

8 - Snakes and Frogs

THE CHANCES ARE that snakes either fascinate you or arouse your intense dislike. Few people are neutral, and children are quick to adopt their parents' admiration or profound distaste for the crawling reptiles. However, some children are so fond of snakes that they will bring them home for pets regardless of how their families receive the creatures. Under such circumstances one conscientious mother said to me:

"How can I make myself like snakes? They revolt me, but my boys are always bringing them home and have so much fun with them that I don't like to object."

My suggestion was not to try to force a liking for snakes-but merely to try to understand them. Snakes are probably the victims of more erroneous beliefs than any other group of animals. Some popular misconceptions, and the true facts about them, are:

1. False: All kinds of snakes are venomous. True: Most snakes are harmless.
2. False: A snake thrusts out its tongue as an act of hostility. True: A snake uses its tongue as a sensory organ to explore its surroundings.
3. False: Snakes have no fear of people and are constantly on the lookout for victims. True: Most snakes do not display an aggressive disposition toward people; if possible, they creep away and hide at a human's approach.
4. False: Snakes can sting as well as bite. True: No snake can inflict a sting.
5. False: Snakes have great hypnotic powers. True: Only the snake's unblinking stare, caused by its lack of movable eyelids, gives us the idea that it is trying to hypnotize its victim.
6. False: Snakes spring from the ground to attack a victim. True: No snake jumps clear of the ground to strike.
7. False: Snakes are slimy. True: Snakes are completely covered with dry scales.
8. False: Snakes have yellow blood or no blood at all. True: Their blood is red and practically the same as that of a mammal.

When you get to know the truth about snakes, and understand why they behave as they do, you may find yourself regarding them with interest rather than horror.

Reptiles –

Snakes are reptiles, a name scientists have given to a group of animals that includes lizards, turtles, crocodiles, and alligators. The name was suggested by the Latin word for "creeping."

THE COLD-BLOODED SNAKES

All reptiles are alike in being covered with scales or bony plates, and all are cold-blooded. (They derive their heat from external sources, whereas warm-blooded animals derive theirs from within their bodies.) We find, however, that reptiles vary greatly in the way they live and in the places they inhabit. Many of them dwell only in regions where summer conditions prevail all year; but there are some snakes that have to adjust to a climate with extreme variations of heat and cold.

Sleeping Through the Winter: Though cold does not endanger a snake's life until it reaches a few degrees below freezing, a lesser drop in temperature is enough to cause sluggishness; and a sluggish snake does not have the energy to procure food. The solution in cold climates is to hibernate in a well-sheltered rocky crevice or in the ground below the frost line. In this way the snake is protected from a fall in body temperature that would be low enough to cause death. The animal can survive hibernation without eating, provided it is in a healthy and well-fattened condition at the beginning of its long rest.

THE SNAKE'S BODY-MORE THAN A TAIL

Many children, and countless adults as well, think of a snake as a long tail attached to a head. This is far from a true picture-there is a very efficient body between head and tail!

This body contains a stomach capable of amazing distension and digestive powers, a liver, kidneys, and other organs too. The snake's heart differs from a mammal's in having only three chambers. (A mammal's heart has four.) The right lung is quite elongated, much more developed than the left.

THE SNAKE'S TAIL

The length of the tail differs according to the species. However, if you scrutinize a snake's underside, you will see that the tail has a definite starting point. There a distinctly enlarged scale-sometimes divided into two overlapping parts-covers the orifice through which wastes pass. This marks the beginning of the tail.

Another way of distinguishing the tail from the rest of the body in most snakes is that the underside scales are large and each of them extends across the whole undersurface of the body whereas the scales on the underside of the tail are almost always arranged in two columns. A zoologist dissecting a snake observes a still more obvious division of tail and body, for the long series of ribs ends where the ribless tail begins.

THE SNAKE'S HEAD

There are two reasons for the snake's fixed gaze: It has no movable eyelids, and its eyeballs are capable of only slight motion. This results in its "stony stare" and the false belief that snakes hypnotize their prey.

The Snake's Hearing Aid: Though snakes have no ears, they might be said to have a sense of hearing as sounds are transmitted to them through ground vibrations. Tests have been made with cobras to illustrate this point. After the snakes' eyes had been bound with adhesive tape, someone walked toward the animals. Immediately they reared and faced in the direction from which the footsteps were approaching. By way of contrast, the noise made by blowing a bugle brought no response.

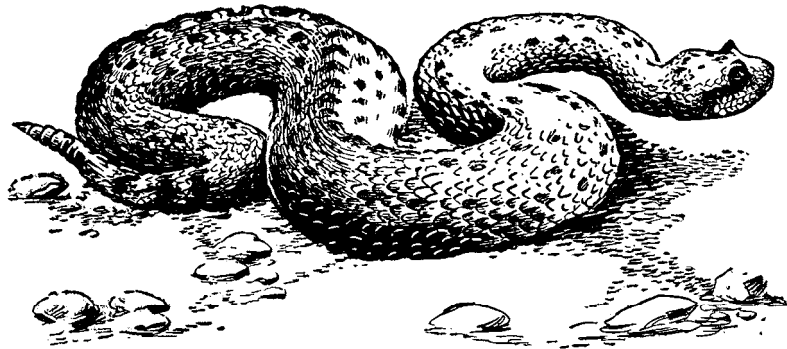
This inability to hear sounds carried through the air tends to disprove the Hindu snake charmer's claim that music charms serpents into dancing. The truth seems to be that the snakes merely follow the continuous movement of the musician's arms or knees as he plays his reed instrument.

You can quite easily see the snake's nostrils. There is one on either side of the snout, and they function in the normal manner.

MOLTING-HOW SNAKES SHED THEIR SKIN

Your child may be thrilled by the discovery of a discarded snakeskin in the course of his summer wanderings. If he visits the zoo he may see just how this molting takes place. The snake loses its lustrous appearance before shedding; its bright colors are dimmed. Even the eyes become milky and the color of the eyes is obscured.

This goes on for a week or two; then the snake's normal coloration returns and it is ready to molt. It finds a rough, hard object and rubs its nose and chin against it until its skin breaks. Once the head is freed, the snake wriggles its body until the whole skin peels off, inside out.



SIDEWINDING FOR DESERT TRAVEL

Most snakes move forward with the body flat against the ground. Not so this desert rattler, which progresses in S-shaped loops—a motion known as sidewinding. This is an effective technique for crawling on sand and it is used not only by the American rattler, but by snakes in the deserts of Africa and Asia as well.

Why Shedding is Necessary: Molting is necessary because the skin to which a snake's scales are attached, cannot grow. After the skin has stretched as much as possible to accommodate the growing snake, it must be discarded. Actually a new layer of skin forms beneath the old one before molting takes place. There is no regular interval for shedding: It depends to a great extent on the age and vitality of the reptile. Young snakes shed more frequently than adults, and healthy individuals more often than those in poor condition.

How Snakes Move

If you discover a snake on hard, packed soil, you will notice that it moves very slowly. But once it gets off this smooth surface into long grass or on rough ground, it will whisk out of sight with surprising swiftness.

Observe a captive snake and you will see the reason for this change in pace. When it is placed on a large piece of glass, it will slip and slide ineffectively; but if it is transferred to loose sand, it is immediately able to make progress. This it does with sideways movements, keeping the full length of its body against the ground.

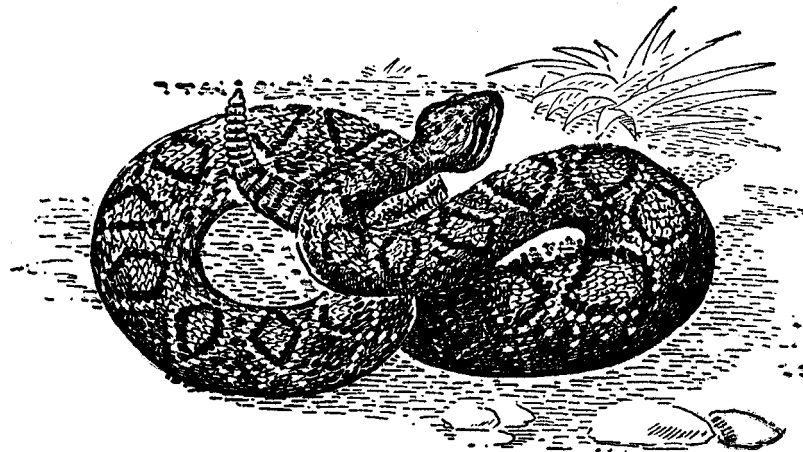
You will observe that the creature leaves in its wake a series of slightly curved piles of sand; these prove to be pivots the reptile has raised in pushing its body forward. Next watch a snake on rough grass. Here it will travel with even greater ease—each blade of grass serves as a pivot.

"Legs" Without Feet: To produce this undulating movement apparently its most usual method of traveling—the snake depends largely on its muscles and ribs which, in effect, are footless legs. The ribs are attached to the backbone and also to the muscles and the slightly overlapping scales on the underpart of the body.

When the muscles are moved forward, the scales are carried forward also. When the muscles are pulled back, the lower edges of the scales press and catch against any roughness on the surface over which the snake rests, and push it forward, using the rough spot for leverage. The snake does not move muscles all along its body at the same time; instead, it brings them forward gradually, and the scales move in waves.

Side-winding: Another method snakes occasionally employ is to curve the body into an S form and then straighten it out again, pushing forward a little in the process. Some desert snakes have developed a specialized method called "side-winding" which is practically indescribable except that the body is thrown into great loops and seems to be flowing sidewise. Using these motions a snake does not waste energy building pivots; yet it does not slip backward.

Snake Tracks: Snakes leave trails in sand or dust that are just as revealing in their way as mammal footprints. Experts not only identify the kind of snake by its trail-they can tell the approximate rate of speed at which it was moving when the trail was made.



THE DANGEROUS DIAMOND-BACK RATTLER

The diamond-back, so called because of the distinctive diamond-shaped pattern on its back, is one of the relatively few harmful snakes in the United States. Practically all the deaths by snake bite in this country (estimated at about a hundred a year) are caused by diamond-back rattlers, prairie and timber rattlers, and water moccasins. If proper treatment is given, their bites rarely prove fatal.

How Snakes Breed

It is often said that some snakes lay eggs while others bear living young; yet actually all species reproduce by means of eggs. The difference between egg-laying and "live-bearing" consists in this: The live-bearing female retains the eggs in her oviduct until the embryo is fully developed. When the offspring are "horn" they are covered by a thin membrane which soon bursts. Only about one-fourth of the known species of snakes follow this procedure.

SNAKE EGGS

When a female of the other species is ready to deposit her eggs, she finds a sunny sandbank or rotting log in which to burrow a hole. There she lays her eggs-the number, size, and shape depend on the species. Usually they are elliptical, with flattened ends. When first laid, the eggs are covered with a moist and sticky skin which

gradually becomes tough and leathery. They absorb water and thus continue to grow after leaving the mother's body until they have increased about one-third in size.

THE EGG-TOOTH

Projecting from the middle of the upper jaw of the fullgrown embryo is an egg-tooth with which it slits the tough egg skin when it is ready to emerge as a perfectly formed young snake. If you rub your finger over the nose of a baby snake you may feel this egg-tooth, which remains until the baby is about a week old.

How Snakes Kill

It may well be that the horror snakes arouse in many people is evoked by their methods of killing. A tiger's prey is just as dead as a snake's victim; but constriction and poison somehow seem more sinister means of inflicting death than fang and claw.

Snakes get their food in three different ways. For the first and most primitive, the reptile seizes its prey by throwing its coils about a victim-without constriction-and then swallows it alive. Constriction is a second method, suffocating the victim until its heart and lungs can no longer function properly. At one time it was believed that constrictors crushed the bones of any creature within their grip; today we know this theory to be erroneous.

Poison is the third method of killing. There are several types of poisonous snakes; those known as vipers and pit vipers have the most effective poison apparatus. The group includes rattlesnakes, copperheads, water moccasins, bushmasters, and the tropical fer-de-lance.

HOW POISON FANGS WORK

All these snakes have hollow fangs in the upper jaw, firmly anchored to the bone above, which they can move to thrust the fangs forward for a strike. When they are not in use, the fangs can be folded back against the roof of the mouth.

As a child, you may have been told that the mere pressure of a snake's fangs against a solid substance brought forth the venom.

It is not quite so simple as that. The snake has its poison supply in two sacs-one in either cheek. Each sac is connected to the fangs by a duct that runs under the eye and over the bone to which the fangs are attached. When the viper strikes, muscles that surround the poison sacs, contract and force the venom through the ducts into the fangs, from which it flows to the wound just made in the victim's flesh.

HEARTY EATERS

The ability of snakes to swallow objects larger than themselves is one of their most spectacular traits. The larger snakes, such as pythons or boas, sometimes devour a goat or small deer whole. Such a feat would be impossible without a number of special body features with which nature has provided them.

Let's look at their jaws, for example. An extra bone hinges the upper jaw to the lower, allowing them to spread far apart. Also, the lower jawbones are held together only by elastic ligaments and they can separate at the chin to further increase the size of the mouth. The teeth point backward and thus present no obstacle to objects taken into the mouth. Even the snake's sides are adapted to the task-they have great elasticity and can stretch to many times their normal dimensions!

THE MOVABLE WINDPIPE

Despite all these helps, you might still expect a snake to choke to death swallowing anything large enough to force its jawbones wide apart. The snake overcomes this difficulty by being able to extend a portion of its windpipe forward-even a few inches beyond its open mouth if need be! By this means it can breathe during the long slow process of forcing down a meal apparently far too big for its size.

Some species of snakes can live on three or four big meals a year; others may eat a moderate meal every week or ten days.

The Ways of a Rattler

Children are understandably curious about the hows and whys of a rattler's rattle. How does a tail tip turn into a rattle? Why do some snakes have rattles? How does the rattle work?

The rattle is made up of a series of horny sections or "buttons" on the end of the spinal column. They are loosely interlocked, and when the snake vibrates its tail they click against each other. Many other kinds of snakes also vibrate their tails, and if they happen to be lying among dead leaves the resulting rustle sounds like a rattle. However, the rattlesnake's vibration is distinctive. It is a half metallic, half insect-like sound, somewhat like the dull buzz of the bumblebee.

THE RATTLE RINGS

At birth a rattler has a bulbous swelling at the tip of its tail. When the snake molts, the tip of its old skin cannot be pulled over this enlargement, so it remains and forms the beginning of a rattle. As successive molts take place, the tip of the skin that cannot be shed forms an additional segment or ring. The rings form around a bone known as the "shaker," made up of the last seven or eight vertebrae which fuse together soon after the snake is born.

The old theory that a ring is added each year has been disproved. Sometimes several molts take place in a year and rings are added; it is also possible for the snake to molt without a new ring being created. This irregularity, not to mention the fact that rings are often broken from the end, makes it impossible to reckon a snake's age by the size of its rattle. If a rattle is unbroken, however, you may approximate the animal's age by allowing one year for each two rings.

WHAT THE RATTLE IS FOR

Many snakes have the habit of vibrating the tip of the tail when they are excited, but the rattler is the only kind equipped with a "noise-maker." We do not entirely understand the purpose of the rattle. The once general belief that this reptile always rattles before striking is no longer credited. Apparently it does use its rattle, as a rule, to try to frighten enemies dangerous to its own safety.

As for the theory of "warning" prospective prey, some observers have decided that this snake sounds its rattle to startle birds, rabbits, or other possible victims into momentary inactivity, thus gaining time for a strike. Other people claim that it never rattles before attacking. There are many reports of rattlers that never rattled at any time, and habitually struck without warning.

KINDS OF RATTLESNAKES

There are no less than fifteen different species of rattlesnakes in the United States and they live in many localities. The deadly diamond-back of the southeastern states frequents neighborhoods where water is plentiful, the timber rattler lives in

woodland mountain regions, the prairie rattler haunts the Great Plains of the West; another species is found in desert wastes.

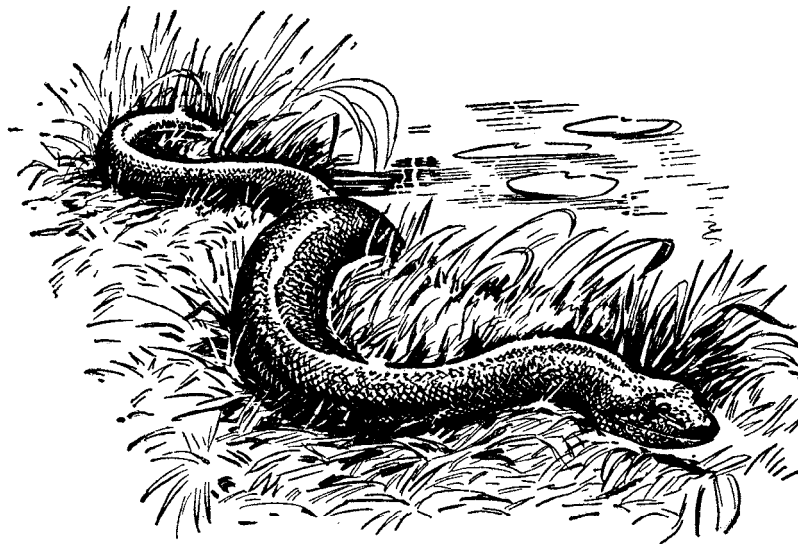
Rattlers are among the more important kinds of snakes in our country that bear live young. The mother gives her offspring no care-but none is necessary. They are able to fend for themselves immediately, and have been seen eating ten minutes after birth!

Spectacular Deadly Snakes

A visit to the snake house at a zoo gives you a first-hand acquaintance with species you would never welcome as house pets, though they are well thought of by zoo keepers.

THE GOOD-NATURED BOA

One of these deadly creatures is the boa constrictor-a big reptile of South America that reaches a length of eighteen feet. It is quite hardy in captivity, and many specimens are goodnatured and easily fed with birds and small mammals. Though most South American Indians dread this boa and believe it to be poisonous, it is not. As a rule this boa seems anxious to keep away from humans, but it will occasionally appear in a native village, apparently attracted by the domestic fowl.



THE ANACONDA — GIANT AMONG SNAKES

A huge boa fossil of about fifty million years ago, unearthed in Egypt, is supposed to have been fifty feet long. Our modern anaconda (or water boa), the largest of New World snakes, has a length of over twenty feet. It lives in South America and though it spends much of its time in the water, it is also an expert tree climber. The anaconda is not poisonous. It will seldom attack humans without provocation.

Still greater in size than the boa constrictor is a water boa known as the anaconda, native to the river valleys of northern South America. Reliable records show that this species sometimes attains a length of twenty-eight feet. The anaconda is the largest snake in the New World.

PYTHONS-THE LARGEST SNAKES

Among the most fearsome-looking reptiles are the pythons, which have been imported from Asia or Africa. There are giants among them: a twenty-five-foot Indian python may weigh more than two hundred pounds; the reticulated python, not quite so

thick in body, may be nearly thirty feet long. The large pythons eat a variety of animals, but their taste runs to fairly large mammals.

"Snake-charming" showmen frequently use relatively small specimens of the rock python in their acts, as these snakes become very docile in captivity. Nevertheless, there is always some danger. If the snake accidentally throws a complete coil about the body of the performer, it will begin to constrict and throw new coils. The "charmer" must quickly straighten out the reptile or be in real danger of strangulation. Anyone who closely watches a snake charmer with a python or boa, will observe that every movement of his hands and arms is made solely to prevent the snake from forming a coil.

THE COBRAS DOUBLE PERSONALITY

A child who has been reading colorful stories of the Orient in which cobras play a sinister part, may well be disappointed when he sees this snake in the zoo. When it is not excited, this dangerously venomous reptile looks quite commonplace. Alarmed or angry the cobra presents a far different picture, weaving its raised head back and forth with its hood erect.

The Cobra's Terrifying Hood: The hood is actually only the skin of the neck stretched taut. The cobra has a series of ribs on the sides of the vertebrae of the neck, and when it is excited it uses powerful muscles to draw these ribs forward, thus stretching its skin and forcing the scales wide apart.

Seen from in back when its hood is spread, the Indian cobra gives the impression of having eyes on top of its head. But what the observer sees are merely markings; the eyes are at the sides of the head, little of which is visible when the hood is open. It is a mistake to think that cobras can be identified by the erection of the hood; other snakes-such as the harmless hognose snake possess the same ability.

While people most frequently think of India as the home of cobras, these snakes also dwell in Africa. The king cobra, which may grow as long as eighteen feet, is the largest venomous snake known. It is very aggressive and its poison is deadly. The common Indian cobra, which rarely attains a length of more than six feet, also causes many deaths every year.

Some Common Harmless Snakes

THE GARTER SNAKE

We have many kinds of garter snakes in the United States and they are well distributed all over the country. The "common" variety (often called the garden snake) is found in the eastern states up into Canada. You cannot be sure of recognizing it by its color, which varies in different individuals.

The ground or major body color may be olive, brown, or black. There is usually a stripe of yellow, green, or whitish hue down the center of the back. Along each side is a similar stripe, subdued in tone, which may be broken up into spots. The underside is greenish white or yellow. A full-grown specimen is about thirty inches long.

Where Garter Snakes Are Found: You are most likely to come upon garter snakes in summer along the banks and edges of streams where their favorite foods-toads, frogs, earthworms, and insects-are plentiful. In the fall they are likely to gather on rocky ledges or stony hillsides. Here each finds a crevice or makes a burrow, which may extend more than a yard underground, where it sleeps through the cold weather.

HOGNOSE SNAKES-HAM ACTORS

The garter snake and the hognose snake both make excellent pets-though the hognose variety has bluffed its way into a bad reputation. When it is frightened, it immediately swells its body, flattens its neck like a cobra, and hisses in a vicious manner. These fearsome actions have earned it such names as "spreading adder," "blowing viper," and "blow snake."

However, the hognose has no poisonous power whatever. If it succeeds in bluffing its enemy, it quickly calms down and crawls into seclusion. If the bluff fails, "hognose" plays dead, rolling over on its back and becoming completely quiet!

How the Hognose Got Its Name: This snake has a remarkable nose. It is equipped with a hard, trowel-shaped shield that plows efficiently into loose soil and often roots out toads that are buried near the surface. Its diet is made up exclusively of toads and frogs.

THE MALIGNED MILK SNAKE

This snake is the subject of one of the most fantastic of all snake myths. According to the fable, the milk snake milks cows. Not only is this feat physically impossible, but no milk snake in captivity could ever be persuaded to drink milk. This snake's presence in barns and stables is explained by its liking for mice and rats as food. Thus, instead of being a menace, the milk snake is an ally of the farmer.

Though the milk snake's ground color is light gray, it is covered with so many brown or dark gray spots that either of these may seem to be the predominating color. The underside is white with square black spots and blotches. A fully grown specimen ranges from thirty inches to three feet long.

KING SNAKES-CANNIBALS

The common king snake is an impressive-looking creature, for it may attain a length of six feet. In the natural state it is a cannibal; in fact it is noted for its attacks on other snakes-even rattlers. It is black and decorated with yellow spots and bands. Strangely enough, some king snakes in captivity show no interest in snakes as food, while others will eat nothing else. King snakes are nevertheless easy to feed as a rule, and are inclined to be docile with their keepers. There are fourteen different kinds of king snakes, and they are found throughout most of the United States.

WATER SNAKES-HARMLESS AND DANGEROUS KINDS

Children who go fishing are very likely to encounter this dingy brown reptile, which haunts dams, wharves, rocks and bushes near water. Because of its protective color plan it may escape notice until it moves suddenly. Like the hognose snake, it puts on a great show when cornered, flattening out its body and striking fiercely.

However, the water snake has no venom and its teeth can inflict only harmless wounds. It makes a good pet. While it will eat almost anything, it particularly likes fish. Its usual size is from thirty inches to three feet. Water snakes are found over almost all of eastern North America.

From southern Virginia to Florida and the Gulf states, you must be extremely cautious about water snakes; for this section is the home of the deadly water moccasin, which has a superficial resemblance to the harmless water snake.

How to Recognize a Poisonous Snake

A child who is determined to be not only an observer of snakes but also a collector of them, should be well coached in safety rules. Of first importance is knowing the character of all snakes in your locality. If there are poisonous species among them, it is essential to distinguish them from the harmless ones. Collecting poisonous species should be left to the experts!

The poisonous snakes of the United States fall into four groups: rattlesnakes, which have been found in every state; copperheads, which are distributed from New England to Texas and in all the southern states; water moccasins, found chiefly in the southern and southeastern states; and coral snakes, which live only in the deep South, from North Carolina to Texas and parts of Arizona. While this broad distribution sounds forbidding, there are many areas within these regions where you will find only harmless species.

WHAT POISONOUS SNAKES LOOK LIKE

The rattlesnakes vary considerably in size and general appearance, but all of them are identified by their "rattles." You can distinguish copperheads by hourglass-shaped markings on the back. Usually, but not always, the top of the head is bronze or copper colored.

Water moccasins have markings resembling those of the copperhead, but they are not noticeably copper colored. The inside of the mouth has a whitish color. Unlike most snakes, which try a hurried retreat at the approach of an enemy, water moccasins stand their ground and fight any intruder in their territory.

Coral snakes are brightly colored, with red, yellow, and black rings encircling the body. They closely resemble certain harmless species, and considerable concentration is needed to distinguish the harmless types from the deadly poisonous coral species.

WHEN YOU ENCOUNTER A SNAKE

If you accidentally come upon a snake and are frightened, just bear in mind that the snake is doubtless as anxious to get away from you as you are to avoid it. Remember that it has no "power of hypnotism." This has been proved many times by experiments in which birds, guinea pigs, and other animals were placed in cages with a snake and where they acted entirely unconcerned about their reptile companion. If you can think of a snake as "just another animal," it will be easy for you to remain calm and move away from your unwelcome discovery.

If you are actively interested in snake collecting, you ought to be thoroughly familiar with first-aid treatment for poisonous snake bite and have a snake-bite kit along on all field trips if there are poisonous species in the vicinity.

You will also want to have a "snake stick" for capturing live specimens. A two-pronged metal fork attached to a pole, or a cut stick with a forked end, may serve your purpose. You can pin down the snake behind the head until you are ready to pick it up and transfer it to a bag.

Snakes As Pets

When a youngster has captured a harmless snake and is keeping it as a pet, he may wish to build a cage especially for his prize. However, an ordinary rectangular fish tank will serve the purpose effectively for a small specimen such as a ribbon or garter snake. To accommodate a king snake or one of the other big fellows, the cage should be at least equal in length to the reptile's body. This will make it possible for the snake to coil and uncoil and move about comfortably.

A cage should have a water dish large enough for the snake to crawl into. A big ash tray is convenient and large enough for a garter snake. Cover the floor of the cage with moss, gravel, or slightly moistened sand to make cleaning easier. The cage should be wiped out regularly with warm water and soap, and the floor covering changed. All waste matter and uneaten food must be removed daily.

There is no harm in exposing a snake to direct sunlight provided that shade is available at all times. Sun that does not feel excessively hot to your hand may be dangerously hot for a snake; a reptile's body absorbs heat and becomes warmer and warmer, as would a piece of iron lying in the sun. A rock or block of wood placed in the cage helps furnish shade, and it is also useful to the snake for rubbing against when it sheds its skin.

Proper Diet for a Pet Snake: A captive snake that has eaten well from spring through fall may safely go through several winter months without eating. But if you have a local specimen that refuses food for nine or ten weeks during warm weather, it is best to give it its freedom. Forcible feeding by an inexperienced person is sure to be fatal to the snake.

Of course it is necessary to know which snakes will eat what. Thus, garter snakes thrive on frogs, tadpoles, and earthworms; larger species, including black racers and pilots, eat rats, mice, rabbits, and gophers. King snakes may eat other snakes, as they do in the natural state, or they may prefer rodents. Very small species such as the green snake eat earthworms, grasshoppers, and other insects. The insect-eating snakes need more frequent feedings than those that feed on rodents.

You may be told that snakes will not touch dead animals, but zoo keepers have found that these reptiles will consume dead prey as readily as living victims. The keepers sometimes teach them to eat raw meat by first serving it mixed with chopped earthworms, then gradually reducing the quantity of worms. When dead food is used, it is moved right in front of the snake to attract its attention.

Captive snakes are likely to be frightened by sudden movements of your hand. "Slow and easy" is the best rule in dealing with them. When you lift a snake, give its long, slender body adequate support; the animal is not comfortable when it is dangled by the head or the tail.

If snakes capture your family's imagination, a generally satisfactory program is to try keeping one or two during the summer and then to release them so that they may hibernate under natural conditions in wintertime.

Turtles

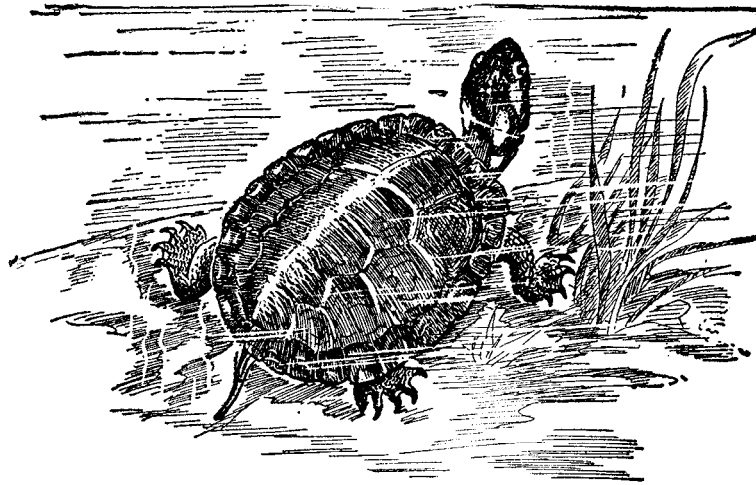
Of all reptile pets, turtles are probably the most commonly enjoyed. Your child is apt to bring home one of these creatures from camp or from an outing to ponds or fields; or they may be bought in pet or novelty stores.

Unfortunately thousands of turtles are entrusted to the care of people who understand little about their way of life. If your child has a turtle, you and he will certainly want to know more about it. And even if you don't have a turtle pet, you will agree that it is a fascinating animal to watch and study if you are at all interested in nature's ways.

ARMOR PLATE FOR DEFENSE

At first glance a turtle may give the impression of an inanimate piece of armor; when it is uncertain of its surroundings, it cautiously keeps every bit of its body under its hard shell. Once the turtle feels safe, however, you will see the snakelike head project

from the front of its shell, the pointed tail poke out from the rear, and two wide legs appear at each side. Then you will notice that even the soft body is covered with rough, coarse skin and often with many scales.



THE PAINTED TURTLE AND ITS ATTRACTIVE SHELL

Encased in armor, turtles have sturdily maintained themselves against their enemies for many millions of years. They are wary and unsociable creatures—at least when they suspect the presence of an enemy. The painted turtle, with a shell about six inches long, has vivid markings of red and yellow on its blackish or olive upper shell. It feeds on water plants and animals, eats them only under water.

The Protective Shell: The upper shell (the "carapace") varies in shape depending on the species of turtle. This shell grows attached to the turtle's backbone; in a few species the carapace is quite flat, in others it is rounded.

The lower shell (the "plastron") also varies in shape and size and is attached to the breastbone. There is also a great deal of variation from one species to one another as to size and color of the turtle's body. Other oddities include the tail of the snapping turtle, which bears a saw-toothed armor of plates, and the front and rear "trap doors" which the box turtle can pull up against the carapace to enclose the body completely!

A child may wonder how a creature encased so completely can manage to breathe. The turtle's shoulder and hip bones do most of the work in contracting and expanding the lungs. The constant pulsation you can observe in the throat is caused by air being swallowed.

SIGHT, SMELL, AND TEETH

Like snakes, turtles lack movable eyelids. However, turtles have a protective membrane which comes up from the lower edge to cover the eye. Some species have nostrils no larger than pinholes, and their poor sense of smell is not surprising. Others, better equipped, have a keen sense of smell.

Though a turtle has no real teeth, its mouth has saw like cutting edges. It does not bother to chew food but simply tears it to pieces.

HOW TO TAKE CARE OF TURTLE PETS

We naturally avoid the big snapping turtles, but the small ones are good pet material because they are hardy and usually easy to feed. (This is also true of musk

turtles.) The kind you are most likely to find in pet shops is the Troost's turtle, which is green with yellow markings.

Keeping a Turtle Pet Comfortable: To keep water turtles healthy, you must give them some means of getting out of water to dry and sun themselves. If they are lodged in a tank or aquarium, a stone island or floating piece of wood will answer the purpose.

Instead of an aquarium, you may use a dry cage or box to advantage. In that case you must furnish it with a dish of water deep enough to serve as a swimming pool, and so arranged that the turtle will find it easily accessible. The rest of the floor of the cage may be covered with stones, sand, gravel, or moss.

The water, especially in the aquarium-type housing, should consistently be between 75 and 85 degrees. Chilling at night must be avoided. (Most pet turtles come from southern states, and they need a little extra warmth in order to thrive in northern regions.)

While turtles should have an abundance of sunshine (or even bask under a sun lamp), they must also have a shady retreat. Too much heat can kill them.

Menus for Turtle Pets: Most water turtles prefer to swallow their food under water. Small bits put on a broom straw will often arouse an indifferent pet. Raw, lean meat or fish scraped or chopped fine is usually acceptable; but small worms, insects, tadpoles and other little creatures are the natural food of young turtles and are excellent if available.

A good way to supplement the home diet is to mix a bit of bone meal and a drop of cod-liver oil frequently with meat. Lettuce and other greens or raw fruits and vegetables add variety to the menu. Baby turtles may be fed as often and as much as they will eat; but a good feeding about twice a week should be enough. A straight diet of "ant eggs" or house flies is not satisfactory.

Turtle Ailments and Remedies: Turtles are often afflicted with softening of the shell and swollen, closed eyes. Recommended remedies are a warmer cage, more sunlight, and a more balanced diet. Swollen eyes should be carefully wiped twice a day with cotton dipped in warm boric-acid solution. When a turtle refuses food for a long time, its appetite may improve if you give the animal more warmth and sunlight. In winter there is a natural tendency for turtles to eat less frequently and to be less active.

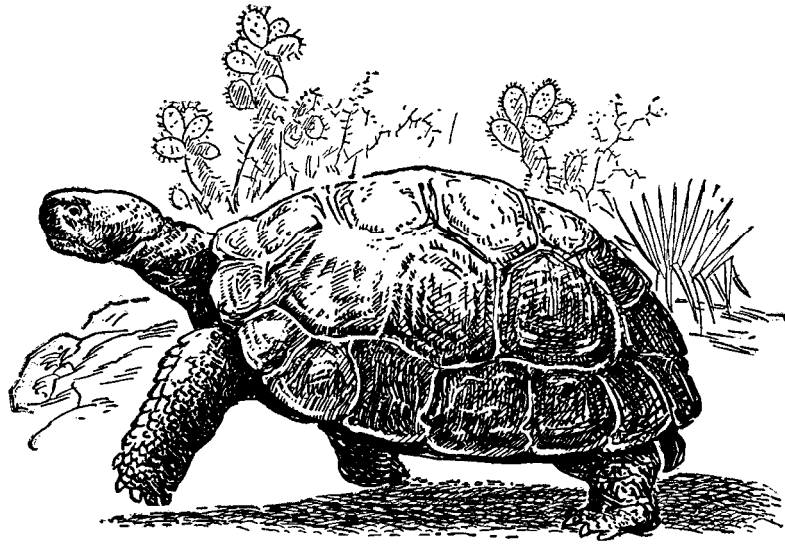
SOME COMMON TURTLES

Ponds are the most likely places to encounter turtles, though aside from the species that frequent ponds there are also sea turtles and those that live exclusively on land. "Tortoise" is a general term that covers all types. "Turtle" is usually applied to sea or fresh-water forms; "terrapin" is the name (of Indian origin) for certain American fresh-water species.

You may find a wood tortoise in the damp woods, far away from water. Its upper shell-one of its distinguishing features may reach a length of six and a half inches. It is made up of many plates ornamented with concentric ridges. With the exception of the top of the head and the limbs, all the fleshy parts of this creature are brick-red. It thrives in captivity and will soon learn to accept food from your fingers. Tender vegetables, berries, insects, and chopped meat form an acceptable diet.

Another turtle that you can tame with very satisfactory results is the spotted turtle, found in many ponds and marshy streams. Its black upper shell is decorated with

numerous spots, whence its name. The spotted turtle enjoys perching on a log for long stretches of time, but its feeding is done under water.



THE GIANT TORTOISES OF THE GALAPAGOS ISLANDS

In contrast to the six-inch painted turtle, the giant tortoise reaches a length of four feet and weighs as much as five hundred pounds. It was once a favorite source of meat for Pacific whalers that touched at the islands off Ecuador. Though these giant tortoises may live to well over a hundred years in the natural state, they have been subjected to relentless extermination by man.

You may recognize another pond turtle—often called the painted terrapin—by the red mottled border of its shell. This is a good aquarium pet but it is much too aggressive to be kept with other creatures.

Snapping turtles, so intriguing as babies, may attain a weight of forty pounds as adults, with a shell fourteen inches long. Be on the watch for them in slow-running streams, ponds, or marshes.

The "alligator snapper" of the South sometimes weighs a hundred pounds.

The mud turtle and the musk turtle are really water dwellers to all intents and purposes; the only time they come to shore is to deposit their eggs. They find their food in muddy bottoms of ponds and streams, and eat only under water. The musk turtle, which has two broad yellow stripes on either side of its head, gives off a strong odor on being handled. The head of the mud turtle is ornamented with greenish yellow spots.

The box turtle, unlike the mud and musk turtles, lives entirely on land. It is easy to recognize this species by the hinges on the front and rear of the lower shell by which it can "box" itself completely within its armor. This turtle grows to a length of about five inches.

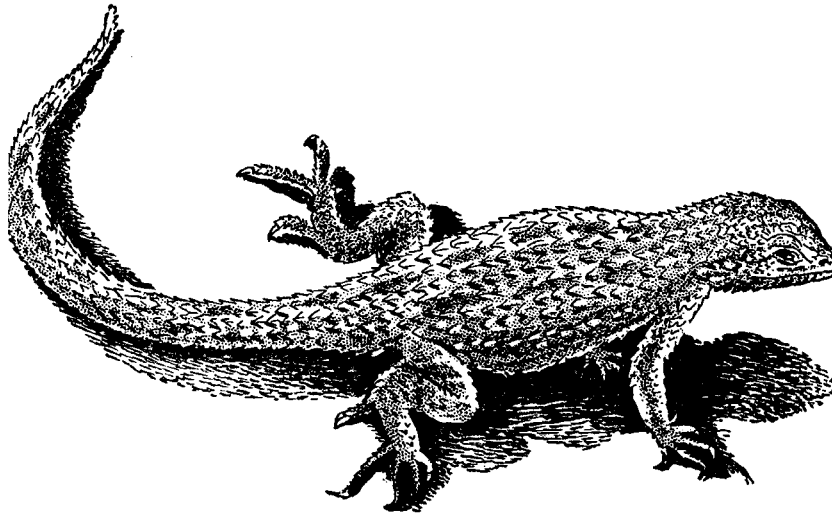
After the wintertime hibernation a turtle deposits her eggs in a shallow hole in earth or sand. As a rule there are five or six eggs, though some species lay more—the snapper, for example, usually produces about two dozen.

Chameleons and Other Lizards

If you take a casual look at a lizard, it will remind you very much of a snake. Outwardly there is not much difference between them-except that most lizards have legs. Nevertheless, a legless lizard is a lizard, not a snake.

One definite difference you can observe between the two groups is in the structure of the lower jawbone. In all snakes the lower jaw is made up of two bones joined at the chin by a more or less flexible ligament. The lizard also has a lower jawbone on either side, but these are attached firmly at the center of the chin.

Another visible difference is that lizards generally have movable eyelids-something no snake possesses.



THE RESOURCEFUL FENCE LIZARD

This lizard, about six inches long, has a very lengthy tail. If a pursuer grasps the tail the lizard is able to shed it, later growing a new one to replace the one it lost. In some lizards the tail is four or five times the length of the rest of the body!

THE SECRET OF THE CHAMELEON'S COLOR CHANGES

At a fair or circus, boys and girls frequently buy a souvenir in the form of a little lizard which they are told is a chameleon. As it happens, true chameleons are seldom seen in our country; they are animals of the Old World, belonging especially to Africa. But another kind of lizard, often called the "American chameleon," also has the ability of the true chameleons to change color frequently. It is this American lizard that is usually peddled at amusement places.

Most children are apt to overrate the chameleon's ability to change color; they take the excessively simplified view that the animal speedily alters to the color of whatever object it stands upon. Chameleons do, to a great extent, harmonize with the foliage on which they rest; but several other factors are involved.

Light and temperature are important influences in changing the animal's color-and so are excitement and fright. Not only does the tone of the body change, but strange patterns come and go on the skin. How does this happen? To put it briefly: Beneath the reptile's skin are a number of tiny branched cells containing pigments of various colors. Whenever the chameleon contracts or expands these branches, the position of the pigments is changed. Those that travel to the surface of the skin are partly responsible for the color the animal suggests.

ALL-AROUND EYES AND A QUICK TONGUE

The true chameleon has a versatility that can be positively startling. It can roll one eye upward while the other rolls down or turn one eye forward and the other backward! Its tongue is a "secret weapon" that shoots forward to a distance of seven or eight inches. On its sticky tip the chameleon snares insects that apparently were well out of harm's way.

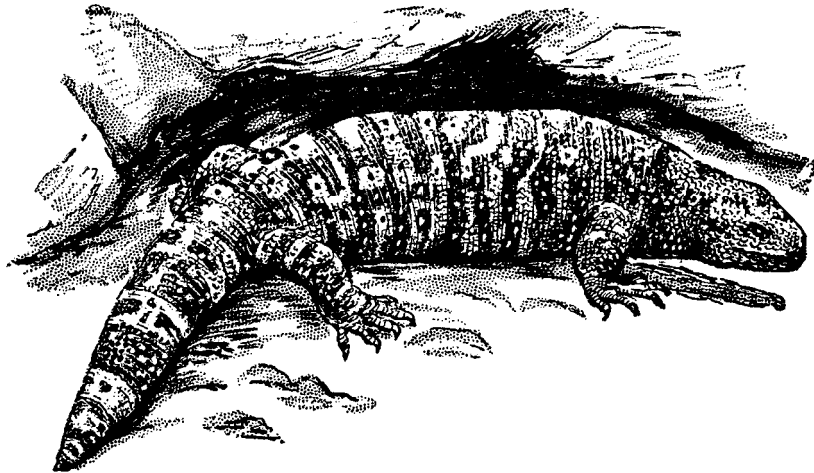
HOW TO KEEP A CHAMELEON PET

Old World chameleons rarely eat in captivity and seldom live longer than five or six months when they are kept confined. The so-called "American chameleon" is not so remarkable an animal, but it does make a better pet.

The American species should be kept in a warm sunny place and fed crickets, cockroaches, or live flies. If it loses interest in eating, you may revive its appetite by moving food slowly in front of it. Your chameleon needs water; but do not put it in a pan or cup in the cage. Instead, sprinkle the water about the cage so that the little creature can lap up the drops just as it drinks dew from leaves in its natural state.

LIZARDS OF THE SOUTHWEST

Children who live in the southwestern United States, and others whose vacation travels take them over some of the arid stretches of this region, may encounter a variety of lizards. There is the whiptail or race runner, a striped species that is active all day in open areas; the collared lizard, a scrappy fighter that has been known to attack rattlesnakes; the big chuckwalla, which may grow as long as sixteen inches; and the banded gecko, a lizard active chiefly at night.



THE ONLY POISONOUS LIZARD OF THE UNITED STATES

The attractively colored Gila monster is large for a lizard—about twenty inches long or so. It lives in our southwestern desert lands, and has the useful trait of being able to store food in its tail! The Gila monster moves sluggishly as a rule, but strikes quickly when injecting its venom. It rarely bites, and its poison is not fatal to humans. It lays its eggs in the sand, where the sun hatches them.

The only poisonous lizard found in the United States is the Gila monster—a colorful figure strongly marbled with coal black and some other marking, often pink, yellow, or white. Its stout body may grow to a length of twenty inches, although eighteen

inches is pretty much the average. Its bite can quickly kill a small mammal and seriously affect a human being.

Lizards are able to grow a new tail when they have lost original one through some mishap. The true chameleon, however, lacks this regrowing ability.

Alligators and Crocodiles

A child is likely to see these giant reptiles only in zoos, for their natural range in the United States is limited to the swamps and lagoons of the Carolinas, Georgia, and Florida west to Texas. If he (or his parent) looks at these animals only casually, he is sure to ask this natural question:

"What's the difference between an alligator and a crocodile?"

How Alligators and Crocodiles Differ: If you look closely, you will quickly perceive a decided difference in the shape of the snout. You will see that the alligator's snout is wide and more rounded than that of the crocodile.

There is also a difference in the teeth. In the case of the crocodile, the fourth tooth on either side of its lower jaw fits into notches on the outside of the upper jaw-so that even when its mouth is closed, the vicious fangs show. The usual effect is to give the crocodile a fiercer and more belligerent appearance than the alligator. Nor are looks deceiving here, for on the whole alligators are timid and try to escape any encounter with human beings, whereas crocodiles are sulky and ferocious by turns.

In the zoo a keeper will often step among and over alligators while cleaning their swimming pool-but he does not take such chances with his crocodile charges. At the circus you may see the "strong man" wrestle with the lazy and slow-moving alligator-never with the quick and active crocodile.

Both alligators and crocodiles spend much of their time in water. Their nostrils, located on top of little bumps at the end of the snout, take in air as the animals float just under the surface of the water. They can even feed under water by shutting off the food tube from the tube that leads to the lungs.

Unlike most reptiles, alligators and crocodiles are able to make noises with their mouths. The young produce a curious grunting sound, while the bellowing of the old bulls may be heard a mile away.

Alligators in the Home: An alligator is an unlikely but not impossible pet. It is not suited to captivity and seldom lives more than a couple of years away from its natural surroundings. However, it is occasionally possible to obtain young 'gators and judging from inquiries to zoos and museums about their care-a number of people do cope with the problem of keeping an alligator in the home.

A little alligator, like other reptile pets, must be kept in a consistently warm temperature with plenty of sunshine, and with shade always available. Its cage must be kept dry and clean and furnished with a pan of water. Feeding it once or twice a week is enough. Raw fish or bits of meat should be offered on a moving stick, preferably to one side of the 'gator's head.

Frogs

Naturalists call the frog an "amphibian"-a creature that lives a double life. This is a good name for the frog, as it divides its time between land and water. It has characteristics in common with fish: It is cold-blooded, and it lays its eggs in the water. In other respects it is akin to reptiles, which are also cold-blooded but are able to live on

dry land. Thus the frog, along with the toad, newt, salamander, and other amphibians, is a "connecting link" between the two great cold-blooded groups-fish and reptiles.



TWENTY THOUSAND EGGS AT A TIME

The bullfrog gets its name from its sonorous call. Though the female lays as many as twenty thousand eggs at one time, the tadpole takes quite long (three years) to develop into an adult. Protective coloration and unusual jumping ability safeguard the frog against most enemies; but the demand for frogs' legs as a delicacy has made inroads on our frog population.

THE HOBBY OF COLLECTING FROGS' EGGS

For generations children have sought frogs' eggs, and successful hunters still bring them home to observe their development in an aquarium. Collecting eggs should not be encouraged, as it makes inroads on the frog population. However, the ability to recognize eggs adds interest to a springtime expedition to a pond or quiet stream.

If a child is serious about exploring nature and particularly anxious to watch tadpole development, it is important to know what species he is collecting; the time required for development of the eggs varies widely according to the species of the parent frogs. Wood frogs take on adult form the same season the eggs are laid; green frog tadpoles usually do not grow into frogs until the following summer; bullfrogs may remain in a tadpole state for two or three years!

HOW THE EGGS DEVELOP

We find frog eggs laid in a transparent protective jelly. The shape of the jelly mass is one clue to the species; the date it is discovered is another. The eggs of leopard or wood frogs, for example, may be found by the first of April; those of the green frog do not appear until a bit later, and the bullfrog may not lay before July. The leopard frog's egg masses are in the form of a flattened sphere; those of the wood frog are round masses.

In the earliest stages, as the original single cell gradually divides into many, you can follow the egg's development only with the aid of a magnifying glass. It is only when the embryo begins to lengthen that it can be easily seen with the naked eye. After five or six days the embryo has a tadpole form, but it is still inside the jelly mass. About the ninth day the tadpole breaks loose from its protective covering.

HOW A TADPOLE GROWS

The Development of the Head: At first the tadpole is so shapeless that the only way to know head from tail is to observe the direction in which it swims-the head naturally goes first. But soon the head grows larger. Instead of a mouth the tadpole has a V shaped raised sucker by which it attaches itself to water weeds. Later this gives way to a small round mouth provided with horny jaws. As the tadpole grows, the mouth gets wider and larger.

How the Tadpole Breathes: When you observe the tadpole you see little tassel-like gills appear on either side of the throat. Blood passing through the gills is purified by coming in contact with the oxygen in the water. Later the feathery gills disappear as a membrane grows down over them, and they function inside the body instead of externally. Water taken in through the nostrils passes through an opening in the throat, on over the gills, and out through a little opening, or breathing pore, at the left side of the body. This breathing pore may easily be seen in larger tadpoles.

The Legs and Tail Develop: A tadpole's flat tail, bordered by a fin, is a valuable swimming aid. But in a matter of weeks-the time depends on the species-the first sign of legs foreshadows the decline of the tail's usefulness. The hind legs appear first as mere bumps but soon push out completely with five webbed toes.

Meanwhile the front legs show just in back of the head, the left one pushing out through the breathing pore. The front feet have only four toes apiece and are not webbed; they are used for balancing, whereas the back feet serve for thrusting forward. While these changes are taking place, the tail is becoming absorbed by the body.

First Amphibian Landing: Young frogs do not always wait for the completion of their adult form before venturing on land. In late spring or early summer you may see one hopping about, still wearing its stumpy little tail. From then on the frog is primarily a land animal, though the members of most species stay near water, ready to jump in at a sign of danger or simply to refresh themselves.

The frog puts its tongue to good use. Hinged to the front of the lower jaw, the tongue can be thrust far out of the mouth to capture insects on its sticky surface.

BIGGEST AND SMALLEST FROGS

The bullfrog is the giant among North American frogs. Eight inches is about its maximum length. Its head is usually a bright green, the upper part of its body green also but shading to gray and brown, and its underside is yellowish.

Other identifying features are its large eardrums and the conspicuous folds of skin which run from behind the eyes around the eardrums to the front legs. The bullfrog's deep voice is probably better known than its appearance. You may hear its sonorous jug-o'-rum repeatedly near lakes and ponds on summer evenings.

Just as the bullfrog is a typical "voice of summer," the little tree frog, commonly known as the peeper, might be called the , "voice of spring." The spring peeper-or, more prosaically, Pickering's hyla -is one of the tiniest of froglets. Fully grown, it is about an inch long!

Under the throat of the male is a thin membrane that swells to surprising proportions as he blows air into it, then closes the openings to his nose and forces the air up and down his gullet. As early as March you may hear the din raised by a number of peepers going through their vocal gymnastics.

There are several reasons why the spring peeper is able to elude most observers. Aside from its tiny size, it changes color to blend with its background. In less

than half an hour the dark cross on its back can alter to a mottled effect, and its body tone can change from a pale yellowish brown to leaf-green, earth-brown, or even the brighter tones of flower petals!

Another point is that the spring peeper spends a great deal of time in trees, which it can climb easily because of its marvelously adapted toes. Each toe ends in a rounded disk that secretes a sticky substance so effective that a peeper can walk up a vertical pane of glass.



TRUTH AND FICTION ABOUT TOADS

There is no truth in the quaint superstition that "it rains toads" and that "toads cause warts." The truth about toads is interesting enough—for example, a toad eats its skin after shedding it; it "drinks" by absorbing moisture through its skin; and it digs holes with its hind feet, retreating into one of these hideouts on the approach of enemies. It stays in concealment by day, becomes active at night.

Toads

Though most children delight in catching frogs, many hesitate to touch a toad. They have heard the old myth that a toad is sure to produce warts on the hand that touches it. While this much maligned amphibian does have warts on its back, it has no power to transfer them.

Basis for the "Wart" Myth: The so-called warts are really glands which secrete a disagreeable-tasting substance. The elongated swollen glands above and just back of the ears exude a milky poisonous substance when the toad is seized by a hungry enemy. This protective feature is entirely successful in some cases, but many toads become victims of snakes and other animals.

THE TOAD EATS ITS SKIN

Unlike the slippery, slimy frog, the toad has a perfectly dry skin. It is cold to the touch because toads, like all amphibians, are cold-blooded. Though the toad sheds its skin periodically, you will never find one of these skins as you may a snake's skin. The skin is promptly swallowed by the toad that sheds it!

HOW TOADS DRINK AND BREATHE

The toad has a very absorbent skin. When it is thirsty it never drinks by mouth; instead, it stretches out in shallow water and absorbs moisture through its skin. Consequently, if pools are not available and if the atmosphere is dry, the toad will die in a short time.

The toad's breathing technique is also curious. You may notice a steady pulsation in a toad's throat that results from its swallowing air. Lacking ribs, it cannot inflate its chest to draw air into its lungs as we do.

HOW TOADS DEFEND "THEMSELVES"

The toad is a favorite prey of many larger animals. It cannot fight back, but it is resourceful in trying to save itself. Toads and frogs use the same means of defense: Both are jumpers capable of making long rapid jumps. The popular game "leapfrog" is a tribute to the extraordinary jumping ability of the frog, which has larger and more muscular hind legs.

With both of these amphibians protective coloration is specialized to the point of transforming color tone to blend with the background. A toad also has a clever way of disappearing. Instead of squatting where it can easily be seen, it kicks backward until its body is covered with earth. At the approach of an enemy, the toad quickly jerks its head back letting earth tumble over its head as well.

The toad also knows how to become inconspicuous by flattening out its body and, when actually trapped, it will "play dead."

Finally, if all these ruses fail and it is seized by an enemy, it emits a terrified noise.

WHERE TO FIND TOADS

These amphibians are rarely out in the open during the daytime, and a child's best chance to observe their habits is to keep one as a pet. They go abroad mostly at nighttime, hunting for slugs, worms, and insects; most of the day they remain in hiding.

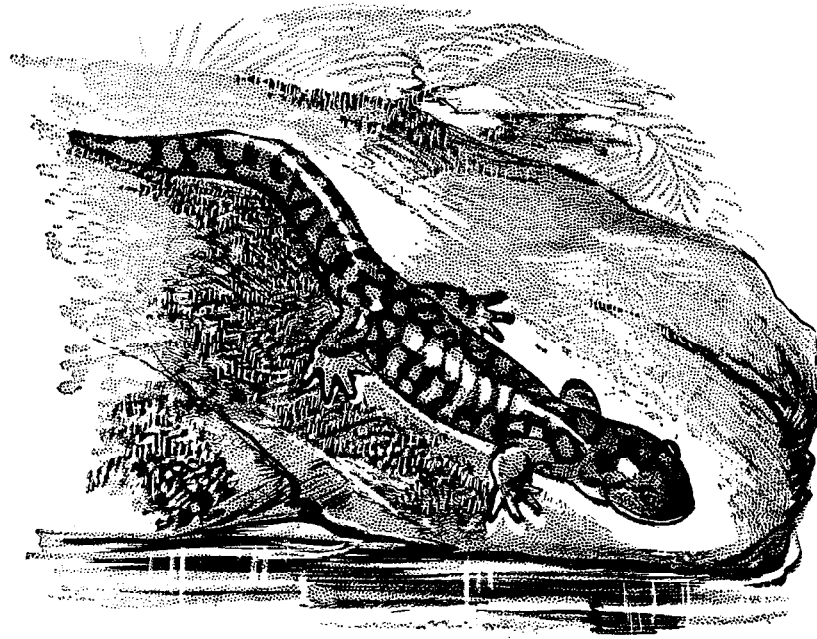
Toads frequent cool damp places; in suburban areas you may discover one under a porch or dug in under a sidewalk. In the fall they burrow deep into the ground to hibernate. When they awaken in the spring they make their way to a pond to breed and lay their eggs.

HOW TOADS' EGGS DEVELOP

The eggs of the toad, like frogs' eggs, are laid in a transparent jelly-like substance, but they can be identified by their form. The toad's eggs are laid in long strings, instead of in masses like the frog's eggs. Changes in toads' eggs take place rapidly. Tadpoles may emerge only four days after the eggs are laid; only a few weeks later the tadpoles have developed into adults.

The toads are still very small, however, and continue to grow as adults-in contrast to frogs, which attain much of their adult size while still in the tadpole stage. The final size achieved by a toad varies with the species. One kind, native to the Southwest,

sometimes measures six and a half inches in length; a little green toad that lives on the grassy flatlands of the Southwest is no more than an inch and a half long.



THE ELUSIVE TIGER SALAMANDER

This salamander gets its name from its colors (yellow splotches cover its brown body), and reaches a length of ten inches. Like most of its kind, it is an elusive creature, burrowing by day, and coming out at night to forage for food. All salamanders have smooth skins, in contrast to the scaly bodies of lizards.

Salamanders

A most likely time to make the acquaintance of the little amphibians known variously as salamanders, newts, or efts, is shortly after a spring or summer rain. If you are walking along a country road or woodland path, you may not even have to look for them: They are out in the open enjoying the newly fallen moisture.

At other times you may find them under stones or rotting logs, in wet crevices along a brook, and even in the water. All salamanders must stay in places where their skin will not become too dry-though some prefer more water than others do.

Frequently when a child discovers a salamander he calls it a lizard; and it does strongly suggest the small reptile. However, there are several distinguishing features. The salamander's skin may be moist, slimy, or even dry and rough; but it is never covered with scales, as is the skin of a lizard. No salamander has claws, whereas you will find these on the toes of a lizard.

THE RED EFT

There is quite a bit of variety in the appearance of salamanders and in the pattern of their lives. The red-backed species does not even conform to the usual amphibian program of a land and-water existence and spends its entire life on land.

One of the most commonly seen salamanders is the red eft. It begins its adventurous existence in a pond or stream, where it hatches from an egg laid on a water plant. The next few months it dwells in the water; it is an expert swimmer, has gills, and

breathes like a fish. By the middle of August the eft has lost its gills, developed legs, and in all respects is ready for life ashore. About this time it takes on a bright orange hue.

For the next two and a half years the red eft lives on land, usually frequenting damp, shady places and hiding under leaves or moss. Then, though it may have wandered far away from water, it starts traveling purposefully until it reaches a pond or stream.

After returning to its native element the eft undergoes more changes: Its color becomes olive-green above and buff below, while its tail develops a keel that extends along its back. Only now does it seek a mate, and its remaining years are spent as a water animal. In this final water stage the red eft is frequently called a newt-a common name for this type of salamander.

The Care of Amphibians

Collecting frogs or other amphibians and keeping them for a while is a fine seasonal hobby for children. However, it is important to first inquire of the conservation department of your state for regulations about which kinds of frogs may be collected and when.

HOW TO CATCH A FROG

A stout collecting net is a useful aid in catching the elusive frog which you are most likely to find in a swamp or shallow pond.

Extend the net slowly and quietly toward and under a prospective captive. With a quick upward and outward movement you may succeed in snaring the frog. It should then be transferred to a suitable container, such as a wet burlap bag, for carrying home.

LIVING QUARTERS FOR THE AMPHIBIAN

You can turn an aquarium into a satisfactory home for small specimens of frogs, toads, or salamanders. A screen top made secure around the edges will prevent their escape. For frogs and salamanders the aquarium should be about one-third full of water, with stones piled high at one end to give the amphibians a place to land. Toads need far less water; for them, the bulk of the cage should be dry.

It is important to bring home some water from the pond where the frogs are caught, using it for them while they are in your care. Tap water is often purified with chemicals that are fatal to these animals. The water in the amphibian's quarters must be changed often and kept perfectly clean; uneaten food particles should be removed daily.

HOW TO FEED AN AMPHIBIAN PET

Live insects-such as flies or bugs-and earthworms are a good diet for most amphibians. Sometimes a captive will nibble at small bits of food, and you can experiment to find the diet that appeals most to it. If it does not respond to your attempts, it should be given its freedom near the locality where it was found.

Sometimes it may prove practical to grow your own insects; this is what a boy of my acquaintance did who was keeping a dozen salamanders in a large terrarium. In it he placed a bottle containing a few pieces of banana. Fruit flies bred rapidly there, and as they started to fly out they were snapped into the ready mouths of the salamanders.

Frogs and salamanders should always be picked up by placing your hand under their body. They are then less apt to get away, and such handling is far less injurious than encircling them with warm, dry skin. The heat of the human hand can kill a very

small amphibian. Thus we see that even in the case of seemingly petty details we have to bear in mind the basic physical make-up of the amphibian, and the possible consequences of not heeding its requirements.