aid of a number of globular fly-traps placed in the garden. It is not advisable to give any flies killed with D.D.T. to your pets.

Houseflies are not so easy to breed as bluebottles ; but they can be reared in much the same way, except that instead of using fish or offal, a paste composed of brown bread with a sprinkling of sugar should be used. Normally, it is only necessary to rear houseflies in the colder months of the year. The breeding box should be stood near a window in an outdoor shed where it catches the warmth of the sun, failing a place artificially warmed.

When young lizards are being reared, fruit flies are an invaluable food, and these are reasonably easy to breed. Fruit flies are the little brown flies which swarm in summer in places where there is rotting fruit lying about. They can be bred in jam-jars containing a piece of brown bread and a few slices of apple or some soft fruits. They multiply very quickly indeed.

Besides these staple diets, your pets will appreciate many common garden insects, including green caterpillars, aphids of all kinds, small beetles, woodlice and spiders.

CHAPTER II

TORTOISES AND TERRAPINS

UNDER the term *Chelonia* come those reptiles popularly called tortoises, terrapins or water tortoises, and turtles. Tortoises are all strictly land dwelling creatures. Terrapins, or water tortoises, as they are popularly called, are amphibious, living in lakes and ponds. Turtles are purely marine species. Unfortunately, the Americans often call terrapins "turtles," which only adds to the general confusion. The true turtles, though often kept in large public aquariums, are outside the scope of the amateur.

Tortoises and terrapins are among the most highly intelligent of reptiles, quickly becoming very tame and learning to recognise their owner. Their eyesight is quite good, but their hearing is very poor indeed. They are amazingly tenacious of life, and it is said that one of these creatures whose brain was removed lived after the operation nearly eight months, the only difference being that it blinked its eyes more often !

The heart of a beheaded tortoise will continue to beat for hours after the blood has been drained from its body. They are, however, not able to withstand really intense cold.

GREEK TORTOISE (*Testudo græca*).

This is the familiar tortoise with the yellowish shell, blotched with brown, which used to be hawked about the streets of London and sold to optimistic garden-lovers enticed by the vendor's flow of talk extolling the reptile's supposed virtue in clearing the garden of slugs and like pests.

But the Greek Tortoise will definitely *not* eat slugs in the garden, nor destroy any other pests. It is a pure vegetarian, and likes nothing better than nice, juicy lettuces. It also has a failing for ripe strawberries.

This one unfortunate element in the character of the tortoise need not deter anyone from keeping it as a pet. It will, of

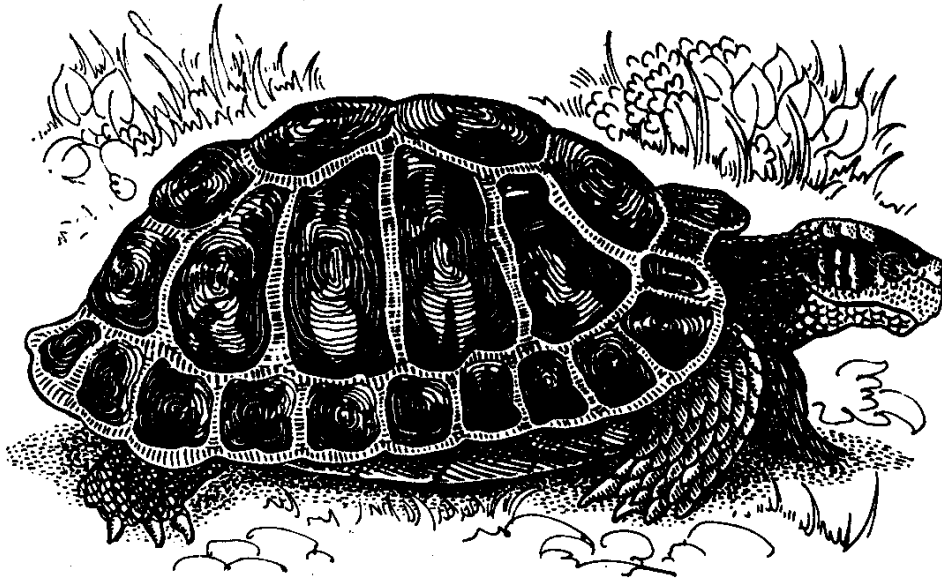


FIG. 4.—Greek Tortoise (*Testudo graeca*).

course, be necessary to make arrangements for its accommodation in the garden, so that it will not be able to wander into the vegetable patch.

Tortoises are much better kept out of doors, for they seem to be more lively and interesting under open-air conditions. In a flower garden, provided it is small and has no openings from which it could escape, the creature is not likely to do much harm, and if there is an expanse of lawn on which it can forage, it will live happily enough.

The chief objection to keeping a tortoise loose in the garden is that sooner or later it is likely to disappear. In any case, it will have to be caught and confined towards the autumn, or it will bury itself in the ground for hibernation, and may not be seen again.

Several tortoises can be kept quite comfortably in a small space, and the best plan is to enclose an odd corner of the garden for them with a fence of wire netting. This need not be very high. A cool greenhouse also makes an excellent home for a tortoise.

Even when given the run of a large garden, tortoises cannot always find enough food for their needs, except in the height of summer. They are surprisingly hungry creatures, and by way of diet they will appreciate the softer leaves of cabbage and other greens, lettuce, sow thistle, tomato (of which they are

TORTOISES AND TERRAPINS

very fond), and even garden weeds of the more succulent kinds. Do not overlook water ; a shallow dish or saucer of this must always be accessible.

It is not altogether a good plan to keep a solitary tortoise, for these creatures are sociable in disposition. It is much better to have two, a true pair being ideal. The sex may be determined by inspecting the breast-plate, that of the male being concave, and that of the female flat.

A pair is much more likely to remain in the garden than a solitary individual, which would become very anxious to wander away in spring.

Greek and other land tortoises, unlike water tortoises, are purely diurnal creatures. When kept loose in the garden they should be fed at the same spot every day, and they will soon get into the habit of coming there regularly.

In winter, the Greek Tortoise hibernates. It will, if left alone, bury itself completely in the corner of the garden, or under a pile of leaves. But it is not wise to allow this to happen as the reptile may be killed by the burning of rubbish under which it has crept, by a fork when digging, or by the cold and damp of winter.

The safest plan is to pack it away in a wooden box filled with dry leaves, which may be stored in a cellar or shed until spring.

A most careful watch must be kept about March when the hibernating tortoise will wake up, if the weather is at all fine. The first thing to do is to give it a drink of water. It is essential to the tortoise's internal economy to take long drinks of water before it can begin to feed at all.

A leaf or two of dandelion can then be offered, but it will probably remain untouched. Care must be taken to protect tortoises which awaken early in spring from sudden frosts, as they are very susceptible to cold at such times.

When a pair of tortoises is kept, it is not by any means an uncommon thing for the female to lay eggs ; always in a hole a few inches deep, scraped in the soil with her powerful forefeet. After depositing the clutch, she carefully covers them over, and then levels the top soil so neatly that it is practically impossible to find the " nest," unless she has been carefully watched.

REPTILES AS PETS

In the Mediterranean region, and North Africa, where tortoises are found wild, the heat of the sun is sufficient to incubate the eggs ; but that is not the case in this country.

If you wish to hatch out the eggs as an experiment, remove them carefully, keeping them the same way up, and rebury them exactly in the same position as that in which you found them, in fine sand.

They must be placed in a garden frame or greenhouse, or other warm place, where a temperature of 80° F. can be maintained during the day. Whether they will hatch or not depends to a large extent on the weather ; the hotter the better, of course. The period of incubation is from four to six weeks.

The young tortoises should be kept in a vivarium or fern case, with a saucer of water sunk in one corner. They should not be removed from the hothouse or frame until they have got into the way of feeding regularly, and then they must be brought gradually into a cooler temperature. Their food should consist of the tenderest, small leaves of lettuce, given fresh every day. Bread and milk is quite unsuitable fare for tortoises, and not necessary. Baby tortoises are soft like putty, and about the size of a two-shilling piece, but are most attractive and quaint little creatures.

A very interesting series of observations was made on a tortoise by Gilbert White, of Selborne, who writes of his pet that " no part of its behaviour ever struck me more than the extreme timidity it expresses with regard to rain, for though it has a shell that would secure it against the wheel of a loaded cart, yet does it discover as much solicitude about rain as a lady dressed in her best attire, shuffling away on the first sprinklings, and running its head up in a corner. . . I was much taken with its sagacity in discerning those that do it kind offices ; for as soon as the good old lady comes in sight who has waited on it for more than thirty years it hobbles towards its benefactress with awkward alacrity ; but remains unattentive to strangers."

Another tortoise lover was the Rev. J. G. Wood, who says: " One of these reptiles, which I kept for some time, displayed a remarkable capacity for climbing, and was very fond of mounting upon various articles of furniture, stools being its favourite resort. It revelled in warmth, and could not be kept

TORTOISES AND TERRAPINS

away from the hearthrug, especially delighting to climb upon a footstool that generally lay beside the fender. It used to clamber on the stool in a rather ingenious manner. First it got on its hind legs, rearing itself against the angle formed by the stool and the fender. Then it would slowly raise one of its hind legs, hitch the claws into a hole in the fender, and raise itself very gradually until it could fix the claws of the other hind foot into the thick carpet-work of the stool. A few such steps would bring it to the top of the stool, when it would fall down flat, crawl very close to the fender, and lie there motionless. If it were taken off twenty times a day, and carried to the other end of the room, it would always be found in its favourite resort in a few minutes."

There are two other species of tortoises found in Europe. Hermann's Tortoise (*T. hermanni*) resembles the above species except that it has no spurs on the thighs, and the tail ends in a claw-like horn.

The Marginated Tortoise (*T. marginata*), is only found in Greece, and is rather distinct. The colour of the carapace is black, except the yellow centres of the plates. It is a vegetarian, and requires the same treatment as the Greek and Hermann's Tortoises.

There is much misinformation concerning the ages to which tortoises attain. The Greek, Hermann's and Marginated species do not usually live much longer than twenty-five to thirty years. Much higher ages have been recorded, however, and the famous specimen immortalised by Gilbert White lived fifty-four years in this country.

The age of a tortoise can be estimated by counting the concentric rings on the shields of the carapace. Each of these slightly raised rings represents a year's growth. In very old tortoises, however, the carapace is often so worn and rubbed over that the rings cannot be seen.

RADIATED TORTOISE (*T. radiata*).

This is a handsome species from Madagascar, which is rather rare on the market. Young individuals are inclined to be somewhat shy, and sometimes refuse to eat, so that it is advisable to purchase older specimens. These settle down quickly and will usually feed well, on and from the day of their arrival.

REPTILES AS PETS

A favourite food is water-melon, even eating the rinds, but it will eat ripe marrows, gourds, cabbage, lettuce, endive, cherries, bananas and most succulent-leaved plants, such as stonecrop.

Nevertheless, if fed regularly in the morning, this species can be given the run of the garden in summer, unless the weather is cold and sunless, and will do little harm as far as flowers are concerned.

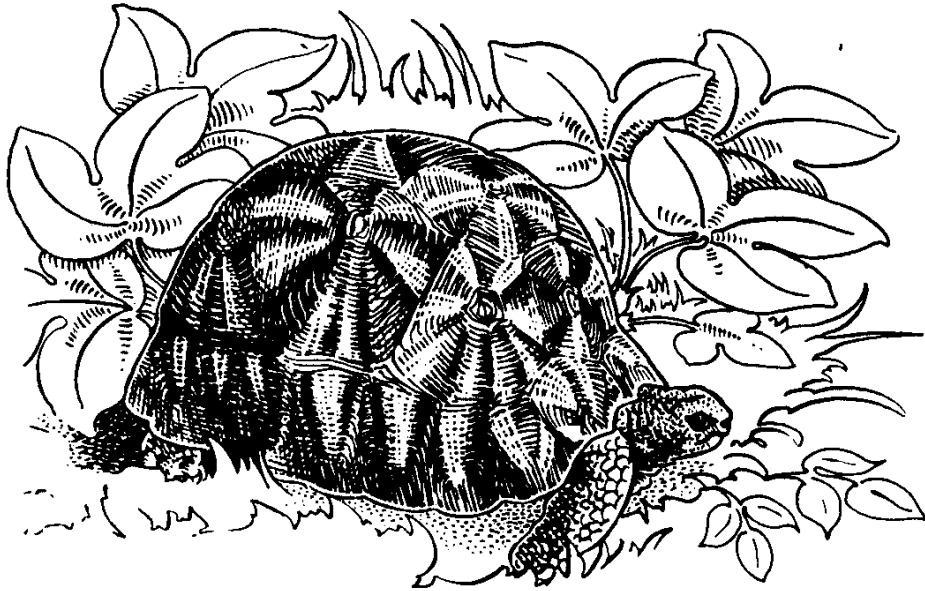


FIG. 5.—Radiated Tortoise (*Testudo radiata*).

A suitable place to keep these tropical tortoises is in a box-shaped cage, covered with wire netting, after the fashion of a rabbit hutch, and raised on legs off the ground. This should be lined with hay.

They do not hibernate, and must be kept warm and fed throughout the winter. A well-heated greenhouse or conservatory is the best place in which to keep them during the cold months.

The colouring of the carapace is very striking. Each shield on the back has a yellow or orange areola from which bands of the same hue radiate, in a manner reminiscent of the "rising sun" as depicted on the Japanese flag. The rays are all the more striking against the black ground-colour of the carapace. The species is very variable, and often it is difficult to find two specimens alike.

TORTOISES AND TERRAPINS

GOPHER TORTOISE (*Gopherus polyphemus*).

This is a North American species, being found from South Carolina to Florida, and in one or two other States. It is fairly large, averaging about twelve inches in length of the carapace, and weighing about eight or nine pounds.

The shell is oblong when viewed from above, of greater length than width, and the anterior and posterior margins are almost square to the sides. In colour the carapace is a light brown, and the breast-plate horn-colour. The limbs are grey, and the eyes are bright and intelligent-looking. The fore-limbs of this tortoise are very much larger than the hind ones, and are shaped like the blade of an oar carried flat side on.

With these strong fore-limbs the Gopher Tortoise digs burrows in the sand in which it lives. It is only found in dry, sandy places.

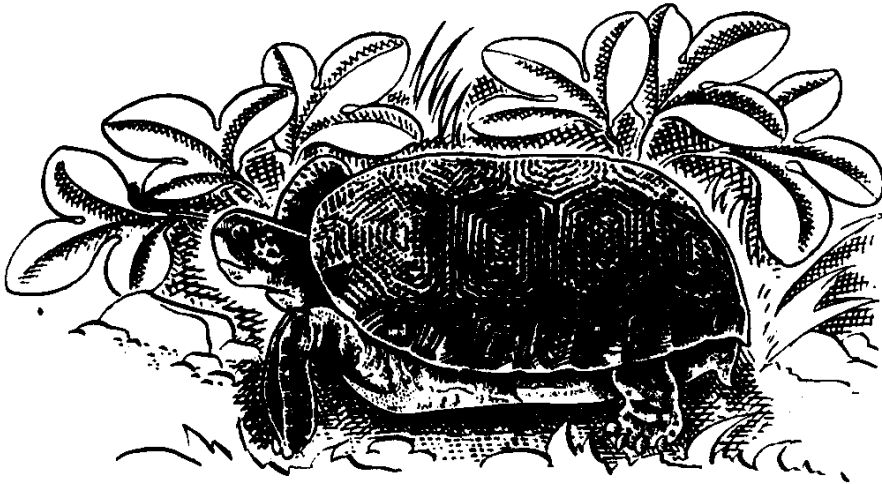


FIG. 6.—Gopher Tortoise (*Gopherus polyphemus*).

In captivity, the Gopher Tortoise is hardy, but must not be kept in a damp, cold situation. An occasional shower or two won't worry it much, but it is apt to go off its food and become very depressed if kept outside in prolonged wet weather. Some sort of shelter, such as a well-lighted garden shed, conservatory or greenhouse should always be available. It is very intelligent and soon learns to take food from the fingers. Like the Greek Tortoise, the Gopher is a vegetarian and fruit-eating species, and will crop grasses and clovers off a lawn, besides making short work of lettuces, soft cabbage leaves, celery and the like.

REPTILES AS PETS

It is the normal habit of the Gopher Tortoise to shelter from the sun during the hottest part of the day, and to eat early in the morning and again in the evening.

A curious point in connection with this tortoise is that there is a species of beetle which lives on its dung, and on that of no other creature, being only found in the Gopher's burrows.

CAROLINA BOX TORTOISE (*Terrapene carolina*).

There is a number of species of Box Tortoises, and they form a very interesting link between purely aquatic and wholly terrestrial species. They are, in fact, descended from terrapins, and have abandoned an aquatic existence, but not progressed to the stage when they can live far away from water.

Their natural habitat is in damp woods, or swampy places, where they live in muddy spots. But they are poor swimmers, unlike the skilful terrapins, due to their globular shells and comparatively webless feet.

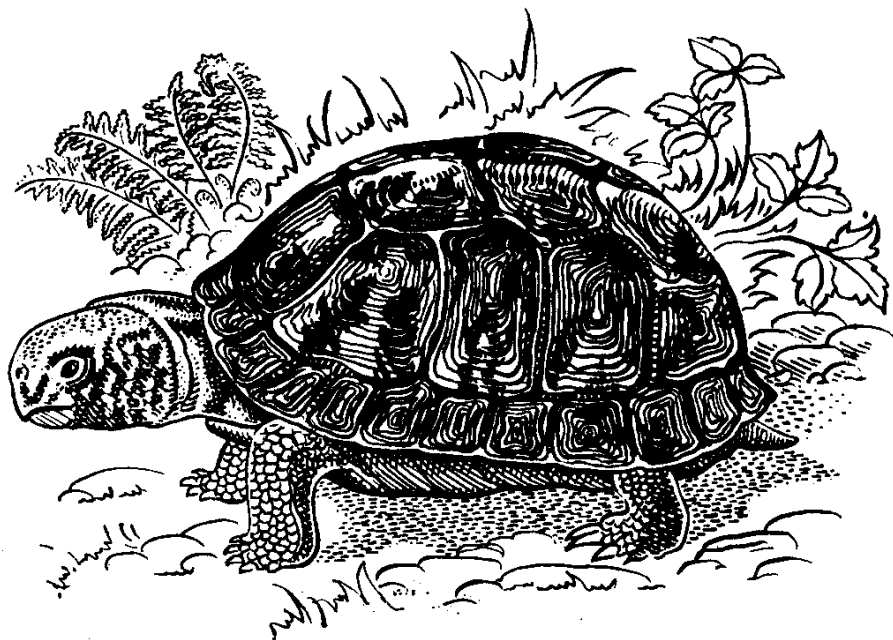


FIG. 7.—Carolina Box Tortoise (*Terrapene carolina*).

The term "Box" is given to these tortoises on account of the strange structure of the plastron or breast-plate, which is divided into two movable lobes. The transverse hinge can be moved in such a manner as to shut like a box, completely closing in the head, legs and tail, so that nothing remains

TORTOISES AND TERRAPINS

visible to an enemy but the shell. The carapace measures about five and a half inches in adult specimens.

The Box Tortoise is small, and average specimens are about four or five inches in length. In the males the plastron is concave, while in the females it is flat. The eyes are red in the male, and brown in the female.

This is one of the best of all the tortoise tribe to keep as a pet, for it really will eat slugs. Though the Box Tortoise is fond of fruit and mushrooms, it is largely insectivorous in its diet, and will not eat grass.

It is hardy, and will hibernate successfully at the bottom of a garden pool. It is very long lived, individuals having been known to spend more than thirty years in captivity.

The carapace is marked with reddish or yellow spots and radiated lines. There is a tendency to lose these with age, so that the majority of the adults become uniformly dark brown or even blackish.

The eggs are buried in the soil about June, and hatch in three months' time.

POND TORTOISE OR EUROPEAN TERRAPIN (*Emys orbicularis*).

Terrapins or water tortoises, as they are sometimes called, make ideal pets, and they can be kept either in a garden pond or in a vivarium. You can keep them quite successfully even if you live in a small flat.

Newly imported specimens are usually about three inches in length, though when full grown this species may reach nearly eight inches. It is found in a wild state in South and East Central Europe, extending to Persia and Algeria.

The colour of the shell is dark brown or blackish, and is ornamented with yellow dots and streaks. The effect is rather pleasing when the reptile is viewed from above in the water, but the colours are dull when the terrapin has dried itself in the sun.

The terrapin is a much more active creature than the land tortoises, and is inclined to be rather shy when first purchased. However, it soon becomes reconciled to captivity, and is then a lively and interesting pet. It is active chiefly at night, and in the day-time spends much of its time basking in the sun out of the water.

REPTILES AS PETS

Although terrapins are very aquatic, and only feed on floating or live aquatic food, they do not like being in the water all the time, and if kept in an aquarium, an island of some sort will be needed. When kept in this way, three or four inches of water will be sufficient depth for their needs.

Undoubtedly, the best place in which to keep terrapins is in an outdoor pool. An ordinary water-lily pool is ideal. There must be a fence of wire netting, or a wall, surrounding

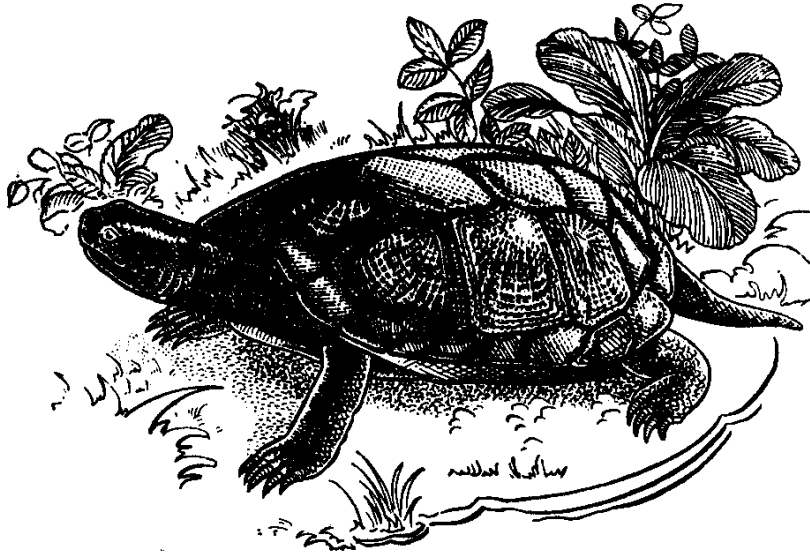


FIG. 8.—Pond Tortoise or European Terrapin (*Emys orbicularis*).

this, or the terrapins will climb out and get lost. A rocky islet planted with some large plants to provide shade will be useful also.

In a garden pond of large size, a few terrapins will find an abundance of food during the summer months, but if kept indoors or in a tub or tiny pool outside, they will have to be fed regularly. The best food is scraped raw meat or fish, and earthworms. Moderate and large sized fish are quite safe in the same pond as small terrapins, though they will eat fish eggs and fry.

During the winter months the European Terrapin hibernates. When they become sluggish and refuse to eat, prepare their winter quarters. Take out the aquatic plants from the aquarium or vivarium, rinse the sand, and add a fresh deep layer, and run over it an inch of water. A few stones should be put in,

TORTOISES AND TERRAPINS

and the terrapins will bury themselves underneath them. They can be stored thus in a dark, cool place, and in the early spring they must be brought gradually into the light again.

In the case of specimens in a garden pond, they will bury themselves in the muddy bottom and should be quite safe left there, provided the pool is not so shallow as to freeze solid to the bottom.

PAINTED TERRAPIN (*Chrysemys picta*).

This is a very attractive species, which is a native of Eastern North America, ranging to Canada.

The coloration is dark olive to black on the carapace, with the shields margined with yellowish tint. The marginal shields are bordered with blood red blotches and crescentric markings. The plastron is clear yellow. The head and limbs are marked with yellow and black stripes, many of the yellow stripes being also picked out in red. Average length of carapace is five inches.

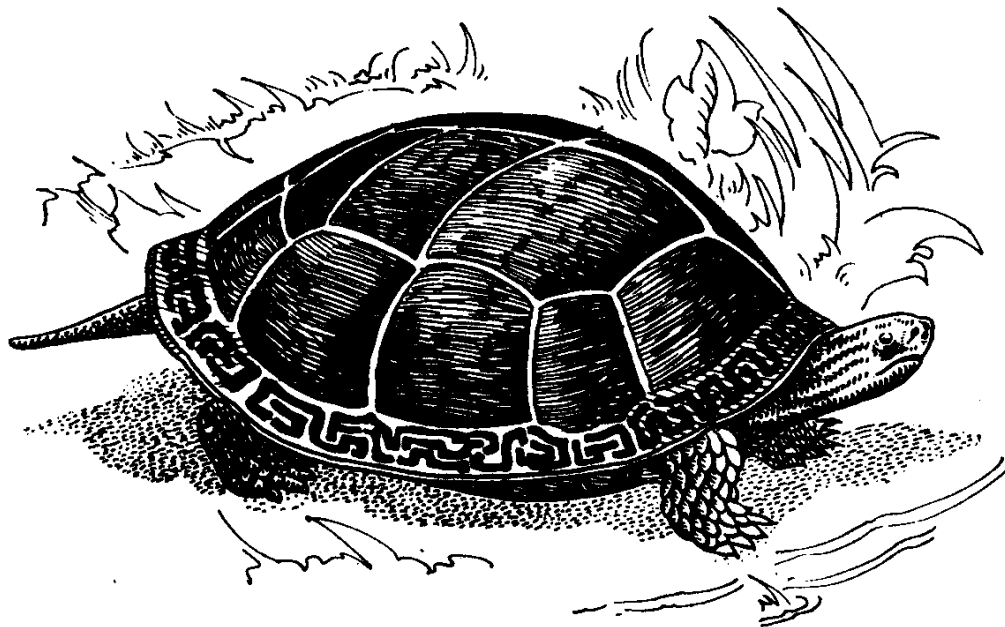


FIG. 9.—Painted Terrapin (*Chrysemys picta*).

This lively little terrapin is quite easy to feed. It is fond of insects, but will also eat very small fish, worms and scraped meat. The strength of jaws of these small terrapins is truly astonishing, and it is an amusing sight to see one of them

REPTILES AS PETS

seize the end of a worm held by a large newt, and then, after a tussle, finally wrest it from him.

The Painted Terrapin, though shy by nature, soon becomes very confiding. It is surprising how soon it learns to recognise the hand, and apparently the face of the person who feeds it. One's approach to the tank is a signal for a headlong dash to the place below the lifted cover, where the terrapin waits expectantly with head up and neck outstretched. It is quite hardy.

There are a number of other species of small terrapins which are to be had from time to time, but they will all require similar treatment.

ALLIGATOR (*Alligator mississippiensis*).

Alligators, when small, are very popular pets. They can be tamed very easily, and are capable of showing quite a considerable amount of affection for their owners, though they do not look very affectionate, with their "gently smiling jaws"!

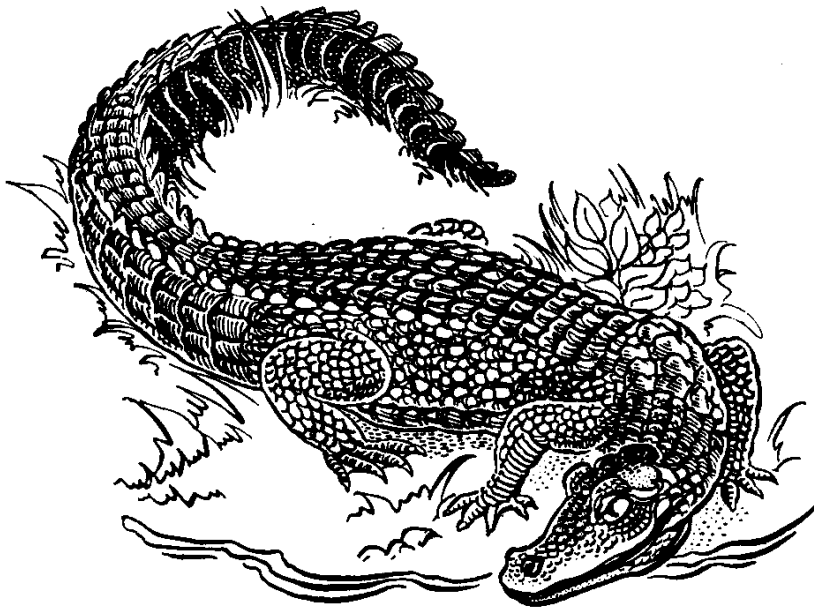


FIG. 10.—Alligator (*Alligator Mississippiensis*).

They are never vicious, and are quite easy to look after. An American reptile enthusiast succeeded in taming a full-grown specimen to such an extent that it would waddle upstairs after him, or follow him out into the garden, and then back to the

TORTOISES AND TERRAPINS

house again. A remarkable thing about this odd pet was that it was on such good terms with the household cat that it would rest its snout on the animal's back when taking a nap on the hearth !

Specimens offered for sale are babies of about three months old, and varying in length from one to three feet. These little fellows are lively pets, and soon learn to come at their owner's bidding.

When kept in a comparatively small vivarium they grow very slowly indeed, but if housed in almost natural conditions, as at the Zoo, they will grow more than a foot a year.

The right place to keep alligators is in a warmed vivarium, specially fitted up for them. Part of this should consist of a little pool about four inches in depth, and at one end a rockery should be built, rising gradually from the water's edge.

In a heated conservatory, or greenhouse, it is not necessary to have special heating arrangements ; in the absence of such general heat the water can be warmed with an immersion heater of low wattage. The vivarium should have a cover fitted with an electric light bulb, as alligators love to bask in bright light.

Below 75° F. alligators tend to become torpid and refuse to feed, consequently they must not be left in any place where the temperature falls below 65° F., though they can stand a short time at as low a heat as 60° F.

A good position is by a sunny window in summer, and in a greenhouse or close to a stove in winter. Food should be worms, small fish, or fish-scrap, raw meat, etc.

CHAPTER III

LIZARDS

LIZARDS are, for the most part, natives of tropical and subtropical regions, though we have two species in England. Many of them are brilliantly coloured, and these form excellent subjects for the amateur.

Lizards of all kinds like sunshine, and the brightly coloured ones are only seen to the best advantage in a really bright light.

A few tropical lizards live partly in the water, but most of them prefer to reside in warm, dry spots. Even in the hottest and driest deserts can be found lizards of one kind or another. Here they hide from the scorching rays of the noonday sun under loose piles of rocks and stones. Others are tree-frequenting species, and spend their time climbing about the branches or running nimbly up the trunks.

Some of the larger lizards are slow in their movements, but the majority of them are extremely agile, and it requires very swift movements to catch one of the small species with the hands.

When handling lizards, they should be grasped firmly, but gently, round the body, as near the fore-legs as possible. One should never grab hold of a lizard by the tail, as in many species this organ easily breaks off. Another tail will grow in time, but it will be shorter than the original member.

Lizards moult periodically, shedding their skin. This will be seen in scaly fragments lying about the enclosure where the reptiles are kept.

Most lizards are carnivorous in diet, living on small mammals, birds and their eggs, insects, larvae, worms, etc. In captivity they will eat earthworms and all sorts of insects, besides, in some cases, raw minced meat, and small fruits, such as grapes and cherries. They are inclined to be cannibals, so that specimens of widely differing size should not be associated.

There is a popular fallacy in hot countries, where lizards are seen lying on parched sands, that these reptiles do not

LIZARDS

drink. They do, however, but it is remarkable how little water will suffice for many species. Some of them at liberty drink only dew.

A few lizards give birth to live young, but most of them lay eggs. These may be only two in number, or as many as thirty. Sometimes they are covered with only a leathery skin, but some are shelled.

When lizards lay in captivity, the eggs should be placed on dry sand in a large glass jar, covered with a piece of butter muslin. This should be stood in a sunny situation until the eggs hatch. The baby lizards should be fed on fruit flies, and aphids collected from rose bushes and other non-poisonous plants. When they grow, they can be weaned on to larger insects and young mealworms.

GREEN LIZARD (*Lacerta viridis*).

This is one of the most popular kinds of lizards as a pet, and is also one of the most attractive. When full-grown it measures about a foot long, the greater part of which is taken up by the tail. The general colour is rich grass green above, the male having a blue throat.

At liberty, we are told that, "It haunts sunny spots, and may be found in orchards, gardens, shrubberies, copses and similar

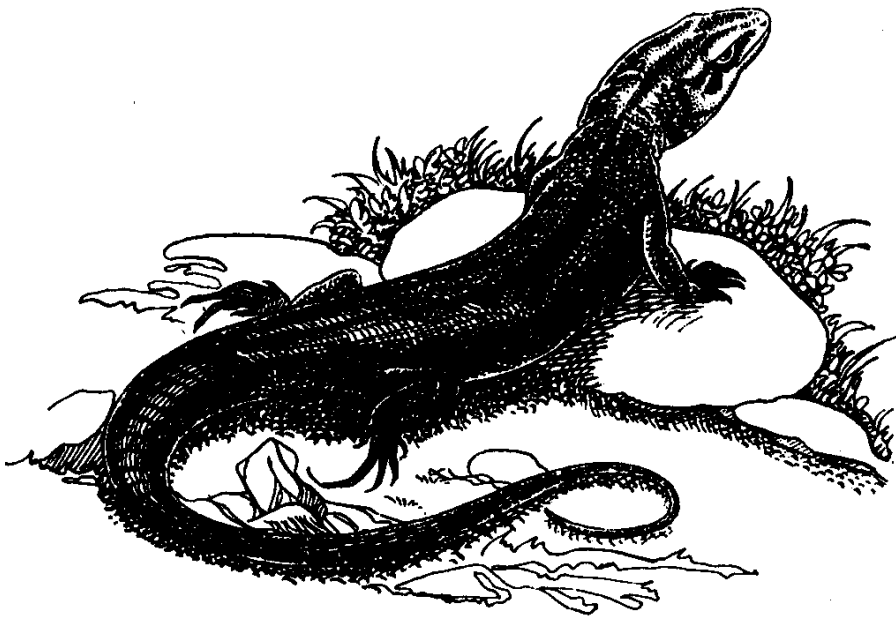


FIG. 11.— Green Lizard (*Lacerta viridis*).

places where it can find plenty of food and obtain concealment when alarmed. Old ruins, too, are greatly haunted by this beautiful lizard, which flits among the moss-covered stones with singular activity, lying at one moment as if asleep in the sunbeams, or crawling slowly as if unable to proceed at any smarter pace, and then, when the hand is thrust towards it, disappearing with a rapidity that looks like magic."

Seeing that grasshoppers form the bulk of its food, one may guess that this lizard is no slowcoach when hunger calls for action. It also eats most other kinds of large insects, larvae, slugs, worms, etc., and will become cannibalistic if normal food is scarce, showing little hesitation in making a meal of other small lizards.

Unfortunately, the Green Lizard is somewhat delicate in captivity, but only when confined to a small vivarium. It is really a much more suitable subject for the outdoor reptiliary.

The eggs of this lizard are white, and number from eight to eleven. They are laid in the height of summer, and take a month to hatch.

It is a common species in many parts of Europe, Asia, and Africa, and is also found in the Channel Isles, hence it is sometimes known as the Jersey Lizard.

A good way to keep this and other hibernating lizards through the winter is to stuff a long, narrow box with dry moss, cotton-wool and wood shavings. A small hole should be made at one end. The lizards will usually go in of their own accord, and stay there till spring.

EYED LIZARD (*L. lepida*).

This is a much larger species than the last, and one of the best lizards to keep—provided you have spacious accommodation. For it grows up to two feet in length, and is powerfully built.

The general colour is green, but not of such a bright hue as in the Green Lizard. Over the green is a variable black network, while the flanks are attractively ornamented with large spots, bordered with black. It is from these markings that the reptile receives its popular name.

In captivity it is long-lived and easy to feed. Large specimens

LIZARDS



FIG. 12.—Eyed Lizard (*Lacerta lepida*).

will eat mice, though insects and worms are the usual food. It must not be associated with smaller lizards. Failing other food, it will eat pieces of meat.

The Eyed Lizard is a native of south-west Europe and the adjacent parts of North Africa.

WALL LIZARD (*L. muralis*).

This is a very attractive little species, measuring only six or seven inches, and is remarkably variable in colour. It is usually greyish, with black markings, the male being marked with green in the breeding season. Some specimens are more boldly marked in black with yellow markings, and a very pretty variety is black above and bright blue below.

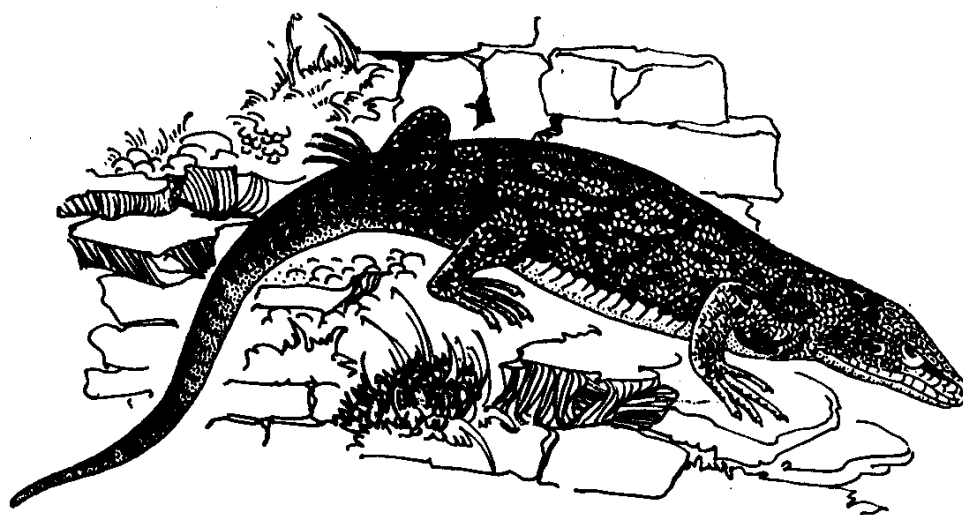


FIG. 13.—Wall Lizard (*Lacerta muralis*).

REPTILES AS PETS

The Wall Lizard extends much further north in Europe than the two last-mentioned species, and is a hardy species. In the last days of October the Wall Lizards will peep out from nooks and crannies in the reptiliary if the sun gives any encouragement at all, whereas the Green Lizard will need a ground temperature of about 60° F., before coming out to feed.

As the Wall Lizard only hibernates for a comparatively short time, it is not difficult to keep it lively all the winter. But if you decide to do this, you must provide adequate warmth, and feed regularly. An ordinary living-room temperature, and a place in the sun during mild spells, is all that is required as far as the Wall Lizard is concerned in winter.

Specimens normally kept on a rockery, or outdoor reptiliary, however, are best left to hibernate naturally in a leaf-filled box, or among rock-work.

COMMON LIZARD (*L. vivipara*).

This little lizard is also known as the Scaly or Viviparous Lizard, and is common in suitable localities throughout Britain.

Its favourite haunts are dry sunny banks by the roadside, railway cuttings, heaths, downs and commons. Here it comes from its hiding places, which are usually under a log or loose boulder, as soon as the sun warms up the earth.

In all its movements it is remarkably active, "darting about in its own quick, lively manner, flitting among the grass stalks

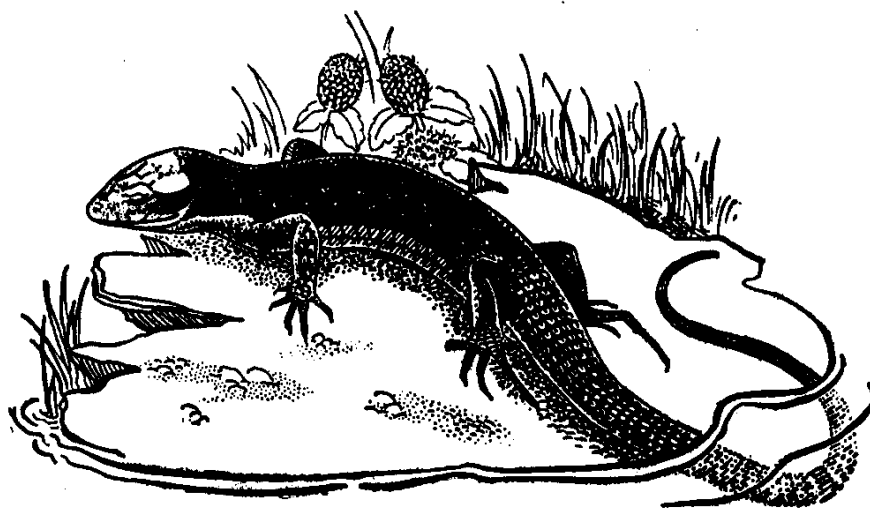


FIG. 14.—Common Lizard (*Lacerta vivipara*).

LIZARDS

with a series of sharp, twisting springs, snapping up the unsuspecting flies as they rest on the grass blades, ever and anon slipping under the shelter of a gorse bush or heather tuft, only to emerge in another moment brisk and lively as ever."

It is most interesting to sit quite still and watch one of these little lizards basking on some favourite spot. As soon as an insect comes along, the sharp-sighted reptile sees it at once, and in an instant has darted forward and snapped up the morsel.

Sometimes this lizard will take to the water, where it can swim well and speedily. When an individual is thrown into a pond, however, it often feigns for a moment to be dead, whether from the shock of the cold water or fear of the person, is hard to say. Very soon it will "come to," and, realising its precarious position, will strike out for the shore in no uncertain manner.

As its alternative name of "Viviparous" would suggest, this lizard does not lay eggs, but is a live-bearer. Actually, the eggs are said to be hatched inside the mother just before the young are born. The young lizards number from three to six, and are quite active little fellows as soon as they see the light of day.

The coloration is variable as is often the case with lizards. Generally, the upper parts are olive brown, with a dark brown line along the middle of the back, this line often being broken in places. Along the sides is a broader band, and between these bands are a few black spots and splashes. The under parts are orange, spotted with black in the male, and olive grey in the female. It has a small head, the feet in many individuals being longer than the head. Unlike the next species, the Common Lizard has no trace of teeth in its mouth.

When full-grown it measures about six inches, and is very slenderly built.

SAND LIZARD (*L. agilis*).

This species rather closely resembles the last, and is extremely variable, both in coloration and size. At one time it was thought to be not one species but several.

It grows larger than the Common Lizard, a few specimens

REPTILES AS PETS

having been taken which measured as much as nine or ten inches.

There are two forms, the green and the brown. The green variety is said to be found in grassy situations where it is almost inconspicuous, while the brown form is mostly seen on heathy and sandy localities.

The markings on the greenish or brownish ground colour are as follows : Top of the head, dorsal line and tail, brown ; chin, throat and under-parts, either yellowish or greenish, marked with black. On the upper surface are some rows of spots, which sometimes have a white dot in their centre.

A sure method of identifying this lizard is by noting the shape of the head, which is short and thick-set with a blunt muzzle. The female has a greyish ground colour.



FIG. 15.—Sand Lizard (*Lacerta agilis*).

As its name implies, the Sand Lizard is to be found most frequently on sandy heaths and commons, where it loves to bask in the sun. Though quick and lively in its movements, it does not spring about with the jack-in-the-box style of movement adopted by the Common Lizard, but runs swiftly and deliberately from one spot to another.

The Sand Lizard lays its eggs in little hollows in the sandy soil of its haunts, leaving them to be hatched by the sun. The situations selected are usually sheltered, dry banks, facing south.

LIZARDS

The eggs are carefully covered to hide them from birds and other enemies. A clutch consists of about a dozen eggs.

In Britain, the Sand Lizard is restricted to certain localities in the South, though it is widely distributed abroad.

In captivity, the Sand Lizard does well, if regularly fed and housed in spacious quarters. An outdoor reptiliary is best, at any rate for newly-caught specimens.

BLINDWORM OR SLOW-WORM (*Anguis fragilis*).

This creature is really a snake-like lizard, and is the sole representative of the legless group of lizards in Great Britain. It is quite common throughout England, and occurs in most parts of Europe and Asia. In our own country it is to be found in almost any type of district, and is often abundant along hedgerows, on heaths, and in woods.

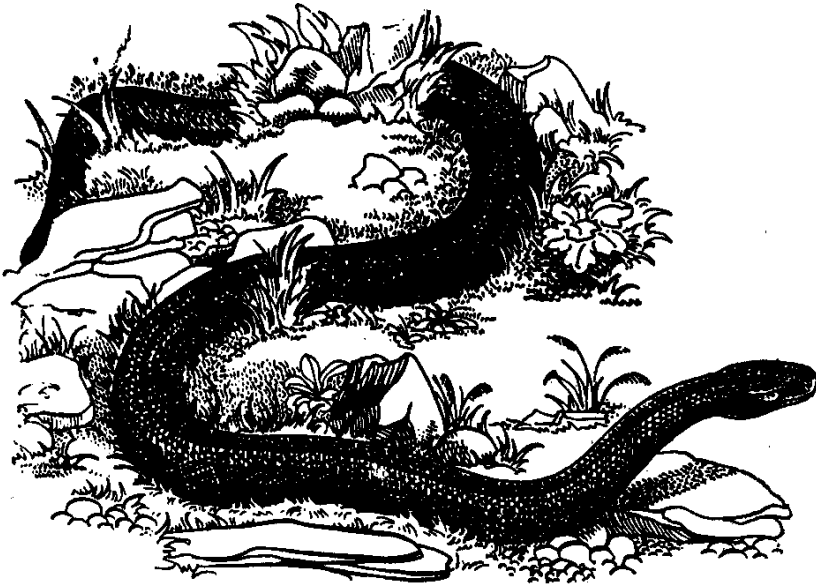


FIG. 16.—Blindworm (*Anguis fragilis*).

It is a most useful creature to the agriculturist, as its diet consists chiefly of slugs and worms. Unlike the other British lizards, the Slow-worm is not a very active reptile, gliding over the ground in a rather unhurried, deliberate manner, watching with its little beady eyes for its slimy prey.

Why this lizard should have received the name of Blindworm is difficult to conjecture, for it is far from being blind, and its eyes are not hidden from view.

REPTILES AS PETS

When picking up a Slow-worm, never catch hold of it by the tail, as this member is very brittle, and will break off readily. Instead, grasp it by the front half, and do not try to prevent the reptile winding itself round your hand if it tries to do so. Never try to straighten a Slow-worm.

It is a very easy reptile to keep, and being one of the very few creatures that will readily eat slugs, it is most useful in the garden. Small, soft white slugs are the kind mostly preferred, but it will also eat worms and various insects.

For accommodation nothing more elaborate is required than a wooden box with a glass lid, lined with turf or moss, and provided with a shallow vessel of drinking water. It is, of course, an ideal subject for the outdoor reptiliary.

The Slow-worm is extremely hardy, making its appearance in spring long before other snakes and lizards have awakened from their winter sleep.

This species is viviparous, and the young are normally born in June and July. Slow-worms breed readily in captivity, and the babies should be transferred to a separate vivarium, and kept supplied with very small slugs, chopped worms and small insects. The young Slow-worms are pretty little creatures, looking like tarnished silver above, and black below. When full-grown, the Slow-worm is about a foot long.

GLASS SNAKE (*Ophisaurus ventralis*).

The name is a misnomer, as this reptile is not a snake, but a legless lizard, looking like a very large Slow-worm. It has a very lizard-like head, and has eyelids, which no snake possesses, and grows to about three feet in length. More than half of this length, however, is taken up by the tail.

The name of "Glass" Snake is given to this lizard because of its glazed appearance, and its habit, when wild, of parting with its extremely brittle tail to avoid capture. Specimens in captivity rarely do this, as the reptile quickly becomes quite tame.

The Glass Snake is a highly popular reptile as a pet, being very easy to keep, and an eager devourer of snails. It will also eat mice, but can usually be trusted to live amicably with lizards rather smaller than itself. It is an excellent companion

LIZARDS

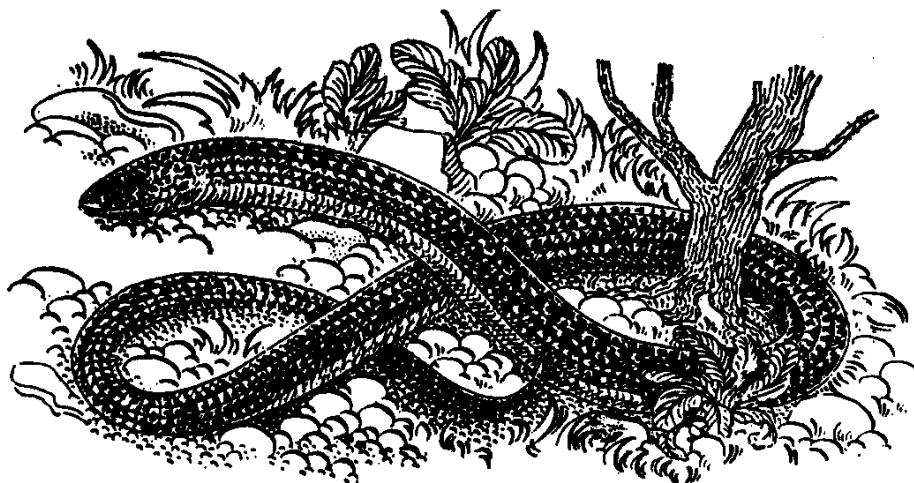


FIG. 14.—Glass Snake (*Ophisaurus ventralis*).

for the Eyed Lizard, both being good-sized reptiles with fine healthy appetites.

It is quite hardy out of doors, and will hibernate of its own account among rock-work in the outdoor reptiliary. Unlike the Slow-worm, this species lays eggs.

The Glass Snake is a native of the United States of America, extending to northern Mexico. It is represented in Europe by a very similar reptile, requiring exactly the same treatment in captivity, the Scheltopusik (*Ophisaurus apodus*).

FAN FOOT OR HOUSE GECKO (*Ptyodactylus hasselquistii*).

Of all the lizard family, none are more interesting and entertaining than the Geckos. These odd lizards, of which there are 270 species, are remarkable for their climbing powers. They absolutely defy the laws of gravitation ; for not only can they ascend the smoothest walls with the greatest ease, but can run along the ceiling upside down like flies !

In a vivarium, Geckos will habitually sleep on the lid. The reason why Geckos can walk anywhere is because their feet are provided with discs, or plates, under the toes, which are constructed like the sucker pads on the legs of a fly.

Geckos are found in almost every part of the world in both tropical and sub-tropical regions. Besides being found on even the tiniest islands and the largest desert plains, they are perfectly at home in the busiest cities.

REPTILES AS PETS

Geckos live in houses, ruins, holes in walls, trees, on the ground—in fact, almost anywhere. They are gregarious creatures, and may be seen basking in numbers during the heat of the day. But it is towards dusk and at night when they become really active, and may be seen stalking sleeping flies on the ceiling.

Though they are gregarious by nature, these lizards are terribly quarrelsome, and are constantly bickering among themselves.

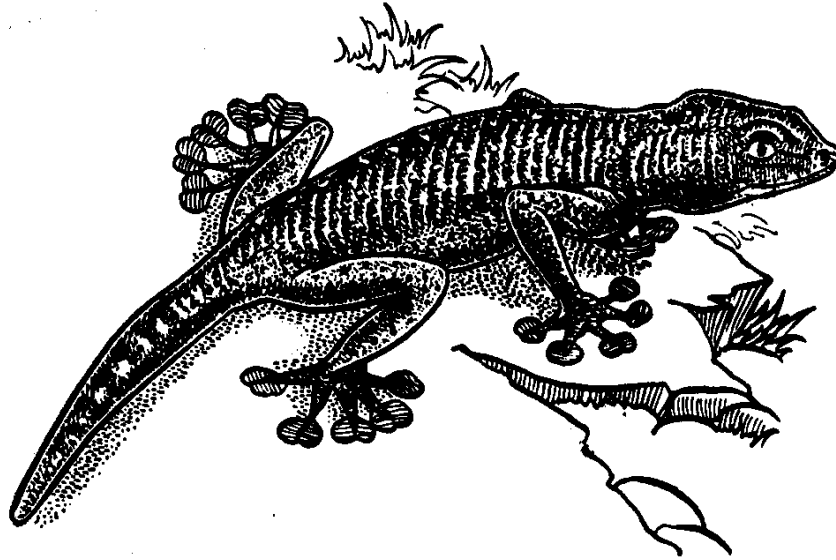


FIG. 18.—Fan Foot or House Gecko (*Ptyodactylus hasselquistii*).

They are carnivorous in diet. Dr. Gunther writes that “their greediness has developed some intellectual faculties in the House Gecko. Accustomed to be fed at a certain time, these little lizards will punctually make their appearance and fearlessly take the offered food.”

Their favourite diet consists of moths, spiders, beetles, cockroaches, mealworms, flies and the like. They will even eat their own young.

A very extraordinary characteristic which the Geckos possess is the ability to utter a distinct cry or call, which is very unusual among reptiles, their normal vocal activities being confined to hissing. The cry differs in various species, some making a sound which may be likened to the words “tok-tay,” and others more of a “click-click” sound. The name “Gecko” is a fair imitation of the sound produced by some of these queer little lizards.

LIZARDS

It is said that it is often difficult to sleep in some countries without being awakened by the cry of the House Gecko.

Geckos are oviparous. The females lay only one egg at a time as a rule, and this is covered with a hard, chalky envelope. Sometimes a number of females will lay their eggs in the same, "nest" which is usually a hole in a tree or wall. In the vivarium Geckos will lay under a piece of loose bark or virgin cork, and the eggs hatch without difficulty.

When the young Geckos first appear, they lead a rather retired life. They are wise enough to keep out of the way of the many enemies of small lizards, including their own parents, who, if they got the chance, would devour them without a moment's hesitation. It is not until they are about half grown that the young Geckos mix with their elders. Even at this stage they are careful not to pick a quarrel with any of their larger companions.

The tails of all Geckos are remarkably brittle, and break off at the slightest provocation. In fact, they seem to have the power to throw off their tails at will ! By this means they are frequently able to escape enemies, such as hawks, cats and the like. When pursued, they shake off their tails, and the broken-off part continues to wriggle, holding the attention of the foe, while its late owner makes good his escape.

Fortunately, the Gecko can quickly grow another tail to make good his loss. The new tail is not quite the same as the original one, being more rounded, thicker and smoother.

Geckos have a slightly forked tongue, and though perfectly harmless little things, are greatly feared by the natives in the countries where they abound.

In Africa, the House Gecko freely enters houses to search for food, much to the horror of the natives, who assert that the creature exhudes poison from the lobules of its toes ! So great is the dread inspired in the Arabs by the Gecko that in Cairo it is popularly known as Abou-burs, or father of leprosy. The people fancy that it purposely poisons their provisions, and that it especially likes to poison salt meat.

In captivity Geckos do well, and are among the most accommodating and easily kept of all tropical lizards. They will live with other lizards of their own size in a large suitably fitted-out vivarium. They like to bask in the sun, and, of course, do not

REPTILES AS PETS

hibernate. The bottom of the vivarium containing Geckos should be covered rather deeply with sand or finely sifted dry soil. They like to hide from view at times, and it is necessary to provide suitable little retreats with pieces of virgin cork.

Do not forget that they will require a little water in a shallow trough or dish.

These lizards are very difficult to catch once they escape, and so guard against their making a "get-away." It is a good plan to throw in a few gentles from time to time. Those which are not immediately eaten will bury themselves, and in due course appear as flies, which will be caught by the Geckos.

The House Gecko is rather variable in colour, but may be briefly described as reddish-brown, spotted with white. Other kinds which are occasionally imported include Delaland's Gecko (*Tarentola delalandii*), the Indian Gecko (*Gekko gekko*) and the Eyed Gecko (*Pachydactylus ocellatus*).

RED-THROATED ANOLIS (*Anolis carolinensis*).

The Anolis Lizards are a small group of extremely attractive and nimble members of the lizard world, and are popularly called "Chameleons" in their native haunts. The only resemblance they bear to the true Chameleons, however, is their power of changing colour, and this they have in a much more advanced degree than their celebrated namesake.

In all their ways, and in appearance also, the Anolis Lizards are very different creatures from the true Chameleon. While that reptile is slow and lazy, the Anolis are extremely active creatures.

The characteristics of the Anolis Lizards are the pyramidal form of the head, moderately long neck, slender body and relatively long hind limbs, and large feet with toes of very unequal length. The tail is long, but not prehensile.

The most striking point in the genus is the brilliantly coloured appendage on the throat of the males. All the Anolis Lizards are able to expand the throat pouch at will, and this puffing out generally takes place when the creature is angry or frightened.

The genus is a very large one, and contains more than a hundred different species, of which only a few are to be had in

LIZARDS

this country. They are all strictly arboreal, jumping about from branch to branch with wonderful alacrity, clinging firmly by means of their curiously formed feet.

The present species, also called the American Chameleon or Fence Lizard, is one of the best-known, being found from Carolina to Cuba, where it is one of the most numerous of lizards.

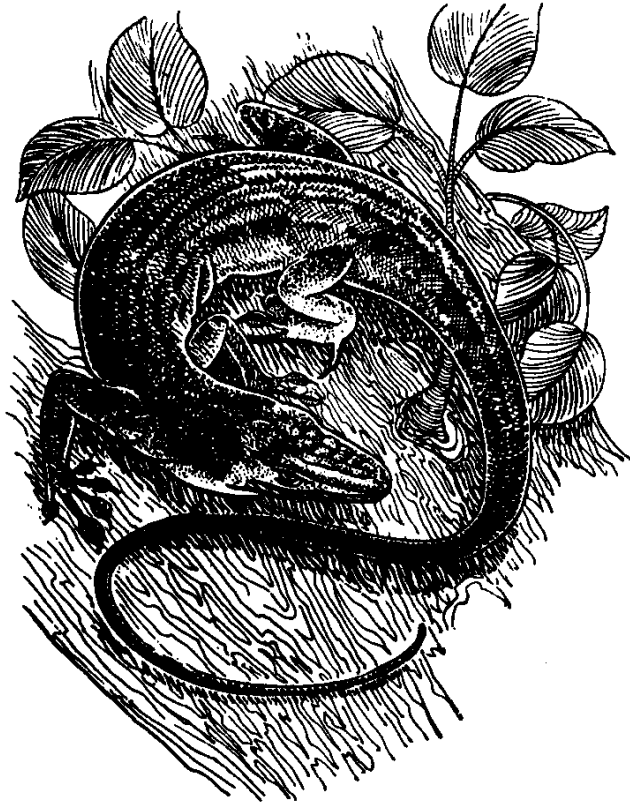


FIG. 19.—Red-throated Anolis (*Anolis carolinensis*).

It may be seen in all suitable spots—such as woods and gardens, and it often runs about the porches of houses, now and again even venturing inside. It is quite fearless, and is carefully protected from harm, as it does a lot of good work for humanity by destroying injurious insects.

In all its actions, the Red-throated Anolis is a lively creature. It darts about the ground, over rocks or among the branches of trees with equal agility, and has a way of springing on its insect prey which reminds the observer of a cat pouncing on a mouse.

In the spring the males of the species become very pugnacious, and many a fight and skirmish takes place. In fact, two of

REPTILES AS PETS

these handsome creatures have only to meet, when at once they flare up, literally, their colour glowing brightly, and their throat pouches swelling out and becoming red. This is accompanied by an emphatic nodding of the head.

Then the fight begins. These fights are remarkable exhibits of courage, agility and endurance, the two combatants facing each other with glaring eyes, their skin changing its lustrous colouring, and their whole being glowering with fury.

During each fight, one or two females are generally watching, and no doubt in most cases it is they who are the cause of the pugilistic display.

If one of the lizards loses his tail in the fray, he is at once the vanquished, and he runs away as fast as he can, to languish timidly away from sight in some nook or cranny. The victor seizes the broken-off tail of his late foe, and struts about with it for a while, evidently well pleased with having secured such a trophy.

The tail-less Anolis seems to be something of an outcast in the kingdom of lizards.

With the coming of summer, however, these lizards lose their pugnacious qualities, and dwell together in peace, often assembling in large companies.

These lizards are oviparous, and the eggs are laid in a rather careless way, and may be simply deposited on the ground, or in crevices of bark, niches of rocks, etc. Some species of the genus bury their eggs.

The normal colour of this lizard is green or brown, usually the former. It undergoes wonderful colour changes, as we have already remarked. These take place very quickly, and an Anolis can vary its hue from brown to pale leaf green in about three minutes. While this change is taking place, rich shades of other hues appear. The brown becomes golden yellow, this, in turn, fading to slatey grey and a general peppering of white dots appears on the back.

The colour is in no way related to the shade of the object upon which the lizard is sitting, as is the case with some other reptiles and amphibians, which can alter their colour to match their surroundings.

In captivity, the Red-throated Anolis makes a charming little pet, and should be fed on flies, mealworms and similar

LIZARDS

insects. It will also eat cockroaches, if these should happen to be obtainable. It is important that plenty of fresh water should be available, as these active lizards drink frequently. It is a good idea to sprinkle some water in the vivarium wherein Anolis are kept, as newly acquired specimens might not drink from a dish. At liberty, it is the habit of these lizards to drink dew and rain drops.

A naturalist who offered a garden spider to an Anolis, was unwittingly the cause of its death. The lizard darted eagerly at the spider, and seized it by the leg. The spider instantly ran round and round the lizard's mouth, weaving a thick web round both jaws. Though the spider was removed and the web rubbed off the lizard's mouth, the poor little reptile died a day or two later.

CRESTED ANOLIS (*A. cristatellatus*).

The usual colour of this species is dark ashen blue, a blackish spot being apparent on each side. Along the nape of the neck and back runs a series of long compressed scales, forming a sort of toothed crest. On the basal part of the tail is a somewhat similar crest, looking rather like a fish's fin. The throat

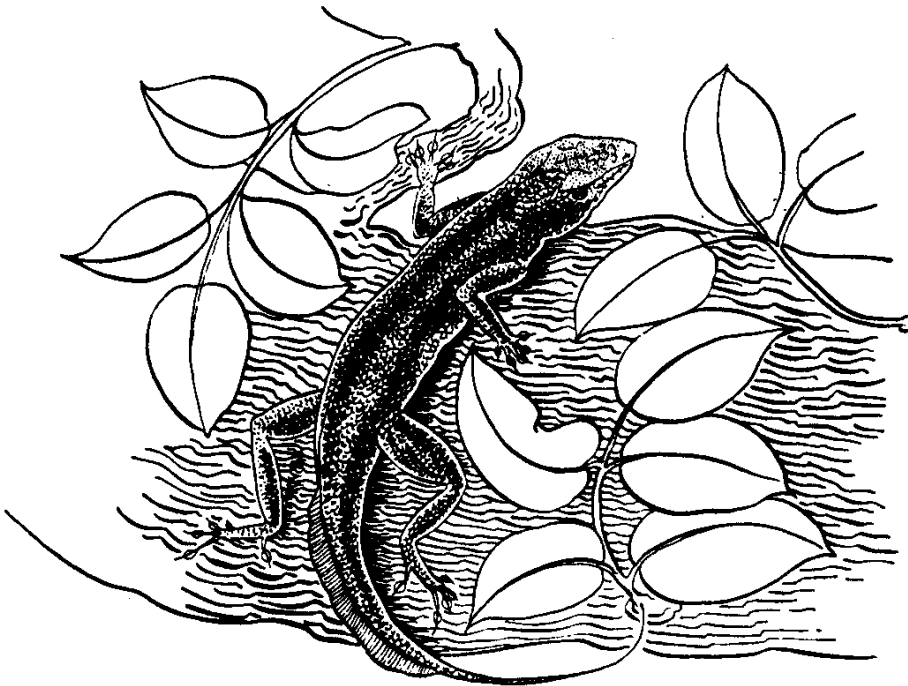


FIG. 20.—Crested Anolis (*Anolis cristatellatus*).

REPTILES AS PETS

of this Anolis has a particularly large pouch, and when fully blown out it makes the reptile appear very ungainly.

The throat-sac is often used as a means of scaring off an enemy. When the lizard finds itself unable to escape, it swells out the pouch until it assumes an enormous size, giving the creature a very formidable appearance. While thus engaged it has the power of continually altering its colours, particularly those of the throat.

As is the general rule with this genus, the Crested Anolis is an active reptile, traversing perpendicular objects with nearly as much ease as the Gecko, and to aid it in these movements the last joint but one of the toes is swollen, so as to form a pad, covered below with cross ridges which help it to take a firm hold.

Though not normally aquatic in its habits, and apparently not willing to take to the water, the Crested Anolis is most often found in woods in the vicinity of a stream or lake. In disposition it is rather timid. But though it instinctively hides itself when a person approaches, it is as curious as a cat, and cannot refrain from poking out its head from its hiding place to watch one's movements. So absorbed does the little lizard become in satisfying its curiosity that it is easily captured in a noose, and is often so obtained by children. Its voice is a sharp chirping sound, and easily imitated, a fact which has lured many of these lizards into a carefully laid trap.

In captivity, as is the case with all the Anolis family, this species makes a charming pet, and becomes very tame.

COMMON SKINK (*Scincus scincus*).

The Skinks are a very large family, containing nearly 400 species, of which only half a dozen or so are regularly imported as pets to this country.

The present species, in ancient times, was looked upon as a sort of panacea for all ills. Its dried body was imported to Rome, where physicians used it to attempt cures of every ailment to which the human race is subject, from cataract to cancer. Even today, dried Skinks are used as medicine by the Egyptians and other races. There is not the slightest evidence, however, that they possess any curative properties at all.

LIZARDS

The Common Skink is frequently imported, and should be kept in a heated vivarium, with a good depth of sand. In a wild state these lizards live only in sandy places, and burrow in the sand to escape an enemy. So quickly can they do this that they seem to literally sink out of sight.

On sunny days, Skinks kept in the vivarium will emerge and bask on the surface of the sand. All Skinks revel in the sunshine and warmth. For food, the usual insect fare—flies, mealworms, cockroaches, gentles and the like—are acceptable.



FIG. 21.—Common Skink (*Scincus scincus*).

Rather more attractive is the Eyed Skink (*Chalcides ocellatus*). This species is grey with a bronze gloss, covered with small white dots edged with black. It is a native of the Mediterranean countries, and requires the same treatment as the Common Skink.

STUMP-TAILED LIZARD (*Trachysaurus rugosus*).

This is a remarkable lizard from Australia, and has a huge, broad flattened tail, and when the creature is lying asleep it appears just as if it had two heads! The Stump-tail was discovered by the navigator William Dampier, who remarks: "I never did see such ugly creatures anywhere but here."

But in spite of its unprepossessing appearance, the Stump-tail makes an excellent pet. It is very gentle and tractible, and never attempts to wriggle from one's hand when captured, as

REPTILES AS PETS

most lizards do, but will lie quiet and soon learn to feed from one's fingers. Its range of diet is large, for, unlike most of the lizard tribe it will eat raw meat and fruit, as well as grubs and large insects.

These lizards must be kept in a moderately heated vivarium, the bottom being covered with sand or gravel. It is viviparous, and produces three or four young at a time. It has been bred in captivity in this country.

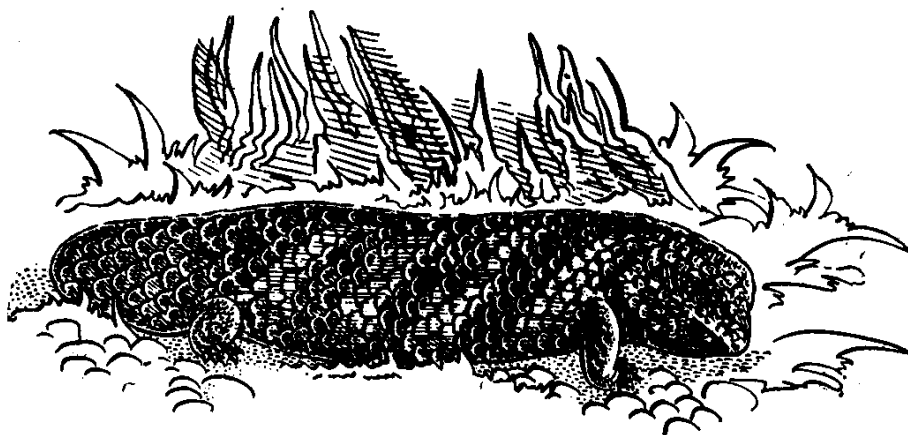


FIG. 22.—Stump-tailed Lizard (*Trachysaurus rugosus*).

The Stump-tail is a large lizard, about a foot in length as a rule, and of very heavy build. The upper part of the body and tail are covered with broad, wrinkled scales, which make it look as rough as a pine-cone. The stumpy tail is about the same length as the head. The colour of the back is dark brown, marked with yellowish spots or cross bands. The under-surface is smooth-scaled, yellowish in colour with brown spots and marbled patterns.

BLUE-TONGUED LIZARD (*Tiliqua scincoides*).

This is a large species which lives well in captivity. It ranges as far south as Tasmania, and requires heat only in the colder months of winter. It is smooth-scaled, and in colour is yellowish grey above, with dark brown cross bands, and sometimes a brown band along the sides of the neck and over the temple. Lower surfaces are of a uniform yellowish colour or spotted brown.

LIZARDS

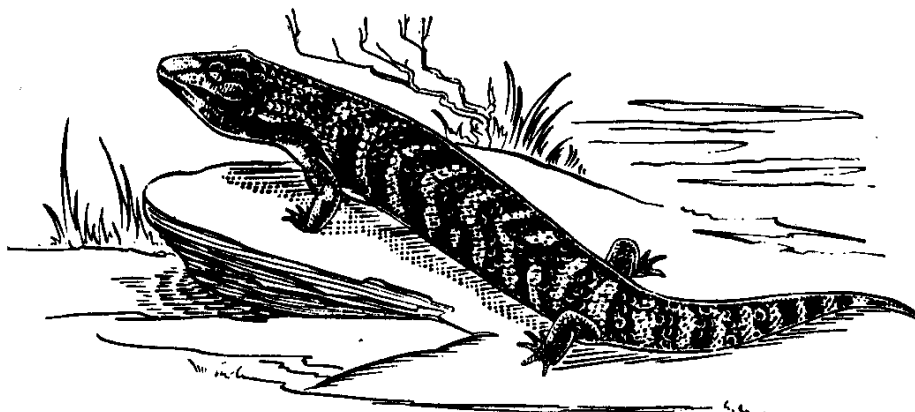


FIG. 23.—Blue-tongued Lizard (*Tiliqua scincoides*).

At liberty, this lizard frequents dry, heath-covered country, where it lies basking in the sun. On one's approach, it generally waddles away, but if pursued, it opens its mouth and protrudes its purplish-blue tongue, at the same time hissing. However, it is perfectly harmless, and even when quite roughly handled it does not attempt to bite.

The Australians call this the "Goanna," and say that it eats snakes. This belief is persistent throughout the range of the lizard, but there seems to be no real evidence that it displays any interest in snakes.

In captivity, it will eat worms, slugs, small soft-shelled snails, as well as raw meat. The young are produced fully formed, and may be reared on minced meat, insects, etc.

ARMADILLO GIRDLED LIZARD (*Cordylus cataphractus*).

This represents an interesting family of lizards, natives of South Africa, which require similar treatment in captivity to the Skinks. They are characterised by their sharp, spiny scales which extend from the head to the tip of the tail.

The Armadillo Lizard is one of the best known and most commonly imported of the Zonures. It is a very intelligent little lizard and makes a most interesting pet. Treatment should be the same as for the Skinks.

This lizard is plentiful in South Africa, where it lives among rocky, rather dry hillsides and similar situations. It is more active on its legs than are the Skinks, but it is not so quick in movements as the smaller lizards.

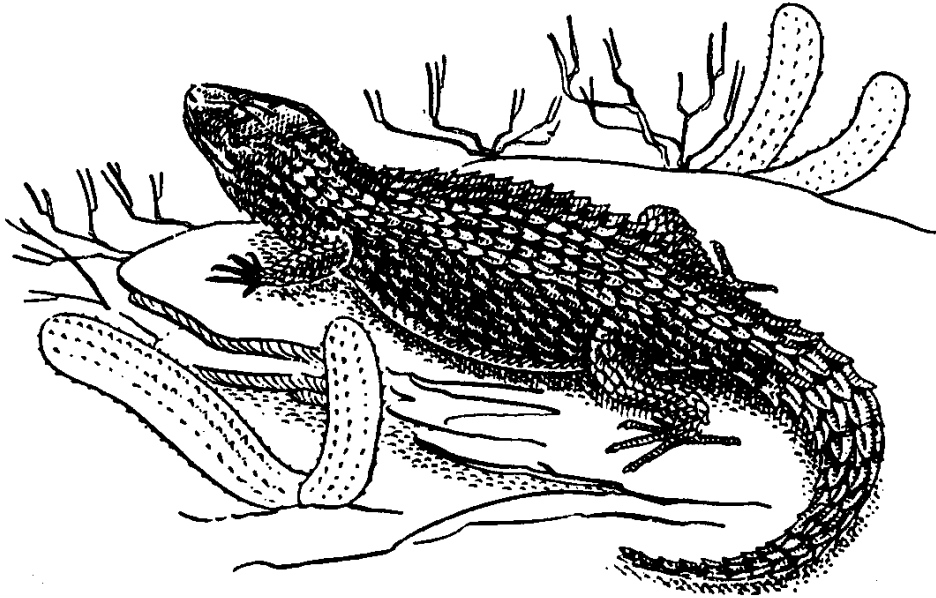


FIG. 24.—Armadillo Girdled Lizard (*Cordylus cataphractus*).

TEXAS HORNED TOAD (*Phrynosoma cornutum*).

The name is, of course, a misnomer, since this very strange-looking reptile is a true lizard. However, it is so broad and squat that it certainly bears a superficial resemblance to a toad. It is covered with spines, and has long horns on the back of the head, giving it a rather forbidding look. Nevertheless, the Horned Toad is probably the most inoffensive of reptiles, and even a wild one seldom makes any attempt to bite when picked up.

The colouring is distinctive. There is a yellow line down the whole length of the back, and three dark spots on each side of the back, bordered in the rear with a yellow crescent. On each side of the nape is a large dark blotch, and there are three dark bands on the top of the head. Below, it is yellow, with numerous round, dark spots. The total length is about six inches.

This is a most interesting lizard to keep in captivity, and will live a long while if properly looked after. The vivarium in which it is kept must have the floor covered with several inches of sand, and be kept dry and warm. Sunshine is very necessary for the well-being of the Horned Toad, since it is a desert-dwelling creature, and refuses to feed without plenty of light.

LIZARDS

It drinks, in the wild state, by lapping the dew or raindrops off leaves, and this may be imitated in the vivarium by introducing every day a lettuce leaf dipped in water. The diet should be insectivorous, and the Horned Toad will eat ants, grubs, caterpillars, cockroaches, grasshoppers and mealworms, but not earthworms.

At night, it burrows into the sand, leaving only the top of the head visible, and just level with the surface.

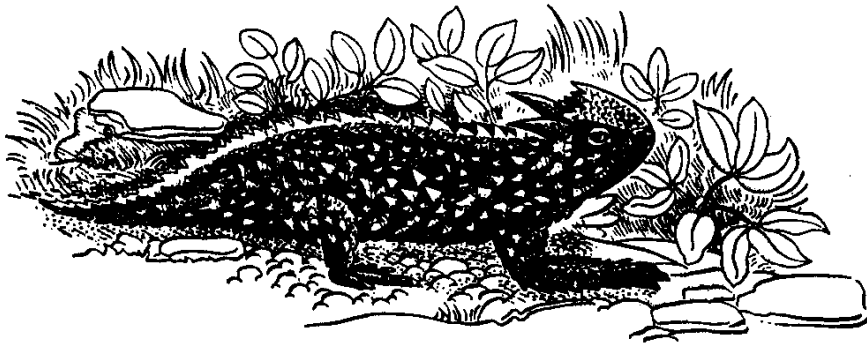


FIG.—25. Horned Toad (*Phrynosoma cornutum*).

This lizard has the most curious form of defence, which for a long time was not believed possible by scientists. This consists of producing drops of blood from the eyelids. Mr. Raymond Ditmars, the American authority on reptiles, says that he was measuring a large species of Horned Toad, when it suddenly made a curious hissing noise, and then squirted a hair-thin stream of blood from the eyelids. This hit the wall four feet away, and 103 spots of blood were counted.

INDIAN MONITOR (*Indovaranus bengalensis*).

The Monitors are a group of very large lizards, and though not commonly kept by amateurs, they are to be seen in most zoos and large private collections. There are many species which much resemble one another, and they are all inhabitants of Africa, Asia and Australia. In America, their place is taken by the Iguanas.

Monitors are generally found near water, and some of them are very aquatic in habits, as Gould's Monitor, of Australia. This species habitually lies on branches overhanging streams,

REPTILES AS PETS

and falls with a mighty splash into the water at one's approach.

All the Monitors are expert climbers, and when disturbed they generally try to escape by running up a tree. They are not normally anxious to show fight, but when cornered they will snap their teeth and lash their tails fiercely from side to side.

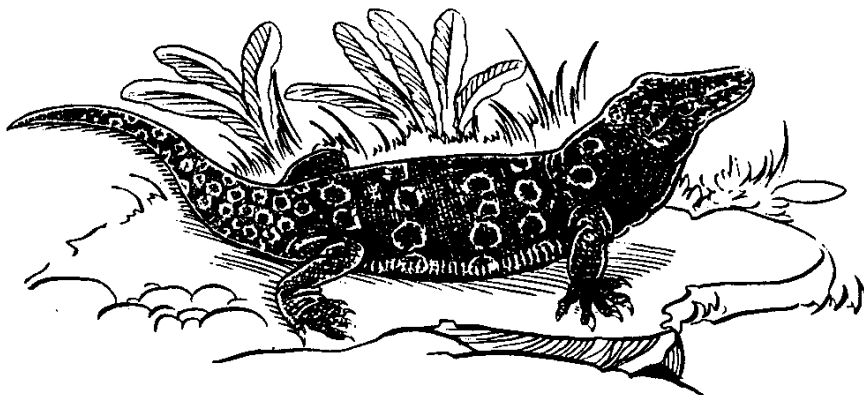


FIG. 26.—Indian Monitor (*Indovaranus bengalensis*).

The Indian Monitor, at any rate, is easily tamed, and lives well in captivity. As it commonly measures about three and a half feet, a large vivarium will be needed to house it. This should be fitted up with one or two tree branches, to provide exercise.

The natural food of Monitors consists of crabs, frogs, small mammals, birds, reptiles, fishes and insects, as well as eggs.

CHAMELEON (*Chamæleo chamæleon*).

This is one of the most curious of reptiles. It is, of course, celebrated for its power of changing colour to match its surroundings, and it certainly possesses this ability within certain limits, showing a strong tendency to assume the colour of its surroundings. It can, for instance, become brown or green, whitish, sooty or brick-red, but it cannot exhibit all the colours of the rainbow. Its colour also varies according to whether it is asleep or awake, angry, frightened, or in a normal state of mind.

The Chameleon has many other curious characteristics. One

LIZARDS

of the most noticeable, to those who have been used to the rapid darting movements of most lizards, is the extremely leisured way in which it moves. It is so slow that it is quite irritating to watch.

Many reptiles become sluggish at times, but the Chameleon is quite incapable of hurrying itself in the slightest degree. It doesn't even walk, as we would understand it.

When it moves along the branch on which it happens to be clinging, the reptile first raises one foot very slowly indeed, and even holds the foot still in the air for a considerable time on occasions, as if it had forgotten what it intended to do with it. It then puts the foot forward as slowly as it can, and takes a good grasp of the branch.



FIG. 24.—Chameleon (*Chamaeleo chamaeleon*).

Having satisfied itself that it is firmly secured, it leisurely unwinds its tail, which has been twisted tightly round the branch, shifts it a little way forward, coils it round the branch again, and then rests for a little while. With the same deliberate movements, each foot is successively lifted and advanced, so that the forward movements seem but little faster than the hour-hand of a watch.

If the Chameleon wishes to turn right-about, it will take several minutes to do so, while it will often take a whole day to move a few inches.

The Chameleon has the most remarkable eyes of any living creature. They work as if on a swivel. Each is moved quite independently of the other, one rolling backwards, while the

REPTILES AS PETS

other may be directed forward or upwards. Thus the creature can look in any two directions at the same time. These eyes are rather like small peas with a dot of black on them, and without the slightest vestige of expression whatever.

Concerning this point, it appears that the Chameleon has two nervous centres, and these can work quite independently of each other. For instance, it often seems, when watching these reptiles, that one side of the creature is fast asleep, while the other is wide awake! When disturbed, the eye which receives the strongest impression propagates it to a common centre, and prevails on the other eye to follow that impression and direct itself to the same object.

It is an accepted fact that the Chameleon really does sleep on one side and remain awake on the other. This may be proved by very cautiously approaching it at night with a candle, treading very gently so as not to vibrate the floor of the room and so arouse the reptile.

You will find that the eye turned towards the candle will open and begin to move, and the corresponding side change colour, whereas the opposite side will remain for some seconds longer in its torpid state, with the eye shut tight.

Seeing how sluggish the Chameleon is, it is not surprising that great numbers of them fall victims to their many enemies, and were it not for the remarkable way in which they are able to assimilate their surroundings, they would have become extinct long ago.

The range of colour changes in the Chameleon is not so great as is popularly supposed. The usual colour when in the jungle is green, from which it passes through shades of violet and blue-yellow, of which the green consists. In this country, however, it rarely retains the bright green hue, the colour fading to a kind of yellowish grey.

Chameleons are not particularly intelligent pets, and some of them get very annoyed when handled. They puff themselves out and bite, at the same time making a faint grunting noise, and are quarrelsome during the breeding season. They are one of the very few creatures which cannot swim, being quite helpless in the water.

Nevertheless, Chameleons are interesting creatures to keep in a vivarium, but must be supplied with live food. They will

LIZARDS

eat mealworms and cockroaches, though live flies are the best form of food. Diet should be varied, as they are apt to tire of the same fare after day.

The natural food of the Chameleon is insects, mostly flies and butterflies. It might seem strange that this sluggish creature should feed on such active insects. But the Chameleon possesses a most wonderful tongue.

This tongue is very long and muscular, and is sticky at the tip. The tongue is shot out at the insect, which adheres to the tip. It is then withdrawn to the mouth, where, if it is large, there are strong teeth to crunch it up. The Chameleon can swallow even large hawk-moths.

Contrary to popular belief, Chameleons need water to drink. They drink regularly and often, generally by licking up drops of water or by scooping them with their lips, pushing the snout along the edge of the leaves. When you purchase specimens from a dealer, they will probably be in a parched condition. It is therefore advisable to sprinkle the leaves in the vivarium with water. From being dull, listless creatures, Chameleons, after drinking continually, begin to assume brighter colours. Soon they will begin to take food, which, when thirsty they refuse.

It is not hard to keep a Chameleon for six months or so, because they take that long to starve to death ! But to keep one for years is another matter.

The main difficulty is to keep them alive through the winter months. The only way to do this is to fatten them up well in the summer and autumn, giving as many live insects as you can find. Those individuals which will take mealworms will winter all right, but any which refuse food in autumn and try to hibernate will most likely die.

Female Chameleons will sometimes lay eggs in captivity, these being deposited in the earth. These are difficult to hatch, because of the necessity of regulating the moisture.

The Dwarf Chameleon (*Microsaura pumila*), is one of the best kinds to keep. It is a live-bearer, and grows to about six inches in length. This species will live in an unheated vivarium during the summer and autumn, but as soon as the days get short and the nights cold, it should be lodged in a small case indoors where a fire is kept burning by day. At night, the

REPTILES AS PETS

vivarium should be stood in a warm place, as in a linen cupboard or by a slow-burning kitchen stove. An electric light should be placed in the vivarium and switched on for at least a couple of hours daily, except on very sunny days. In November and December Winter-moths can often be collected in numbers as they sit by day on wooden fences, and these are a good food for all lizards in winter.

CHAPTER IV

SNAKES

IN spite of the popular prejudice against snakes, many people find in them a certain fascination, and they are quite popular as pets, some pet dealers finding it difficult to obtain enough specimens to satisfy their customers' demands. Their advantages in the vivarium are that they do not require feeding very often, are readily handled and in some species are attractively coloured and marked.

It is a curious fallacy that snakes are slimy to the touch, and cold like eels. This is not so. In fact, they are pleasant to handle, and the scales are beautifully smooth to the touch. They are not quarrelsome, and a number may be kept together, provided they are not unduly overcrowded. Of course, snakes of very unequal size should not be associated. Some species of snakes are sociable in the wild state, hibernating in colonies.

At one time it was popularly supposed that snakes could not be induced to feed on anything but live animals and amphibians. But this is not the case, and today all the principal zoological gardens in this country feed their larger snakes on freshly-killed food. Many of the smaller species can be induced to take freshly-killed mice, etc.

The main difficulty in getting snakes to take dead food is that after rigor mortis has set in, such fare is more troublesome to swallow. Hence, the necessity for any animal food offered to snakes to be freshly-killed.

The dead mouse or frog, or whatever is being offered to the snake, should be dangled before it with the aid of a pair of forceps. If the food is moved about to simulate life, the snake's natural instinct will usually make it seize the morsel. It must be remembered, however, that one small mouse or frog a week is quite enough for a medium sized Grass Snake, and the reptile will come to no harm if it fasts for a month. Snakes, also, will only feed in warm conditions, becoming torpid when

REPTILES AS PETS

cold. Some snakes only feed at night, so one which refuses to take food offered in the day-time, might eat it if it is left in the vivarium till the next morning.

It is easy to feed a snake forcibly. A small mouse caught in a break-back trap, dipped in warm water could be pushed down a snake's throat. But it is strongly advisable *not* to do this if the snake can be tempted to take food any other way. Forcible feeding is always harmful, and leads to gangrene of the jaw.

Incidentally, a snake can easily swallow a creature which seems far too big to go down its throat. This is because the jaws are attached by a ligament, which enables them to stretch to a remarkable extent. When the prey is passing down into the stomach, the reptile's expanding ribs and elastic skin are equally accommodating.

The snakes offered for sale by pet stores are usually natives of Europe and North America, and these hibernate in winter. They should be given a thick layer of dry leaves or moss in autumn, and left in a cool place till spring.

Some species of snakes give birth to live young, as does the English Viper ; others lay eggs, which are soft-shelled and take rather a long time to incubate. To hatch the eggs, they should be slightly buried in peat or friable soil made slightly damp, in a box or similar receptacle. This should be placed in a warm place, as in a greenhouse. The eggs should hatch in about six to ten weeks. This, at any rate, is the period which may be expected in the case of the Grass Snake.

When the baby snakes emerge, they should be put in a small vivarium by themselves, with a shallow dish of water, sunk to the rim in the soil or peat. Small tadpoles, earthworms, and fish-fry could be put in the water. Baby snakes will also sometimes take mealworms. Egg-laying snakes are usually of the harmless species, while poisonous kinds are viviparous.

As with lizards, snakes periodically shed their outer skin, and this always takes place soon after awakening from hibernation. The skin, or "slough," as it is often called, is cast entire, including even the covering of the eye. The skin breaks away at the lips and the snake literally "jumps out of its skin," or rather crawls out, leaving it turned inside out. The cast-off skin is transparent, but traces of the markings can be

SNAKES

seen, particularly in the case of those species with dark colours, as the Viper.

Most snakes drink a lot. They do not do this by lapping up the water with their forked tongues, as might be supposed, but by sucking it up and immersing the anterior part of the head. Some kinds are said to be fond of milk.

Once they can be tamed sufficiently to allow them to take food freely, snakes are long-lived and easy to keep in captivity. They will live for years in an ordinary wooden grocer's box, with a piece of glass over the top to admit light. In the matter of readiness to feed not only do different species vary in this respect, but individuals of the same species behave differently. Sometimes a perfectly healthy snake will voluntarily starve to death, without any apparent reason. On the other hand, another of the same species may show enough interest in food to take it from one's hand. The Common Viper, however, is a snake which very rarely condescends to feed in captivity, and it is not advisable to try to keep it, as it is poisonous and vicious.

GRASS SNAKE (*Natrix natrix*).

This is a common British species, which is the most popular of all snakes as a pet. It grows to about three feet long in this country, but Continental specimens are larger, sometimes reaching to five feet or more. Females do not breed until they have reached about two feet in length, males a little earlier.

Though a perfectly harmless reptile, a wild Grass Snake will emit from the cloaca a very unpleasant-smelling fluid on being handled, and the odour is very persistent. But specimens in captivity quickly lose this habit.

The Grass Snake makes quite a good pet and will become very tame, learning to distinguish between different persons—a display of intelligence shown in few reptiles other than tortoises. It will, in time, allow itself to be freely handled without showing any annoyance, and will often crawl up the arm or sleeve, and curl itself up like a contented cat.

Even when wild, it never tries to bite, but when cornered will hiss and strike out furiously with the head. In the vivarium it will soon settle down, and may be fed on mealworms and

REPTILES AS PETS

other insects, as well as freshly killed young mice, frogs, tadpoles and fish. A large dish of water and a bed of florist's moss is all that is required in the way of vivarium furnishing.

Pairing takes place in May, usually on hot sunny mornings. Between June and August the female lays her eggs, which number from a dozen to four times that number. The older the snake, the larger her clutches. The eggs are sometimes laid in sunny places, where they can only be hatched by the heat of the sun, but they have also been found in manure heaps. The newly-hatched Grass Snakes measure about six to eight inches, and can be reared easily on worms and tadpoles.

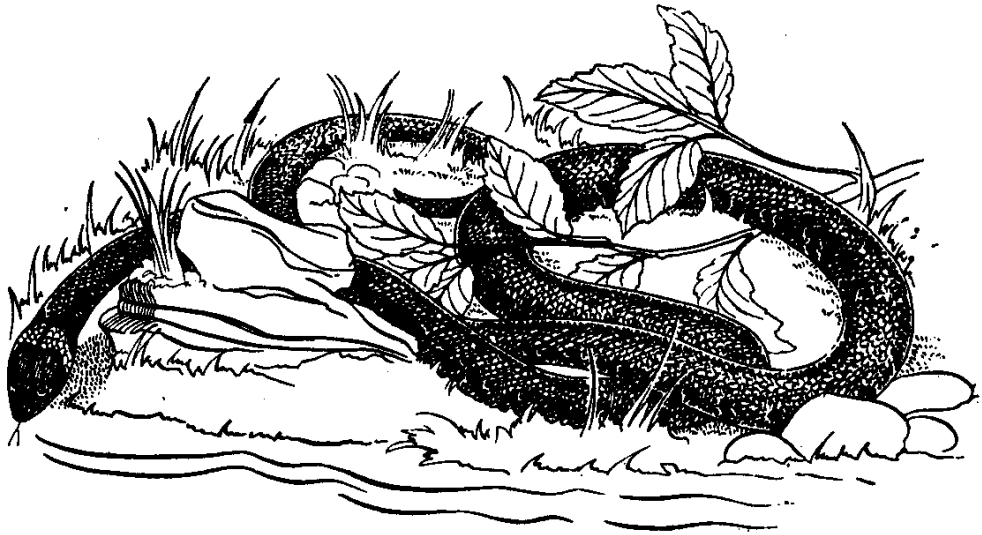


FIG. 28.—Grass Snake (*Natrix natrix*).

The usual colour of the Grass Snake (also called Ringed Snake by older writers), is olive green. Behind the head is a yellow collar, and immediately behind this another collar of black. Along the back run two rows of small dark spots, and a row of large oblong black marks is arranged along the sides. There are a number of varieties on the continent, which are sometimes found among importations of these snakes from abroad. Specimens from Spain are sometimes uniform olive, without any markings, while those from Italy have the markings very large and bright (var. *persa*). Albinos have been met with occasionally. These have the general hue flesh-colour, with brick-red markings, a yellow or white collar and the tongue and eyes red.

SNAKES

In the British Museum is a young Grass Snake with two heads, side by side.

VIPERINE SNAKE (*Natrix maura*).

This is a harmless snake which bears a remarkable resemblance to the Viper, having a wavy dark line down the centre of the back, on a reddish brown ground. Along the sides is a series of large black spots with yellow dots in their centres. On the back of the head are dark V-shaped marks.



FIG. 29.—Viperine Snake (*Natrix maura*).

This is a docile and hardy species from France, ranging to North Africa. It is found in ponds and marshes, where it basks on the banks, plunging into the water when disturbed. It feeds on frogs, newts, toads, tadpoles, earthworms and fish. In the vivarium, this is one of the easiest and most satisfactory snakes to manage. It will readily accept dead fish—they must of course, be fresh—and is usually quite gentle when handled. It hibernates, often in large numbers, and is oviparous. The young feed on tadpoles, aquatic larvae, worms and fish-fry.

Very closely related is the Dice Snake (*Natrix tessellatus*) (Fig. 30) which is drab above, but handsomely marked below with black or blue, orange or salmon-colour. It may be treated similarly to the Viperine Snake, and is a free breeder

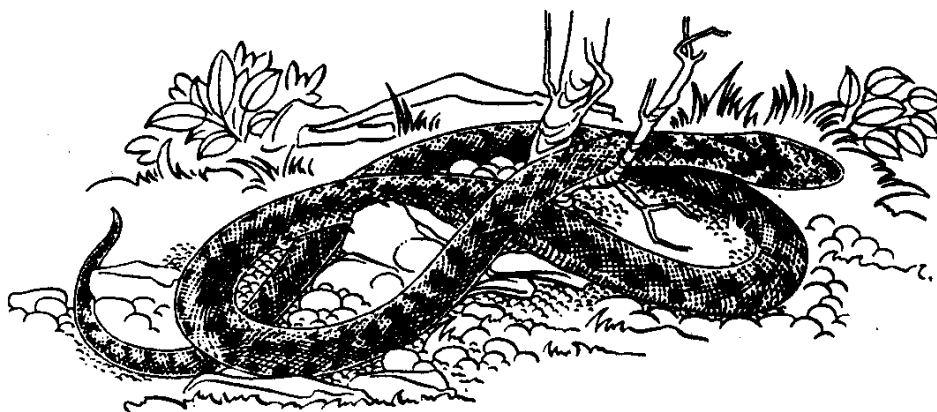


FIG. 30.—Dice Snake (*Natrix tessellatus*).

in captivity. It feeds mostly on fish and frogs, bringing its captures ashore before swallowing them. It is viviparous, producing live young.

SMOOTH SNAKE (*Coronella austriaca*).

This is the rarest of the three British snakes, and is found on dry heaths in the south, principal localities being in Hampshire, Dorset, Surrey and Berks. A century ago, it was very common near Bournemouth.

It is a small species, seldom growing to more than two feet in length. The general colour above is grey, brown or reddish, with brown or brick-red spots in a double row down the length of the body. The top of the head is dark—almost black in young specimens—and there is a dark streak from the nostril, passing through the eye, along the sides of the neck.

Though quite harmless, this little snake is often mistaken for a Viper, all the more so because it is very ready to bite when wild, and may fasten its jaws into the finger when picked up.

The name "Smooth Snake" refers to the absence of the raised line or keel, which in the Grass Snake and Viper runs along each of the scales of the back.

The Smooth Snake is one of the most intelligent of snakes, and does well in captivity, becoming quite tame. It can be trained to feed in the hand of its owner. Its natural food consists mostly of lizards, but it will eat small mice and voles at liberty, and might be persuaded to eat mealworms in captivity.

SNAKES

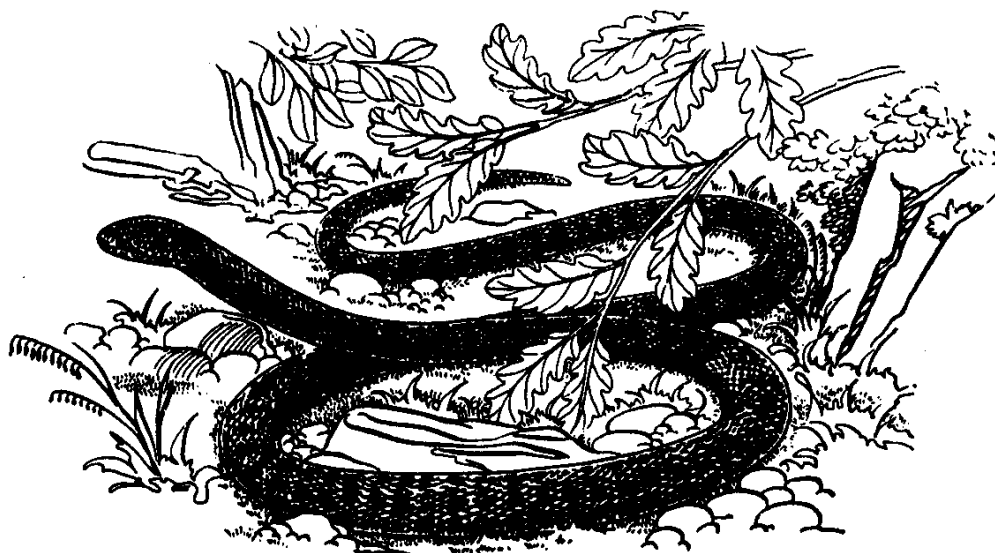


FIG. 31.—Smooth Snake (*Coronella austriaca*).

Pairing takes place in early spring, and the young, which number from two to fifteen, are born in early September. They are enclosed by a thin membrane which they tear immediately.

GARTER SNAKE (*Thamnophis sirtalis*).

This is a frequently imported, attractively coloured snake, which is related to the Grass, Dice and Viperine Snakes, but is a native of Eastern U.S.A. to Canada, south to Florida, and west to Minnesota, Wisconsin and Missouri.

It is the best-known and commonest of harmless American snakes, and is very hardy, being the last snake to retire for hibernation in the autumn, and the first to wake up in spring. Sometimes it comes out to bask in the sun while patches of snow are still on the ground.

It is sociable, and towards the end of summer large numbers of these snakes collect together and hibernate in clefts and burrows in soft soil. Sometimes they go down to a depth of a yard or more. In spring, the snakes still remain in numbers till the season is well advanced, when they scatter.

In the vivarium, the Garter Snake does well, and becomes very tame, even gliding to the door when it is opened, to take food from the fingers. The natural food is frogs and toads,

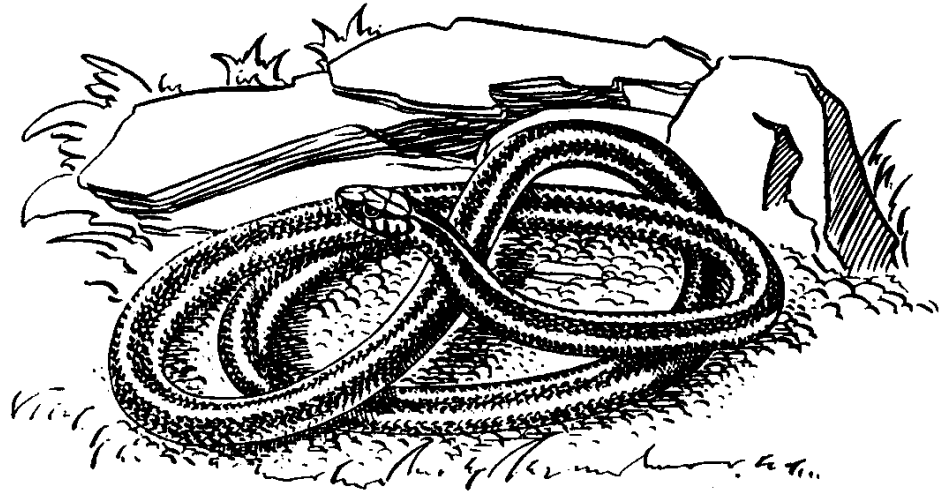


FIG. 32.—Garter Snake (*Thamnophis sirtalis*).

but it will eat large earthworms, and these can form its staple diet in captivity.

The Garter Snake is viviparous, and may produce any number of young up to fifty. These are born in August, and shift for themselves at once, living on worms until hibernating time. Albinos are known of this snake. They are most attractive creatures, being pure white with red eyes.

FOUR-LINED SNAKE (*Elaphe quatuorlineatus*).

This is the largest European snake, reaching six or more feet in length. It is found in Southern Italy, Yugoslavia, Hungary, Greece and the Caucasus.

The adult is brown, with two black bands along each side of the body. The young are very different, being fawn with large black spots. In the typical form these dark markings very gradually disappear with age, while the two dark lines along the sides appear, commencing a little distance behind the head. There is a broad black band from the eye to the angle of the mouth. Specimens from south-east Europe and the neighbouring countries are referable to var. *sauromates*, in which the dark lines of the ordinary type are absent. In this variety, which has been regarded by some authors as worthy of specific rank, the dark spots of the young sometimes persist in the adult, though they are less conspicuous.

This is a most attractive snake, and easily the best to keep

SNAKES

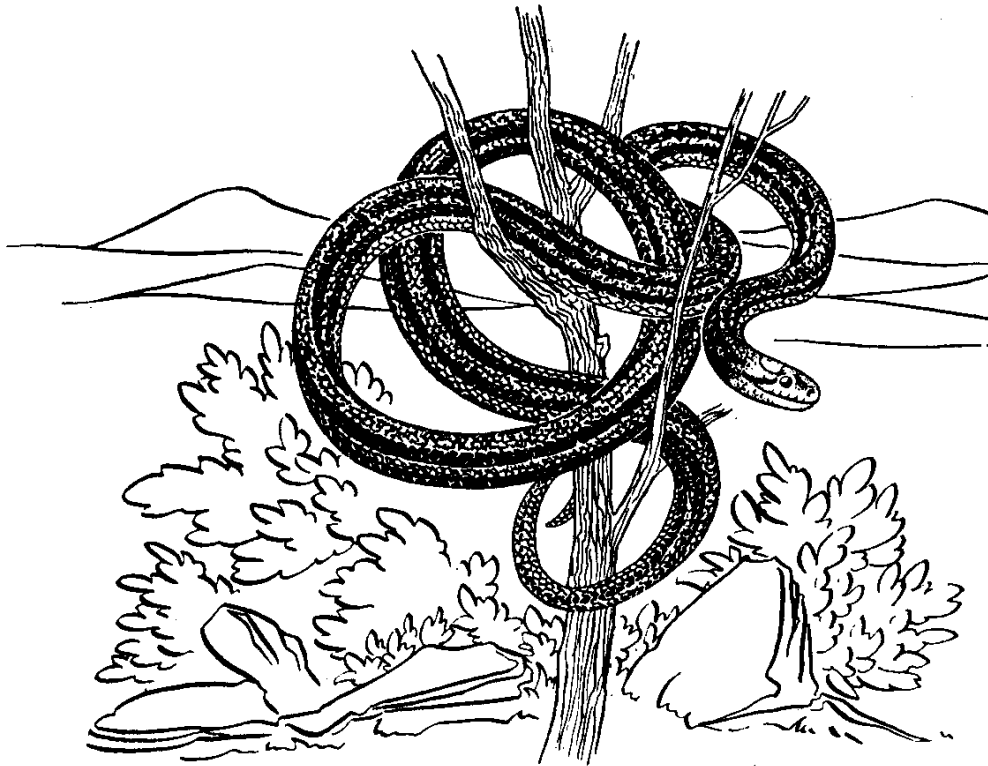


FIG. 33.—Four-lined Snake (*Elaphe quatuorlineatus*).

in the vivarium. It is very fond of water, and should be given opportunities to indulge in this fancy. In a pond, it can swim well, and will remain under water for hours at a time. It becomes very tame, and is more leisurely in its movements than most snakes. In a wild state it feeds on mammals and birds, but will readily take dead food in captivity. It is oviparous.

This fine snake grows to a length of about six feet, and is olive greenish above, with pale spots or lines on some of the scales. There is a dark bar behind and below the eye. The under-parts are yellow, as also are the lips. Its range extends from France and Germany to the whole of south-eastern Europe, but it is local in the first two countries.

ÆSCULAPEAN SNAKE (*Coluber longissima*).

This snake was well known to the Romans who kept and revered the reptile in temples devoted to the art of healing. It is chiefly a woodland species, and is a good climber, often ascending trees in search of birds and their eggs. It also eats

REPTILES AS PETS

mammals and lizards. In captivity it is easy to maintain on dead mice and voles. Though very savage when fresh-caught, the Æsculapean Snake soon becomes very docile, and will allow its owner to handle it freely, but is usually distrustful of strangers.

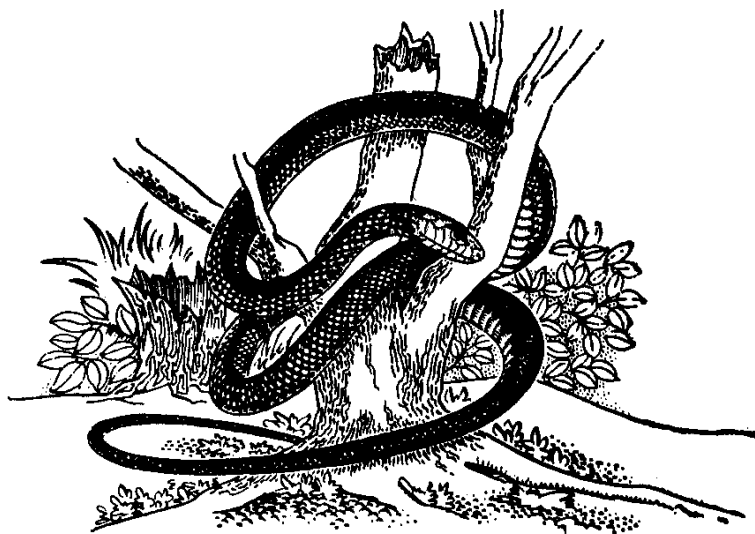


FIG. 34.—Æsculapian Snake (*Coluber longissima*).

This snake is rather late to emerge from hibernation in spring, being somewhat sensitive to cold, but it also avoids excessive heat in summer. It is oviparous, and the eggs laid in June or July hatch in September.

Another member of this group which is very attractive is the Leopard Snake (*E. situla*), one of the prettiest and most graceful of European snakes. It becomes quite tame in the vivarium, and should be treated in the same way as the Æsculapean Snake. It kills its prey, which consists of birds and mammals, before swallowing, being a constrictor. It is not, unfortunately, a ready feeder, and is apt to refuse to take food. Mice are the best creatures to feed it on. Its colour is buff with brick-red patches, edged with black regularly spaced along the whole length of the body. The eyes are red.

AFRICAN PYTHON (*Python sebæ*).

Young specimens of the Python and Boa family are commonly offered as pets, and will become quite docile with frequent handling. They are, of course, not poisonous, and

SNAKES

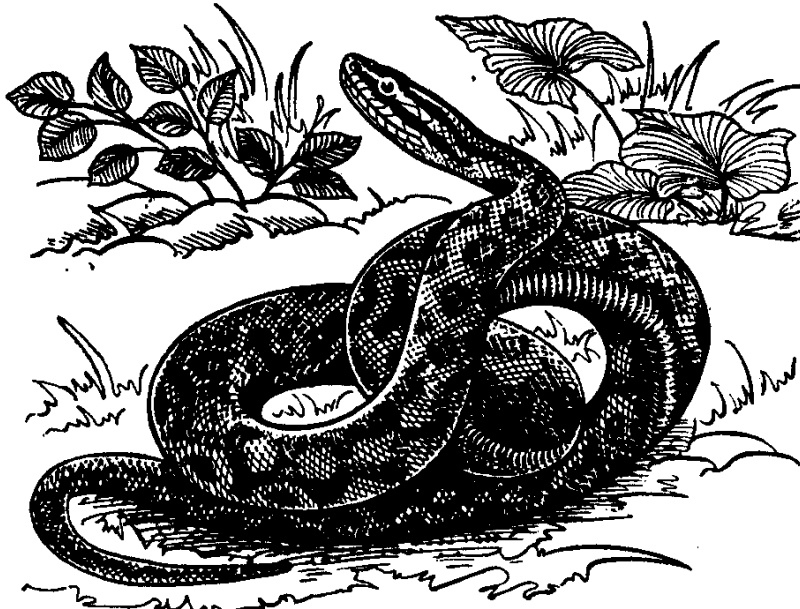


FIG. 35.—African Python (*Python sebae*).

specimens of less than six or seven feet do not inflict serious bites, even should they prove vicious. They are usually fed on mice and rats, and even when dead food is offered to them they automatically go through the process of constricting the prey before consuming it. Being tropical species, all Pythons need to be kept warm throughout the year.

CHAPTER V

FROGS AND TOADS

AMPHIBIANS fall into two well-defined groups, the tail-less amphibians (frogs and toads), and the tailed amphibians (salamanders and newts). Unlike the true reptiles, they do not have a scaly skin, this in most instances being smooth and soft. Nearly all of them prefer shady, moist situations, and cannot live under parched conditions. Some species will die after only an hour or two in a warm, dry place. The vivarium in which these creatures are kept must therefore be cool and moist. Water must always be available, and the floor is best covered with earth, and not sand as recommended for lizards and snakes.

Amphibians are more popular as pets than reptiles proper. Their habits, particularly in the early stages, are much more interesting, and on the whole they are better subjects for a captive existence. They are capable of undergoing surprisingly long fasts without coming to grief, though every effort should be made to keep them supplied with regular food.

Whether amphibians are more intelligent than reptiles is somewhat doubtful, but they certainly appear more alert and quick witted. For instance, when a snake is offered food, it often shows not the slightest interest in it. But give a toad a mealworm, and at once its attention is aroused. It carefully inspects the wriggling insect as if deciding whether it is a suitable thing for a toad to eat. Then, having satisfied itself upon this point, a rapid flick of the sticky tongue transfers it to the toad's mouth. A decisive gulp of the throat and the titbit is swallowed.

There are quite a large number of species of frogs and toads which are hardy in the vivarium, all of which are most interesting to keep, and some of them are very prettily coloured.

COMMON FROG (*Rana temporaria*).

A favourite pet of young people, there can be few who are not familiar with this popular amphibian. Frogs make in-

FROGS AND TOADS

teresting pets, but on account of their active habits, and rather large size when full-grown, they are much better kept in a walled garden enclosure, containing a pool. They are, however, not so easy to confine to such quarters as are toads, which do not jump.

Though an adult frog does not enter the water much, except at spawning times, some should always be placed within reach. Times of heat and drought are hard ones for frogs, and in dry, sunny summers their dried corpses may be frequently seen on country roads.



FIG. 36.—Common Frog (*Rana temporaria*).

In the autumn, frogs make their way to the nearest pond or stream, in search of a suitable place in which to hibernate. This may be in the mud of a partially dried-up pond, or in a hole that can be turned into a warm, moist sleeping place. Here they remain dormant till spring.

Though nervous when first caught, frogs soon become tame. Bell mentions a case in which a frog used to come out from a hole in the skirting-boards where it had taken up residence, accept food offered by members of the family, and even jump on the hearth-rug in winter to squat by the fire! Stranger still, the family cat took a fancy to the frog, and would allow it to nestle under its fur, as it lay by the fireside. Frogs are

REPTILES AS PETS

remarkably long-lived. One which was caught fully grown lived for twenty-five years in an ordinary backyard. The average length of life is said to be about eighteen years.

EDIBLE FROG (*R. esculenta*).

This is the frog which is used for culinary purposes in France, and is the largest and most brilliantly coloured of all European frogs. Though common on the Continent, it is local in this country, being found mostly in Norfolk, Cambridgeshire and Surrey. It is rather doubtful if it is a native of Britain, and was most likely introduced here.



FIG. 37.—Edible Frog (*Rana esculenta*).

It is of sturdy build, about three inches in length and very variable in coloration. Some specimens are brown or bronzy, while others may be grass green spotted with black. There is a narrow vertebral stripe of light yellow, and a prominent glandular fold extends along each side of the back from behind the eye. Below, the colour is cream, often with small brown

FROGS AND TOADS

spots. It can be easily distinguished from the Common Frog apart from its different colours, as its snout is more pointed and the toes more completely webbed.

The Edible Frog is a far more aquatic species than the Common Frog, and rarely travels more than a few yards from the edge of the pond where it lives. Because of this peculiarity, it is a much more suitable subject for keeping in the garden pond. This need not even be walled round, as the frogs will not leave it. In such a place, they quickly become tame, and will accept worms placed before them by hand. They can be fed on anything small which shows movement—caterpillars, spiders, flies, and the like all being equally acceptable. Out of doors, of course, these frogs can find their own food. They will not interfere with goldfish.

Edible Frogs breed freely in a garden pool. Mating takes place in June, and the spawn is deposited in masses among water weeds. The tadpoles hatch out in about eight days or so, but they grow very slowly, and do not usually metamorphose until the following spring, remaining in the water all through the winter. It is a curious fact that the young frogs of this species take to the land, where they hide under stones, or bury themselves in the ground. When adult they are so thoroughly aquatic that they even hibernate in the mud at the bottom of the pond, like terrapins. They do not reappear until about May.

This frog has a loud croak, and the voice of the male was committed to words by Aristophanes, about 400 B.C. He describes it very accurately as *Brekekekex Koak Koak*. The male can easily be distinguished by the pair of vocal sacs placed behind the angle of the jaws. Normally, they are just a tab of skin, but when distended they look like large peas. The female is larger, sometimes measuring four inches, and is usually darker in colour.

MARSH FROG (*R. ridibunda*).

The Marsh Frog is considered by some authorities to be merely a variety of the Edible Frog, while others believe it to be a distinct species.

REPTILES AS PETS

It was introduced into the Romney Marsh district of Kent in 1935, and is now abundant over an area stretching from Hythe to Rye and Tenterden to Ham Street. In colour it is very variable, but generally the ground hue is a putty grey, with a series of dark brown spots on the legs, which remain constant. It appears to lack the yellowish-green vertebral stripe which is a feature of the Edible Frog.

The Marsh Frog is a large species, growing to about four or more inches from snout to vent. It will eat almost any kind of insect fare, as well as worms and other frogs smaller than itself, and takes its food both on land and in the water. The breeding season is in May, and the males then become very aggressive towards one another, as well as extremely noisy. In general habits it resembles the Edible Frog, but we still have a good deal to learn about its way of life. It is very aquatic, and not often seen more than a few yards away from water.

LEOPARD FROG (*R. pipiens*).

This is a very attractive frog, but like most of its kind the colour and markings are subject to some variation. Normally, the ground colour is pale brown, grey or green above, with a double row of large dark brown blotches on the back, and similar ones along the flanks. There is a pale yellow line from behind the eye to the base of the spine. The spots of the back may be regular or irregular, and their shape also varies. Usually, but not always, they are bordered with a lighter shade of brown. The belly is white.

The Leopard Frog is a North American species, and is both common and widely distributed, being the only frog found on the great plains east of the Sierra Nevada. In Texas it is sometimes eaten, in spite of its small size, being less than three inches long.

When picked up the Leopard Frog makes a curious musical note, and the vocal sacs swell and collapse as it "sings." The female has a similar voice, but it is not so powerful as that of the male.

It comes out of hibernation in March, and spawns from then until early April. The eggs are laid in large masses, often

FROGS AND TOADS

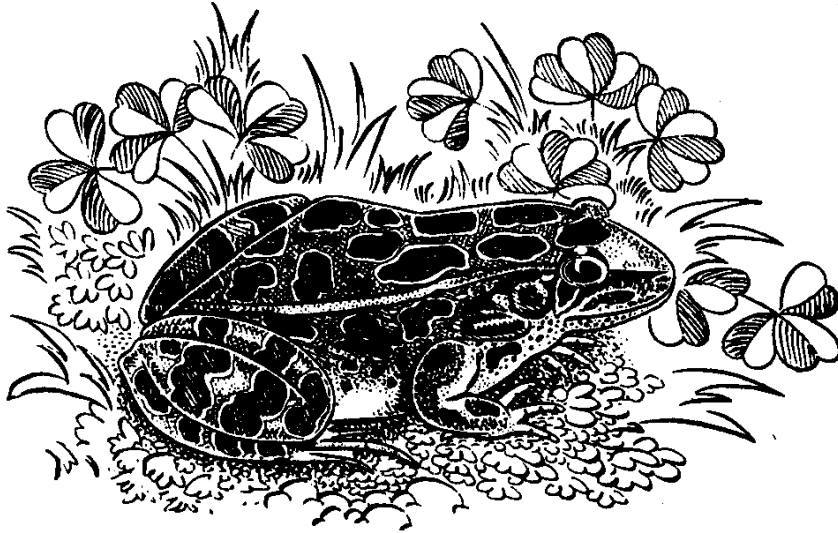


FIG. 38.—Leopard Frog (*Rana pipiens*).

six inches in diameter and two or three inches thick, containing several thousand eggs. These are jet black above and yellowish-white below, contained in a gelatinous coating. They hatch in about ten days, the actual time varying according to the weather. In sixteen to twenty days a myriad of gold spots appear on the tadpoles, and transition to the mature frog is fairly rapid.

This pretty frog does well in captivity, and will eat worms, spiders, beetles, grasshoppers and mealworms. It is an active species, and can make jumps of eight feet or so in length.

AMERICAN BULLFROG (*R. catesbeiana*).

This is a huge frog as big as a guinea-pig, and quite capable of swallowing a full-grown rat. It makes an unusual and interesting pet, and is useful, too, as a vermin destroyer. It can be kept outside in summer, and in the milder localities it can be hibernated successfully. It is very aquatic and does best in a garden pond, small specimens being safe with adult Common and Edible Frogs.

The Bullfrog is found throughout the U.S.A., but not west of the Rockies, and is bred on a number of "Frog Farms" as an article of diet. The flesh is said to be like chicken, but even more tender.

It is solitary in habits, fond of water, from which it seldom strays far, and is a powerful swimmer. Bullfrogs have been

REPTILES AS PETS

known to live for years in wells, where there was no opportunity for them to rest out of the water. Its natural food consists of fishes, baby terrapins, ducklings and other water birds, water voles and the like. In captivity it will eat large earthworms, and these can easily be collected with the aid of a torch on any lawn at night. It will also eat snails.



FIG. 39.—American Bull-frog (*Rana catesbeiana*).

During the breeding season, these Bullfrogs become sociable, and collect together in great numbers, several hundred being found in a pool or marsh sitting with their bodies half submerged and bellowing loudly. The Bullfrog has the loudest voice of any frog, and it can be heard several miles away. Tame Bullfrogs can be induced to roar almost to order, by making other noises such as rubbing the sides of a matchbox or shuffling the feet. When hurt, or caught by an enemy, its voice becomes a shrill, piercing scream, so human in character as to be positively uncanny and nerve-shattering. Numerous enemies prey upon the Bullfrog almost exclusively, including otters, snakes and alligators.

In colour the Bullfrog is green or brown, mottled with darker shades. The legs are spotted, blotched or barred with similar hues. The belly is white or greyish-white, faintly mottled with a darker shade. Sometimes the males have the

FROGS AND TOADS

throat yellow. On each side of the head are very large vocal sacs. These act as sounding boards and give the Bullfrog the voice for which it is famous.

The Speckled Bullfrog (*R. adspersa*), of Central and South Africa, is sometimes obtainable, and may be treated similarly to the American species, except that it is best kept in a warmed conservatory or greenhouse in winter. These giant frogs are a familiar sight to Colonials, and average about a pound in weight. They are bright green in colour, except for the throat, which is of a light neutral shade, sometimes spotted with brown.

PAINTED FROG (*Discoglossus pictus*).

This is a very attractive little frog found in Southern Spain, Portugal and North Africa, as well as some of the Mediterranean islands.

In size it about equals the Common Frog, but shows a greater variety of markings, and is a most variable species. The usual ground colour is olive brown, marked with darker spots and splashes. There is generally a triangular dark patch on top of the head and some dark bars on the legs.

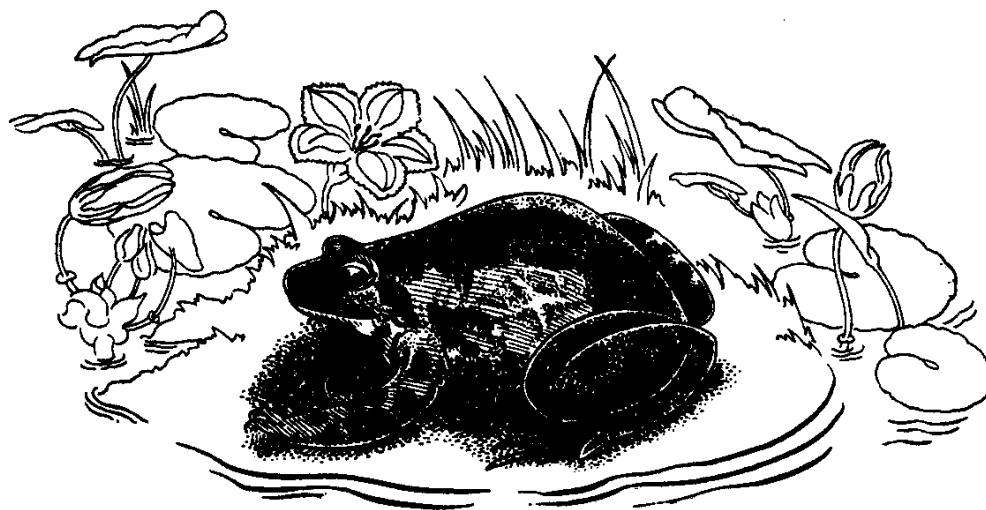


FIG. 40.—Painted Frog (*Discoglossus pictus*).

The Painted Frog has one or two structural points of interest. It has a rather pointed head, with the mouth set a little back from the tip of the snout. The tongue is much shorter than in

REPTILES AS PETS

the Common Frog and is disc-shaped. When feeding it makes a sideways grab at its prey, the tongue not being long enough to project and flick up insects as with most other frogs. It appears to feed only on land, and is quite a terrestrial species. There is a difference in the web of the toes in the sexes, those of the female having hardly any webs at all, while in the male the membrane extends to half their length.

The natural breeding season is from February to August, and during this period the females can lay up to three batches of spawn. This is spread in a flat mass over mud and plants by the water's edge. The tadpoles hatch in about forty-eight hours and grow rapidly, completing their metamorphosis within two months.

The Painted Frog is an excellent subject for the indoor vivarium, the male being without vocal sacs and practically a non-croaker. It is easily managed and will eat earthworms, small slugs, gentles, flies, moths and other insects.

TREE FROG (*Hyla arborea*).

This is perhaps the most popular of all hardy frogs, being small, pretty and easily kept. The colour of the upper parts is bright leaf-green, and the skin is smooth and shiny owing to its being covered with a film of moisture. Below, the colouring is pale yellow, and on the thighs there is quite a rosy tint.

There are many varieties which the keen collector can watch out for, and these can sometimes be picked out from dealers' consignments. Remember, when examining these frogs that they can change colour, so look at the markings chiefly. The typical form has a narrow black stripe which begins at the nose and extends backwards along the side of the body to the groin, where it turns upward. But in the south of France, Spain, and on the North African coast is found a variety without any traces (or very little) of this black stripe. This is called var. *meridionalis*. In the same districts one finds specimens with the black stripe broken up into a series of black dots. This form is referable to var. *japonica*. There is also a very scarce form in which the green colour is replaced by blue. As much as £20 has been paid for specimens of this variety.

FROGS AND TOADS

It is very interesting to see the manner in which the Tree Frog can change its colour to assimilate its surroundings. The change is slow. The normal green colour assumes its brightest in warm, sunny weather, but is duller when the sky is overcast. Day and night, however, have no influence on the colour. The exact tint of the green closely matches that of the leaves upon which the frog happens to be resting.



FIG. 41.—Tree Frog (*Hyla arborea*).

From time to time, Tree Frogs change their skin, and this usually takes place during the summer months. Weather conditions seem to exert some influence on the moult, and it mostly takes place under warm, showery conditions. In getting rid of the old skin, the frogs open their mouths as if yawning, and hump their backs. The outer skin soon begins to flake away and fall off, assisted by grotesque contortions and leg movements of the frog.

REPTILES AS PETS

The Tree Frog is a lively little creature, and spends most of its time in trees, but has a great liking for maize plants, and in the maize fields there are always plenty of these frogs, where they do good work in keeping injurious insects in check. The Tree Frog likes to rest between the stems and the broad bases of the leaves, where it is very difficult to detect.

During the day-time it remains rather quiet, and is mostly active towards dusk and at night, particularly during thundery weather. It is not a species which dislikes sunshine, however, but on the contrary likes to bask in its full rays.

When an insect—a fly or a butterfly—settles within reach, the Tree Frog leaps at it with remarkable agility and accuracy. These frogs jump without any fear of where they will fall, but seem to trust to luck. They are marvellous acrobats, and after taking a leap they always manage to cling to some leaf before reaching the ground, even clinging to some thin-stalked leaf which swings perilously under the little creature's weight. Then the prey is eaten at leisure, wings and all being packed into the mouth with the assistance of the little hands. In very wet weather Tree Frogs often descend to the ground, and even take to the water. Here, however, they run great risks of falling victims to Grass Snakes, which kill them in large numbers.

Pairing takes place in spring, and the eggs are laid in the water. They occur in masses up to a thousand or so in number, and lie on the bottom of the pond. The baby Tree Frogs leave the tadpole stage in three months, when they are about half an inch long. They hide in the grass for two years, and then take to an arboreal life. They are not full-grown until four years old, and then measure about one and a half inches in length. Baby Tree Frogs are very common, but the adult specimens are comparatively scarce.

A vivarium containing a few Tree Frogs is a source of much interest and amusement. When a few live flies are introduced, the frogs will perform lively acrobatic feats in pursuit of this food. Since the toes are fitted with adhesive discs, Tree Frogs can climb up perpendicular glass with ease. The case in which they are kept must, of course, be covered in to prevent their escape. They can also be kept satisfactorily in a greenhouse.

The male Tree Frog has a vocal sac which swells out the

FROGS AND TOADS

whole throat when inflated. The call-note is loud for such a small frog and sounds like *Creek-crek-crek*, uttered mostly towards dusk. It is advisable to limit the number of males on account of their vocal habits, which are insistent and monotonous.

In the winter the Tree Frog hibernates. If kept warm, of course, it will not do this, but it is best to hibernate amphibians when it is natural for them to do so. Provide a bed of moss for the frogs to snuggle down in for the winter, and keep this moist.

AMERICAN TREE FROG (*H. versicolor*).

This is a pretty little frog, which is remarkable for the way in which it changes its colours to assimilate its surroundings. It does this to such an extent that it is hardly possible to say what are its real colours. Mostly, it is between brown and pale grey, but it can pass from white to dark brown in quite a short time. Unlike the European Tree Frog, it has a warty skin, and is often called a Tree Toad.

Though common in many parts of the United States, ranging from Canada to Mexico, it is frequently overlooked owing to its protective resemblance to its surroundings. It likes to sit on lichened walls, stumps of old trees and similar places.



FIG. 42.—American Tree Frog (*Hyla versicolor*).

REPTILES AS PETS

Before rain, this Tree Frog is very noisy, the voice sounding like *l-l-l-luk*, with a sharp ending. During the breeding season it leaves the trees and makes its way to ponds for spawning. It is very active, catching insects with great jumps. In winter it hibernates, burrowing in damp soil, becoming active at a temperature of about 60° F. It is hardy and can be treated in a similar manner to the European Tree Frog.

COMMON TOAD (*Bufo bufo*).

Toads make excellent pets, and can be kept in the garden reptiliary, greenhouse or indoor vivarium. They are most useful creatures to the gardener, and in some parts of France market gardeners collect toads and build little brick houses for them among their vegetables. It is a natural habit of toads to adopt some hole or cranny as a home. They are very intelligent, and will soon learn to come to their owners for food if they are fed on garden worms and insects regularly at the same hour.



FIG. 43.—Common Toad (*Bufo bufo*).

It is amusing to watch a toad eating a worm, as having no teeth it does not find the squirming creature any too easy to deal with. The toad seizes the worm by the middle, and, sitting quietly down, proceeds to push it into its mouth with its chubby “hands,” using first one and then the other.

FROGS AND TOADS

Eventually, with alternate gulps and pushes the worm is swallowed.

Though quite harmless to anyone who picks it up, the toad has a means of defence in the poisonous skin secretion glands. This is only in evidence when the toad is severely interfered with, as when a dog foolishly picks one up in its teeth. The result must be very unpleasant, and causes the dog to foam at the mouth. M. Jean Ristand, the French naturalist, says that a meal of ten toads would prove fatal to a man or dog. He also says that the toad has poison in its blood as well as in the skin, and the latter type affects both heart and nerves, causing paralysis. But unfortunately for the toad, its poison is quite ineffective against its worst enemy, the Grass Snake.

When spawning, the toad spends a good deal of its time in water, often collecting in numbers at a favourite pond. The toad's spawn differs from that of the Common Frog in being deposited in a double string, not in masses. The spawn is produced later in spring than is the case with the frog, and the tadpoles do not undergo their metamorphosis until August or September.

The toad casts its skin at certain periods, and this always takes place on dry land. The process of casting being somewhat exhausting, the toad remains near water so that it can regain the safety of the depths should danger threaten.

When casting, the toad hides away for a time under a fallen log, among the roots of an ancient tree or some such retreat. Here it crouches flat on its belly waiting for the skin to burst. The skin becomes very dry, and at length it splits down the centre of the back and also along the middle of the belly. When this has happened, the toad begins to rub its hind legs vigorously together, and thus gradually works the old skin right down over its thighs. Continuing the process of rubbing, it soon frees its hind legs from the skin altogether. It then gathers the loose skin beneath it, holding it down with its freed hind feet, and commences to extricate its forelegs. This part of the operation occupies about twenty minutes. Using the forefeet like hands, the toad pulls the skin over its head like a man taking off his shirt. The final act is the most curious of all. Rolling its old coat into a ball, the toad stuffs it into its capacious mouth and gulps it down !

REPTILES AS PETS

Once the skin has been changed and eaten, the toad takes to the water and remains there for a few days until it has recovered from its trying ordeal.

NATTERJACK TOAD (*B. calamita*).

This is our only other species of toad, but unfortunately it is not a common species, and prefers well-drained, sandy localities.

The general colour is olive green and yellow, with a distinct yellow line running down the middle of the back. Below, it is white, spotted with black. The male has a bluish throat, and when uttering its croak this swells out to a size equalling the head. The eyes are pale yellow.



FIG. 44.—Natterjack Toad (*Bufo calamita*).

The Natterjack is a most interesting toad for the vivarium, and though not so fond of damp places as most amphibians, it should always have some water available. The most remarkable feature of the Natterjack is that it does not hop but runs, and in the dusk could easily be mistaken for a mouse. It is a small species, the ordinary length being about three inches.

FROGS AND TOADS

It is an alert, intelligent toad, and when kept in the outdoor vivarium, it will frequently come out of hibernation and sit in the sun during mild spells in winter. It is more diurnal in its habits than the Common Toad, but likes to sit at the entrance of a burrow of its own making. For this purpose, some loose mould should be placed over the floor of the vivarium. In its diet it is similar to the Common Toad, being fond of mealworms and other moving insects and their larvae.

GREEN TOAD (*B. viridis*).

This is a very prettily marked little toad which bears a greater resemblance and affinity to the Natterjack than the Common Toad. But it is a hopper, not a runner, having longer hind legs than the Natterjack. It is a very lively species, with a big appetite. In size, it is somewhat smaller than the Common Toad, and unlike that species it does not seem to care about worms as an article of diet, being mostly insectivorous.



FIG. 45.—Green Toad (*Bufo viridis*).

The ground colour is light dun colour above, and silvery below. The markings consist of irregular blotches of dark green and brown. It is a native of Central and Southern Europe, North Africa, South-western and Central Asia.

REPTILES AS PETS

MIDWIFE TOAD (*Alytes obstetricans*).

This is a very small toad, rarely exceeding an inch and a half in length, which has such remarkable breeding habits that it is worth a place in any vivarium.

The male takes charge of the eggs, carrying them round with him. He does this by twining the eggs, which are laid in a rosary-like string, round his hind legs. From the moment they are laid, until they are ready to hatch, the male toad looks after the eggs, carrying them with him everywhere he goes. In the day-time he remains hidden, but at night he comes out to hunt for food, little troubled about his burden.

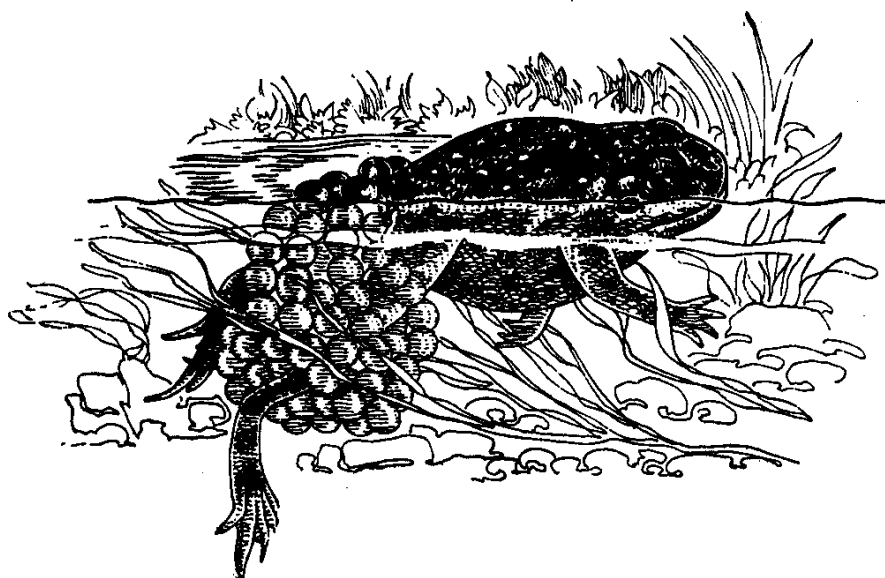


FIG. 46.—Midwife Toad (*Alytes obstetricans*).

So that the precious eggs may not dry up, father Midwife Toad makes frequent visits to damp places and may on occasion enter the water for a short period. After three weeks, when the eggs are ready to hatch, he makes for a pond, where the tadpoles are liberated. They develop in the same way as those of other species. Normally the tadpoles have changed into young toads by the end of the season, but sometimes they remain in the pond until the following year.

The Midwife Toad is very hardy and makes an excellent pet for the vivarium, having one strong advantage over many of its kinsmen in that it possesses a melodious voice. Instead of an unpleasant croak, the voice of this species resembles the

FROGS AND TOADS

tinkling of a tiny bell, or the piping voice of a bird. It is a series of single notes uttered at very regular intervals.

Being hardy, the Midwife Toad is a good subject for the outdoor vivarium. With very little trouble a suitable home can be laid out in which it will go through its unique breeding process. A suitable shelter in which it can retire is necessary, as well as a small pool. At liberty, it is nocturnal, hiding under stones by day and seeking its food at night. In captivity, however, it is not so keen to take cover, and soon becomes fairly tame, especially if an effort is made to offer it favourite titbits. As a staple diet earthworms are very satisfactory, while gentles, spiders, smooth caterpillars, flies and mealworms are readily accepted.

In colour it is of olive or greyish hue above, with small dark spots; below, it is white. It is found in many parts of Europe, except Britain, and is particularly plentiful in France.

FIRE TOAD (*Bombina bombina*).

This is a very popular little toad, which is suitable for either indoor or outdoor vivaria, and will breed fairly readily in captivity. Its maximum size is two inches, and the general colour above is dark olive or blackish. But below it is strikingly marbled in black and vermilion. An interesting habit of this toad is the way in which it displays the bright colours of the belly when danger threatens. It stiffens the body and raises the head and hind quarters so that the back becomes hollow, the bright colour of the underside being visible. This habit is a good example of what naturalists call "warning colours." Many snakes of a poisonous nature, a number of caterpillars and moths, have also vivid schemes in scarlet, yellow and black, which serve to show their inedible or venomous nature.

After a short time in captivity, however, Fire Toads lose this habit, and refuse to "perform." They are very intelligent and soon get to know that their owners will do them no harm.

On account of the poisonous nature of the secretions of the skin, no creatures will harm these little toads. Gadow says he has kept them with snakes, terrapins, and even alligators without their coming to any harm, although they shared the same pond in which no other frog or newt could be placed

REPTILES AS PETS

without being eaten. He says, "Hungry Water-tortoises stalk them under water, touch the intended prey with the nose in order to get the right scent, and then withdraw from the toad, which remains motionless, well knowing that quick movements or a show of escape, would most likely induce the tortoise to a hasty snap, which would be regretted by both."



FIG. 47.—Fire Toad (*Bombina bombina*).

The Fire Toad is a native of Germany, Russia, Denmark and other parts of Northern and Central Europe (not Britain), and is found in ponds and marshes, rarely wandering far from water. It is active by day, and is more lively than most toads, leaping about like a frog. In the water it is equally at home, and swims strongly. It likes to rest near the surface with its limbs widely spread, and only the nose and eyes rising above the water. When disturbed, it dives, and remains concealed beneath stones, or in some such cranny, until all danger has passed.

The pairing season begins at the end of May, and lasts three weeks. At this time the male utters at intervals a somewhat powerful and melancholy note like *Hook, Hook*. In fact, from the sound produced, the Fire Toad is known in Germany under the name of "Unke."

Though the Fire Toad is fairly aquatic by nature, it does not want to be always in the water. A fairly deep dish of water should be stood in the vivarium, and this should be sunk

FROGS AND TOADS

to the rim in peaty soil, covered with a slight layer of moss. These toads like to hide under pieces of virgin cork or little mounds of rockery. They do not properly hibernate in winter, but creep away from the direct influence of frost. They will thrive out of doors.

In the young stages, the brilliant colours of the chest and under-parts are absent. These characteristic hues do not begin to make their appearance until the young toads are about a year old. The colours appear slowly, becoming more and more intense until the adult is reached, at about three years old.

In the south of Europe this species is replaced by a very similar toad, which differs in having the belly marbled with black and yellow. This is the Yellow-bellied Toad (*B. variegata*), which is even more suitable for the vivarium since it breeds more readily than the Fire Toad. The spawn is deposited from the end of May till July, and is laid as separate eggs or in small groups, rarely exceeding twelve in number. These are attached to the leaves and stems of aquatic plants, and in the vivarium suitable water plants should be provided for the purpose. The eggs hatch in about a week, and the tadpoles grow as big as those of the Common Toad, completing their metamorphosis by the end of October ; occasionally it is postponed until the following spring. The tadpoles will feed on duckweed and nibble water plants when first hatched ; later they can be fed on chopped worms, scraps of meat and the like. The adult toads will eat practically any insect and small grubs.

CLAWED TOAD (*Xenopus laevis*).

Sometimes called Clawed Frog, this is one of the most odd-looking and fascinating of amphibians. It is of great interest to biologist and aquarist alike, and will live in an aquarium like a fish, never needing to come out on dry land.

It is a highly specialised creature, and lives in the shallow swamps and backwaters in tropical and sub-tropical Africa, where it floats just under the surface, breathing through its nostrils, ready to dive and hide in the mud on the slightest disturbance. It is regarded as a very valuable amphibian, since in a state of nature it lives largely on mosquito larvae. In the aquarium it feeds readily on small worms, and scraps of meat.

REPTILES AS PETS

Physically, the Clawed Toad is a queer creature. The fore-legs are not webbed, and the fingers stick out like claws, whereas the hind legs are webbed for practically their whole length, so that when the toes are extended the webbing looks almost like a parachute, giving the toad immense power of progression through the water, and allowing it to stand almost humanly in an upright position in the water, with only its nostrils and periscopic eyes appearing above the surface.

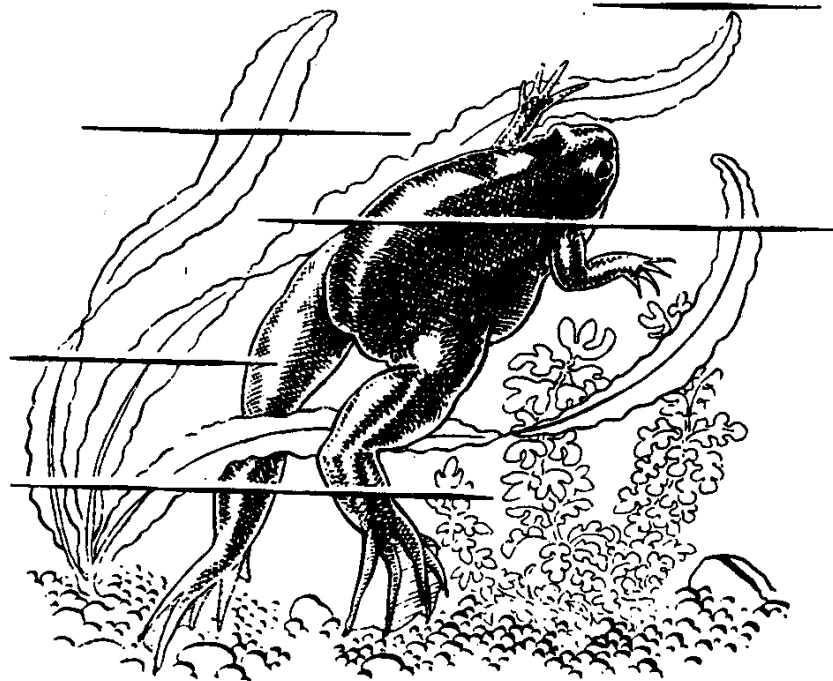


FIG. 48.—Clawed Toad (*Xenopus laevis*).

Mr. A. E. Hodge gives an amusing account of these toads and says “ My own specimens, which I feed by hand, appear to show striking intelligence, for sometimes when I go near their tank and do not give them any food they come to the front and go through the antics of feeding themselves, stopping every now and then with an appealing ‘ What about it ? ’ expression. If this is not asking to be fed, then I have been shamefully deceived.”

Though a native of Africa, the Clawed Toad is quite hardy, and has wintered successfully in an outdoor pond. Normally, however, it is kept in an aquarium indoors, where it is a source of much amusement and interest. It is difficult to breed, and the best way to induce spawning is to give the toads a large

FROGS AND TOADS

tank, placed in sunshine, and with plenty of floating aquatics. A muddy bottom seems to be desirable. Under these conditions the water soon becomes thick with millions of infusoria and these form a food for the young tadpoles. In nature, August is the month when pairing takes place. Then the queer voice of this toad is heard, a sort of low ticking sound.

The male embraces the female in the way customary to the tribe, gripping her with his forelegs around the groins. The eggs are deposited singly, with only a little gelatinous coating. They measure 1.5 mm. in diameter, swelling to twice that size through absorption of water. The eggs are attached individually to plants and stones, and in a temperature of around 75° F., they hatch in thirty-six hours.

Clawed Toads were first bred in this country at Cambridge University, and special apparatus was used in order to create artificial rain, since in nature it breeds in the rainy season. This was only the second time these toads had been bred in captivity. It has now been discovered that they can be caused to deposit eggs by injecting the females with 1 cc. of prepared extract from pituitary glands. The toad reacts to this by producing large numbers of eggs within five to ten hours after the injection, irrespective of whether pairing has taken place or not. But the males seem to know instinctively when a female is about to lay, and if placed with an injected female they are usually ready to mate with her.

When eggs are obtained, the toads should be removed. The eggs must not be shaken off the plants to which they are affixed. The water temperature must be maintained at around 80° F., with the aid of an electric immersion heater, when necessary. A good place to stand the tank is in a greenhouse or sunny window. Sunshine is essential to keep the tank supplied with infusoria.

The tadpoles hatch in two or three days and hang on to the plants and sides of the aquarium, like fish-fry, until they have absorbed their yolk-sacs. Then they swim freely, and feed on infusoria, though to the naked eye they do not appear to eat at all. But they draw in water in regular gulps, swallowing microscopic creatures which abound in it. Soon, the green, cloudy aquarium water becomes crystal clear, and cultures of infusoria will have to be put in. These are made by putting

REPTILES AS PETS

some hay in a jar or bucket of water, and standing it in the sunshine. Water from these containers soon goes cloudy, the murkiness really consisting of minute forms of life.

As the tadpoles grow, they can be fed on Daphnia, or Water-fleas, Brine Shrimps and other food sold by pet stores for feeding tropical fish. Daphnia can be collected from any pond or ditch in summer. They look like tiny reddish particles in the water, and dive when you approach. A fine net swept in figure-of-eight movements in the water will collect plenty of them.

The tadpoles are mature when about one year old. They are not always easy to rear, and have been found sometimes to develop a fungoid disease. This is supposed to be due to lack of iodine, and the addition of a little potassium iodide to the water has been found to overcome this difficulty. The amount of iodine to add is ten drops of a one in one thousand solution to every gallon of water. This should be repeated when the water is changed for any reason, or otherwise about every four to six weeks.

The Boers call this toad "Plathander," or flat-handed.

SURINAM TOAD (*Pipa americana*).

This is another odd-looking amphibian, which has become a popular feature in natural history books owing to its unique breeding habits. Like the Clawed Toad, it is entirely aquatic, but not hardy, requiring more warmth than that species. It is not commonly imported, though it has been bred at the London Zoo. It feeds readily on strips of raw meat, aquatic insects, small fishes, etc.

The method of spawning is unlike that of any other creature. During nuptial clasping, the ovipositor is extruded by the female and passed over her back, beneath the body of the male. Pressure by him spreads the fertilised eggs over her back, the skin of which contains a number of cells for the reception of the eggs. The eggs, once stuck upon the skin, sink into the cells, these having a lid which is believed to be formed by the shell of the egg itself. The male completes the task of embedding the eggs by pressing them on the female's back with his star-shaped fingers.

FROGS AND TOADS

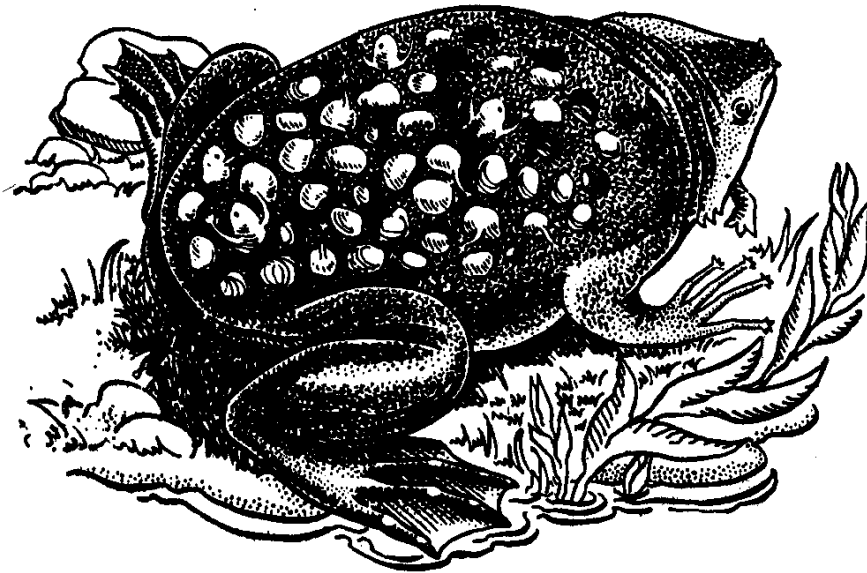


FIG. 49.—Surinam Toad (*Pipa americana*).

The eggs complete their metamorphosis in the skin cavities, and then break their way through the cover of the cells, emerging as complete replicas of their parents. When the whole brood has left the mother's back, the cells fill up again.

CHAPTER VI

NEWTS AND SALAMANDERS

NEWTS are among the most attractive and graceful of Amphibians, and being largely aquatic they are quite easy creatures to keep. An ordinary glass-sided aquarium, about $24 \times 12 \times 12$ in. is ideal for converting into a suitable home for newts. The water should not exceed eight inches in depth, and some rocks, granite or sandstone, should be arranged at one end and covered with patches of moss, so that the newts can readily leave the water.

All newts are most graceful swimmers, and their movements in the water never fail to arouse interest. The numerous imported kinds are really the best to keep, rather than our indigenous species, as they are more totally aquatic in their habits.

The Common Newt (*Triturus vulgaris*) has the disadvantage of leaving the water for the greater part of the year, and is then rather troublesome to manage, being naturally secretive in its ways, and is not particularly attractive, so that it is hardly worth the trouble of keeping in the vivarium. But the British Crested Newt (*T. cristatus*) is quite easy to manage, though even with this species the Continental race is prettier and of a more essentially aquatic nature.

The imported species are more or less aquatic throughout the year, and are therefore very satisfactory creatures to keep in an aquarium as described above. Newts show a fair degree of intelligence, and will learn to recognise their keeper, and take food from the hand. In the matter of food, they are easy to cater for, and will greedily consume small aquatic insects, bloodworms, small earthworms and the like. When a worm is dropped in an aquarium containing newts, a lively scene ensues. The newts, which had previously been floating idly on the water, with no apparent interest in life, suddenly spring into animation, and a general rush towards the unfortunate worm is made. When one of them seizes it and

NEWTS AND SALAMANDERS

makes off with the coveted morsel, he is at once hotly pursued by his indignant companions. Round and round the tank they go and a regular skirmish takes place. Sometimes one of the newts will get his tail bitten off in the fray, or sadly torn into a series of jagged edges where once were graceful curves, or possibly one of the combatants will loose a leg or a portion of it. But such maimed parts do not cause the newt any inconvenience, and are soon restored to their original condition.

Large newts should not be associated with small kinds. Two good collections would consist of the following species, each group being lodged in a separate aquarium. No. 1 collection : Marbled, Crested, Californian and Spanish Newts. No. 2 collection : Japanese, Alpine and American Newts.

The natural history of newts is very interesting. There are only eighteen kinds known, and of this number twelve are natives of Europe. Many species have a very limited range, as is the case with the Corsican Newt (*Euproctus montanus*) and the Sardinian Newt (*E. platycephalus*), both of which are confined to the two islands.

All newts like moisture, but detest heat. During the pairing season—that is, early in the year—they live in ponds to which they often have to travel long distances overland. During this period, which is sometimes of long duration, they become thoroughly aquatic creatures, and sometimes noticeable changes in the structure and colouring of the males take place. The fine tails become larger ; in some species a handsome crest grows along the head and back, and some very gaudy colours are assumed on the under-sides. In winter, these attractive features are again lost, and the males then more closely resemble the females.

Newts grow by a process of shedding their skin, just like caterpillars. The skin is shed either entirely or in pieces. When shed completely, these cast skins are very curious and pretty objects, but exceedingly frail. The skin begins to break away at the mouth, and the skin of the paws is drawn off just like a glove, every finger being perfect, and even the little wrinkles in the palms are clearly marked. These gloves look very pretty when floating about in the water, but they collapse immediately if removed. The shedding of the “ slough,” as the skin is called, almost always takes place in the water.

REPTILES AS PETS

For a long time naturalists were puzzled as to how newts actually reproduced themselves, and it is only in comparatively recent years that the life-history has been fully worked out. The male courts the female, rubbing the latter with his head, or lashing her gently with his tail, and generally skirmishing playfully about her, clad at this time in his gay nuptial dress. At intervals during this courtship, the male emits spermatophores, which sink to the bottom, and which the female takes up. None of the newts are viviparous. The eggs are laid singly, or in small batches.

When about to lay, the female newt selects suitable stones and water plants for her purpose. The eggs are laid on these, and hatch out in about a fortnight, sooner or later in accordance with the particular species, and the temperature conditions prevailing. From the eggs come tadpoles. These are curious little creatures when first hatched, being then so very slender and transparent that even in a small tank it is not easy to pick them out. Newt tadpoles develop two pairs of thread-like tubercles on the sides of the upper jaw, by means of which they attach themselves to water plants soon after hatching. Thus moored, they remain motionless in a slanting position, now and then wriggling their tails, and shifting their place, or sinking to the bottom. They have external gills in the form of tufts on the neck, and their front legs grow before their hind ones appear—the reverse of what happens in the case of frogs and toads.

Newts hibernate in winter, either underground or in water, and those kept in a vivarium should be put in a cool place, such as an outdoor unheated greenhouse, for the winter.

CRESTED NEWT (*Triturus cristatus*).

This species is one of the largest and handsomest of the newts, and is not uncommon in this country. The Continental form is the most desirable as it is much more at home in the water than our type is, and it is easier to maintain. It is known as *T. cristatus* var. *karelinii*, and is distinguished by the larger spots on the under-side, the ground colour of which is rich orange.

The general colour of the Crested Newt is olive brown to

NEWTS AND SALAMANDERS

blackish above, interspersed with dark spots. There are irregular whitish spots on the sides. Below it is rich yellow, with large black spots. In the breeding season the male acquires a special dress of considerable beauty. A high saw-edged crest appears along the head and back ; the top of the head becomes strikingly marbled in black and white ; the underparts intensify to orange and black, and a blue band appears on the tail. The female is at all times devoid of a crest.

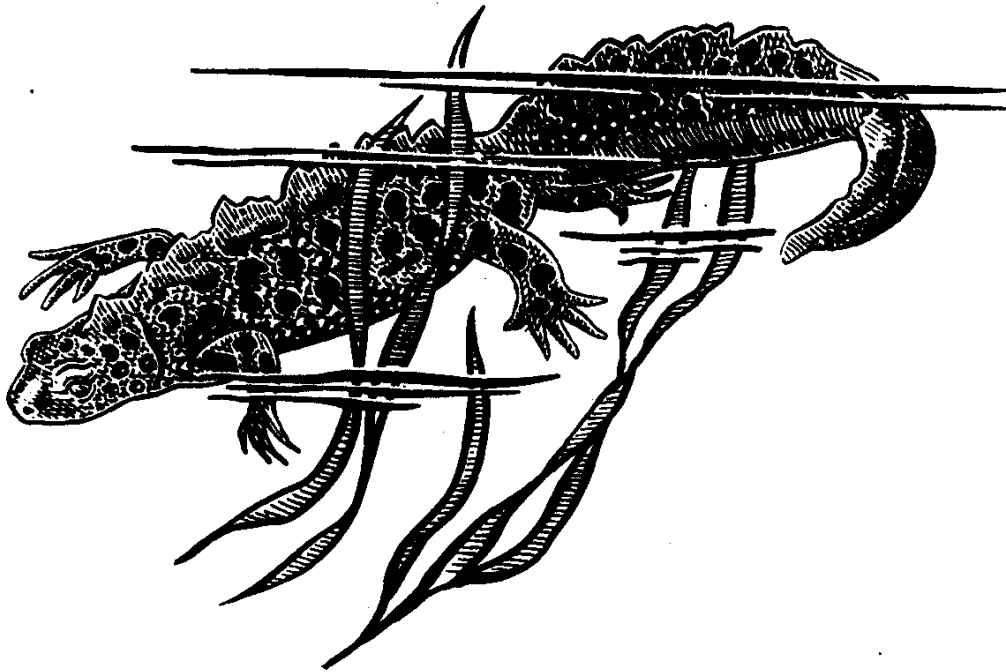


FIG. 50.—Crested Newt (*Triturus cristatus*).

When fully grown, the crest of the male is a strikingly attractive feature, and waves about delicately in the water. But when the newt crawls on to land, the crest collapses on to the back. When the breeding season is over, the crest disappears as rapidly as it grew, and in a short time becomes almost wholly absorbed. Some traces of it always remain, however, and the male may be identified in winter by a line of irregular excrescences along the back. The breeding season commences in April. These newts will breed readily in a large aquarium or outdoor pond. Unless removed to safe quarters, however, the young will almost certainly be eaten.

It is an interesting sight to watch the clever way in which the female newts secure their eggs. They seem to prefer *Vallisneria*, or Water Grass, upon which to deposit them, as its

REPTILES AS PETS

long, slender leaves are most suitable for holding the eggs. The egg is laid on one of the leaves, and then the leaf is twisted round the egg with the aid of the newt's feet. Somehow or other the amphibian manages to fix the twisted leaf so that it remains in position. When newly hatched the tadpoles are greenish-yellow, with two black dorsal bands, and a white edge to the tail-fin. They grow very quickly, and when they attain the length of nearly two inches the forelegs are strong and the hind ones still very small and weak.

After metamorphosis, the newt is no longer able to lead a sub-aquatic life, but is forced to breathe atmospheric air. For this purpose it rises to the surface at frequent intervals, puts its snout just out of the water, and with a popping sound ejects the used air and takes in a new supply.

An interesting experiment may be carried out with the tadpoles of the Crested Newt. If these are reared in an aquarium without any means for them to leave the water when their metamorphosis is nearly completed, they retain the clefts of their gills, though they breathe a considerable amount of surface air. Such individuals grow to a length of about three inches and retain their finny tails. They hibernate in this condition, but only the females reach sexual maturity.

MARbled NEWT (*T. marmoratus*).

This is one of the most strikingly marked of the family, and like the last species, possesses a fine crest in the male. It is a native of France, Spain and Portugal.

It differs from the Crested Newt in being quite smooth along the crest, which is not serrated as in that species. The ground colour of the upper parts is green, with marblings of black. Below it is grey, with more or less distinct darker spots, and dotted with white. The crest of the male is barred with black and white. The female, although crestless, has an orange line down the back.

The Marbled Newt is a large species ; adult specimens reaching up to eight inches in length. It is not common in France, and its chief localities are in the Basque country, North Portugal. Here it lives in ponds and streams during the early part of the year, afterwards spending its time in

NEWTS AND SALAMANDERS

moist shady places. In summer it generally leaves the water in its native country, because of the hot sun striking down on it, a condition which is disliked by newts. It will also leave ponds and streams when floods threaten. During the winter it hibernates, choosing for this purpose a hole in a decaying tree-stump, or some such secluded position.

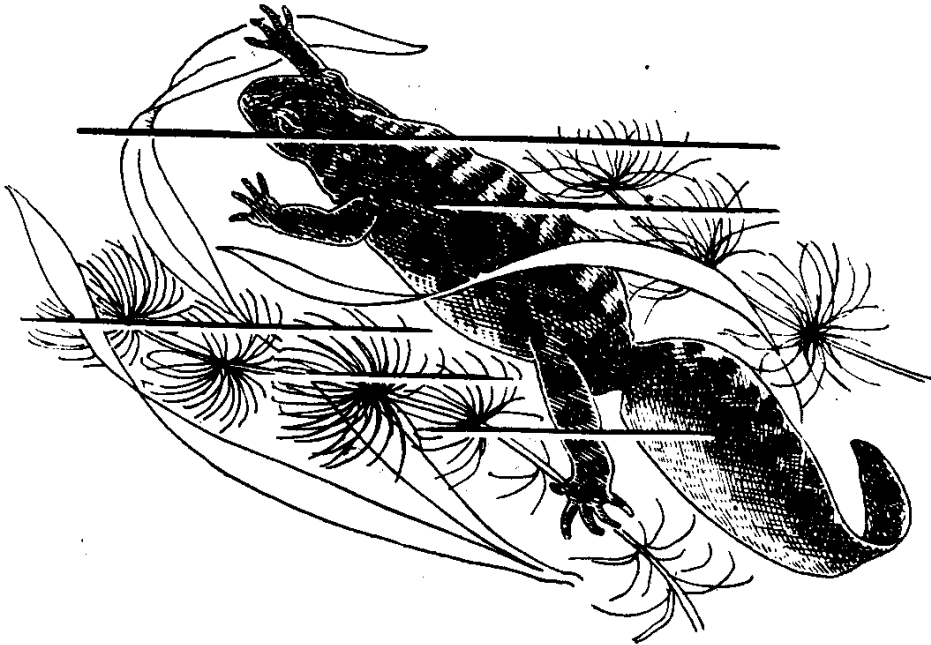


FIG. 51.—Marbled Newt (*Triturus marmoratus*).

The Marbled Newt will breed readily in the aquarium, and will hybridise freely with the Crested Newt both in the wild and captive state. Such hybrids are fertile.

ALPINE NEWT (*T. alpestris*).

This is a great favourite, being the least offensive of any newt in disposition. It is a small and very pretty little species, varying in size from three to four inches in length. It is easily distinguished by the rich, plain orange colour of the under-side, without any markings. All the upper colours are dark, but the shade varies considerably. In the handsomest specimens the back is dark purplish grey, with black mottlings; others incline more towards brown tones, the blackish markings being then more conspicuous. There are often numerous white dots on the sides. The eyes are golden yellow. In the

REPTILES AS PETS

breeding season the male develops a low, smooth-edged crest, which extends from the nape to the tail. In colour this crest is of a yellowish hue, with black vertical bars and spots. In the spring the upper parts of the male become bluish in tint, particularly along the sides of the back, and bluish-white patches appear on the lower fin of the tail.

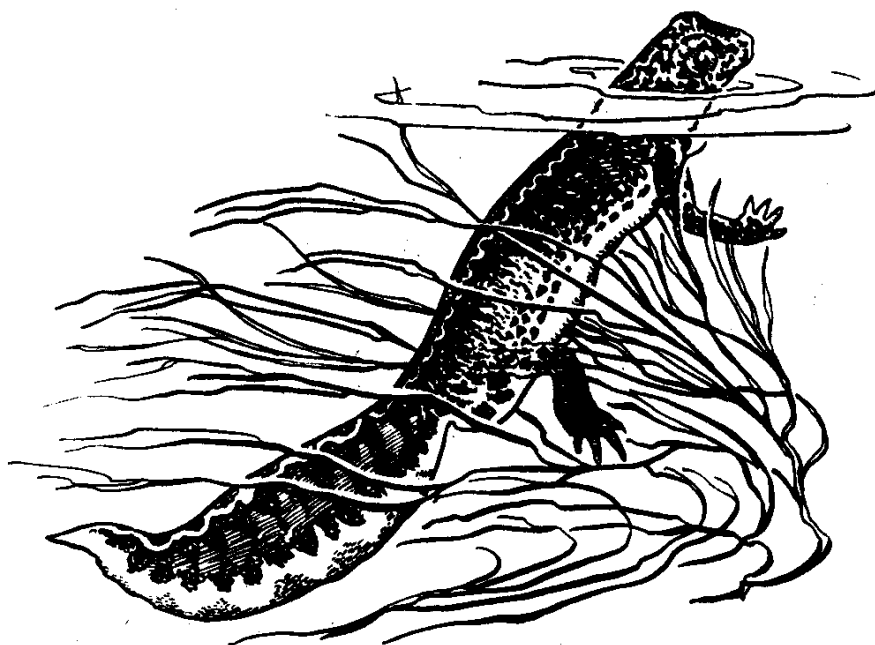


FIG. 52.—Alpine Newt (*Triturus alpestris*).

The Alpine Newt lives chiefly in the hilly and mountainous districts of Central Europe, such as South Germany, Switzerland and the Austrian Tyrol. It is found at elevations up to 7,000 feet.

AMERICAN NEWT (*T. viridescens*).

This species is common throughout the northern and eastern parts of the United States. The general colour above is brown, with a strong tinge of green on each side of the body, and a row of vermilion spots. The under-parts are orange, studded with small black dots. Half-grown specimens are brownish-red, with the same lateral red spots as the adult.

This is a small newt, about four inches long being the average size, and is a suitable companion for the Japanese Newt. Unfortunately, unlike the Alpine Newt, it does not breed at

NEWTS AND SALAMANDERS

all readily in the aquarium. This may be due to the fact that its life-history is not quite the same as that of other newts. As soon as it has left the tadpole stage it takes to the land, where it remains for a year or so. It then goes back to the water, and becomes a purely aquatic species.

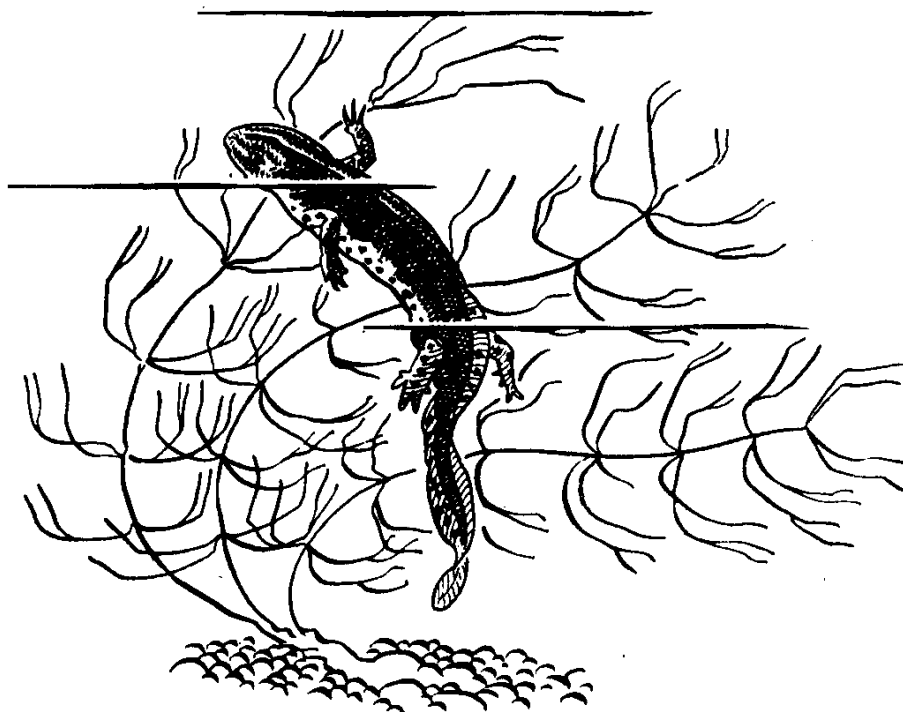


FIG. 53.—American Newt (*Triturus viridescens*).

The eggs are laid from April to June, one individual period lasting for four to six weeks, or even longer. A female under observation laid 108 eggs in all from 20th April to 30th May. After having selected a suitable plant in the water the eggs are laid singly, and are secured by a tangle of the shoots glued together with a gelatinous substance. The young newts, which pass their life entirely on land, are called Red Newts at this stage, the green coloration which characterises the adult not yet having appeared. It takes several years for them to reach maturity.

The change from the red stage has been carefully studied by Gorge. He remarks that the transformation takes place in the spring, and may do so when the newts are still terrestrial or when they have entered the water. Of two which he kept in a jar with moist wood, one was especially brilliant, but

within two weeks it assumed the typical greenish colours of the adult. The two specimens were in the jar till the following spring, when they were placed where they could take to the water. This they did with great readiness, and they remained submerged for a considerable time at first. The time spent under the water increased in length, until within a few days the under-water respiration was fully established. Once they get their green colours they will never revert to the red form, even if they are kept out of water.

Another American species sometimes to be had is the Californian Newt (*T. torosus*), a very large species often reaching seven inches in length. It has a broad, strongly depressed head, and very strong limbs, especially in the male. The skin of the back is granular and of a uniform dark brown colour, without any crest. The under-parts are uniform yellow or orange, and the tail is flattish and larger than the head and body. The eyes are green.

This newt spends most of its time in cracks in the virgin cork placed in its vivarium, becoming active at dusk. It is said to eat only earthworms, and not insects. It is seldom bred in captivity, but is a long-lived and handsome species.

JAPANESE NEWT (*T. pyrrhogaster*).

This is one of the most beautiful of newts. The back is black and granular, but the belly is brilliant carmine, the skin of this part being smooth. The males of this species do not develop a crest in the breeding season, but both sexes have a bony ridge along the centre of the back. Fortunately, it is not difficult to determine the sex in this newt. The male has a smoother skin, the female being much more warty. The male also has the tail more pointed, and when fully mature, he has a swelling round the vent. In the breeding season he has a habit of standing on the tips of his fingers and toes, elongated for that purpose, while he scans the neighbourhood for a female.

The Japanese Newt is a native of North-east China and Japan, and is a hardy species in captivity. It is also a good breeder. The adult newts are easily accommodated, and being small (about four inches) they require very little room. Three inches of water is a sufficient depth, but do not omit to provide

NEWTS AND SALAMANDERS



FIG. 54.—Japanese Newt (*Triturus pyrrhogaster*).

rocks for the newts to climb out on for an occasional rest, as they often do when the water gets too warm for their comfort. You can also keep Japanese Newts in a garden pond, but they are not seen at their best under such conditions. They are very long lived, and there is a record of one being kept in captivity for twenty-five years.

SPANISH NEWT (*Pleurodeles waltli*).

This species is olive brown above and yellowish with black markings below. There is a yellow ventral line on the tail. It lacks any sort of crest. A remarkable peculiarity about this species is the ribs, which are very long and pointed. They frequently penetrate the skin. When these newts are handled too roughly, their wriggling motions force the points of the ribs through the skin of the flanks, and there they remain sticking out to the extent of several millimetres. The wounds heal up, forming a neat hole through which the ribs project as a sort of protective weapon.

This is the largest of all the newts; old females often reaching ten inches in length. The Spanish Newt is often found in the large tanks set up in Spain and Portugal to catch supplies of rain water. The amphibians tumble in during their wanderings in rainy weather, and find themselves trapped, being unable to climb the corrugated iron sides of the tanks.

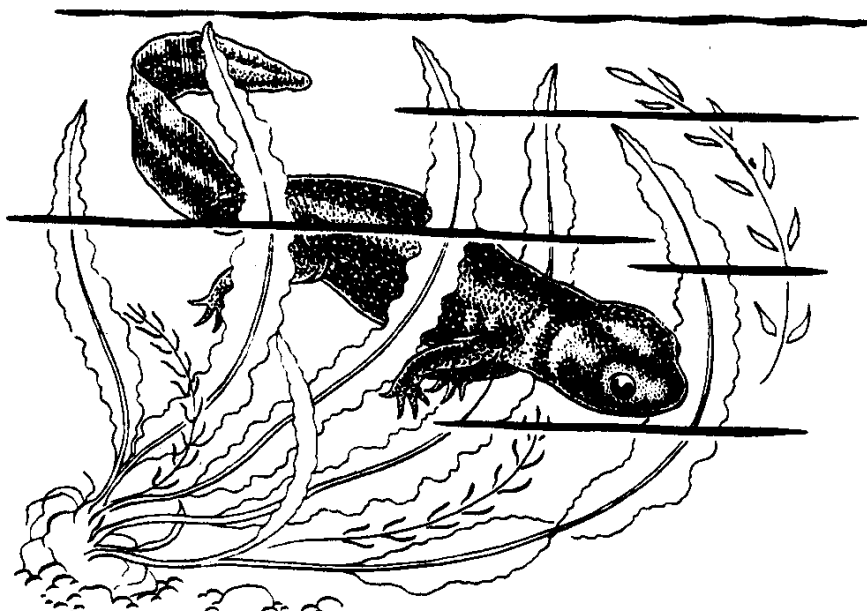


FIG. 55.—Spanish Newt (*Pleurodeles waltli*).

This species is mostly aquatic and seems to spend nearly all its life in the water, choosing ponds for its habitat as a rule. Here the newts may be seen lying motionless with their heads near the surface and their limbs hanging down lazily. But they become very lively at night. In summer the ponds in which these newts live often dry up, and the newts then aestivate—that is, they become dormant from the heat and lack of moisture, as hibernating animals become dormant from the cold. They leave the muddy bottoms of the fast-disappearing ponds and secrete themselves in holes in walls, cracks in tree-trunks and such places. Here they remain until awakened by the cooling rains of autumn, when they return to their ponds once again.

SALAMANDER (*Salamandra salamandra*).

The Salamander is one of the most strikingly coloured of amphibians, having what naturalists call “warning colours”, bright hues which denote poisonous properties and act as a warning to creatures which might be tempted to eat them. In the present species these colours are very rich orange on a jet black ground. The Salamander has a smooth skin, which is full of pores, and is poisonous, but only when subjected to considerable pain. When handled in the ordinary way, it is

NEWTS AND SALAMANDERS

perfectly harmless, but if seized by an enemy a milky white fluid exudes from the glands, and under violent contractions of the body may be squirted out in fine jets to a distance of a foot. This fluid is very painful if it gets into the eye. Gadow records that he once put two American Bullfrogs in the same enclosure with a number of Salamanders. The next morning he found the huge frogs dead, each having swallowed a Salamander, with which they were not acquainted, and had eaten without suspecting the poisonous nature of the creature.

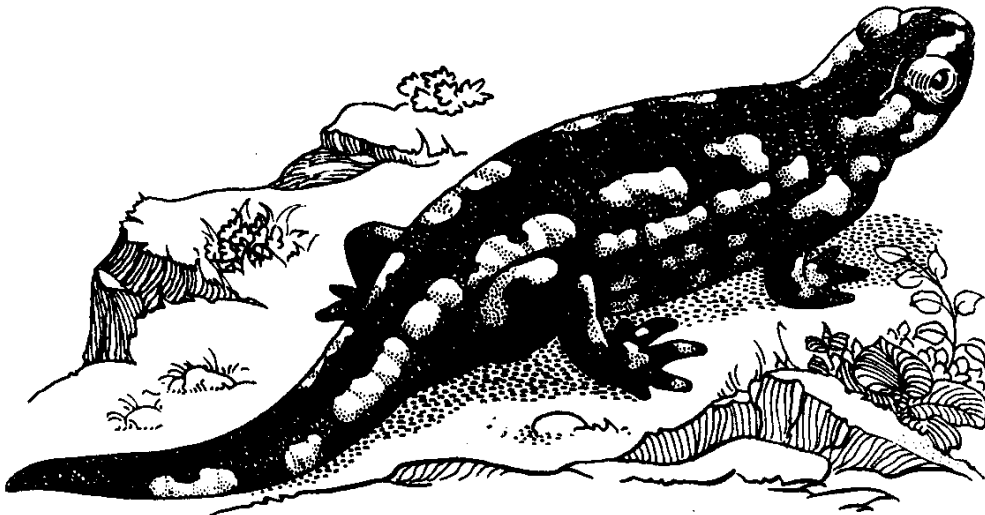


FIG. 56.—Salamander (*Salamandra salamandra*).

The Salamander is widely distributed over the whole of Central, Southern and Western Europe, except the British Isles. It is also found in Algeria, Asia Minor and Syria. Several geographical races occur and are distinguished by the amount of orange in the colour pattern. The most attractive kind is from Southern Europe, where the orange predominates.

Where it does occur the Salamander is generally quite common though it is not much seen, as it hides away during the day under rocks and fallen logs. It frequents moist and shady places, particularly in mountainous or hilly districts where there is plenty of vegetation. Here it makes its home under mossy rocks, or in cracks in the ground, in fact, any place where it can creep away from the strong sunshine and remain cool and moist. It feeds on snails, slugs, beetles and the like. The Salamander often consumes a large quantity of food during wet weather, which enables it to fast when the

weather is too hot and dry for it to venture forth. It can fast for as long as a month at a stretch.

In winter the Salamander hibernates in the ground. It awakens in April, and later on congregates at mountain brooks and springs for breeding. This is the only time the creature enters the water, being thoroughly terrestrial. In fact, a Salamander is soon drowned if placed in water from which it cannot escape.

During the pairing season, when both sexes take to the water, the females collect the sperm deposited by the males. The young Salamanders do not make their appearance until nearly a year elapses. When about to give birth, the female Salamander crawls half into the water, mostly at night, and produces any number from half a dozen to fifty young. These are born in the tadpole state, but they are surrounded by an egg-membrane, which usually breaks away before birth. Sometimes it happens that eggs are laid by the female, from which the young Salamanders almost immediately make their escape. These have three pairs of external gills, a long tail furnished with broad fins, and well-developed fore and hind limbs. They measure about one inch in length. In colour they are blackish, with a pretty metallic green and golden lustre. They are quite active little creatures, and begin to feed at once on both animal and vegetable matter. The change into the adult state takes about two to three months when well fed and kept in a warm-water tank ; about five months in an unheated vivarium or outdoor pool. At this stage they are about two inches long. About a week before their metamorphosis the larval Salamanders cease to feed, and cast their skins for the first time. Traces of yellow pigment appears, producing a mottled effect. The gills and tail disappear, and the young Salamanders leave the water. They should then be fed on very small worms, or gentles. The full-grown Salamander is about six inches in length.

In the vivarium Salamanders are quite easy to keep and will live a long time under suitable conditions, shade and moisture being their main requirements. The vivarium should be fitted up with damp soil and moss, and provided with old pieces of wood bark, or a small pile of rocks, under which they can hide when disposed to do so. The vivarium must

NEWTS AND SALAMANDERS

never be put in the sun. Salamanders are mainly nocturnal feeders, and will eat worms, small snails, beetles, mealworms and similar insect fare.

On no account should these amphibians be overcrowded. Under such conditions they are apt to cluster together in some particular nook or cranny, as if no other existed. As a result, unhealthy conditions arise, and they become infested with a highly contagious disease. This makes its appearance as sores on the knees and elbows, and will soon kill off every specimen you possess.

Closely related is the Alpine Salamander (*S. atra*), which measures about four inches when full-grown, and is only found in the Alps. It is entirely black in colour. In this species only two young are produced at a time, and these are born in the perfect state rather than as larvae, being able to breathe atmospheric air.

AXOLOTL (*Siredon mexicanum*).

This is really a giant tadpole which never undergoes its metamorphosis into the adult form, being the larva of a species of Salamander. It breeds freely in its immature state, and grows to a length of about ten inches. It has a large head, small brown eyes, a heavily finned tail, dorsal fin and four legs. On the nape are external, branched gills.

The Axolotl is a native of Mexico, being found in abundance in the extensive lakes surrounding Mexico City, and is

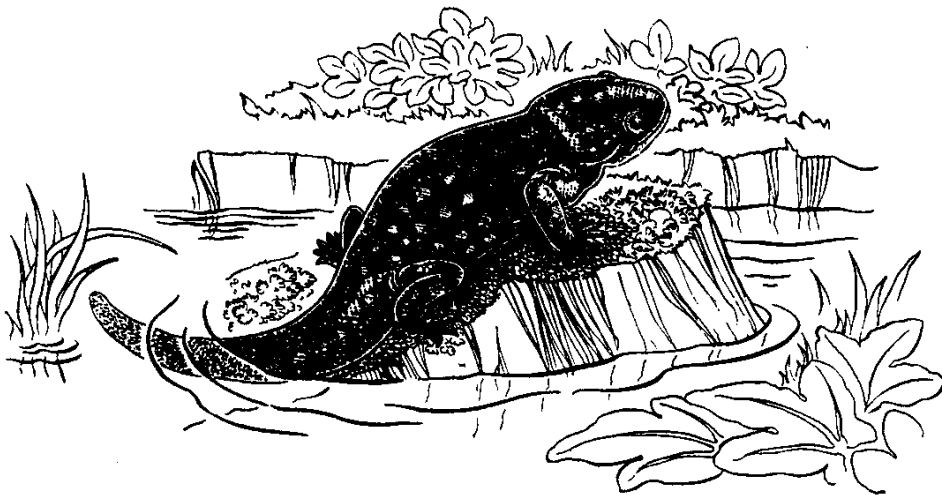


FIG. 57.—Axolotl (*Siredon mexicanum*) Adult State.

REPTILES AS PETS

sold in the markets of this town as a food delicacy. It is only in Mexico that we find the "Peter Pan" type of Axolotls. In other parts of America where the species is found they grow up into perfect Salamanders, or Amblystomes, as they are called. The reason why Mexican Axolotls do not undergo metamorphosis is because the extremely dry, parched desert and cactus covered country surrounding the lakes is too hot and dry for the adult. Possibly what was once swamp is now desert, and in remote times the locality may have been of a more suitable character. In other words, the Mexican Axolotl is a good example of adaption to changed surroundings.

It is very easy to keep in an aquarium, and is hardy, having bred successfully in an outdoor pond. Without the opportunity to leave the water, it may be kept indefinitely in the Axolotl state, as the metamorphosis will only take place if the water supply is threatened with extinction.

The eggs are laid in the winter or spring, and may number as many as two hundred odd. These will hatch in from ten to twenty days according to the temperature of the water. The young should be reared by themselves, or their parents will quickly eat them. At first the baby Axolotls should be fed on Daphnia, Brine Shrimps, Cyclops, etc. Later, as they grow, they will take mosquito larvae, small earthworms, and the like. They are sexually mature when about a year old.

CHAPTER VII

AILMENTS

JUST as is the case with the higher animals, reptiles are subject to a number of diseases and other allied troubles.

One of the commonest difficulties, particularly with newly-purchased reptiles, is that of obstinate refusal to feed, and as likely as not a reptile which does this has never taken any food since it has been in captivity. Certain species are much more prone to this annoying habit than others, and snakes and lizards are the worst offenders. Reptiles can go without food for a long time without coming to any harm, but a starved reptile will die during hibernation. In nature, all hibernating creatures eat to the full before their long winter sleep.

There are a number of reasons why a reptile may refuse food, for unlike an animal, it is not forced to eat from feeling pangs of hunger. At liberty, many reptiles feed only at very long intervals, and are stimulated by the sight and smell of their natural prey. In captivity, it is necessary that natural conditions should be imitated as much as possible. A good light or sunlight will tempt those species which naturally live in sunny lands to feed ; in other cases, a dark retreat to which it can retire to feed may do the trick.

Another point is that the prey must be of suitable size, especially in the case of snakes. Though it is true that these reptiles can swallow incredibly large prey, that offered should be of a size which the creature can readily tackle. Snakes about to shed their skins will not take food, as they become more or less blind during this process.

Eye troubles are not uncommon in tortoises and terrapins, especially upon awakening from hibernation. In these cases, the trouble is either caused by the presence of foreign bodies, in which the eye itself appears bluish and filmy, or due to the eyelids having become stuck together. The former case should be treated with a five per cent solution of protargol, a colloidal solution of silver and iodine, obtainable from the

REPTILES AS PETS

chemist. One or two drops should be allowed to drip right into the eye and flow over the surface.

Where the eyelids are stuck together, the best plan is to bathe the eyes with warm boracic lotion, or wipe them with boracic lint dipped in warm water. If the condition recurs, a smear of yellow oxide of mercury ointment over the eyes will cure it.

Lung troubles are apt to occur in tortoises and terrapins, especially newly imported ones which have not had time to become acclimatised. Pneumonia is easily recognised, as the reptile breathes rapidly and with difficulty. There is also a frothy mucuous discharge from the mouth. The best treatment consists of putting the patient in a well-ventilated box or vivarium in a very warm place, as before a fire, where the temperature can be raised to over 80° F.

Pneumonia is usually the result of a neglected chill, and when a tortoise or terrapin has a constantly wet nose, and inflamed eyes, it should be put in a warm place. A tortoise with a cold makes a curious wheezing noise, not unlike the mewing of a kitten. Asthma cures, as sold for dosing cage birds, are often very effective in checking a cold in reptiles. A few drops should be put on a teaspoon, diluted with a few drops of warm water, and the contents poured down the tortoise's throat.

Terrapins, or Water Tortoises, are also subject to lung troubles, and can be treated in the same way as land tortoises. A good method of curing colds in these reptiles is to place them in a closed wooden box, and give them an inhalation for half an hour of Friar's Balsam. This should be diluted with boiling water in a vessel shallow enough to allow steam to escape near the patient's head. This method is more troublesome than dosing, but is effective, and very useful with terrapins—and some tortoises—which withdraw their heads too far into the shell to administer medicine.

Shell-rot is another serious complaint to which terrapins and tortoises are very prone. This generally occurs on the breast-plate (plastron), and the decay may in time perforate the bone and cause death. It is seen as small holes, which indicate that there is a microbe eating away the shell. The affected parts should be painted with double strength iodine, painted on

AILMENTS

carefully with a camel-hair brush. The cavities can then be filled with a mixture of zinc oxide and oil of cloves, such as a dentist uses as "temporary filling" for teeth.

Parasites, both internal and external, are common on reptiles. Newly imported tortoises and snakes are sometimes infested with ticks. These are unpleasant, crab-like creatures, which suck the reptile's blood. They are less than half an inch in diameter, and are found round the neck and thighs of tortoises, and partly concealed by the scales of snakes. These ticks can be removed by pulling them off with a pair of forceps. Do not jerk them off, but pull steadily, otherwise you will break the creature's head off, leaving it in the skin to make a nasty sore spot. If the ticks are touched with a fine paintbrush dipped in paraffin, it causes them to loosen their grip.

There are a number of internal parasites which trouble reptiles, and of these, worms are the worst. The treatment of these is simple, however, a few doses of santonin usually clearing them out. A quarter of a grain for a terrapin, and one grain for a 5-lb. tortoise, sprinkled on the food once a week for a month is the right amount to give.

Wounds on limbs of tortoises, terrapins, and other reptiles should be bathed in a good antiseptic, such as permanganate of potash, dried, and painted with Friar's Balsam. Carbolic acid should never be used on reptiles or amphibians, as it is fatal to them.

CLUBS AND SOCIETIES

All who are interested in keeping and studying reptiles should join the British Herpetological Society, which has recently been formed to promote interest in and a better understanding of reptiles and amphibians. The secretary's address is c/o The Natural History Museum, South Kensington, London, S.W.7. There are hundreds of aquarists' societies throughout Great Britain, and though they cater primarily for fish fanciers they usually number some reptile devotees among their members. Classes for reptiles and amphibians are often a feature of the open shows promoted by these societies, while the more enterprising of them issue bulletins containing

REPTILES AS PETS

articles of interest to reptile keepers. Reptiles and amphibians can be obtained from advertisers in the two magazines which cater for the fancy in this country—*The Aquarist*, published by the Buckley Press Ltd., The Butts, Half Acre, Brentford, Middlesex, and *Water Life*, published at Dorset House, Stamford Street, London, S.E.1.

INDEX

- Adder, 11
- Ailments, 111-13
- Alligator, 32-3
- Amphibians, 11
- Anolis, Crested, 49-50
 - Red-throated, 46-9
- Blindworm, 11
- Bullfrog, American, 77-9, 107
 - Speckled, 79
- Chameleon, 56-9
 - Dwarf, 59-60
- Clubs and Societies, 113-14
- Flies, 20
- Frog, American Tree, 83-4
 - Common, 72-4
 - Edible, 74-5
 - Leopard, 76-7
 - Marsh, 75-6
 - Painted, 79-80
 - Tree, 80-3
- Frogs, 11, 72-84
- Gecko, Delaland's, 46
 - Eyed, 46
 - House, 43-6
 - Indian, 46
- General Management, 12-20
- Gentles, 19-20
- Glass Snake, 42-3
- Goanna, 53
- Hibernation, 17-19, 23, 26, 29
- Lizard, Armadillo Girdled, 53
 - Blue-tongued, 52-3
 - Common, 38-9
 - Eyed, 36-7
 - Green, 35-6
 - Sand, 39-41
 - Stump-tailed, 51-2
 - Wall, 37-8
- Lizards, 34-60
 - Food for, 20, 34, 35
- Mealworms, 19
- Monitor, Indian, 55-6
- Newt, Alpine, 97, 101-2
 - American, 97, 102-4
 - Californian, 97, 104
 - Common, 96
 - Corsican, 97
 - Crested, 96, 97, 98-100, 101
 - Japanese, 97, 104-5
 - Marbled, 97, 100-1
 - Sardinian, 97
 - Spanish, 97, 105-6
- Newts and Salamanders, 96-110
- Python, African, 70-1
- Reptiles, Advantages as pets, 9-10
 - Intelligence of, 9
- Reptiliary, 16-17
- Salamander, 106-9
 - Alpine, 109
- Salamander's Wool, 11
- Skink, Common, 50-1
 - Eyed, 51
- Slow Worm, 41-2
- Snake, Æsculapian, 69-70
 - Dice, 65-6
 - Four-lined, 68-9
 - Garter, 67-8
 - Grass, 63
 - Leopard, 70
 - Ringed, 64
 - Smooth, 66-7
 - Viperine, 65
- Snakes, 10, 14, 61-71
- Terrapin, European, 29-31
 - Painted, 31-2
- Toad, Clawed, 91-4
 - Common, 84-6
 - Fire, 89-91
 - Green, 87
 - Midwife, 88-9
 - Natterjack, 86-7
 - Surinam, 94-5
 - Texas Horned, 54-5
 - Yellow-bellied, 91
- Toads, 11, 84-95
- Tortoise, Carolina Box, 28-9
 - Gopher, 27-8
 - Greek, 21-5
 - Hermann's, 25
 - Marginated, 25
 - Pond, 29-31
 - Radiated, 25-6
- Tortoises, 21-33
- Vivaria, 12-16, 18
- Zoo, 33