

IN THIS CHAPTER

- » Understanding the term *chelonian*
- » Finding out about the physical characteristics of turtles and tortoises
- » Treasuring these unusual creatures
- » Understanding the threat of extinction and seeing what you can do to help

Chapter **1**

Understanding Chelonians

When you think of turtles, do you think of the tiny quarter or half-dollar-sized turtles that used to be sold in pet stores (and in some places still are)? If so, you're not alone. That image is the one that comes to mind when many people think of turtles. However, those tiny little turtles (most of whom died shortly after their purchase) are only one of many different types of turtles and tortoises, many of which can be long-lived, healthy, hearty pets.

Turtles and tortoises are known as chelonians, from the Greek word for "tortoise," *chelona*. *Chelonian* refers to all turtles and tortoises, no matter whether they live in the ocean, in fresh water, or on land.

- » The term *turtles* applies to chelonians that live in or around water. Sea turtles, for example, never leave the ocean except to lay their eggs. Other turtles are more or less aquatic, depending on their species. The sliders, mud, bog, and leaf turtles are all found close to fresh water. Terrapins are aquatic turtles that people frequently eat. Many terrapins live in and close to brackish salt water. Box turtles are primarily *terrestrial* (land roving) but are almost always found within walking distance of water. See Figure 1-1 for an example of a turtle.

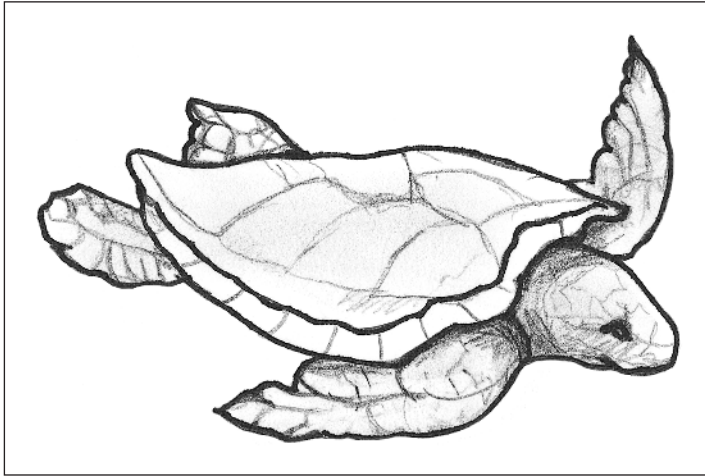


FIGURE 1-1:
A turtle.

» The term *tortoise* refers to chelonians that live on land and rarely venture into water except to drink or bathe. Tortoises range in size from tiny little guys weighing less than 1 pound to gigantic, weighing over 600 (or more) pounds. Size aside, tortoises have many things in common. They are primarily *herbivores* (plant eaters), although many will scavenge, given the chance. Tortoises also usually have hard shells, often with high domes, to help protect against predators. Take a look at Figure 1-2.

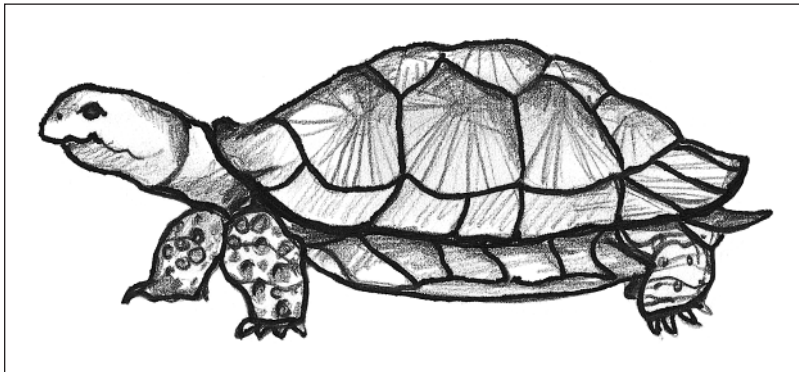


FIGURE 1-2:
A tortoise.

In this book, I focus on the species of turtles and tortoises best suited for pet ownership. Although more than 250 different species of chelonians exist, many are impossible to keep as pets. Think of the size aquarium and the filtration system you would need to keep a 200-pound green sea turtle! However, many species of turtles and tortoises do quite well in captivity and make good pets.

Understanding Life in the Original Mobile Home

Turtles and tortoises are in the reptile family, which means that they are *ectothermic*, or cold-blooded. Cold-blooded animals rely on external heat sources, such as warm ground, hot rocks, or sunshine, to warm their bodies. Turtles are the original sun worshippers and can often be found sleeping on rocks or logs, soaking up the sun's rays.

All turtles and tortoises share a similar characteristic: their shell. No other animal on Earth has a shell quite like this. A turtle's shell is a boxlike *exoskeleton* (a word that refers to a part of an external skeleton) with the spine and ribs fused to the top shell. These bones are, in fact, a part of the *carapace*, or top shell. The shell itself is made of bone, and the outer covering of the shell is made of *keratin*, much like human fingernails.

Each shell is made up of sections called *scutes*. As the turtle grows, new layers of keratin are formed around the outer edges of each scute, looking much like the growth rings of a tree. Some people count each of these rings in an effort to tell how old a turtle may be. This can give only a rough idea, however, because just like a tree, if food is plentiful a turtle may have two growth spurts per year, or in a bad year may grow very little. Also, as a turtle gets older, the shell becomes worn and smooth, and the rings may be difficult to see.

The type of shell and the degree of protection offered by the shell are based on the turtle's lifestyle and habitat. Sea turtles, for example, have a light, streamlined shell covered by a leathery skin. Freshwater turtles usually have a hard shell, but in some species, it's too small to protect the entire body. Land turtles and tortoises that rely on the shell for protection have a hard, domed shell.

THE STAY-AT-HOME TYPE

When Zeus held his wedding feast, all the animals were invited. Only the tortoise arrived too late. Zeus wanted to know why, so he asked her the next day why she was the only one who did not arrive in time for the banquet. Her answer was, "My house is dear to me; my house is the best." Zeus was angry at her answer and ordained that the tortoise should always have to carry her house around with her. In just this way, many people prefer to dwell simply under their own roofs rather than live luxuriously in the homes of friends. (from *Aesop's Fables*)

THIS TURTLENECK COMES IN GREEN

When a turtle pulls its head into its shell for protection, its neck either folds to the side or into a vertical S shape, and the skin of its neck bunches up — hence the name *turtleneck* for shirts and sweaters with bunched-up necks.

Many turtles and tortoises can pull in all four legs and their head so that the shell protects them from predators. With many species, the outer skin of the legs is hard, rough, and, in some tortoises, armored, giving the turtle even more protection.

Some turtles and tortoises can even close their shell, giving additional protection. Box turtles (hence their name) have a hinge across the bottom shell (the *plastron*). This hinge can close both front and rear, hiding the turtle completely inside. The muscles holding the shell closed are incredibly tough, and after the hinge is shut, you can't open it without harming the turtle. A type of tortoise can close its shell, too, although not as completely as the box turtle. Hinge-back tortoises have a hinge across the top of their top shell (the *carapace*) and can close in their back legs, protecting them.



WARNING

Although the shell, made of bone, seems to be the ultimate protection, it is vulnerable. Predators can chew and break the shell. A larger bird of prey can pick up a small turtle and, flying high, drop the turtle on rocks below, breaking the turtle's shell like an egg. The shell can protect a tortoise from a small, fast-moving wildfire, but larger, hotter fires will kill a turtle or tortoise caught in it. Domestic dogs — Fido and Fluffy — have been known to treat turtles like chew toys, with disastrous results!

The skin on the legs of tortoises is hard, with scales made of keratin protecting it. Some of the keratin scales are quite large and pronounced; on some species, the scales create spurs or spikes that help protect the tortoise from predators and also help desert tortoises retain water. Because aquatic turtles usually dive into water when threatened, their skin is much softer with fewer protective scales. Most turtles and tortoises have five toes (although they sometimes have four or as few as three) with hard nails on the toes. Aquatic turtles have webbing between their toes.

Most chelonians have a birdlike beak, which enables them to bite off chunks of food. They don't have teeth, but hard, bony plates enable them to *masticate* (chew) their food. Most food, however, is swallowed whole.



TECHNICAL
STUFF

SURVIVORS FROM THE AGE OF DINOSAURS

Turtle (and tortoise) fossils have been found linking them to the Mesozoic era in the Triassic period. Because of the mass of bone found in the shell, finding fossilized tortoises is actually quite common (compared to finding other creatures of the same size and era).

This Triassic turtle, called *Triassochelys dux*, is remarkably similar to turtles found today. It had an armored shell with ridges, tough skin with spurs, and spinelike projections on the tail. One marked difference, though, was that this turtle had teeth, whereas today's turtles have hard bony mouths or beaks instead of functional teeth.

The Cretaceous period, when dinosaurs became extinct, was the age of sea turtles. The turtles of this era had large gaps in the bony mass of their shells, making the shells lighter for swimming. The largest marine turtle ever found came from this era. The *Archelon ischyros* had a carapace measuring over 18 feet!

Toward the end of the Mesozoic era, land tortoises developed. In what is today central Europe, land tortoises evolved that look much like tortoises found in Indochina today. These tortoises had (and have) thick bony shells.

It is probably totally scientifically incorrect, but I can picture in my mind a gigantic dinosaur, looking like something out of the movie *Jurassic Park*, striding along, roaring and drooling, while at its feet a herbivorous tortoise munches calmly on greens!

Treasuring the Unusual

Most tortoise owners seem to enjoy the fact that their pets are different. Obviously, your tortoise won't chase a tennis ball like Fido will, but that's okay because your tortoise is different. Because turtles and tortoises came in a variety of sizes, shapes, and colors from an assortment of environments, there's something for everyone willing to care for them.

- » The Spix's snake-necked turtle (*Platemys spixii*) is from eastern Brazil and has a black plastron, a long, heavily armored neck (complete with spikes), and a face that looks like a fish's.
- » The big-headed turtle (*Platysternon megacephalum*) has such a large head — out of proportion to the rest of its body — that it can't retract its head fully into its shell. The big-headed turtle also has powerful jaws and has been known to bite.

- » Side-neck turtles have exceptionally long necks; a few have necks as long as the rest of their bodies. The matamata (*Chelus fimbriatus*) has a long neck and a long nose that it uses as a snorkel. The matamata eats whole fish, using its powerful neck to help reach, grab, and subdue its prey.
- » Box turtles don't vary much in size or physical conformation, but their colors can be quite striking. Some have yellow or red spots, stripes, or patterns on the skin and yellow or gold patterns on their shells. Red-eared sliders (*Trachemys scripta elegans*), western painted turtles (*Chrysemys picta belli*), and eastern painted turtles (*Chrysemys picta picta*) can be quite colorful and striking.

If you enjoy and treasure the unusual, you can find a turtle or tortoise that will strike your fancy.



REMEMBER

Make sure that you don't choose a turtle or tortoise entirely for its looks, markings, or body conformation. Many turtles or tortoises require special conditions or care. You need to understand what this particular species requires before you add it to your family. See Part 2 for information on many species of turtles and tortoises.

Battling Extinction

Over the centuries, turtles and tortoises have evolved on every continent except Antarctica. Temperate or tropical climates are most popular, with southern North America, South America, Africa, southern Europe, and Asia being home to the most numerous species.

Although turtles and tortoises have flourished for millions of years, their future survival is not so certain. Many species have been wiped out or threatened with extinction because they have been used as food sources, or their eggs are routinely dug up and eaten.

Habitat destruction has threatened many species. Many South American tropical turtles and tortoises have been killed during the destruction of rainforests. In North America, gopher tortoises in the south and desert tortoises in the west are finding it harder and harder to survive as more people move into their territories. The situation is no different in Africa, Europe, or Asia.

DWINDLING NUMBERS

The California desert tortoise (*Gopherus agassizii*) used to range the Mexico, California, Arizona, Utah, and Nevada deserts in great numbers. This medium to large sized tortoise could live and even thrive in the hostile deserts. Unfortunately, loss of habitat and off-road recreational vehicles have threatened this hardy tortoise. An equally dangerous but much less visible threat is a respiratory infection known to infect most captive desert tortoises. This potentially fatal disease is treatable with antibiotics but is not curable, and has been spread to the wild population by captive tortoises set free by caring but ignorant owners.

In many parts of the world, warfare is killing turtles and tortoises. Landmines blow up tortoises as well as people. Tanks and heavy vehicles crush tortoises and collapse burrows. Vegetation necessary for survival is destroyed. During times of famine, a heavy tortoise is food for the hungry.

Future survival may be based on humankind's ability to step in and change what's happening now in many parts of the world. If sections of land can be set aside as preserves and protected from poaching, some species may be able to survive. Captive breeding populations may also hold hope for the future. Some species breed quite well in captivity, and the offspring of these turtles and tortoises may prevent some species from disappearing entirely.

Captive breeding can serve another purpose: to provide the pet-owning public with a source of animals already adapted to captivity. When wild-caught turtles and tortoises are captured, transported, and then sold to pet owners, the animals are traumatized. They have been removed from their natural habitat, stored somewhere (during which time they were probably not fed, or at least not properly fed), shipped one, two, or even three times, and then held again at the pet store or animal dealer's facility. When the unsuspecting pet owner brings home this traumatized turtle or tortoise, the chelonian may or may not adapt to its new home. As a result, say many experts, fully 90 percent of wild-caught chelonians die within their first year of captivity.

However, when chelonians are bred in captivity, they grow up exposed to people, the foods normally fed in captivity, and captive conditions. These turtles may feel some stress at shipping and during changes in their environment, but after they're sold, they are then re-exposed to what are, to them, normal captive conditions. They experience far less stress and thus have a greater chance for survival. Captive breeding also produces more animals for the pet market, reducing the need for animals to be caught in the wild. If more people request captive-bred animals and refuse to buy wild-caught animals, there will be again less need to capture chelonians in the wild.

The tortoises on the Galapagos Islands are a good example of the good that captive breeding can do. By the late 1960s, the number of Galapagos Islands tortoises was decreasing rapidly. Harvesting by sailors took a great many tortoises, but the introduction of feral cats, goats, rats, dogs, and other predators was decimating entire *clutches* (litters, with all eggs laid at one time) of eggs as well as any hatchlings that managed to finish incubation. The future looked bleak.

However, the Charles Darwin Research Station was built on Santa Cruz Island, and the remaining 14 Hood Island tortoises — all that remained of that subspecies — were relocated to the station. In 1971, the first eggs were incubated. Young hatchlings (of Hood Islands tortoises and other island subspecies) were *head-started* — fed regularly and grown to a size that can survive most predators — and then relocated to their ancestors' islands. Although some Galapagos subspecies are still decreasing in number, others are now thriving thanks to captive breeding.

The African spur-thigh tortoise, commonly called a *sulcata* (*Geochelone sulcata*), was rarely found in the pet trade as little as 20 years ago. Today, breeders have successfully raised generations of these large, friendly, and active tortoises. Although their survival in the wild is in question, these tortoises will survive in captivity.

TURTLES IN MYTHOLOGY, LEGEND, AND ART

Turtles and tortoises have had a special place in many ancient cultures. In China, in 2,500 B.C., the symbol of a snake entwined with a tortoise was said to protect against evil spirits. The Emperor Hwang-ti had flags with this symbol lead and follow his armies to protect them from danger.

Eastern mythology said that the Earth was supported by a tortoise. East Indian legends said that a tortoise supported an elephant, which in turn supported the Earth. In Japan, the tortoise carried the mountain Horai (the home of the immortals) on its back. Also in Japan, turtles were considered symbols of happiness and good fortune, primarily because of their longevity. Tortoise art was frequently given at weddings to wish the newlyweds long life and happiness.

The legend of extreme longevity isn't true for all turtles and tortoises but certainly is deserved by some. The explorer Captain Cook is reputed to have given the King of Tonga a radiated tortoise. When the tortoise died, it is said to have been at least 189 years old. French explorer Marion de Fresne planted five Seychelles tortoises on the island of Mauritius in 1776. The last of these five died in 1918. The turtle had been in captivity for at least 152 years and was an adult when taken into captivity, so this chelonian may have been over 200 years old.

Perhaps because of their longevity, several cultures also associate tortoises with reincarnation. In one South American legend, if a person who was dying was laid on or next to a special tortoise's shell, the spirit of that person would live on and be transferred to a living person. In a Native American legend, a giant water turtle leads the dying person to his or her next lifetime.

Some Native Americans compare the tortoise shell with the night sky. The three bright stars that make up Orion's belt highlight the tortoise's back. In the story, these three stars, because they are always present, show the traveler the way home.

Turtles and tortoises also appear in many art forms, including paintings and sculptures. The favorite art form for turtles and tortoises seems to be that of small storage boxes, with the back shell coming off to reveal a storage area inside. Turtles and tortoises have also been depicted on stamps and coins: Japan released a nature conservation series of postcards with stamps, the ninth issue of which features a Spengler's turtle; Cuba, Vietnam, Yugoslavia, and Italy all released stamps with sea turtles on them; and Brazil, Kenya, the Cayman Islands, New Guinea, and several other countries released stamps with a variety of different species featured. The Fiji Islands released a sixpence coin with a loggerhead turtle on it. The Cayman Islands issued a 10 cent piece with a green turtle, and the Tonga Islands featured a radiated tortoise on a 1 senti coin.

Collections of turtles and tortoises in ceramic, porcelain, glass, and stone are still very popular. Modern depictions may be realistic, down to the small details in the scutes or skin wrinkles, or may be funny, with the turtles or tortoises having exaggerated characteristics. Some collections include hundreds or even thousands of chelonians.

Making a Difference by Preserving Turtles and Tortoises

When I adopted those two desert tortoises many years ago, I did so because I knew that they were threatened in their native habitat (in this case, the Mojave Desert of California). I was doing something to help, and I felt good about that.

In today's society, we feel a little helpless sometimes. With so many problems in the world, we can do so little to change things. Sure, we can recycle. We can conserve gas. We can build a compost pile in the backyard. We can try to raise our kids right so that they don't contribute to the problems of our world. But even while I was doing those things, I often asked myself, "Isn't there something else I can do?"

By myself, I can't save a rainforest or prevent a highway from going through delicate desert lands. But by taking in those two misplaced, threatened tortoises, incubating their eggs, and raising their babies, I actually felt like I was doing something real to save a threatened species.

Since then, my husband and I have concentrated on five threatened species: two from North America, one from Eurasia, and two from Africa. We have had breeding success with two species and have enjoyed watching the babies grow and develop. The individuals from the three species that have not yet bred are still young but are healthy, active, and showing breeding behaviors, so we're anticipating the day when they, too, reproduce.

I can't think of much of anything that's more exciting than watching a baby turtle or tortoise break open its shell. A perfect miniature of the adult, complete with tiny little toenails, a baby turtle or tortoise from a threatened species is hope for the future. Chapter 21 shares more information about breeding.

THE TORTOISE AND THE HARE

Nearly every child reads the story called *The Tortoise and the Hare*. This fable from Aesop appears to have had its origins in African legends. In the African story, an eagle and a tortoise race to win the hand in marriage of a fair young woman. The tortoise won through prior planning, intelligence, and deceit and suffers for using deceit by being banned to the ocean forever — hence the origin of marine turtles. In the modern version, the tortoise wins due to hard work, steadiness, and reliability, whereas the hare takes his abilities for granted, goofs off, and, as a result, loses the race.