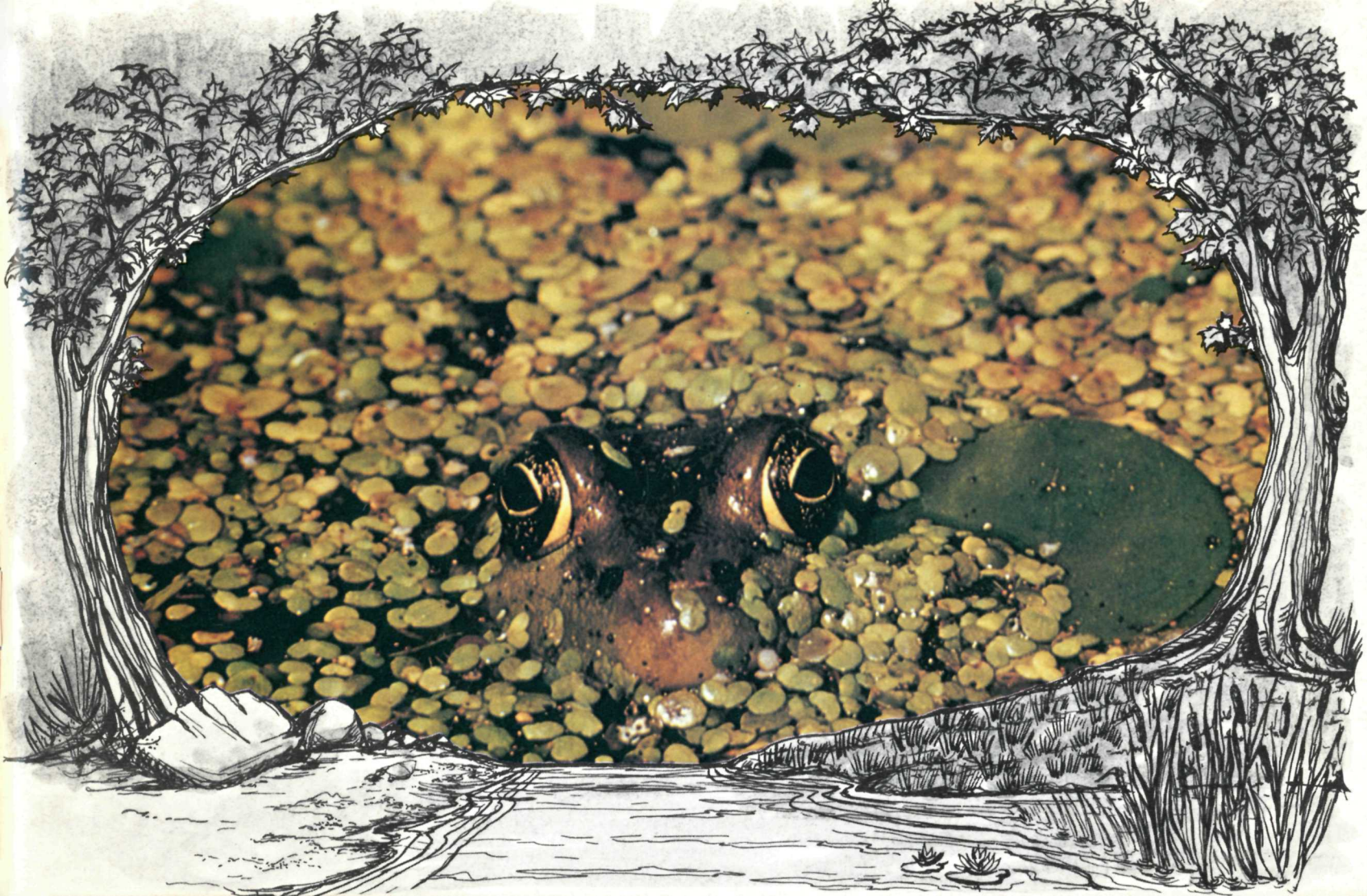


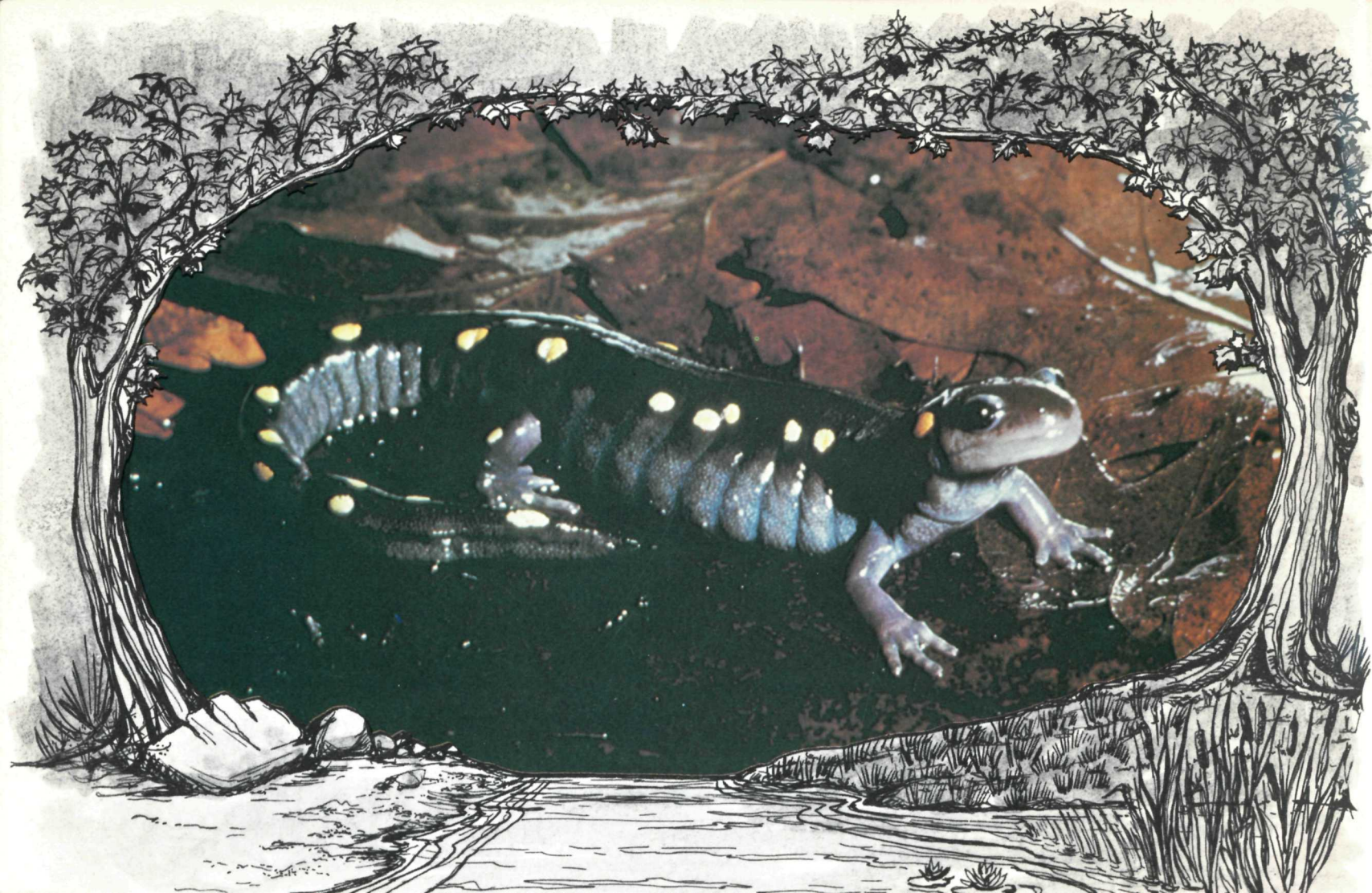
FOUL AND LOATHSOME CREATURES

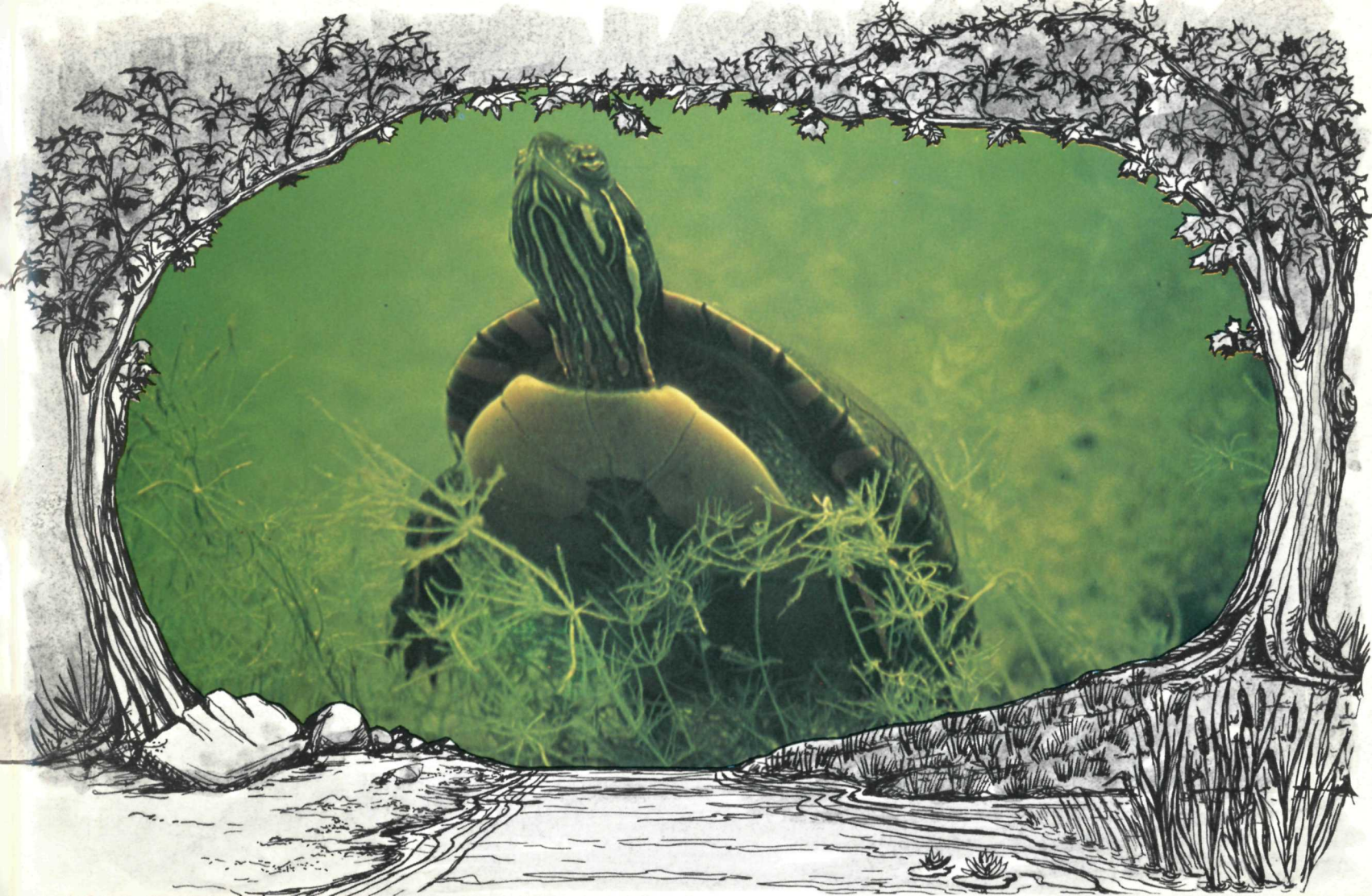
BY HARRY PARSONS



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FOUL AND LOATHSOME CREATURES

by

Harry Parsons

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“These foul and loathsome creatures are distinguished by a heart with a single ventricle and a single auricle, doubtful lungs and a double penis. Most amphibia are abhorrent because of their cold body, pale colour, cartilaginous skeleton, filthy skin, fierce aspect, calculating eye, offensive smell, harsh voice, squalid habitation and terrible venom: and so their Creator has not exerted his powers to create many of them.”

LINNAEUS, 1758

INTRODUCTION

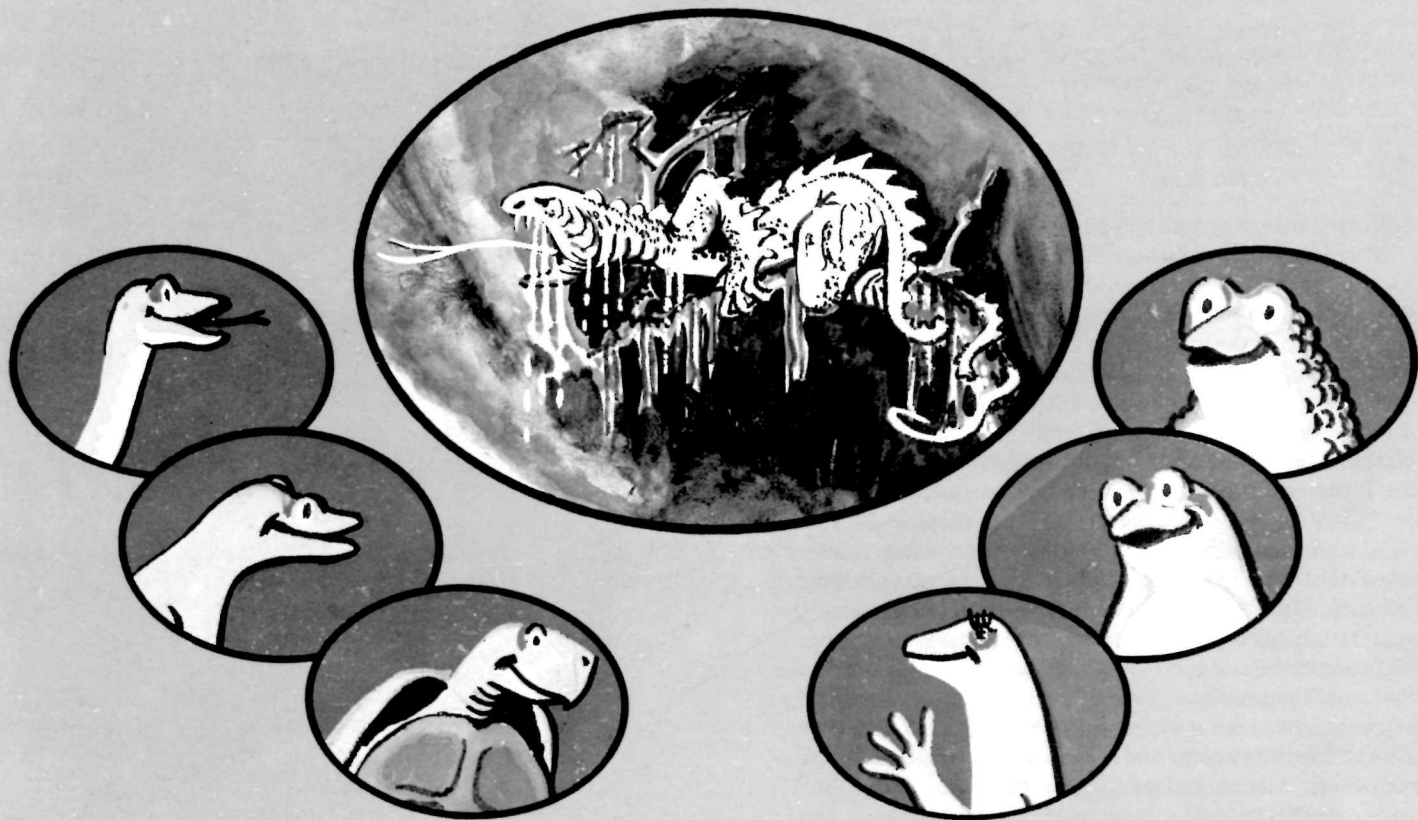
As surely as poison ivy itches and beavers eat aspen bark, people will fear snakes.

Snakes and to a lesser extent their close relatives turtles, lizards, frogs, toads and salamanders occupy a space in most people’s minds that is usually reserved for similarly cheerful subjects like the Black Plague or Inflation. Those who attempt to defend herptiles (the common abbreviation for reptiles and amphibians) or – God forbid – praise them are normally regarded as yet another example of our permissive society mollycoddling vicious criminals. But we have a book to write. Perhaps better than that, we have a story to tell. Conservation is a sad story of losing battles, some already lost, but it can seem a pretty sad world any way you look at it. In fact, if you give them a chance, herptiles can brighten it up for you. So while we discuss some of the many ways herptiles benefit us

and perhaps prove to you that they are really not such “foul and loathsome creatures,” the main story is a personal one about a means of achieving a higher quality of experience from nature. If you have ever been stunned by the vivid colouring of a Milk Snake, amazed by a sealed-up Box Turtle, frightened by a rattlesnake or even amused by a homely little toad; then in a small way you already know the story. The real fascination of herptiles lies in their stoic unconcern with man and his magnificent plans and in their simple desire to be left alone in the niche they have carved for themselves over the centuries.

In practical terms, National Parks of Canada conducted extensive surveys of the reptile and amphibian populations of Ontario’s three most southerly parks: Point Pelee National Park, St. Lawrence Islands National Park and Georgian Bay Islands National Park during the summers of 1972, 1973, 1974 and 1975. The intent was to determine the status of herptiles in these parks and to suggest methods of preserving their populations. The results of these surveys combined with the seasonal observations of the park naturalist staff, revealed that together, these three parks contained the most diversified herptile fauna of any national park in Canada. It was also found that this diversity was very representative of Ontario’s herpetofauna. Furthermore, a greater variety of herptiles exists here than in any other place in Canada. As is the case in the rest of the province, some species had already disappeared and others were seriously threatened. One final conclusion of the study was that a prime element in the preservation of herptiles is the education of the public.

This book is an introduction to these harmless and beneficial creatures.



“OOOH, I HATE THOSE SLIMY THINGS!”

“OOOH, I HATE THOSE SLIMY THINGS!”

“Oooh, they’re so slimy!”

“How can you stand to touch it?!?”

“I hate snakes!”

“Does it bite?”

“Ugh!” (or any similar disgusted exclamation.)

I offer the reader a small wager. I will bring the snake and we will pick any random group of passersby on any street in any city in Canada. I will present the snake and if the reply falls within the list above, you will give me one dollar. For every reply other than one of the above, I will give the reader ten dollars. Fair enough? By the end of one week of this, I will open my own retreat for embittered herpetologists somewhere in the Caribbean.

Herpetologists are people who study reptiles and amphibians. A pretty safe generalization is that they actually like those “slimy things,” they can stand to touch them, and – if the truth must be known – they sometimes even get bitten. But herpetologists usually find that they are part scientist and part missionary. Their ministry is an appeal to try to understand what are probably the earth’s most misunderstood creatures. In all fairness, they do not have a hard time when it comes to turtles. Many people are fond of turtles and many have had a little pet turtle at some time in their childhood. Frogs and toads are usually tolerated and often there is no real reaction for or against. Lizards and salamanders are so rarely seen by most people that the majority probably has no thoughts whatever about them. But snakes! There is the villain and scoundrel of the ages, the tempter of Eve, the living symbol of evil and cruelty. Hate, or at least fear of snakes, is so com-



the snake . . . there is the villain and scoundrel of the ages



young children will handle snakes with curiosity not fear

monplace that many people assume it is instinctive. In fact, research has proven that young children (under age four or five) will handle and play with snakes as they will anything put in front of them – with curiosity not fear. Many people share the recollection of early school days when they used to catch and play with snakes or, in the case of boys, use them to scare the girls. But at some point, usually in their early teens, a complete reversal of attitude takes place and from then on snakes are no longer playthings. Part of this change can be attributed to the influence of parents who fear snakes, while part may be the result of less time spent out-of-doors in contact with these animals. Amazingly enough, fear of snakes is widespread in Canada; yet only a very few species can be considered dangerous and these are easily recognized and have restricted ranges. But this is not the case worldwide nor historically and nowhere is this same attitude found.

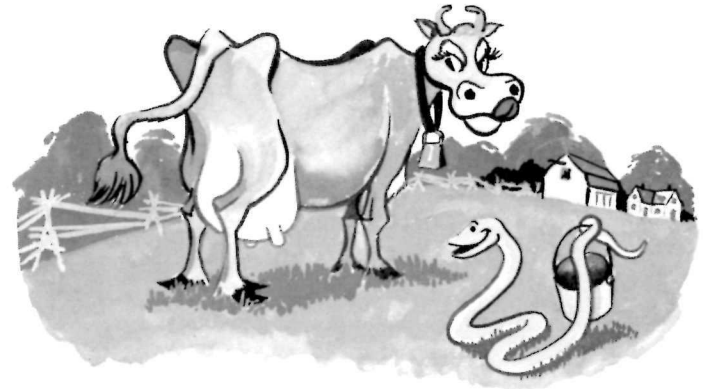
Some parts of the world, such as India and Central Africa, have large populations of poisonous snakes and contact between these snakes and barefooted natives results in substantial numbers of deaths. In certain Hindu and African sects, the snake is worshipped as a divine or special being. Historically snake worship is almost worldwide and traces of it can be found in nearly every religion. It is not hard to understand how this came to be. Primitive man must have encountered many snakes and they were probably an important food source being easier to kill than most mammals or birds. But in the course of this association some people would be bitten and would die, often from apparently nothing more than a couple of tiny pin pricks. To the primitive mind it would be easy to extend mysterious and supernatural powers to an animal that could kill so magically. Many cultures believed that snakes lived forever and only had to shed their skin to keep growing.

Because of the snake's resemblance to a penis, snakes were often included in fertility rites. They were associated with lightning, rivers and rainbows and seen as both messengers of the Devil and symbols of God. Logically, snakes formed an important religious entity in areas where snakes were large or prevalent so that Canada has little in the way of snake myths compared to desert and tropical areas. Nor is this religious involvement all ancient as attested by certain Christian sects in the southeastern United States. They take as their mission Mark 16 verses 17 and 18 in the Bible:

*And these signs shall follow them that believe:
In My name shall they cast out devils; they
shall speak with new tongues;
They shall take up serpents; and if they drink
any deadly thing, it shall not hurt them;
they shall lay hands on the sick and they
shall recover.*

During their religious services people freely handle Copperheads, Water Moccasins and Rattlesnakes. Unfortunately but inevitably there have been a number of deaths resulting from these practices and in certain states these sects are illegal.

Certainly, no animal is as burdened by superstition and old wives' tales as the snake. Some of the most common myths in Ontario are that snakes are slimy, that their tongues are stingers, that any number of species are poisonous, that the Hognosed Snake's breath is poisonous. Many rural areas believe that Milk Snakes milk cows. Female snakes are supposed to swallow their young to protect them. The Hoop Snake puts its tail in its mouth and rolls away from danger. Snakes can break into pieces and then join back together again.



many rural areas believe that Milk Snakes milk cows



the Hoop Snake puts its tail in its mouth and rolls away from danger

Some myths are just exaggerations. Nearly every community has a story of a snake that is so long it can reach right across a road with its head in the grass on one side and its tail on the other. One of the most common snake stories is the story of the wicked, frozen snake found by a farmer in the middle of winter. The good-hearted farmer takes the poor snake home and warms him up, at which time the ungrateful serpent bites him and the man dies. There is a version by Gotthold Lessing that has a boy confront a tame snake with this story and accuse it of being malignant and unthankful, to which the snake replies:

"I am astonished. How partial your historians must be! Ours relate this story quite differently. Your kind-hearted countryman thought the snake was really frozen to death; and it being a handsome specimen, he picked it up in order to skin it when he arrived home."

Many of the most colourful myths associated with snakes are those of the rattlesnake. Certainly any unusual animal is bound to have a folklore about it, but the rattlesnake outdoes them all. Among the most widespread beliefs are that rattlesnakes always rattle before striking, they travel in pairs, they will not cross a horsehair rope, they will not die until sunset, their age can be determined by counting the rattles, they can be rendered harmless by removing their fangs, and their bite can be cured by the use of dead chickens, alcohol, potassium permanganate and any number of other home remedies. The truth, of course, is far removed from these myths.

But what is the truth? The truth is that snakes, along with lizards and turtles, are reptiles. Frogs, toads and salamanders are amphibians. Well, so far, so good. But what is an am-

phibian and what is a reptile? General rules are dangerous because there are always exceptions, but the simplest characteristics defining herptiles are those based on their structures. Amphibians and reptiles both have backbones and are cold-blooded. Unfortunately "cold-blooded" has come to mean heartless and cruel and is, in fact, a misnomer. The actual body temperature of most herptiles in the summer can be over 32°C so they are hardly cold. Their problem is that they cannot control their body temperature internally as we can so they depend on the heat of the sun. That is why turtles like to lie out and bask. If it is cold out, the herptile's body temperature drops and he becomes less active. While the sun is a herptile's best friend, it can also be his worst enemy. Amphibians have soft, wet skin and to some extent breathe through it, so that the skin must be kept moist. Because of this, most amphibians must stay in the water or hide from the sun in damp locations, like under rotting logs. Some, like the toad, have developed a thicker skin which allows this amphibian more independence to wander around. (By the way, those warts on the toad's back are to poison and discourage predators and are not contagious!)

Reptiles have dry skin covered with scales and usually lay hard-shelled eggs (except in some snake species). Another obvious difference between amphibians and reptiles is that the young of reptiles closely resemble the adult whereas the young of amphibians are often totally different in appearance.

One of the most amazing adaptations of the snake is its tongue. It is not a stinger and, in fact, feels like the touch of a feather if it touches bare skin. The tongue is really used to "smell" the surrounding ground and air. The tongue picks up particles in the air and brings them to a special organ in the roof of the snake's mouth. No snake's breath is poisonous and the Hognosed Snake's hissing is merely part of an elaborate

defensive behaviour. Since Milk Snakes' and all other snakes' teeth are sharp and point backward, it would be inconceivable to imagine a cow standing quietly while a snake clamped onto her. The story no doubt sprung up from the frequent appearances of this species around barns hunting its favourite food, mice. The largest snake in Ontario is the Black Rat Snake, which can reach eight feet in length, but that size is exceptionally rare. It is a well-known fact that judging the length of a snake is very difficult and that they always seem to shrink when measured. Female snakes pay no attention to their young, but a number of snakes prey on smaller snakes, and chancing upon one of those snakes feeding on another may have given rise to baby-swallowing stories. There is no such snake as the Hoop Snake. Snakes cannot break apart although kings and some salamanders can lose and then regrow their tails.

The only poisonous snake in Ontario is the little Massasauga Rattlesnake and it has a very small range but a great reputation. Although its venom is potent, the Massasauga's small fangs and docile temperament make it only a minor risk. The fact that probably at least nine out of ten people bitten by this snake will recover without any treatment at all has given rise to a great many folk remedies. For instance, if someone is bitten and puts a split, freshly-killed chicken on the bite and then recovers, then a lot of people will feel that split, freshly-killed chickens cure snakebite. Alcohol is another of the popular home remedies but it can be positively dangerous as alcohol speeds up the blood circulation and spreads the venom through the body more rapidly. Nonetheless in the 1880's even physicians recommended the alcohol treatment and there is even a record in the **North-Western Medical and Surgical Journal** of 1855 of a physician who administered a quart of brandy and a gallon and a half of whisky over a 36-hour period. The



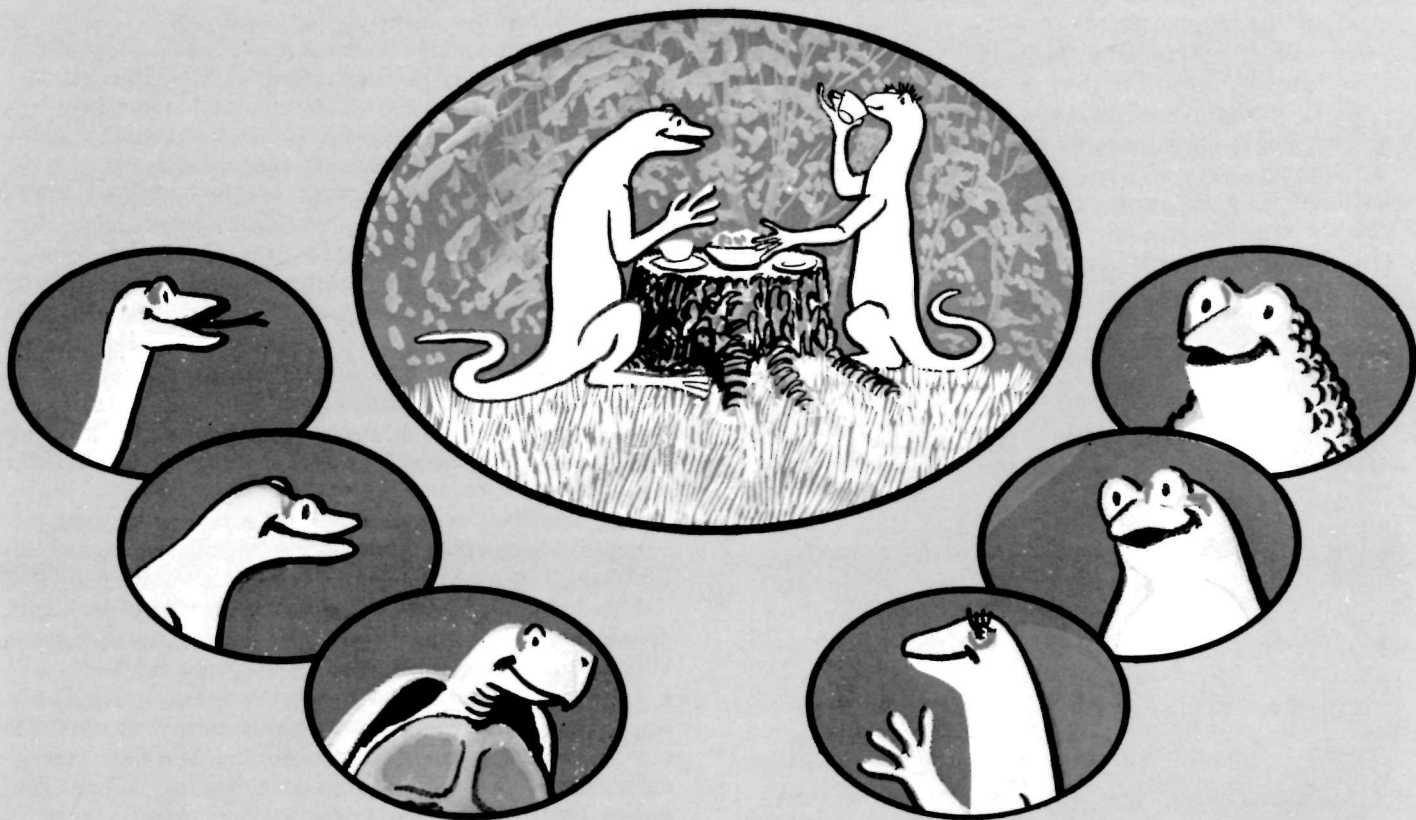
the patient was seen looking for another rattlesnake to bite him

doctor reported in all seriousness that after recovery, the patient was seen looking for another rattlesnake to bite him! This is not to imply that the bite of a Massasauga should not be taken seriously. The victim should always be taken immediately to a hospital. There are hospitals equipped for this throughout the rattler's range in Ontario. If the hospital is more than a short distance away, a tourniquet should be applied above the bite and loosened at regular intervals. It should always be remembered that shock plays a big role in most snakebites and the bitten person should be watched carefully for symptoms of it. There is a great deal of misinformation about rattlesnakes besides the treatment of their bites. They add a new rattle after every shedding and there may be four or five sheddings a year. Furthermore, they often lose their fragile rattles through rough use. Therefore, the number of rattles is no indicator of age. Rattlesnakes may, like any other snake, be seen in pairs during the breeding season, but after that, the couples split up. Massasaugas do not give a darn about horse-hair rope and certainly do not wait until sundown to die. Note, however, that the nervous system of a snake does not shut down as fast after death as that of mammals and there have been a number of people bitten by carelessly handling freshly-killed snakes.

An unfortunate situation with snakes – and all herptiles for that matter – is the cloud of superstition that surrounds them. Certainly people are fascinated by snakes in particular. Any zoo that has a reptile house will tell you that that is the most popular display they have. But herptiles are fascinating in truth with their amazing lifestories and adaptations without needing any fiction. The naturalists in the National Parks where the herptile surveys, that formed the basis for this book, took place, all spend a substantial amount of their time with visitors doing public relations work for herptiles. But they report encouragingly that more and more people ask them about the snake they saw or the frog they heard and are taking the time out to try and get to know these “foul and loathsome creatures.”

And God made the beast of the earth after his kind, and cattle after their kind, and everything that creepeth upon the earth after his kind: and God saw that it was good.

GENESIS 1:25



**LOVE, LIBERTY AND THE PURSUIT
OF FOOD**

LOVE, LIBERTY AND THE PURSUIT OF FOOD

LOVE

*“And when two lovers woo,
they still say ‘I love you,’
On this you can rely,
The fundamental things apply,
As time goes by . . .”*



and there in the middle of that mess is a tiny, little brown frog

It is a chilly spring day. To be more exact it is 5°C on April 16, 1974. But it seems much colder standing dead-still in a pond with your hip waders now full of icy cold water and your hands gently, slowly freezing as the wind and moisture meet on them. It is now that thoughts turn to coffee and fireplaces, thick rugs and warm, dry socks. You have decided to wait exactly to the count of 100 and then pack it in. But as certain as the sun rises in the east and ice melts in the spring, you will hear a defiant peep just about the time you reach 94. On goes the flashlight. Down goes the hand. Up comes a tangle of water plants, snails and mud. And there in the middle of that mess is a tiny, little brown frog with a little black cross on his back. For a minute your feet are not cold and you have feeling in your fingers and for a brief, flashing instant there is some reasonable, rational explanation for a grown man wading around in a pond at night when anyone with a grain of sense is inside watching “Untamed World” and sipping hot chocolate.

Perhaps this chapter ought to be an explanation of why some people choose to do unquestionably silly things with their life, but if it were, I am afraid it would be a very short chapter. But reasons can be presented to explain why that Spring Peeper was there so late at night and calling so proudly. Very similar reasons would account for the Chorus Frog being there calling and for the Leopard Frog and the Bullfrog and even the homely toad. The reason is simply that there is love in the air. The male frogs and toads have arrived or are arriving at the ponds from their respective hibernating spots. Some were already there and have just surfaced from the mud and leaves

on the bottom. And that magnificent chorus of cheeps, trills, grunts, quacks and clicks is simply what made Madison Avenue rich, advertising. Any female within earshot (and it is very difficult not to be within earshot of a chorus of excited male frogs) knows that the time for making little frogs has come. And the calling serves to notify other males that Mr. Right has arrived and is presently occupying that portion of pond bordered by those four lily pads on the right, that old stump on the left, this patch of shore behind and the call of that great brute of a bullfrog in front. Yes, some frogs, the larger ones especially, do display territoriality and, in fact, Green Frogs have fights over their territory. Admittedly, their combats lack the magnificence of bull elk's bellowing and charging each other in the mountain passes, but the feeling is still there. The fight tends to be a simple shoving match with the winner staying on top, but that is enough to establish who will have the first attention from any female drifting into the area.

There is considerable evidence too that frogs use their voices to space themselves evenly throughout the breeding area. But as is usual whenever we get to know a wild creature better, the answer is not as simple as that. For one thing, all frogs do not jump in the nearest pond and start singing. Bullfrogs like to sing in the water. Pickerel Frogs will even call under water. Chorus Frogs and Spring Peepers like matting or clumps of vegetation out of the water but in the pond. Toads seem to prefer the edge of the pond and treefrogs often call from high in the trees.

Nor do they all call at the same time. The first to call are usually the Spring Peepers and Wood Frogs with the Chorus Frogs and toads close behind. Soon after them will be the Leopard Frogs with the Pickerel, Mink and Green Frogs just

starting as the earlier callers begin to disperse back to the woods. Bullfrogs seem to be the last to begin; but they, along with the Green Frog, will often call all through the summer.

But what about the nitty-gritty? Everyone loves a lover and this is particularly true with toads. A male toad will climb on anything that even remotely resembles a female toad such as another male toad, a dead toad or a herpetologist's foot. A male toad will give a series of release clicks to let the offender know he's wasting his time; a dead toad, of course, will do nothing; and a herpetologist will generally give a series of disgusted release swats. Since toads and frogs have no organs for copulation, the only thing that keeps them together is the male's ability to hang on. This act is called *plexus*. To facilitate a good grip, the males develop large thumb patches during the breeding season. While the female passes her eggs from her oviducts, the male simultaneously emits milt, a fluid containing sperm. When the sperm unites in the water with the nucleus of each egg, fertilization takes place. The eggs may be laid singly, in strings or in clumps depending on the species. After a period of weeks (again differing with each species), the eggs hatch and become tadpoles, the larval stage of the adult frog or toad. Now most everyone has at some stage in their schooling studied the metamorphosis of tadpole to frog, but what is less well-known is the role of predators, availability of food and temperature in the rate of this change. Bullfrog tadpoles regularly overwinter and may go another winter if food is plentiful. But if food is scarce or the pond starts to dry up, there is evidence that metamorphosis will accelerate.

Tadpoles are strictly on their own with not so much as a good luck blessing from their parents and the vast majority of them ends up in the stomachs of fish, waterfowl, turtles or

any other of the numerous predators that find tadpoles delicious. But Nature has foreseen this problem and to remedy the predicament of such high losses, blesses frogs and toads with large families. Some frogs lay as many as 20,000 eggs.



elaborate courtship rituals of the salamanders

Although salamanders are not entirely voiceless, their tiny little squeaks and whistles are not loud enough to attract any passerby. No one has ever been kept awake at night by a chorus of male salamanders. But what they lack in voice, they more than make up for in elaborate courtship rituals.

Take for example, the Two-lined Salamander. The male of this species of brook salamander presses his nose against the female's head and body. After the female is satisfied that this is the male for her, she acknowledges his advances by straddling his tail and pressing her nose against the glands at its base. The male then moves his tail out of the way and the pair will waddle or swim along with the female pressing her head against him. Once the male decides that the time has arrived, he deposits his spermatophore, which is simply a sticky cluster of sperm. The female moves along until the sperm adheres to her cloaca and she then deposits her eggs, now fertilized by the sperm. But the male is watching all this and should the female not show any interest in his spermatophore, then he will go back to stage one rubbing his head against her and lashing his tail. The purpose of lashing the tail seems to be to waft the scent given off at the base of his tail towards her nose.

In the case of the Red-backed Salamander and the Four-toed Salamander this same little dance and courtship takes place, only on land. It should be realized that whether it takes place on land or in the water, this rubbing and nudging of each other can go on for days.

One of the more unusual features with salamanders like the Spotted and Blue-spotted Salamanders, which breed in the water but spend the rest of the year on land, is that the males all arrive at the breeding pond in advance of the females and spend their time swimming about patrolling the shoreline for arriving females. This activity serves to stimulate them to even

more activity and the pond may appear to have hundreds of little waves on it.

Once the eggs have been fertilized, the female deposits them on some suitable rock or plant in the water and both male and female go back on land. But this is not the case with the terrestrial species, the Red-backed Salamander. The female of this species lays her eggs in decaying vegetation or in rotten logs and then remains with them. This apparently serves two purposes. Not only does the female's presence discourage predators from taking the eggs but experiments have shown that the moisture from her body helps keep the eggs from drying up. Sometimes, females will move their eggs to another location if they have been disturbed.

Once the eggs have hatched, the young of all the salamanders that breed in the water are on their own. They all possess bushy, external gills for breathing and, in the case of Mud-puppies, these gills are permanent. In the other salamanders the gills slowly disappear as the young make ready for life on land. The exception again is the purely terrestrial Red-backed Salamander, whose young possess only the remnants of gills and who look almost identical to the parent. Some salamanders may even stay with the young for a while after they hatch, apparently to keep them moist.

The best known fact about reptile reproduction is that not very much is known. One very clear difference between reptiles and amphibians is that reptiles possess copulatory organs and do mate after the fashion of higher animals. Most of them do possess that great evolutionary advantage over amphibians in that they lay eggs with shells on them so that they are not as dependent on the weather for survival. Some snakes have gone even further than that and have their young alive which takes even more of the risk out of being a parent.

The lazy old turtle has an active and exciting courtship. A turtle like the Painted Turtle which breeds in the water courts his chosen female by swimming backwards while facing her and periodically stroking her cheeks and chin with his long claws. When and if she likes the look of him she sinks to the bottom and he follows swimming onto her back and gripping her shell with his claws. Sometimes they will copulate for over an hour.

Turtles like the Box Turtle and the Wood Turtle that mate on the land, spend their time looking for the opposite sex. When they meet, a courtship of bobbing their heads and nudging one another takes place before copulation. In the case of the Box Turtle with his high, domed shell, copulation can be awkward with the male almost vertical so that he may be sitting on the back end of his shell. Many respected herpetologists have remarked that mating Box Turtles look ridiculous.

All turtles lay eggs and one of their problems is finding suitable soil to dig in. In areas like the St. Lawrence River, with a highway running right beside the river, many turtles are killed each year crossing the highway while looking for a nesting site. Once the eggs are laid, they are no concern of the parents and when the little ones break through their shells, dig themselves out, and head for the water; they are on their own.

Several years ago I had the opportunity to be a foster parent to five Snapping Turtle eggs that had been found by a friend who was working for a construction company filling in a small marsh near Ottawa. Knowing I liked herptiles, he brought them to me and I put them in dry peat moss and gave them a bright lamp during the day. Three weeks later the first little snapper could be seen pushing his head through a crack in the shell and I took him out of the jar so I could watch the hatching better. Ten minutes of struggling followed till finally

the little fellow was free of his old home. Except for the yolk sac on his belly and the soft flexible shell, he was an exact replica of the big Snapping Turtles I had often caught. Nor was the resemblance only physical for when I picked him up to examine him closer, the little devil bit me – in true snapper fashion. I guess he must have got a good briefing in the egg about the harsh realities of the outside world.

Ontario's only lizard, the Five-lined Skink, seems to have the same problem as our old friend the toad. He cannot tell another male from a female. The male skink solves this



if it runs away, he knows it is a female skink

problem in a way even simpler than does the toad. During the spring mating season, the male runs around with his mouth open attacking any other skink he sees. If the other skink opens its jaws and fights him, then he knows it is another male. But if it runs away, he knows it is a female skink. He then pursues her and copulation takes place. Unlike turtles, but in common with snakes, the Five-lined Skink possesses a double penis, called a hemipenis. Only one penis at a time is used during copulation depending on which side of the female the lizard is on. Again, unlike turtles, Five-lined Skinks do show some maternal instinct, at least towards the eggs. After the female has laid her eggs under a board or log where it is soft, dark and damp, she will lick and turn her eggs to keep them equally moist. She may even pick an egg up in her mouth and move it to a new position. Baby skinks look just like their parents, except that the pattern on the back is more pronounced and the tail is bright blue.

Snakes have the most complicated and least known reproductive history. For one thing, they are shy and only a few species have been bold enough to let us observe their romances in captivity. Much of what we know is based on a few observations and should, therefore, be considered to be what often happens, not what always happens.

To a certain point, snake courtship conforms to a widespread pattern. When the male locates a female, he waves his tail slowly back and forth. He then approaches her from the rear flicking his tongue in and out rapidly. She usually responds by moving away. The two snakes then interwind and the male presses his chin against her back. Male Garter and Brown Snakes press their chin against the female's neck and contract their muscles, sending a series of waves down their bodies. Fox Snakes and Milk Snakes do not entwine as much and the

male usually bites the female on the back and neck. Once copulation (which may last hours) is over, the two snakes usually go their separate ways.

What happens with the fertilized eggs depends on the species of snake. Some snakes lay leathery eggs in rotted logs or under rocks. Other give birth to live young who are encased in thin transparent membranes, which they break immediately. Some are intermediate between the two, producing eggs but hatching them inside their bodies.

In Canada where the summer is so short and unpredictable, the female snake who leaves her eggs runs the risk of a sudden frost, a heavy rainfall or a hot spell; all of which can destroy the eggs. Therefore, it is an advantage for a snake to let its young develop inside its body where the snake can keep conditions relatively stable by reacting to the weather conditions. It should come as no surprise, then, to find out that the snakes that range farthest north in Ontario and are the most abundant, are also live-bearers. The Water Snake, the Garter Snake, the Brown Snake and the Red-bellied Snake all give birth to living young. The Queen Snake and the Massasauga Rattlesnake also are live-bearers, but they have other specialized problems that restrict their ranges. The only snake in Ontario that hatches its eggs inside its body is the Ribbon Snake. All the rest lay eggs. However, it is not certain that those species which lay eggs, immediately abandon the clutch. There is an authentic report of a pair of Black Rat Snakes which sunned themselves for a while, then incubated a clutch of eggs deposited in a sawdust pile, by curling their heated bodies around the eggs.

Newborn snakes may be more brightly patterned than the adult but they are identical in form and structure. Baby Massasauga Rattlesnakes are born with fangs and venom sacs and are quite willing to use them.

If the mating of Ontario's herptiles seems like stories of rushed romances and callous partings, it must be remembered that in Ontario everything in the nature of herptiles is a rush to beat the winter. Mates must be found, young must be produced and given a chance to grow and food must be found for the parents in the few short months between spring and fall.

“During the millennia that frogs and men have lived in the same world, it is probable that men have hunted frogs. And during that time a pattern of hunt and parry has developed. The man with net or bow or lance or gun creeps noiselessly, as he thinks, towards the frog. The pattern requires that the frog sit still, sit very still and wait. The rules of the game require the frog to wait until the final flicker of a second, when the net is descending, when the lance is in the air, when the finger squeezes the trigger, then the frog jumps, plops into the water, swims to the bottom and waits until the man goes away. That is the way it is done, the way it has always been done. Frogs have every right to expect it will always be done that way. Now and then the net is too quick, the lance pierces, the gun flicks and that frog is gone, but it is all fair and in the framework.”

JOHN STEINBECK
CANNERY ROW

LIBERTY

To maintain one's liberty one must be prepared to defend it. One of the main threats to an amphibian's survival is not any predator but that fickle lady, the weather. Away back when the first amphibians crawled out of the water and began to breathe air, it was a marvellous new step for any animal to take. As millions of years passed, amphibians grew bolder and bolder and more and more able to leave the water behind,

but they never did completely cut that thread. That act would be left to the reptiles, with their new impervious scales and shelled eggs that would leave them free of the age-old fear of drying out, either before or after birth. Amphibians today remain obliged to conserve considerable moisture in their bodies. Although some, like the toad, have developed tough, almost leathery skin to retard evaporation, they still must seek cover in the heat of the day and seek bodies of water when there are lengthy droughts. Some of the salamanders no longer have to lay their eggs in water but they must lay them in rotted logs which retain moisture. As adults, they must also stay where it is cool and moist, avoiding the direct sunlight.

One of the handicaps which faces all amphibians is the use of their skin for breathing. With reptiles, their skin mostly just holds them together and acts as a defence against predators, but since all amphibians, to varying degrees, breathe through their skin, it must be soft and permeable. The tadpoles of all Canadian frogs possess gills and take their oxygen from the water. Likewise many of the salamanders lay their eggs in the water and the young possess gills and are water-dwellers. This, perhaps, is one of the major fascinations of amphibians. Every spring, the naturalist gets to watch a re-enactment of the first major step in the evolution that eventually led to man, as tadpoles lose their gills, develop lungs and head for the land.

Some salamanders, like Ontario's Mudpuppy, never leave the water and retain their gills throughout their life. Some, like the Red-backed Salamander, have left the water completely and have even lost their lungs, depending completely on the moisture in the rotting logs or moss they inhabit for their oxygen. This water is absorbed through their skin. In fact, it is unwise to handle these attractive little amphibians because their skin will dry out quickly in contact with a dry hand.

The most amazing life-story of our amphibians is the newt. The newt begins life as an egg in the water and hatches into a water-breathing larval salamander. As metamorphosis takes place, the gills disappear, lungs develop and out onto land waddles the brightly-coloured red eft. The eft will completely forsake the water for two or three years and will wander through the wet woodlands until, heeding some unknown urging, it returns to the water. The bright red colouring fades



a fin is added to the tail before the eft returns to the water

to a dull green, a fin is added to the tail and skin changes take place to permit aquatic respiration. As an adult newt it will spend the rest of its days in the waters of ponds, rivers and lakes.

Frogs and toads, of course, must always retain a certain amount of moisture in their bodies. Once it falls below a certain level even the most terrestrial amphibians must seek water to re-establish their water balance. This level varies from species to species. The toad, for example, can travel great distances from water, while the Bullfrog desiccates very easily and must stay in or close to water. As a point of fact, by the way, that fluttering of the throat that resembles swallowing in frogs and toads, is, in fact, breathing. These vibrations force air down into the lungs.

Reptiles escaped the handicap of having to keep their skin moist. But this does not mean that reptiles are completely unaffected by the sun. True, they can stand direct sunlight but only for limited periods. The length of time snakes and turtles spend sunning and the time of day they sun is determined in Canada by the season. In the spring and fall, when the sun is not directly overhead, reptiles will sun for great periods of time, but in July and August, with the sun nearly overhead, they will only bask in the early morning and late afternoon and will seek cover during the hottest part of the day. Turtles, with their hard shell, can tolerate more direct sun than snakes or lizards.

But the other threat to reptiles and amphibians is the cold Canadian winter. All Canadian herptiles hibernate. Many of the amphibians and turtles burrow into the mud at the bottom of ponds or lakes to spend the winter. How does an air-breathing turtle survive five or six months in the water? The answer is not perfectly known but is based on the extremely low metabolism of a hibernating herptile and the seal of mud

or dead leaves around it. The turtle does not cease breathing but only breathes so slowly and needs so little air that the oxygen available in the mud is sufficient.

Snakes and lizards hibernate on land under large rocks, in empty woodchuck burrows or in any area that is below the frost line. The reports in the newspapers of houses in Manitoba and Saskatchewan being overrun with Garter Snakes in the spring were simply cases of an old house basement constituting a perfect hibernation spot. Snakes, in particular, often congregate to hibernate and numbers of over 100 in one hibernaculum are not rare. One such site in Manitoba was found to contain over 2,000 Garter Snakes. A reptile's or amphibian's ability to tolerate extremes of temperature is one of the principal determinants of species distribution and abundance in Canada. It is no coincidence that the herptiles most commonly seen, like the Garter Snake and the Leopard Frog, are also the first we see in the spring and last we see in the fall.

But let us assume that our frog or snake or turtle has found a pond to live in that never dries up or freezes, or a good rocky ledge where it can hibernate and sun-bathe, and has figured out how to avoid drying up or freezing. Life in the animal world is and always has been a case of avoiding getting eaten and of getting enough to eat. The first problem is to avoid getting eaten.

There are many predators which feed on herptiles including birds, raccoons, skunks, foxes, fish, waterbugs and in many cases, other herptiles. There are almost as many ways to avoid getting eaten as there are predators to fear and the variety of defences employed by herptiles is one of their many fascinations.

One of the oldest and most successful methods to avoid getting eaten is to run away. Nearly all herptiles employ this

method to some extent and with some of the most successful, like the Garter Snake and Leopard Frog, it is the main technique. Even herptiles like the rattlesnake and Snapping Turtle, which have few natural enemies, given a chance will run away.

Coupled with fleeing is the other most common defence, hiding. This is usually done through the aid of colour. Some herptiles like the Green Snake are perfectly camouflaged for one sort of habitat but would be poorly hidden if placed in a different setting. In this way, an extremely specialized colour restricts the habitat where a herptile can live. For this reason, most snakes are blotched or striped with green or brown as the predominant colours so they can blend reasonably well with a variety of habitats. One Ontario herptile, the Gray Treefrog can change colour between green and gray which is useful since the two basic colours of the trees where it lives are green and gray-brown.

Some herptiles cannot run away very effectively but they do not usually have to. The turtles are, compared to birds and mammals, very slow, but their hard shells protect them from most predators. Two Ontario species, the Box Turtle and the Blanding's Turtle, have hinges on their lower shells which allow them to close their shells even tighter. The Blanding's Turtle can only incompletely close its shell while the Box Turtle can seal itself up tight – hence its name. The Softshell Turtle's shell offers little protection from a big predator while the Snapping Turtle and Stinkpot have shells that only partially cover their bellies and legs. All are vicious fighters with long mobile necks and the Softshell Turtle is also a very fast swimmer.

One of the best ways of surviving is to be poisonous. The Massasauga Rattlesnake is actively poisonous. Although its

poison was evolved to kill its prey, it will use it against any attacker. All the other poisonous herptiles in Ontario are passively poisonous. That is, a predator must bite them or in some cases eat them before the poison is effective. This might seem a very poor way to be poisonous but, in fact, nature is looking after a species not an individual. If enough predators eat a toad and get sick, then any toads encountered from then on will be left alone. In this way, it is more advantageous to the species for a herptile to be mildly poisonous than to be fatally poisonous. If the raccoon that eats the eft dies, then no lesson will be learned by the raccoon species. Therefore, it is better that the predator get sick but survive so that it, and perhaps its young, will learn to avoid that particular prey. In Ontario, the bright red eft, the toad and the Pickerel Frog are the best known poisonous herptiles.

If you cannot actually be poisonous, you can at least taste bad or smell bad so that a predator will be less inclined to feed on you. Nearly all Ontario snakes and most Ontario turtles will secrete a distasteful smell or empty their bladders if picked up and in some cases, this habit has given them their name. The Fox Snake, the Mink Frog and the Stinkpot were all named for the secretions they produce to discourage enemies.

Another excellent way to survive is to make the predator work so hard, or risk so much, that he gives up, and goes away looking for easier prey. The Snapping Turtle, the Black Rat Snake, the Fox Snake, the Milk Snake, the Massasauga Rattlesnake and the Blue Racer Snake will all fight viciously if cornered or cut off from escape and even a large hunter like a mink or a hawk would find it difficult taking on one of these fellows. But these herptiles all have something else in common besides the fighting spirit, and that is their size. Clearly, size is valuable too, because it reduces the number of animals that

can attack you. Many herptiles like the Water Snake, Garter Snake and even the little Brown Snake, flatten themselves out when threatened to make themselves look bigger. Many amphibians like the toad and the Bullfrog inflate themselves with air if attacked by a snake, so that they appear too big to swallow. Probably the most amazing defensive behaviour by any Ontario herptile is the bluff routine of the Hognose Snake.

I saw my first Hognose Snake along a nature trail in Georgian Bay Islands National Park. It was late afternoon and I had been hiking along with Park Warden Al Gibbs exploring the islands and taking photographs. Suddenly my eye was caught by a movement on the trail in front of us. Looking closer I found we had come upon a baby Hognose, less than eight inches long. I had read and heard much about the amazing defense displays of the Hognose, of how it was called a spreading adder and puff adder and of how its breath was poisonous. I was interested to see this for myself. So I held a finger in front of the snake and sure enough the little fellow reared up in defiant anger, spread its hood and hissed at me. True, when it reared up it was only about two inches off the ground and you had to have your ear close to hear the hiss, but the fighting spirit was there. The little snake's tongue came out and with mouth open it rolled onto its back and writhed about on the ground in the apparent throes of death. When it finally stopped, on its back, mouth still open, tongue dangling out, Al and I just stood there amazed. Deciding to check if everything I had heard was true, I picked the snake up. It lay limp in my hand. Then I placed it back on the ground but on its stomach. To our great amusement, it immediately rolled over on its back and lay still. It was true. Hognose Snakes believe that all dead snakes lie on their back.

Unfortunately this amazing display often goes unnoticed by those who encounter this snake in the sandy habitats it frequents. Although this intricately evolved bluff should compensate the fat-bodied snake for its inability to slide quickly away from danger, it all too often serves only to get the poor, totally harmless creature killed. This is the problem that faces any snake whose defence involves standing and fighting. While it works well against most animal predators, it only makes it easier for men to kill them. But there is a certain kind of beautiful pathos in watching a Milk Snake not ten inches in length and not as thick around as your little finger, coil up in a striking pose and try to frighten you away.

Another method of defense which is usually coupled with yet another behaviour is scaring or at least disconcerting an enemy with sounds. Rattlesnakes possess rattles, a series of interlocking horny rings, which, when vibrated, produce a sound more like a buzz than a rattle. Since a rattlesnake cannot hear its own rattle, there has been considerable speculation on the purpose of the rattle. But one of the most popular theories traces the origin to the prairies when it served to keep buffalo and antelope from stepping on the snake. Many snakes, such as the Milk Snake, the Black Rat Snake and the Fox Snake vibrate their tails rapidly, but whether this is an imitation of the rattlesnake or simply a nervous reaction designed to frighten or distract the enemy, is not known. Many snakes and turtles will hiss and this can be pretty alarming to a human nearby, so hissing probably has a similar effect on the herptile's natural predators.

Many pond frogs will squawk when grabbed or frightened. Green Frogs will often squeak as they dive from the shore and that will often cause other Green Frogs to enter the water. One of the most unusual sounds I have ever heard was that

made by a large Bullfrog I had captured for the purpose of measuring. The sound could only be described as the cry of a baby and I was so startled that I loosened my grip on the frog and it leaped into the water. When I recaptured it, the frog repeated that mournful cry and I must admit I measured and released it as quickly as possible.

Herptiles that are often visible to predators have evolved a system of mutual aid. Frogs will dive to the bottom of ponds when they hear other frogs dive and if one turtle in a sun-bathing group dives into the water, the rest will usually follow, often having no idea what the danger was.

Sometimes a herptile must give a little to save a lot, and this is the case with many salamanders and with the skink. The tail of the Red-backed Salamander will come off at the slightest pressure and will thrash about for several minutes after being detached. In the Four-toed Salamander this is facilitated by a constriction at the base of its tail. Skinks, particularly the young, lose their tails at the slightest contact during an encounter with an enemy. The reason for this is obvious. The predator theoretically stays chewing at the writhing tail while the animal itself dashes to safety. These herptiles can regenerate their lost tails so that the loss is only a temporary one.

Two interesting and unusual defense behaviours are those of the Ringneck Snake and the treefrog. The Ringneck Snake is a fairly plain-coloured snake except for the bright yellow-orange ring around its neck and bright yellow-orange underside. This snake is rarely seen except under rocks or logs, but if uncovered the snake will often curl the last few inches of its body into a tight coil and present the bright underside to the intruder. Whether this is to simulate a warning of poison or simply to distract a predator is not known. It is worth men-



herptiles have clearly evolved many unique ways of protecting themselves from predators

tioning that the deadly poisonous but timid Coral Snake of the southern United States also uses this defensive technique of coiling the tail.

Another technique developed is the flash colouring of the treefrog. The treefrog is able to change its colour from green to gray and is normally well-camouflaged from predators, but during the spring breeding season, the males congregate and their calls attract predators as well as females. During this time of year the male develops bright orange patches on the insides of its hind legs, which are hidden when the frog is resting normally against a tree trunk. When a predator approaches, the frog leaps away revealing the bright patches and again concealing them when it lands. The principal idea seems to be to distract the predator's eye so that the animal is left staring where the flash appeared and not where the frog landed.

Herptiles have clearly evolved many unique ways of protecting themselves from predators but it should be remembered that no defense always works. If they are big, something is bigger. If they taste bad to raccoons, hawks may find them delicious. If they are fast, something is faster. As is usual, the most successful herptiles employ a variety of defenses. Garter Snakes are well-camouflaged, flee if approached, bite if grabbed, flatten themselves out to look bigger and secrete a foul smelling scent. And some defenses which work well with some predators, work very badly with man, leaving a species that has spent millions of years finding a way to survive natural predators, suddenly threatened with extinction.

THE PURSUIT OF FOOD

You are a herptile and you are happily settled in some lovely little habitat. Spring has come and gone with all its romance,

and now the very important business of getting enough to eat has begun. But what will you eat? Most of that will be decided by your size and structure. If you happened to be an inch-long Spring Peeper, you would be very foolish and short-lived to try feeding on turtles. If you were a seven-foot long Black Rat Snake then you would probably die of exhaustion if you tried to live on slugs. And if you were a Box Turtle, you would starve to death long before you caught enough Mudpuppies to eat. Quite simply, you are what you eat.

Turtles are, as a general rule, slow-moving. Therefore, plants form a large part of their diet. A Black Rat Snake would lose more energy hunting small prey than it would gain from eating them. For this reason it feeds on fairly large prey. Most frogs do not actively prowl, as do the reptiles, so that their lack of motion results in less energy loss. Instead, they tend to plop themselves into an area of high insect activity and wait for dinner to serve itself. Terrestrial salamanders prowl under logs and rocks where they have the advantage of being one of the largest predators in those locations. Some herptiles specialize in food that most other animals find distasteful. Hognose Snakes show a marked preference for toads, which are poisonous to most predators. They even possess a special tooth for puncturing toads that inflate themselves. Red-bellied Snakes prefer slugs and have evolved a unique method of curling their lips out so that only the teeth are in contact with the slug. The defensive slime released by the slug is then of no use. Toads make a meal of many of the hard-shelled beetles and bugs that many birds find unpalatable.

Not being choosy is also helpful. Most of the pond turtles, the Snapping Turtle in particular, will feed on carrion. Dead fish apparently play a large part in the Water Snake's diet as well. But let us assume that you have decided what food

suits you best in terms of energy requirements, ease of capture and availability. How do you go about feeding?

Patience is a virtue where frogs are concerned but the Common Toad prefers to prowl. For the toad to be attracted, the insect must be moving. Once the toad is close enough, it uses its long, sticky tongue to grasp the moth or beetle and pull it back into its mouth. The tongue is the main weapon of all the frogs and toads although if the prey is very large, frogs and toads will use their front feet to “stuff” it into the mouth. Once in the mouth there is no chewing as their teeth are minute, and the food is simply swallowed whole. Even the backs of the amphibian’s eyes are used to force the prey down the throat.

I know it sounds a little strange, but I hold the esteemed position of being one of the very few people who have ever been kept awake at night by the sound of frogs feeding. Does sound a little strange, doesn’t it! The circumstances were a little unusual as my partner and myself had been given a treefrog by some well-meaning park visitors, and we were keeping it overnight before releasing it. Before we went to bed we went outside to the light over our cabin door and caught some moths to see if the little fellow would eat. Shoving the moths into the gallon jar with the little frog we sat down to watch what we felt sure would be an orgy of feasting. Nothing. The little treefrog just sat on his branch and stared back at us as the moths flitted back and forth in front of him. After twenty minutes of trying to outstare a treefrog we went to bed. I had been lying down for no more than a moment when I heard a soft little “thump” from the next room. Silence. Then another thump. Curious, I got up and went into the frog’s room where I found my companion already observing the jar. “Watch this!” I just arrived in time to see our little treefrog

leap, legs outstretched, directly towards us, landing on the glass with a loud thump. Right in front of him was the quarry, a large, fluffy moth, and with a sudden dart of the tongue he snatched the moth. No sooner had the last bit of wing disappeared inside that little mouth when our treefrog leapt across to the other side of the jar to grab another one. When he finally finished he was so fat that the normally smooth lines of his body were broken by bulges, lumps and swellings.



an overfed treefrog

The salamanders grasp their prey and swallow them in the same manner, but there is much more prowling involved than with most frogs. One of the best rules for what amphibians will eat is that they will eat any living thing they can overpower. Mudpuppies will take crayfish, Bullfrogs will eat smaller Bullfrogs and even small snakes!

Reptiles are also versatile in their eating habits but they tend to specialize more than most amphibians, due to their greater size. Nearly all turtles are in part vegetarians, but some have specialized further. The Map Turtle has large broad jaws for crushing its principal food, snails and clams. Snapping Turtles and Stinkpots have long necks and hooked jaws for striking at fast-moving, slippery fish and frogs.



herptiles are versatile in their eating habits

Ontario's only lizard, the skink, feeds on small insects, centipedes, spiders and other small creatures found under logs, boards and rocks. Turtles, lizards, frogs, toads and salamanders share a single weapon for capturing prey, their mouths. It is not until we examine the snakes, who would seemingly be at a disadvantage in lacking limbs, that we find more advanced methods of hunting.

Many snakes are like other herptiles in that if they cannot subdue and swallow an animal with their mouth alone, their prey will escape. To aid this, all snakes have rows of sharp teeth all pointing backward and a double-hinged jaw that enables the snake to extend its jaws to encompass prey seemingly too large for it. In addition, the snake's windpipe is movable. If a large prey item is being swallowed, the snake can still breathe. The trouble with this system of feeding, however, is that if the herptile picks an animal that is too large for it or one that is too lively, the herptile can be seriously injured attempting to subdue it. This becomes evident when the main prey are mammals which have teeth and claws. To overcome this, many of the snakes that feed primarily on mice or rats are constrictors.

Constrictors, like the Black Rat Snake, the Fox Snake and the Milk Snake, grasp their prey with their jaws but only for a good grip. An instant after striking, the constrictor throws its coils about the mouse or rat and tightens. Contrary to common belief, the prey is not crushed to death but rather is suffocated. When the prey exhales, the constrictor tightens its grip so that the animal cannot inhale. The process is very quick. The snake cannot afford to give the prey time to bite or claw.

The most efficient hunter of all the snakes, however, is the Massasauga Rattlesnake. The venom of the rattlesnake attacks

the prey's circulatory system and acts very quickly on a small mouse. The venom is manufactured and stored in two venom sacs at the back of the Massasauga's head which gives the head its triangular appearance. The venom is injected by means of two fangs which lie against the roof of the snake's mouth when it is closed and spring erect when the snake strikes. These fangs are hollow and act like hypodermic syringes. When the rattler strikes, it throws its head back so the fangs are pointing forward and as they enter the prey, venom is injected through them into the animal. If it is an accurate strike to a small victim, death comes in a matter of seconds. The Massasauga is in contact with its prey for less than a second.

But venom is not all the Massasauga possesses to aid its hunting. The rattler hunts mostly at night when rodents are active. While elliptical pupils improve its night vision, an even better adaptation is its secret weapon, heat detectors! Rattle-

snakes belong to a group of snakes called pit-vipers because between each eye and nostril there is a deep pit. For many years the purpose of these pits was unknown until it was discovered that they detected any variation from the normal air temperature. Hunting at night, the rattler can detect the temperature difference between the night air and small rats or mice, who are constantly producing heat to maintain their body temperature. Later studies revealed that not only did the rattlesnake use these pits to locate its prey but also to direct the strike. It was found that blindfolded rattlers would strike unerringly at a hot lightbulb. And if the prey should crawl away a few feet before dying, the snake used its sensing pits to follow it. The U.S. Air Force's Sidewinder missile is a heat-seeking missile named after a desert rattlesnake. Apparently man can persecute the rattlesnake for its dangerous potential but sees no irony in copying the snake's methods to create better weapons for killing man!



WHEREFORE AND WHY

WHEREFORE AND WHY

Certain aspects of animal distribution are familiar to everyone. We all know that sharks live in the ocean because they cannot survive in fresh-water. Boa constrictors stay in the jungle because they live where it is very hot. There are exceptions. There is a fresh water shark in Lake Nicaragua and there is a boa that lives in British Columbia, the rubber boa.

Biogeography is the study of the distribution of organisms (plants and animals) on the earth's surface. A discussion of biogeography usually is punctuated by words like dispersal, endemic, and relic populations but to simplify matters, it is the study of **why** things are where they are and **how** they got there.

Herptiles in Canada are all representatives of U.S. species that spread north after the last glacier withdrew. The extent of their range was and is determined by the availability of food, suitable habitat, moisture, heat and the lack of competition. Herptiles, like all other organisms, occupy niches. Some are restricted by their own specialization and these species are the ones that suffer most, especially from human interference. Others are highly adaptable in terms of food and habitat requirements. For example, the Spotted Turtle's preferred habitat is marshy meadows, swamps, marshes or other shallow bodies of water. But this preference exposes it to contact with humans and natural predators, as swamps and marshes are drained for human development. Unfortunately this turtle is easy to capture and is frequently taken as a pet then released again in some totally unsuitable habitat by well-meaning keepers. Its low reproductive rate of one to four eggs also contributes to this attractive little turtle being rare and endangered. On the other hand, the Snapping Turtle will live in virtually any body of fresh water, large or small. It rarely

leaves the water and strikes viciously if cornered on land. Combining these factors with an egg clutch of up to eighty eggs explains why the snapper is one of the most abundant turtles in Ontario.

There are many different ways of classifying habitats and since few experts agree on the names, we will try using only terms that are familiar to everyone, words like ponds or beaches. Some species like the Garter Snake, the Water Snake, the Snapping Turtle, the toad and the Leopard Frog are highly adaptable and will be found in a great number of habitats. But in Ontario, which displays the greatest diversity of herptiles in any province of Canada, a large number of species are confined to southern and southwestern Ontario. The main reason for this, of course, is the significantly warmer climate in this part of Canada. Both British Columbia and the prairie provinces share a large number of species in a small southern portion of their areas. These southern lands are often the same or similar to much larger habitats in the U.S., so that herptiles which are abundant farther south are rare in Canada or confined to very small ranges.

One term that needs to be introduced and explained is ecotone. An ecotone is the area where two habitats meet. One could almost say it is a border or edge. For instance, the edge of a pond where the field or forest surrounds it is a miniature ecotone. Many herptiles live primarily in ecotones. For example, the Ribbon Snake, the striped fellow that looks like a slender, elegant Garter Snake, frequents the edges of ponds, marshes, and streams, but he can also climb and swim. The advantage this gives the snake is that it can hunt three different habitats for its food, which primarily is frogs. Some frogs, like

the Green Frog and Bullfrog, generally stay in the water while others, like the Leopard Frog, tend to stay on land near water. Still others, like the Gray Tree Frog and Spring Peeper, often call from low bushes near water. Thus the Ribbon Snake has a selective advantage over the Water Snake, which rarely hunts far out of water and is a poor climber. However, the Water Snake has its share of advantages too. Being so aquatic allows for greater size, which gives the Water Snake a wider variety of prey to choose from and reduces the number of predators which can attack it. Being such an excellent diver as opposed to the surface-swimming Ribbon Snake again reduces the number of predators, since the majority of birds and mammals that hunt snakes hunt on land or on the water surface. This way two niches are created, so that the Ribbon Snake and Water Snake live in close company but in distinctly different habitats.

Any consideration of herptiles by habitat introduces another problem. Although many herptiles have been shown to have territories, spring breeding activities break all the rules. Frogs, toads, salamanders and turtles all make pilgrimages to breeding or egg-laying sites in the early months of the year. This movement often brings them in contact with man when their routes cross highways. Indeed, in some places there are sufficient numbers involved to create a traffic hazard. And this congregation attracts its share of predators. The advantage this activity brings to the herpetologist is the chance to see and study secretive species like the Spring Peeper and Chorus Frog, that are rarely seen after they disperse back into the woods, or, like the Spotted and Blue-spotted Salamanders, which spend most of the rest of the year underground.

Therefore, the simplest classification of herptiles by habitat would begin with a look at where different herptiles spend most of their time.



frogs, toads, salamanders and turtles all make pilgrimages to breeding sites

Only a few herptiles in Ontario live primarily in deep water such as lakes or rivers and none is restricted to this habitat. The Mudpuppy is a salamander which is found in lakes, streams, rivers, ponds and canals. Since it is completely aquatic, the only time people see it is when it is caught on a hook and line by a fisherman. Then there are great cries of dismay and the Mudpuppy gets unhooked with much caution and thrown back. This salamander was probably searching the area for its principle food of crayfish when it spotted the unusual looking earthworm. Actually, there would have been much greater astonishment if the fisherman had been in Japan and had hooked the Mudpuppy's distant relative the Great Salamander which can reach a length of over five feet. Now that would make a great fish story! An interesting adaptation of the Mudpuppy is its ability to cope with extremes of water conditions. Like the larval stage of many land salamanders, the Mudpuppy extracts its oxygen by means of external gills. If the water the Mudpuppy lives in is foul or warm, the gills will be large and bushy and kept in constant motion to obtain oxygen. But if the water is cool with plenty of oxygen, then the gills will be small and contracted.

Another deep water herptile is the Map Turtle. The name map comes from the patterns on the turtle's shell and skin which resemble contour lines on a map. This species is the shyest and wariest turtle and though given to sunning out on rocks or logs, it will dive in at the slightest hint of danger. The photographers who want a picture of a great pile of these turtles packed two or three high on some rock had better possess great patience. One sudden move will leave them nothing to show for their troubles but a series of "plops" as one after another the turtles dive into the water. But if our photographers are truly patient and find comfortable positions for

waiting, they will be rewarded in time by the appearance of heads in the water one after another, scanning the area for danger before crawling back on the rock. And if they are very patient and cautious with their movements, our photographers may get a chance to see the intricate patterns of the Map Turtle and perhaps notice the large, broad jaws that help identify it. The only other chance to examine a Map Turtle is to happen upon one laying its eggs in the spring or early summer. Apart from sunning and nesting, the Map Turtle stays in the water most of the time.

Another herptile whose principal habitat is large bodies of water is a turtle that can easily claim to be the strangest looking turtle in North America. The Softshell turtle is peculiarly adapted for spending most of its life buried in sand in the shallows along rivers and lakes. This species is rare and endangered in Canada and so a special section has been set aside in a later chapter to give this unusual turtle the attention it deserves.

There are other herptiles besides these three that are frequently found in lakes or rivers, but they are as common in ponds or streams or marshes and their large ranges in Ontario reflect this adaptability.

The Snapping Turtle is probably the best-known turtle in Ontario. Nearly every lake has a legend about the old granddaddy snapper that chased everyone out of the water one day. At this point the story-teller invariably spreads his arms to encompass something the size of a tractor tire. In fact Snapping Turtles do get big – up to sixty pounds – although the average is closer to twenty. And when confronted on land they do make a formidable sight. They will strike at anything, and their long necks and powerful jaws make that strike a serious threat. The stories of them snapping broomsticks are exaggerations

but snappers could seriously damage a finger or hand that got too close. Their habit of hanging onto anything they bite proved useful when the Parks researchers were studying them. Simply give the turtle something to hang onto and measurements can be taken safely – for a little while! The Snapping Turtle should not be handled at all, as that long neck enables it to reach almost any hand holding its shell, and holding the turtle by the tail can seriously damage its vertebrae. For some reason the snapper is much less offensive in the water and the author has, on several different occasions, stepped on these turtles in the water with no response from the turtle other than a slow retreat.

A full-grown Snapping Turtle, weighing upwards of thirty pounds and measuring a foot and a half along the shell is truly the king of the lake or pond where it dwells. Despite its formidable jaws the snapper feeds almost equally on vegetation and animal matter and even prefers dead fish to live ones. It is equally indiscreet about its living quarters, which vary from the Great Lakes to small ponds – almost any permanent body of water. This turtle is also extensively hunted for food in southern Ontario and this demand may endanger its population in the future. But for now, the Snapping Turtle seems to be holding its own.

The only turtle that could compete with the Snapping Turtle for abundance would be the Painted Turtle. The distinguishing features of this turtle are the bright red, orange and yellow spots and stripes on the neck and legs of this turtle, which look as if they were painted on. There are two major reasons for the abundance of this species. The first is its remarkable resistance to low temperatures. It has even been observed on several occasion moving about below ice. Painted Turtles also seem much more tolerant to industrial pollution than most



one sudden move will leave him nothing but a series of “plops”



a full-grown Snapping Turtle is truly king of the pond

other herptiles and it is one of the few who have adjusted to living with man's wastes and effluents. These by-products of industry aid the growth of algae and weeds and these organisms form the bulk of the Painted Turtle's diet.

More often than not, the many forms of life around us escape our attention unless we take the time and effort to search for them. This is the case with a little turtle that is common throughout most of Southern Ontario but unknown to most of the people who swim or boat or fish in the waters it inhabits. The Stinkpot or Musk Turtle is a little turtle (its shell is rarely over six inches long) which derives its name from the powerful scent it gives off when disturbed or handled. It is actually a near relative of the Snapping Turtle with a long neck and powerful jaws. Like the snapper it may strike viciously at a hand held in front of it but its jaws are too small to do much more than break the skin. The Stinkpot, like the Mudpuppy, is sometimes caught by fishermen and is often mistaken for a baby Snapping Turtle. But even the harmless little Stinkpot, which, like its big cousin the snapper performs a valuable job in the ecology of a lake or pond by eating dead and diseased fish, can get its unfair share of human persecution. In Georgian Bay Islands National Park a camper brought in a Stinkpot he had captured in a swimming area. This tourist was angered that such a "dangerous" animal should be allowed in the area and left with the warning that he "didn't want to see that thing near the beach again!" Despite the educational efforts of the Park's Naturalist and Warden staff some people still refuse to understand that National Parks are there for the animals too and that a Stinkpot is about as dangerous to humans as a bunny rabbit.

Yet the herptile that shares the lakes and rivers with the turtles, frogs and salamanders, but takes more abuse than all

the others put together, is the Water Snake. Like the Snapping Turtle, Painted Turtle and Stinkpot, the Water Snake is not restricted to deep bodies of water, but may be found anywhere where there is a permanent body of water such as a creek or pond. The Water Snake is commonly mistaken for the poisonous Water Moccasin and killed, despite the fact that the real Water Moccasin has **never** been found in Canada. It belongs rather to southern American swamps and bayous, coming only as far north as the southern tip of Illinois. Nevertheless, many people believe the Water Snake is dangerous and the author has frequently been told of killing parties being organized by cottagers to hunt down Water Snakes. Unknown to these people the Water Snake provides a valuable service, particularly to fishermen. Along with amphibians the main diet of this snake is fish but as it is too slow to catch most healthy fish, it eats primarily the sick, diseased and even the dead ones. This culling of the fish population leaves more food for the healthy individuals. Campers often relate to Park staff their stories of attacks by Water Snakes. This usually results from the Water Snake's preference for sunning on land a few feet from the water. If a hiker walks between the resting snakes and the water, the snakes will often dash in the direction of the interloper. An attack? No. When frightened, Water Snakes invariably dash for the water where they are safest. If a person is in the way and not moving the snake might crawl right over his feet, but the snake's only desire is to reach the security of the lake or river and he has no intention of biting anyone. If grabbed or poked with a stick the Water Snake will bite, and a fully-grown four-foot Water Snake can give a nasty bite. There is no poison, however, and such a wound should be treated the same as any other cut. The message is clear: leave the Water Snake alone and he will gladly do the same to you.

But how did the Water Snake get such a sinister reputation? One day in the summer of 1974, I got the chance to observe what might be the basis for these rumours. It was a hot summer day in Georgian Bay Islands National Park and there were three of us hiking along by a lake when we decided to take a break to sit and enjoy the scenery. One fellow decided to go for a swim. While he was in the water we sat and scanned the area with our binoculars. It was a very peaceful scene until



when frightened, Water Snakes invariably dash for the water

one of the observers called out “There’s a snake headed for Gary!” I looked through my binoculars and there was a snake, too far away to distinguish the species, and it was headed straight for Gary. As we were in Massasauga country we called to the swimmer to warn him of the snake so that there would be no surprise collision. We then climbed higher on the bank to get a better view. The snake pressed on and it was definitely on a direct course towards Gary. It had reached to within about twenty yards of our swimmer, and we were beginning to wonder whether in fact there was some truth to those stories of Water Snake attacks, when it stopped dead in the water. It waited. We waited. After a few seconds it turned and swam off, but this time in a direction directly opposite from Gary. We sat on the shore and tried to think of what had caused this strange behaviour when the reason dawned on us. Gary had been swimming very leisurely and changing strokes so that the slight erratic ripples that reached the Water Snake probably resembled the ripples from a wounded or sick fish or frog. So it had headed out to investigate, but when it got near Gary it either saw him or realized from the ripples that what was there was too big for a Water Snake to handle, and it took off. Although we’ll never know for sure what caused that action, the logic of that explanation, combined with the fact that between us we had caught hundreds of Water Snakes and had never been attacked, makes that the most likely explanation.

Although several species of frogs are found in lakes and rivers they tend to remain right along the shoreline where their green colouring has good camouflage value. Therefore, I have classed them with other herptiles that live in small bodies of water. The newt is found in ponds and weedy bays of lakes throughout Southern Ontario. Its land stage, the eft, is found

in forests, under logs and rocks, and remains terrestrial for two or three years.

The word “distinguished” is rarely used to describe a herptile, but I feel it is the right word to describe the Bullfrog. While Leopard Frogs and Green Frogs will leap out of your way as you wander along the edge of a pond, the Bullfrog will more often sit out some distance in the water and eye you. And the expression on that face could be described as dignified although it is probably closer to suspicious. The Bullfrog is the largest frog in North America and the only one that is hunted extensively for – what else – frog’s legs. Even in Ontario the business is large enough to necessitate a season on Bullfrogs in the counties of Lanark and Leeds and to require a permit to take more than a certain number. No wonder Bullfrogs prefer life in the water.

Very commonly mistaken for the Bullfrog is the Green Frog. While their colour and ranges are similar, the Green Frog is noticeably smaller than the Bullfrog. Adult Green Frogs rarely exceed four inches in body length, whereas adult Bullfrogs can reach twice that size. Also distinctive about the Green Frog is the presence of two folds of skin which run along its back from behind its eyes to the end of its body. These folds are absent in the Bullfrog.

Even more difficult to recognize is the Mink Frog which looks rather like a dirty Green Frog and is about the same size. The Mink Frog derives its name from the odour it emits when captured; this is very similar to the smell of mink. This is one good method of identifying this frog (providing, of course, you know what a mink smells like). This is not meant to suggest that you should go dashing out smelling minks and frogs. All you would usually get, trying to capture a Green or a Mink Frog, is a handful of air. While both these frogs spend

much time on land, they rarely wander more than a leap from the safety of the water, and they are both strong leapers. The Mink Frog could just as easily be called the Canadian frog because it is one of the very few herptiles with most of its range in Canada. A truly northern frog, it has even been caught around James Bay.

The fourth frog to be classed as a shallow water frog is the Pickerel Frog. Although this frog has a wide range in Southern Ontario it is limited by its intolerance of warm, sluggish bodies of water, therefore its primary habitat is cold fast-running rivers or streams. The Pickerel Frog does not – in case you are wondering – smell or in any way resemble a pickerel; however, it is a preferred bait by anglers seeking that fish. Reportedly this frog, like the Leopard Frog it resembles, wanders in meadows and woodlands during the summer months, which might explain the similarity of colour pattern with the two species.

These four species share a number of characteristics that explains their similar habitats. All have powerful hind legs with webbed feet making them strong swimmers. Therefore, they stay near water. All are indiscriminate feeders and will eat practically anything they can fit into their mouths. If necessary they will use their strong feet to help stuff food in. (If you have ever watched one eat you would realize how undignified a Bullfrog really is.) So how can four species share the same habitat and one not emerge dominant? The answer is that they do not share the same habitat. Pickerel Frogs prefer the cold, fast water while Bullfrogs and Green Frogs are at home in still, warm water. Mink Frogs are more tolerant of a cold climate so that they predominate farther north. And the two species that seem most to share the same habitat have divided it up into their respective spheres of influence. The Green

Frog stays mainly on land, while the Bullfrog divides its time between shore and water. And it is with good reason that the Green Frog does not often venture farther out in the pond. Bullfrogs are perfectly happy to augment their diet with any frog they can catch.

Frogs and newts share the same ponds and streams with other herptiles. The adaptable Snapping Turtle, Painted Turtle, Stinkpot and Water Snake all have the occasional meal of frog or newt. And there are others too.

The domed shell of the Blanding's Turtle would not seem very good for an aquatic species, but, in fact, this turtle is a fast swimmer. Like all the turtles in Ontario, it eats both plants and animals. Its distinctive bright yellow throat and a shell that can close almost as tightly as a Box Turtle's make it easy to recognize. While primarily aquatic, Blanding's Turtles do wander about on land and unfortunately are often killed crossing roads.

Another turtle that prefers shallow bodies of water is the Spotted Turtle, but this beautiful little turtle is rare and endangered in Ontario and like the Softshell will be discussed at length in another chapter.

The next group of herptiles are species that inhabit the edges of bodies of water. The difference between the habitat of a Fox Snake, for example, and a Blanding's Turtle is chiefly one of where each spends most of its time. The Fox Snake enters water freely and the Blanding's Turtle frequently wanders on land but each spends most of its time on land and water respectively. Unfortunately five of the species that prefer this amphibious environment are restricted in Ontario to south of Georgian Bay. The Fox Snake, Massasauga Rattlesnake, Queen Snake, Hognose Snake and Fowler's Toad all live in densely populated and intensively developed south and south-

western Ontario. Not surprising, all five species are considered by federal authorities to be rare and endangered.

One species that is not yet in this category in Ontario, is the Ribbon Snake. This slender striped snake shows a marked preference for the edges and margins of ponds and marshes, and in certain inaccessible or protected parts of the province is even common. St. Lawrence Islands National Park, Point Pelee National Park and Georgian Bay Islands National Park all have populations of this species and the protection they receive in these areas may help preserve the species. It is hoped that these parks will not become one of the last refuges for the Ribbon Snake as has Point Pelee for the Fox Snake and Georgian Bay Islands for the Massasauga Rattlesnake.

Two species frequently encountered near water are the Garter Snake and the Leopard Frog. These two are also among the most common herptiles in Ontario and both can be observed at considerable distances from water. Their diversity of habitat and indiscriminate food habits combined with comparatively high tolerance for cold weather give these two species large ranges in Ontario. In fact, both the Leopard Frog and the Garter Snake have been found as far north as James Bay!

Semi-aquatic in a specialized way is the little Two-lined Salamander. This salamander is most commonly found under the rocks at the edge of cold, clear streams. It is completely at home in the water and often dashes into it to escape danger. In Ontario it does not seem to occur much south of Georgian Bay which may be because of unsuitable habitat.

The Four-toed Salamander is a creature of bogs and swamps, with an apparent preference for sphagnum moss. In Ontario, it has been recorded as far north as the northern end of Georgian Bay.

Some of our most beautiful herptiles are never seen. Their lives are spent under rocks and logs, inside rotting stumps or even deep in the ground. These are the salamanders that have left the water behind. Most have to return to water in the spring to lay their eggs, although the Red-backed Salamanders court, breed, and lay their eggs without ever entering the water. But like the frog they still must keep their skin moist, so they remain under damp logs and rocks, out of the heat of the sun. All these salamanders feed on the small insects and other invertebrates such as spiders, worms and millipedes.



salamanders must keep their skin moist, so they remain out of the heat of the sun

There are actually two colourings of Red-backed Salamanders, red-backed and lead-backed. It is one of the most common salamanders in Ontario south and east of the Great Lakes and after a good rain, a search under logs in nearly any forest will sometimes reveal three or four of these little creatures under any one log.

The Spotted Salamander and the Blue-spotted Salamander are seen less often. They belong to a family called the mole salamanders, because of their burrowing abilities, and these two species spend much of their time underground though after a heavy rain they may also be found under logs and rocks. They are most apparent in the spring when they migrate to breeding ponds.

Three species of Ontario snakes spend most of their time under rocks and logs as well. The Ringneck, Brown and Red-bellied Snakes all hunt slugs and earthworms, although the Ringneck is the king of this underworld, feeding extensively on salamanders and other snakes. These three are small, inoffensive snakes, that average around a foot in length and seldom bite.

One of the most beautiful of the snakes in Ontario is the Green Snake. No one could feel threatened by this gentle little reptile and whenever one is found in the Parks, it is usually a centre of interest and affection. It is a snake of the meadows rarely climbing or hiding. Its bright green colour gives it amazing protection from predators while it hunts its preferred prey of spiders and insects. So effective is its camouflage, that few people even know of its existence.

Three other snakes share a preferred habitat of open areas like meadows or clearings but two of them, the Blue Racer and Butler's Garter Snake, are rare and endangered in Ontario and will be discussed later. The third one is the best known

and most abundant snake in Ontario and, in fact, in most of North America. We are talking about the Garter Snake.

In Canada, the Garter Snake ranges from coast to coast and as far north as the Northwest Territories. In Ontario this snake may be found from the sand beaches of Point Pelee National Park to the shores of James Bay. There are a number of reasons for the Garter Snake's abundance and distribution. First of all it is the most resistant to cold of any snake in Ontario, being the last to hibernate and the first to come out in spring. Garter Snakes have even been seen out sunning when most of the ground was still covered in snow. It also is at home in a wider variety of habitats, ranging from marshes, meadows, forests, and streams to city lots and dumps. Garter Snakes also take a wide variety of food such as frogs, salamanders, fish, earthworms, leeches, birds, mice and even carrion. Furthermore, its behaviour contributes to the snake's success, since unlike the Hognose Snake, the Garter Snake always runs from a threat. The Garter Snake is probably the only snake in Ontario that is well-known to everyone as non-poisonous and is not mistaken for something else. Lucky Garter Snake!

Another snake that seems to hold its own, at least in Southern Ontario, is the Milk Snake. This success is not due to human benevolence, however, as this brightly-coloured snake is frequently mistaken for a rattlesnake and is even accused of milking cows. Its survival, to some extent, is due to the availability of mice, its principle food, around human habitation. Mice occur in greater numbers around barns where there is an inexhaustible source of food. In the wild, mice must spread out to find enough food. And there you have one of the confused situations occurring when man extends his massive influence on the environment. In one way man has destroyed much of the Milk Snake's natural habitat by developing

the fields and woodlands throughout its Southern Ontario range. But in its place, man has substituted by means of barns and garbage, an alternative source of food for mice. As is the story over and over again, contact between man and snake always results in the snake being the loser as men seem to manufacture reasons to kill it. In this way the Milk Snake must hold man responsible for both its continued existence and its greatest threat. In a similar predicament, but less fortunate, is the large Black Rat Snake. Although rare and endangered, its story will have to wait.

Two species of turtles in Ontario spend most of their time on land. One is the Wood Turtle, a turtle of meadows and wet woodlands. It is easily distinguished by its orange cheeks and by the rough shell that looks almost as if it were sculptured. Although it has a large range in Ontario, this turtle appears not to be common anywhere, and very little is known of its status here.

A real intruder in Ontario is the Box Turtle. It has only recently been recorded in Ontario at Point Pelee National Park and many experts believe it has been brought there by tourists releasing their pets in the park. It has not been found anywhere else in the province. However, Point Pelee has a climate and vegetation that closely resembles the Box Turtle's habitat farther south and since this turtle is vigorously protected in the park, there is a good chance that it is here to stay. Such a practice of releasing pets in a new area is a very bad one because conditions are rarely suitable, so that the poor turtle or snake usually dies or is killed in a short time. If you have such a pet and want to return it to the wild, the best method is to contact a park or museum and ask them where to release it.

Four species of frogs in Ontario spend most of their time in the forests. The Wood Frog, Chorus Frog, Gray Treefrog and Spring Peeper are all inhabitants of forests which remain moist throughout the year. Except for the Wood Frog, they are rarely seen after the spring breeding season and the exact details of their life histories are not known. As opposed to



a chorus of Spring Peepers

the case of the large snakes, where persecution by man is an obvious factor, the major problem for these frogs is destruction of their habitat. A sad aspect of the problem is that we really have no idea of what effect these little amphibians have on the ecology of an area. But we do know by the size of their spring choruses that there are a lot of them. And we know that they eat insects primarily. They are also, no doubt, an important food source of many different animals. It is probably another case of "we won't know what we have until it is gone".

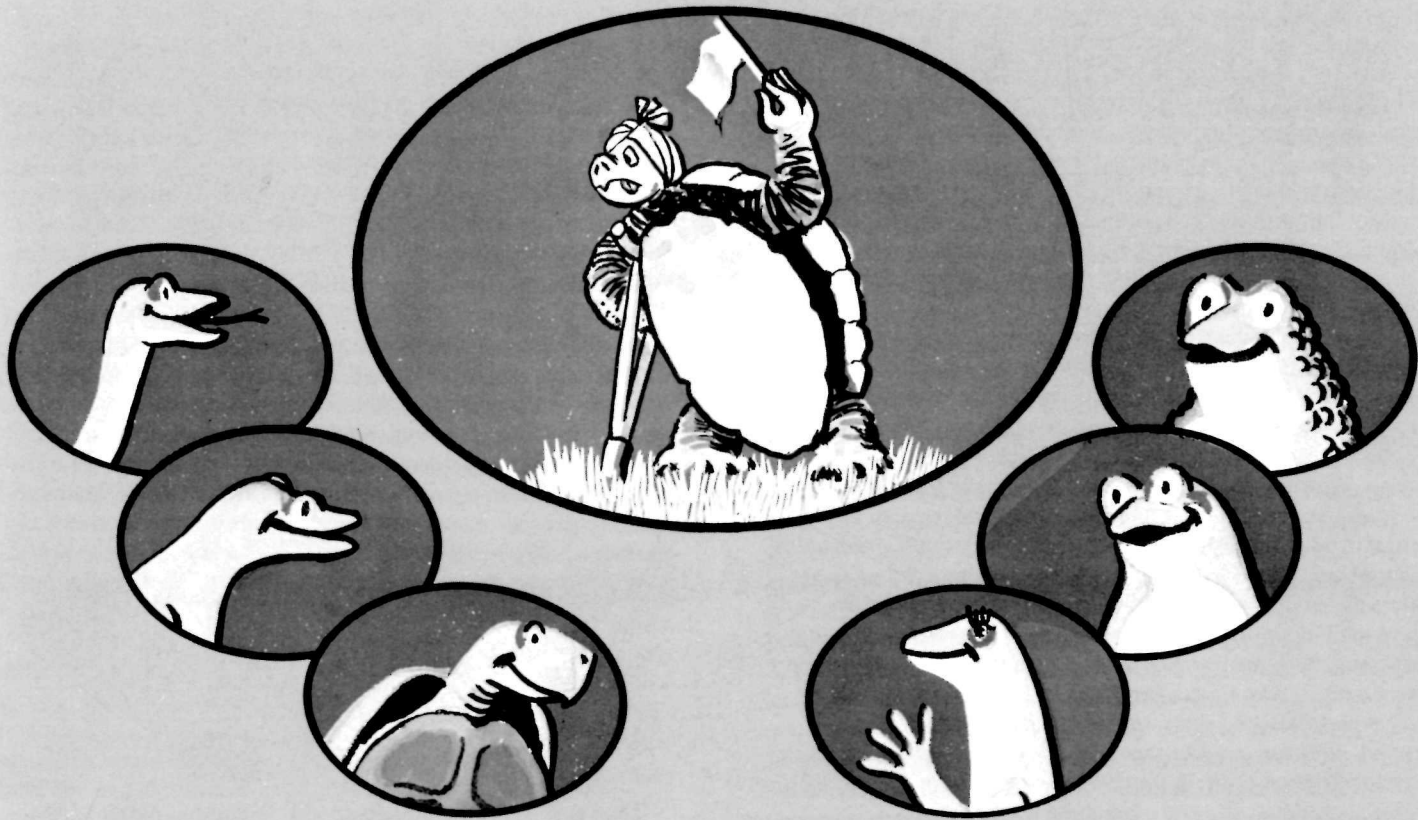
The fourth species of terrestrial frogs is an exception to most of the rules. The Wood Frog is the most northerly ranging amphibian or reptile in North America. It has even been collected north of the Arctic Circle! It has been observed in every province in Canada except Newfoundland and in the Yukon and the Northwest Territories. But many people have no idea what a Wood Frog is. The reason for that lies in the Wood Frog's habits. This frog returns to the water only for breeding in the spring and during the rest of the year is a solitary wanderer, whose camouflage expertly matches the ground cover throughout its range.

One very well-known herptile is the toad. The thick skin of the toad retards evaporation so that this animal is free to wander greater distances from water than the thin-skinned frog. Those warts and glands on the toad's body emit bitter secretions that make it inedible for most predators. Toads have also adjusted well to human invasions of their habitat and many gardens in the city have their own toad who has made himself at home and feeds on the insects and caterpillars that stray nearby. With three clear advantages over most other herptiles in terms of defence against water loss, defence against predators and flexibility of habitat, the toad is one of those unusual herptiles that can be said to be common.

Common to some parts of Southern Ontario is the Five-lined Skink, the only lizard native to Ontario. Lizards, as a rule, have less cold tolerance than snakes and turtles and the skink is no exception. It is most commonly found under debris and rocks in extreme southwestern Ontario and becomes rarer as we move north and east. This lizard suffers little directly from man because of its small size and elusive speed, but it probably suffers from animals brought by man, cats and rats.



many gardens have their own resident toad



RARE AND ENDANGERED HERPTILES

RARE AND ENDANGERED HERPTILES

Now for the sad part. The one comment heard over and over again by the researchers when they asked the residents of an area about some herptile was “Oh yes, there used to be lots of them, though I haven’t seen very many the last couple of years”. Some loss, of course, is inevitable. Man has tamed this planet and for better or worse will bend it to his will. Some say it is all right if there are no snakes in Canada, because there are lots of them in the jungle. This rationalization brings to mind the great naturalist Aldo Leopold’s comment that such an attitude was too much like relegating happiness to heaven – one may never get there!

I suppose against a background of wars and famines, the impending extinction of the Spotted Turtle in Ontario might seem pretty trivial but I, for one, cannot help but feel that we are less human for having let another form of life disappear. Maybe we should try to learn from our fellow creatures instead. We know, for instance, that frogs have been around in a very similar form some 180 million years longer than human beings. And scientists constantly discover unusual, interesting things about herptiles. One example came from a test on the effects of radiation on organisms, which found that reptiles last much longer than us frail mammals. The researchers even speculated that reptiles might again rule the earth if there were ever a nuclear war. So maybe we should try to avoid having those who follow us say that we stamped out a life form that worked. Herptiles are simple creatures with little ability to adjust their plans to fit us, so we must change ours.

Here is a list of who and a bit about why.

Not every time a species is rare and endangered can the blame be laid on man. Such is the case with the tiny **Cricket Frog**. This little frog is common throughout much of the central

United States but has only been found in Canada on Pelee Island and in Point Pelee National Park. Apparently this is a southern species that has never moved far into Canada. The Cricket Frog’s habitat of marshes, weedy shallows in lakes and ponds, and sluggish streams flowing through open country is available throughout southwestern Ontario. However, it seems that this particular frog cannot handle the change to a cooler climate. In Point Pelee National Park this frog, like all the herptiles in the park, is protected from persecution and destruction of habitat, as is a deer or duck. It is hoped that this attractive creature will survive in Canada.

Another amphibian that is common south of the border but of uncertain status in Ontario is **Fowler’s Toad**. The simplest way to tell a Fowler’s Toad from the common toad is to examine the large dark spots each has on its back and chest. Fowler’s Toad has three or more warts in each of the largest dark spots, and an unspotted chest and belly, while the common toad has only one or two warts in each dark spot and a chest spotted with dark pigment.

The Fowler’s Toad habitat in Ontario is found along the shores of Lakes Erie and Huron and it seems to show a preference, in Ontario at least, for the vicinity of beaches. This toad would seem to be safe as long as suitable habitat is available, and there is a good chance this herptile can continue to co-exist with man. Like the common toad, Fowler’s Toad feeds mainly on insects and acts as an important pest control.

The **Small-mouthed Salamander** is another amphibian with a restricted range in Canada. In fact, its range is even smaller than that of the Cricket Frog, being recorded in Ontario only on Pelee Island. Although only a few specimens have been ob-

served, this species probably stands a good chance of surviving unless there are extensive habitat changes.

Butler's Garter Snake is a small snake that could easily be mistaken for the Eastern Garter Snake. The easiest way to distinguish these two species apart, is watch the snake as it tries to dash away. Butler's Garter Snake wriggles vigorously from side to side but seems to accomplish very little in terms of forward progress. In Ontario this species is found only in the extreme southwestern portion of the province where it is endangered.

Strangest, by far, of all the turtles in Ontario is the **Softshell Turtle**. This turtle's shell is flat and leathery and its neck is long and snake-like, ending in a narrow head with a tube-like snout. These are truly aquatic turtles with a favorite practice of burying themselves in the sand of shallow waters and occasionally sticking that long neck up to the surface for air. Unfortunately this turtle is often killed as a poacher when taken in fishermen's nets although its primary food is crayfish not fish. Although it has been recorded in the Ottawa and St. Lawrence Rivers, Lake St. Clair and a few rivers in southwest Ontario as well as Lake Erie, it is rare everywhere in its Ontario range and may well be on the way to extinction in this area.

The pretty little **Spotted Turtle** is a classic case of man's influence on a species. One of our most attractive turtles, it prefers the shallow water of ponds, brooks and marshes. It is restricted to southwestern Ontario on or near the shores of Lake Erie, Lake Huron and Georgian Bay and in these areas it faces the loss of much of its habitat to human development. And the increased contact with man has been as detrimental to the Spotted Turtle as it has been to snakes, but in the opposite way. In the case of snakes, increased contact with humans usually means snakes get killed; but with Spotted Turtles it

often means the turtle is taken home for a pet. Unfortunately few people know how to look after a turtle properly so all too often the turtle dies in captivity or is released in a weakened state in the nearest field or lake. This misplaced affection could also be a factor in the decline in their numbers in Point Pelee National Park, where it was common just fifty years ago. Regrettably, the Spotted Turtle has a low reproductive rate of only two to four eggs a year so extinction, at least in Canada, is a definite possibility if no steps are taken to prevent it. It is still found in low numbers in Point Pelee and Georgian Bay Islands National Parks, so hopefully these semi-wilderness areas can provide some sort of refuge.

The **Lake Erie Water Snake** is a special case in the list of rare or endangered herptiles. It is not truly a species but rather is a subspecies of the Northern Water Snake, which is widely distributed in Ontario. It is restricted to the chain of islands in Lake Erie of which Pelee Island is one. As is the story with all Water Snakes, it is commonly confused with the poisonous Water Moccasin, or is accused of killing off game fish and is, therefore, heavily persecuted. Being restricted to an island habitat, they are very vulnerable to persecution and are, therefore, classed as an endangered species. Regrettably, few people realize the value of this snake to science.

There is a tendency to think of evolution as something that happened and is now over. Amphibians crawled out of the sea, apes began to walk upright and the dinosaurs died off. Therefore, it is particularly fascinating to see natural selection, the survival of the best-adapted, in action in present day to remind us that evolution is still going on. And a very clear and easy case to study is the Lake Erie Water Snake. As mentioned before, this snake is only a subspecies of the common Water Snake and will interbreed freely with the Northern Water

Snake, which is one of the simplest tests of a species. The difference between the two is in colour. The adult Northern Water Snake is typically brown with broad banding along the body, but the adult Lake Erie Water Snake is typically gray with very little or no banding. The University of Chicago did studies on this species in 1956 and discovered some very interesting facts. First of all, in newborn water snakes, there were nearly equal numbers of the brightly-banded colour phase and the gray phase but almost all the adult snakes were gray. The conclusion was simple enough. The snakes that were brown and banded stood out clearly against the gray rocks of the Erie island shorelines and so were first to fall prey to predators whether they be men or hawks. Consequently, very few of them survived to adulthood. The researchers themselves found this out while searching for the snakes. While the brown-banded reptiles were easy to spot, they rarely saw the gray species before the snakes had a chance to see them. This simple, measurable example of natural selection is of considerable importance to biologists so that it is especially hoped that populations of these snakes will continue to survive.

The **Queen Snake** is representative of the plight of most of the rare and endangered snakes in Ontario. It is restricted to the southwestern portions of Ontario where there is the greatest human population and the most extensive land development. It has a restricted habitat, in this case shallow, clear-running creeks with stones to hide under. Thus it is poorly equipped to adapt to the environmental changes brought about by man. Being a snake, any contact with humans is liable to result in its death. In those three ways the problems facing the Queen Snake also face the Blue Racer, the Hognose Snake, the Fox Snake, the Black Rat Snake and the Massasauga. But the Queen Snake has a few things going in its favour. First of all, it is a

water snake whose response to danger is to flee. In this way, it is more likely to survive than the land snakes who often stand and fight. Secondly, it is plain-coloured and less likely to attract attention than a Fox Snake or Black Rat Snake. And thirdly, it is secretive, spending much of its time under rocks and stones in the water, hunting out crayfish. In this way it may be able to survive in the scattered localities where it has been found, but the real danger to this and other aquatic herptiles may be from the increased pollution of rivers and streams. The effect of pollution on these animals is not yet known.

The **Blue Racer** is one of the most attractive snakes in Ontario. A slender blue snake that may reach six feet in length, it has a wider variety of habitat than the other rare and endangered snakes in the province, but is probably the closest to extinction. It has apparently disappeared from Point Pelee National Park. It is worth mentioning here the decision by the Province of Ontario to give the Timber Rattlesnake and the Blue Racer full protection in the province. There was some scepticism that it was too late and both species might already be extinct, but it was far-ranging and courageous of the authorities to put a snake – let alone a rattlesnake – on the protected list. They should be commended. These species along with all forms of life have always been protected in the National Parks, but it is only recently that a conscious effort has been made to make this well-known.

The elaborate and amazing defence behaviour of the **Hognose Snake** has been described in an earlier chapter. I must admit I reserve a special place for this snake in my sympathies and concern for herptiles. The Hognose Snake reminds me so distinctly of the old vaudeville comedian who insists on performing long after he has lost his favour with the fickle public. Like the original public who cheered the old entertainer

but are now old or passed on, many of the predators once frightened off or intimidated by the Hognose Snake are now rare and endangered themselves. But the poor old Hognose Snake like the old comedian is too set in its ways to be able to learn a new routine so it continues to play out the old one to an audience both unappreciative and hostile. The Hognose Snake is now absent throughout most of its original range including Point Pelee National Park, although there is still a population in Georgian Bay Islands National Park.

My first encounter with a **Black Rat Snake** occurred while working with two other students on a herptile survey of St. Lawrence Islands National Park. We all knew we were in Black Rat country and were all hoping for a glimpse of the largest snake in Canada. When we finally did see our first, it was on a road at dusk, a few miles north of the park. We pulled the car over and dashed out. It was only about five feet long, nowhere near its maximum eight feet, but to us it was a king. As soon as the snake realized it was cut off from escape, it coiled up in a striking pose with its tail vibrating rapidly on the pavement. The coiled snake was constantly moving, constantly edging off the road towards cover, but all the time the head was turned waiting for an attack. The closest analogy is a boxer circling in the ring, ready to meet an attack from any direction. Finally Don grabbed it. He grabbed it far back on the body but not far enough to keep the snake from biting. Brian grabbed, trying to get him behind the neck, but failed, and also got a good bite for his trouble. At this point I tried the same manoeuvre, but with the same result. Finally we subdued this magnificent serpent, measured him and released him. And it is no exaggeration to say that as we watched him crawl slowly away, we all shared a profound feeling of admiration and respect.

The **Black Rat Snake** is one of the most valuable herptiles in Ontario, feeding primarily on mice and rats. A captive specimen once ate twenty-two mice at one sitting. Some farmers have realized this and have protected these large snakes on their property. But the inability of most people to tolerate even a harmless snake, and the increase in highway traffic has reduced the **Black Rat Snake's** range in Ontario to a few scattered localities in southwestern Ontario and the Rideau Lakes region. Although the snake is protected in St. Lawrence Islands National Park, its wandering habits make it vulnerable to traffic. Nonetheless the park staff have shown some positive results in informing the public of the value of these snakes and there is a hope that at least the Rideau Lakes populations will survive.

The **Eastern Fox Snake** is one of the largest, most impressive snakes in Canada. A six-foot specimen will startle anyone and the usual reaction is to freeze and stare at it for awhile before the hysterics commence. The big ones seem aware that their size leaves them with few natural predators, as they will often just stand their ground or crawl away slowly. Unfortunately, they have two unlucky habits when it comes to man-Fox Snake relations. If threatened, they will often coil and vibrate their tails very rapidly, a trait they share with many other harmless snakes like the Milk Snake and Black Rat Snake. In dry leaves this vibration can vaguely resemble the buzz of a rattlesnake and that is often enough reason for a man to kill it. This human characteristic of being unable to distinguish species of animals when bent on killing, reminds me of the Alberta farmers' habit of referring to their cattle as "Slow Elk" during the hunting season. Another bad strike against the Fox Snake is the copperish tinges to its head which falsely identifies it as the dreaded Copperhead despite the fact that

the real Copperhead has never been found in Canada. And even its average size of four to six feet is generally interpreted as meaning it is a dangerous reptile. The final strike against the Fox Snake is its preferred habitat of marshes near large bodies of water. Large egg-layers, like the Fox Snake, require more time for their eggs to incubate and proportionally more heat for their bodies, than a small live-bearer like the Garter Snake. Therefore, they cannot move as far north. This keeps the Fox Snake along the edges of Lake Erie, Lake St. Clair, Lake Huron and Georgian Bay. Even a marsh is not a good place to be a snake these days because marshes in Southern Ontario seem to be destined for one of two purposes: drainage for farmland or waterfowl hunting. Either of these purposes brings the Fox Snake in contact with man, with predictable results. Therefore, the only places where it seems to be holding its own are the three marshes that are parks along Lake Erie; Point Pelee National Park, Rondeau Provincial Park and Long Point.

The gradual disappearance of this species is especially regrettable for two reasons. Firstly, it is one of the very few herptiles which has most of its range in Canada and secondly, its main food is not, as seems to be generally supposed, small children, livestock and cash crops, but is actually primarily mice and rats.

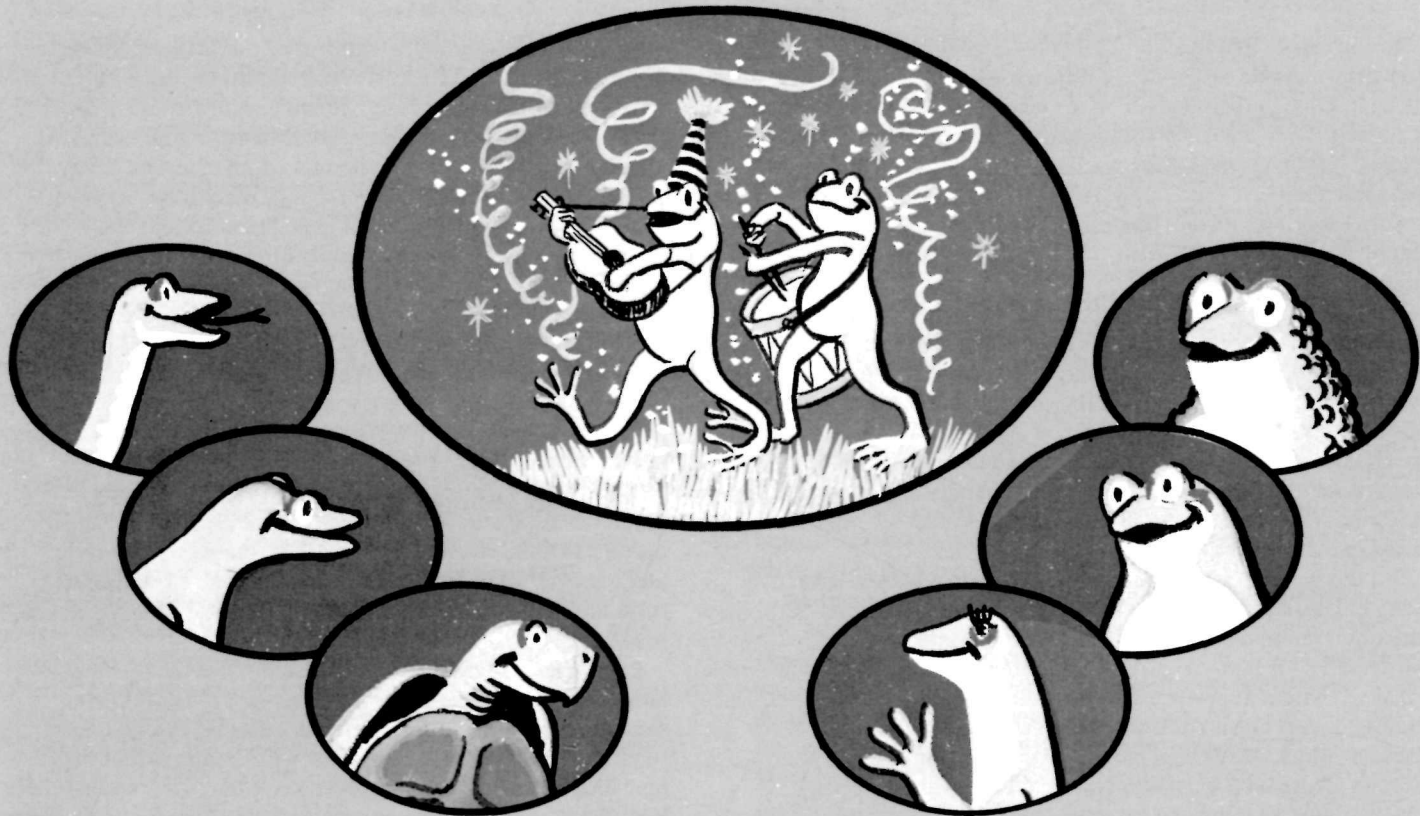
People can get very excited when the word rattlesnake is mentioned. A news broadcast of fifty deaths on Ontario highways in a single weekend, five accidents in the home, or ten drownings will barely raise an eyelid, but suggest saving rattlesnakes and watch out! The fact is that Ontario's only poisonous herptile, the **Massasauga Rattlesnake**, is dangerous. It can and has killed. Twice since 1960. In other words, considerably less than lightning or bee stings. And it is of the same sort of danger as slipping in the bathtub, which kills much easier and more often. Both cases are accidents. The Massa-

sauga will not attack or stalk a human being. Its food is mice and frogs and other than this it bites only to defend itself. It even usually gives warning. Although its venom is potent, it injects only small quantities, and with treatment the chances of death are extremely low. Its range in Canada is very similar to the Fox Snake's, as both like a damp, marsh habitat. However, the Massasauga has been heavily persecuted in the Lake Erie-Lake St. Clair region, and now persists in any numbers only along the Bruce Peninsula and around Georgian Bay. There is a small population in Georgian Bay Islands National Park, but people there do not realize that harming this species is actually an offence for which they can be charged.

The Massasauga Rattlesnake is such a small, inoffensive little herptile that it is a shame that such a fuss has been raised about it. Parties have even been organized to exterminate the species. Their energies might better be directed to the control and care of domestic dogs and cats that run wild, posing a much greater threat to humans and environment alike. But people can still be moved to try and kill off a species that is valuable in practical terms as a predator of rodents, and an example of specialization and adaptation in the herptile world.

The simplest and most intelligent plan if you should encounter a Massasauga in the bush is to simply walk away. Trying to kill it is dangerous. If you walk away, the rattler will not follow or chase you. It will simply go on its way in search of food. But if you come close, too close, it will certainly strike at you in self-defence.

If someone is bitten, take the victim to the nearest hospital. You can quite truthfully comfort the victim with the facts that with treatment the death rate from Massasauga bite is virtually nil. There is no need to fear that this herptile will disturb your vacation plans and, in fact, if you take the time to chat with a park naturalist you may find a unique way to enrich your wilderness experience by learning more about the Massasauga.



**A CASE FOR INTERNATIONAL
HERPTILES' YEAR**

A CASE FOR INTERNATIONAL HERPTILES' YEAR

It is not likely that the world is ready for such an event. Perhaps we should just ask for a little understanding. Herptiles are neat. Even herpetologists, on the whole, are a decent bunch of fellows. They are frank about their interest. They do not pretend poisonous snakes are not dangerous. They do not deny that some toads are pretty ugly. Archie Carr, one of the world's experts on turtles, confessed, in a moment of weakness, that turtles probably represent "the nadir of cerebral evolution".

But maybe this book has succeeded beyond their wildest expectations and the reader wants to be a herpetologist. The sad truth is that as a profession, herpetology makes a good hobby. There are extremely few full-time positions for herpetologists in Canada, and they are coveted and vigorously contested. Also, herptiles do not make very good pets. The ones that are not constantly trying to escape generally just sit there. In spite of this, demand for the pet trade has been an important factor in the near extermination of some species.

But this is not to say that herpetology has no rewards. It has many unique rewards. Bird-watchers must content themselves with observation from a distance whereas a herpetologist can actually – if fast – reach down and touch a frog or a toad or a snake. There is a special excitement that pumps the adrenaline whenever one is confronted with a big snake like a Fox Snake or Black Rat Snake, or by a rattler. So many people pass through Georgian Bay Islands National Park without seeing a Massasauga, that many deny its existence. But those are the same people who visit a piece of Canada's greatest resource, its wilderness, and never leave the trails or their campsite or the crowded beach. They never ask the naturalist what is there and why.

In 1970 a questionnaire was handed out in Great Smoky Mountains National Park in Tennessee asking the park visitors what types of animals, if any, should be allowed in National Parks. A generous 89.9 percent thought **all** animals should be allowed. But the second question asked what snakes, if any, should be allowed. At this point a large percentage of visitors decided that **all** animals did not include snakes and over 50 percent were in favour of eliminating either all snakes or at least poisonous snakes in national parks. But what was most interesting about the interview was that over 70 percent worked indoors for a living and over 60 percent came from cities of over 20,000 people. There is something impressive about finding out that people who work indoors in cities are often terrified of something they will probably see once or twice in their lifetime.

What we are getting at is a plea to refrain from being a predictable statistic. Massasaugas are the only dangerous herptile in Ontario and they should be treated with caution and respect. But lightning storms, bee stings and shovelling snow are all much more dangerous in terms of probabilities, not to mention that highway you drive everyday.

Conservation seems always to be a story of too little, too late, even when it consists of nothing more than asking that something be left alone. Herptiles are unique, fascinating reminders that we share this planet with creatures that were here long before us and may just survive long after we are gone. But do not be so glum. Some people do care.

A CASE IN POINT

The three parks that formed the basis for this study were Point Pelee National Park, St. Lawrence Islands National Park and Georgian Bay Islands National Park. Like all the National Parks in Canada their mission is to preserve sections of Canada's wilderness heritage for present and future generations.

Ontario has the largest diversity of herptiles in any province of Canada and these three parks have representatives of the vast majority of those species. This is partly because of their locations in the province and the variety of habitats to be found within their boundaries. But perhaps the most important factor in the diversity of herptiles is the fact that they are protected in these parks and a concerted effort is made to maintain their populations.

Point Pelee National Park is the most southerly tip of mainland Canada and as such, attracts a number of more southerly species of herptiles. Particularly appealing for herptiles is the large marsh that dominates the park. Many species of turtles make their home in the marsh, in the woodlands nearby or in the waters of Lake Erie that border all but the north side of the park. One of the largest populations of Fox Snakes left in North America is found in the park along with other rare and endangered herptiles like Blanchard's Cricket Frog, the Softshell Turtle, and the Spotted Turtle.

St. Lawrence Islands National Park is located amid the Thousand Islands and consists of several islands, a number of rocky islets stretching from Kingston to Brockville, as well as a small mainland area.

An important feature of the Thousand Islands in natural history has been the use of the islands as stepping stones for species moving north. The Park has a large number of herptile species including spectacular congregations of water snakes.

The Park also marks the range limit eastward of the Ribbon Snake in Canada and the impressive Black Rat Snake which still survives in fair numbers in the rocky country north and west of the park.

The greatest variety of herptiles is found in Georgian Bay Islands National Park of which Beausoleil Island is the largest island. The 40 glacier-shaped, rocky islands mark the edge of the Canadian Shield, but the variety of marshes, ponds, wet forests and meadows combined with the moderating effect of Georgian Bay gives the park the largest variety of herptiles of any National Park in Canada. The most famous herptile in the park is the Massasauga Rattlesnake, but other rare and endangered herptiles are found there like the Fox Snake, the Hognose Snake and the Spotted Turtle. Separated from the rest of the park islands, which are on the east side of Georgian Bay, is Flowerpot Island off the tip of the Bruce Peninsula. Besides the unique limestone caves and formations, Flowerpot Island has gained somewhat of a reputation for its snakes. A look in the guest book on the island will find numerous mentions of the snakes and usually the visitors compliment the park on these little creatures.

All these national parks have full-time naturalists whose job is to interpret the park to its visitors. They answer questions, give slide talks, lead hikes and generally act as roving, human versions of "Untamed World". Any visitor to one of these or any other of the National Parks can feel free to approach any naturalist or warden with questions about the park. Herptiles are often a controversial subject because of the many myths and fallacies surrounding them. Conscious of this, the park staff are particularly happy to help anyone who wants to find out a little more about these misunderstood and maligned creatures. Just ask where you can see a real "foul and loathsome creature"!



SOME PRACTICAL CONSIDERATIONS

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The National Parks keep as accurate as possible a record of what species of herptiles occur within their boundaries and are constantly at work determining the complex interactions between herptiles and the other organisms in the park, including man. The Park staff are very helpful in providing information to visitors and are always glad to hear reports of sightings. What follows is a checklist of the species of herptiles that have been recorded in the three parks studied. Sometimes the species mentioned have not been sighted for a long time and new species are always a possibility, so keep a sharp lookout.

Note too, that this book is not intended as a field guide. There are a number of excellent field guides available which are listed after the checklists as recommended reading, but to conserve size, most of them are brief when it comes to life histories or else they focus on one particular area of herpetology. Throughout this book only the simplest most common names have been used. The Softshell Turtle, for instance, is in fact the Eastern Spiny Softshell Turtle (**Trionyx spiniferus spiniferus**). This identification as “Eastern” and “Spiny” is important in other parts of North America where a number of similar species may occur and the scientific **Trionyx spiniferus spiniferus** is the definitive name to identify a species. For this reason, all three names are listed in the checklists though most people refer to this species as a Softshell Turtle.

CHECKLIST OF THE HERPTILES OF ONTARIO

EXPLANATION OF THE CHECKLIST

A number of herptiles have been left off of this checklist deliberately in order to keep this list practical and readable.

Three herptiles: the Western Painted Turtle, the Central Newt and the Boreal Chorus Frog are subspecies of herptiles already listed, but are restricted in Ontario to ranges in the extreme western portion of the province far from these National Parks. The Hudson Bay Toad is believed to be a subspecies of the American Toad but as its status is still in doubt, it has not been included here. The Timber Rattlesnake is generally regarded as being extinct in Ontario as no observations have been made since the 1940's. The Northern Dusky Salamander, Northern Spring Salamander and Eastern Tiger Salamander have only been recorded once in Ontario and it is felt that these were either accidental introductions or that these animals are now extinct in this province.

EXPLANATION OF TERMS

C – Common: a species which is frequently observed in a number of different habitats or is **very** common in one specific habitat.

U – Uncommon: a species that is rarely observed but not necessarily rare. Some, like the Northern Brown Snake are very secretive. Others, like the Map Turtle, prefer areas away from human disturbance.

R – Rare: either only a few are sighted every year or only a few have ever been sighted. Any observations of a rare species should be reported to the Park Naturalist.

R & E – Rare and Endangered: See chapter on “Rare and Endangered Herptiles”.

STATUS IN OR NEAR THE NATIONAL PARKS

Species	Georgian Bay Islands N.P.	Point Pelee Nat. Park	St. Lawrence Islands N.P.
Salamanders			
Mudpuppy <i>Necturus maculosus</i>	R	R	R
Blue-spotted Salamander <i>Ambystoma laterale</i>	U		U
Spotted Salamander <i>Ambystoma maculatum</i>	U		U
Small-mouthed Salamander <i>Ambystoma texanum</i>		R & E ¹ .	
Red-spotted Newt <i>Notophthalmus viridescens</i> <i>viridescens</i>	U		U
Red-backed Salamander <i>Plethodon cinereus cinereus</i>	C		C
Four-toed Salamander <i>Hemidactylium scutatum</i>	R		R
Northern Two-lined Salamander <i>Eurycea bislineata bislineata</i>	U		U

¹. on Pelee Island, south of Point Pelee

Species	Georgian Bay Islands N.P.	Point Pelee Nat. Park	St. Lawrence Islands N.P.
Toads and frogs			
American Toad <i>Bufo americanus</i>	C	C	C
Fowler's Toad <i>Bufo woodhousei fowleri</i>		R & E ² .	
Blanchard's Cricket Frog <i>Acris crepitans blanchardi</i>		R & E	
Northern Spring Peeper <i>Hyla crucifer crucifer</i>	C	C	C
Eastern Gray Treefrog <i>Hyla versicolor</i>	C	R	C
Western Chorus Frog <i>Pseudacris triseriata triseriata</i>	C	R	C
Bullfrog <i>Rana catesbeiana</i>	C	C	C
Green Frog <i>Rana clamitans melanota</i>	C	C	C
Mink Frog <i>Rana septentrionalis</i>			R
Wood Frog <i>Rana sylvatica</i>	C		R
Northern Leopard Frog <i>Rana pipiens</i>	C	C	C
Pickerel Frog <i>Rana palustris</i>	R		

2. Probably extinct in Point Pelee

Species	Georgian Bay Islands N.P.	Point Pelee Nat. Park	St. Lawrence Islands N.P.
Turtles			
Common Snapping Turtle. <i>Chelydra serpentina serpentina</i>	C	C	C
Stinkpot <i>Sternotherus odoratus</i>	U	U	U
Spotted Turtle <i>Clemmys guttata</i>	R & E	R & E	
Wood Turtle <i>Clemmys insculpta</i>	R		R
Blanding's Turtle <i>Emydoidea blandingi</i>	R	R	R
Map Turtle <i>Malaclemys geographica</i>	U	U	U
Midland Painted Turtle <i>Chrysemys picta marginata</i>	C	C	C
Eastern Spiny Softshell Turtle <i>Trionyx spiniferus spiniferus</i>	R & E	R & E	
Lizards			
Five-lined Skink <i>Eumeces fasciatus</i>	R	C	

Species	Georgian Bay Islands N.P.	Point Pelee Nat. Park	St. Lawrence Islands N.P.
Snakes			
Northern Water Snake <i>Natrix sipedon sipedon</i>	U	U	C
Lake Erie Water Snake <i>Natrix sipedon insularum</i>		R & E ³ .	
Queen Snake <i>Regina septemvittata</i>		R & E ⁴ .	
Northern Brown Snake <i>Storeria dekayi dekayi</i>	U	U	U
Northern Red-bellied Snake <i>Storeria occipitomaculata occipitomaculata</i>	R		
Butler's Garter Snake <i>Thamnophis butleri</i>		R & E	
Northern Ribbon Snake <i>Thamnophis sauritus septentrionalis</i>	R		U
Eastern Garter Snake <i>Thamnophis sirtalis sirtalis</i>	C	C	C
Eastern Hognose Snake <i>Heterodon platyrhinos</i>	R & E	2.	
Northern Ringneck Snake <i>Diadophis punctatus edwardsi</i>	R		R
Blue Racer <i>Coluber constrictor foxi</i>		R & E ² .	

³. on islands south of Point Pelee

⁴. north of Point Pelee

Species	Georgian Bay Islands N.P.	Point Pelee Nat. Park	St. Lawrence Islands N.P.
Snakes (cont'd)			
Eastern Smooth Green Snake <i>Opheodrys vernalis vernalis</i>	R		R
Eastern Fox Snake <i>Elaphe vulpina gloydi</i>	R & E	R & E	
Black Rat Snake <i>Elaphe obsoleta obsoleta</i>		2.	R & E
Eastern Milk Snake <i>Lampropeltis triangulum triangulum</i>	R	2.	R
Eastern Massasauga Rattlesnake <i>Sistrurus catenatus catenatus</i>	R & E		

RECOMMENDED READING

If herptiles have caught your fancy, there are a number of excellent books and pamphlets available which are non-technical and informative.

A FIELD GUIDE TO REPTILES AND AMPHIBIANS OF EASTERN AND CENTRAL NORTH AMERICA by Roger Conant, (Houghton Mifflin Company, Boston, 1975) is probably the best field guide available for eastern North American herptiles. Being one of the excellent Peterson Field Guide Series, it is well laid out and superbly illustrated.

THE SNAKES OF ONTARIO by E. B. S. Logier (University of Toronto Press) is a similarly fine guide to, as you may have guessed, Ontario's snakes. It goes into more detail than Conant as one would expect with a more restricted subject, but it is a little too large for a field guide.

THE SNAKES OF ONTARIO by Barbara Froom (McClelland and Stewart Limited, Toronto/Montreal, 1972) is an excellent introduction to the subject and is more up-to-date than Logier although not as detailed. Miss Froom is also the author of **ONTARIO TURTLES** and **ONTARIO SNAKES**, two handy booklets available from the Ministry of the Environment.

LIVING REPTILES OF THE WORLD by Karl P. Schmidt and Robert F. Inger (Hamish Hamilton Ltd., 1957) and **LIVING AMPHIBIANS OF THE WORLD** by Doris M. Cochran (Hamish Hamilton Ltd., 1961) are thorough, extremely well illustrated introductions to herptiles on a worldwide basis.

If your interest lies more in the adventures and less in the identification of herptiles, **THRILLS OF A NATURALIST'S QUEST** by Raymond L. Ditmars (MacMillan, 1933) started

a lot of herpetologists, including this author, on their way. This book may be out of print now but is available in most public libraries.

Any number of Gerald Durrell's excellent accounts of animal adventures contain large sections on herptiles including **BAFUT BEAGLES, THREE SINGLES TO ADVENTURE** and **THE WHISPERING LAND** (all published in paperback by Penguin Books).

And if your interest is in the myths and legends of herptiles and man, read **MEN AND SNAKES** by Desmond Morris (Sphere Books Ltd., 1968) for an entertaining resume of our relationships with foul and loathsome creatures through the past and present.

