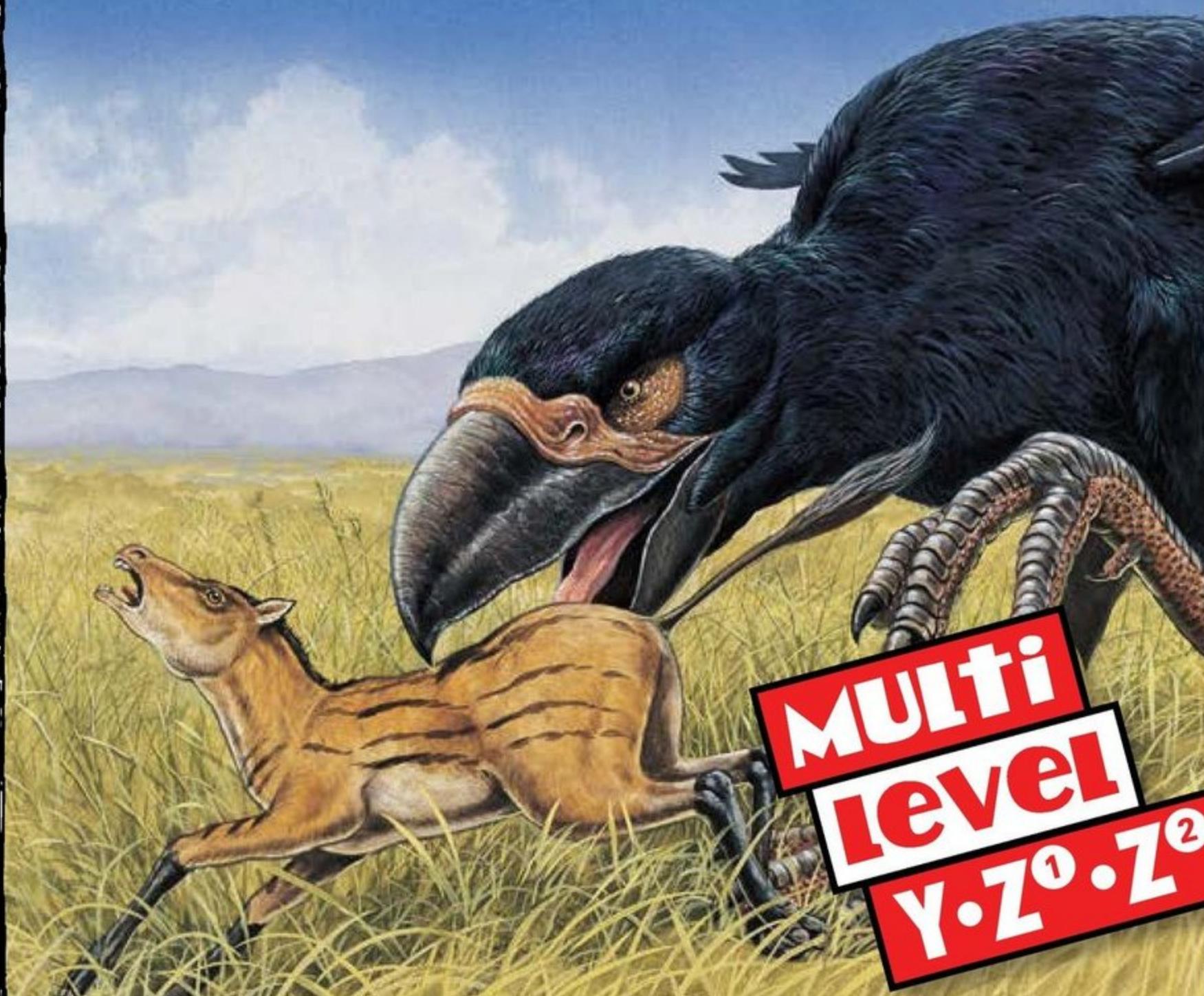


LEVELED BOOK • Z¹

Prehistoric Giants (Other Than Dinosaurs)



MULTI
level
Y•Z¹•Z²

Written by Alfred J. Smuskiewicz

Prehistoric Giants (Other Than Dinosaurs)



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Focus Question

How and why has animal life evolved on Earth over the past millions of years?

Words to Know

amphibians
arthropod
DNA
eras
extinct
habitat
herbivores
ice age
invertebrates

marine
paleontologists
periods
predators
prehistoric
species
tentacles
trilobites

Table of contents: Georges Cuvier (portrait, top left) defined the ways scientists decide how an extinct animal, such as *Megatherium* (top), might look. Geologist William Buckland (foreground, left) found a tiny mammal's jawbone (under magnifying glass) with a dinosaur's toe bone, which led him and Cuvier to decide that mammals had lived in more ancient times than anyone had ever known.

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Correlation

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Fountas & Pinnell	W-X
Reading Recovery	N/A
DRA	60



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What Giants Lived Long Ago?

Imagine traveling in a time machine to walk through a forest millions of years ago. As you stroll along, you suddenly hear a loud snorting behind you. When you turn, you see a huge animal, bigger than a house! You may think at first that this giant is a dinosaur—but it might not be.

Many **prehistoric** animals other than dinosaurs were giants. There were other giant reptiles as well as giant **species** of shellfish, insects, centipedes, fish, **amphibians**, birds, and mammals. There was even a giant ape, almost like King Kong!

Scientists called **paleontologists** learn about prehistoric animals from shells, footprints, and fossils (remains or traces of animals, such as bones). Paleontologists can use a fossil to learn when and where an animal lived, how big it was, what kind of food it ate, and how it moved. Sometimes, paleontologists can even remove **DNA** from animal remains. Tests of this DNA can show how the prehistoric animal is related to animals living today.

Do You Know?

Species have changed over and over again throughout Earth's history, with old species becoming extinct (dying out) and new ones appearing. More than 99 percent of all animal species that have ever lived are now extinct.



- 1 *Cameroceras*: N. America
- 2 *Meganeura*: Europe
- 3 *Arthropleura*: N. America, Europe
- 4 *Leedsichthys*: France, Chile
- 5 *Koolasuchus*: Europe
- 6 *Liopleurodon*: Europe
- 7 *Elasmosaurus*: N. America, Russia, Japan
- 8 *Cymbospondylus*: N. America, Europe
- 9 *Ornithocheirus*: S. America, Europe, Africa, Australia
- 10 *Gastornis*: N. America, Europe
- 11 *Phorusrhacos*: N. and S. America
- 12 *Indricotherium*: Mongolia
- 13 *Mammuthus*: N. America, Europe, Siberia
- 14 *Megatherium*: N. and S. America
- 15 *Gigantopithecus*: China, Southeast Asia

Scientists divide Earth's history into several different **periods** of time. These periods are grouped into different **eras**. The chart on page 7 shows in what periods and eras the animals in this book lived. As you read this book, pay special attention to parts that discuss causes and effects of various events, such as why a species disappeared during a certain period.

Enjoy your prehistoric journey with giants!

Giant Invertebrates

Set your time machine for the Paleozoic (pay-lee-ah-ZO-ik) era to see some giant **invertebrates** (animals without backbones). Some fly through the air, and others swim in the oceans, so don't forget to bring your swimsuit!

Cameroceras—Scariest Shellfish



It is 470 million to 440 million years ago, and all animals live in the ocean. What are you waiting for? Dive in to see *Cameroceras* (cam-er-ah-SAIR-us), a giant squidlike shellfish. Its head and eight **tentacles** stick out of a cone-shaped shell, which might grow as long as 36 feet (11 m).

Cameroceras swims by forcing water out of its shell through a tube. The force of the water makes the animal move in the opposite direction. This is similar to a balloon releasing air and flying across the room.

Cameroceras hunts **trilobites** (TRY-luh-bites) and other sea animals. It grabs these animals with its tentacles and uses its sharp beak to tear them to pieces.

Do You Know?

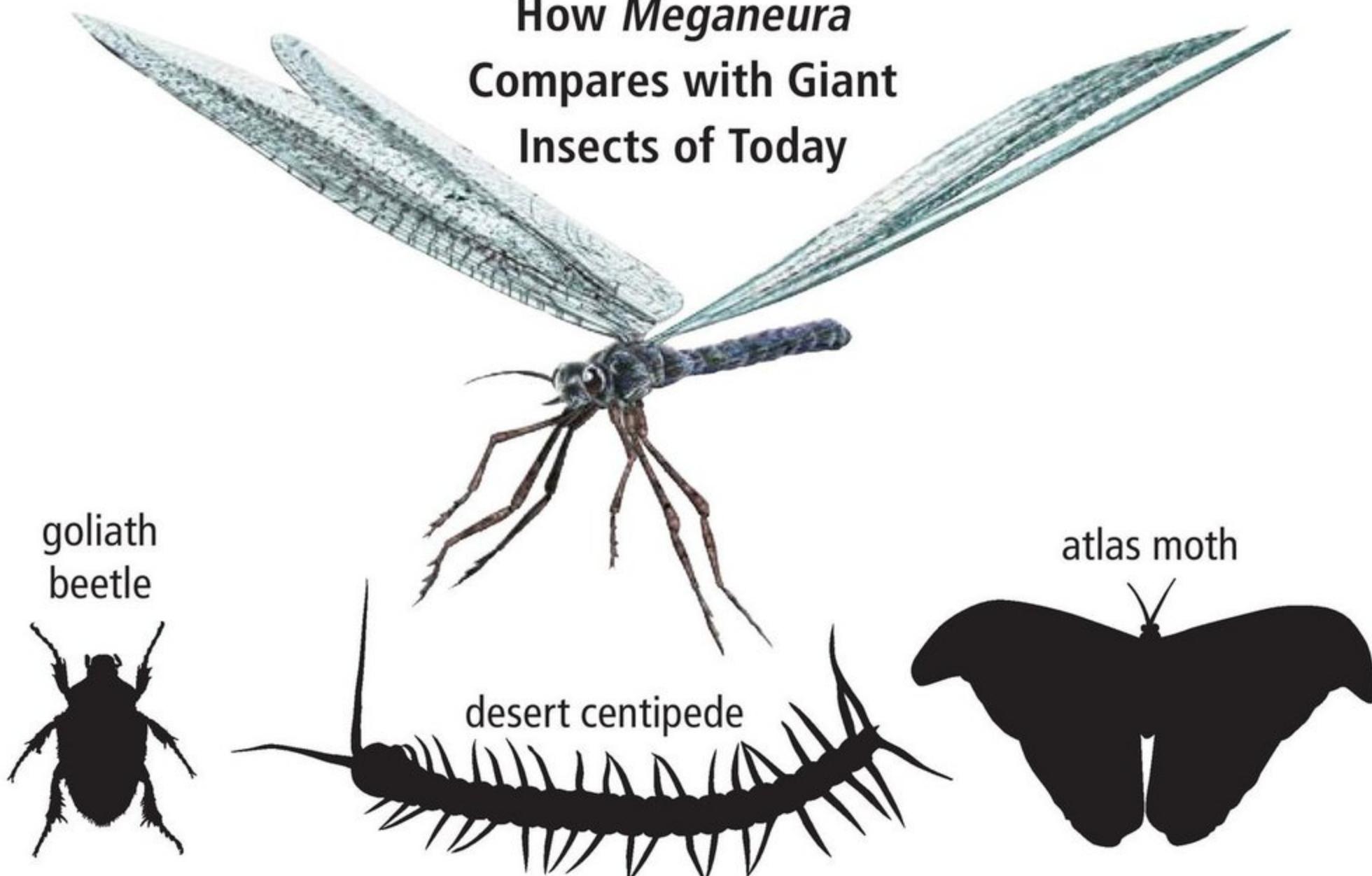
People used to think the fossil shells of small relatives of *Cameroceras* were the horns of unicorns.

Eras and Periods in Earth's History

Era	Period	When Period Began (years ago)	Animals in Period
Precambrian Time		4.5 billion	*
Paleozoic	Cambrian	543 million	
	Ordovician	490 million	<i>Cameroceras</i> , page 6
	Silurian	443 million	
	Devonian	417 million	
	Carboniferous	354 million	<i>Arthropleura</i> , page 9
	Permian	290 million	<i>Meganeura</i> , page 8 
Mesozoic	Triassic	248 million	<i>Cymbospondylus</i> , page 12
	Jurassic	206 million	<i>Leedsichthys</i> , page 10
			<i>Liopleurodon</i> , page 13
	Cretaceous	144 million	<i>Ornithocheirus</i> , page 15
			<i>Koolasuchus</i> , page 11
			<i>Elasmosaurus</i> , page 14 
Cenozoic	Tertiary	65 million	<i>Gastornis</i> , page 16
			<i>Indricotherium</i> , page 18
			<i>Phorusrhacos</i> , page 17
			<i>Gigantopithecus</i> , page 19
	Quaternary	2 million	<i>Mammuthus</i> , page 20
			<i>Megatherium</i> , page 21
		Today	

* The first known animal appeared about 600 million years ago.

How *Meganeura* Compares with Giant Insects of Today



Meganeura—Dangerous Dragonfly

If you travel more than 100 million years after *Cameroceras* roamed the seas, you will probably end up in a swampy forest, about 311 million to 282 million years ago. And you might want to duck because a giant dragonfly is swooping down through the tropical air. *Meganeura* (meh-guh-NYUR-uh) is bigger than most birds you know. It has a wingspan of 2.5 feet (76 cm), making it the largest insect ever known.

You've probably noticed that the air is heavier than you're used to. That's because there's more oxygen in it. This heavy air helps support the weight of the giant flyer, and the extra oxygen allows *Meganeura* to grow to a giant size.

Arthropleura—Biggest Bug

Now that *Meganeura* has flown by, crawling toward you along the forest floor is *Arthropleura* (AHR-throw-PLOOR-ah), the largest land **arthropod** ever. But it isn't a six-legged insect. It is more like a 60-legged centipede, and it can grow longer than 8 feet (2.5 m). It lives in swampy forests between 340 million and 280 million years ago. Like *Meganeura*, *Arthropleura* grows so large because the air is heavy with oxygen.



The body of *Arthropleura* was made up of 30 hard plates. Under each plate was a pair of legs.

Giant Fish and Amphibians

The next giants you will visit on your journey through time are a fish and an amphibian who live during different periods of the Mesozoic (MEZ-uh-ZO-ik) era. You might want to bring your snorkel as you head out to sea.

Leedsichthys—Largest Fish

Leedsichthys (leeds-ICK-thiss) is no “big fish that got away” story. It is real. The largest fish that ever lived, it can grow almost 55 feet (16.8 m) long in the seas of 165 million to 155 million years ago.

Leedsichthys gulps in huge mouthfuls of water as it swims. At the back of the fish’s mouth are more than 40,000 long, thin teeth. These teeth act like a screen to keep in shrimp, jellyfish, and other small animals when *Leedsichthys* blows the water back out. Many whales eat this way back in your time.

You know *Leedsichthys* will eventually become extinct because the animal doesn’t exist in your time. The reason is possibly because seas become lower and smaller. Smaller seas will mean less food for the giant fish to eat.

Do You Know?

In May 2005, fishermen in Thailand caught a Mekong giant catfish almost 9 feet (2.7 m) long. Before scientists could study this giant fish, however, the fishermen and their friends ate it!

Koolasuchus—Slimy Giant

Hit the fast-forward button in your time machine, skipping ahead between 40 million and 60 million years further into the Mesozoic era. See that slimy giant salamander with the really wide, flat head? That's *Koolasuchus* (KOOL-ah-SOOK-us), an enormous amphibian, about 17 feet (5 m) long, that lives in swampy forests 137 million to 112 million years ago. Its big head holds more than 100 long teeth, which it uses to capture fish, crabs, turtles, and other prey.

Koolasuchus has eyes on top of its head. This allows it to bury itself in muddy water while keeping watch for prey. Crocodiles hunt in the same way.

Koolasuchus and other giant amphibians will disappear. A change in climate will cause them to become extinct. The change in climate will cause their swampy **habitat** to become less common.

Animals of the Mesozoic Era



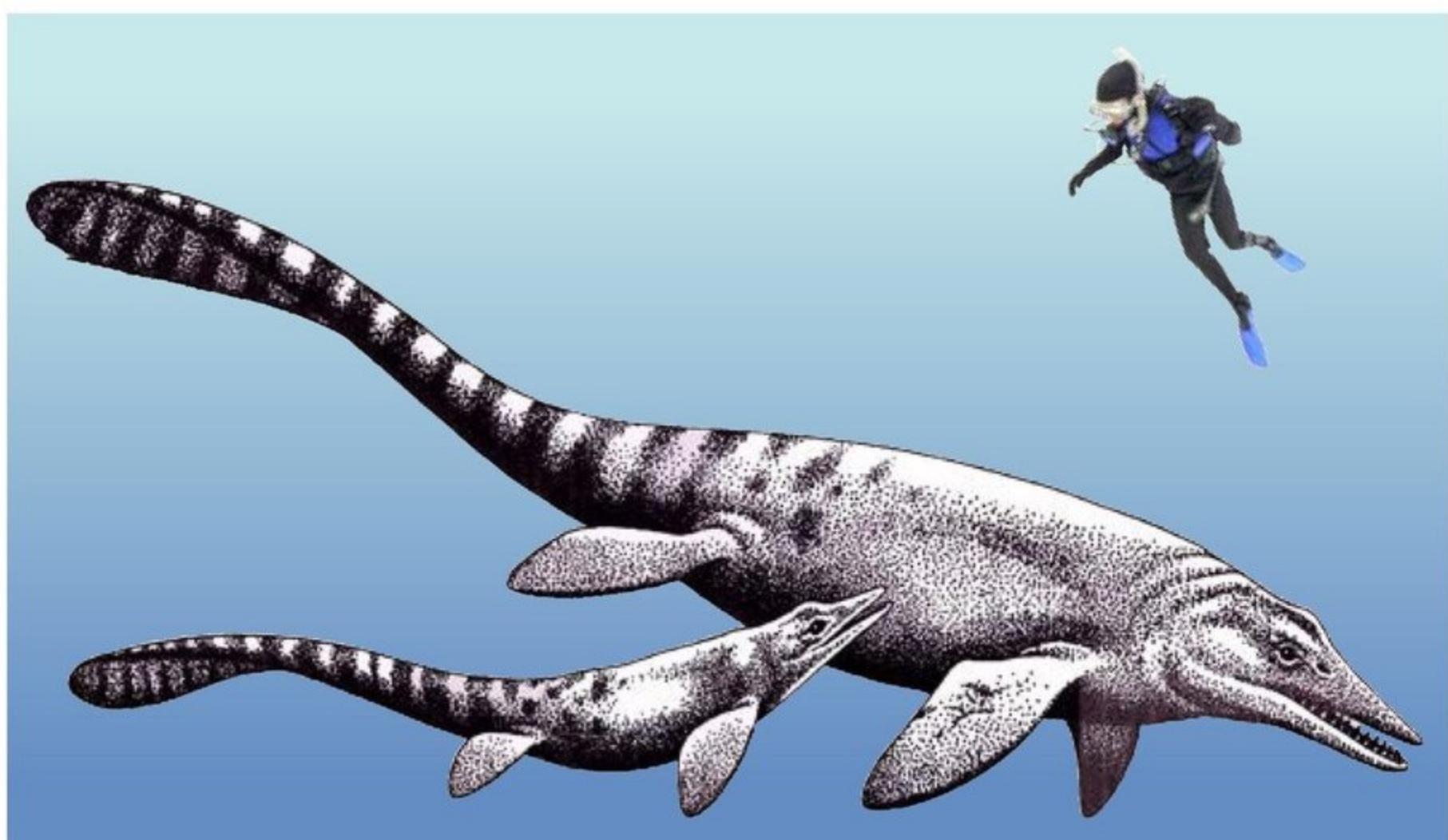
Giant Reptiles

During the Mesozoic, while dinosaurs walk on Earth, other giant reptiles swim in the ocean. They are just as gigantic as some dinosaurs. And just as deadly.

Cymbospondylus—Fishlike Reptile

Cymbospondylus (sim-bow-SPON-di-lus) belongs to a group of fishlike **marine** reptiles called ichthyosaurs (IK-thee-uh-sorz). It lives 240 million to 210 million years ago, when it is one of the largest animals in the sea, at 33 feet (10 m) long.

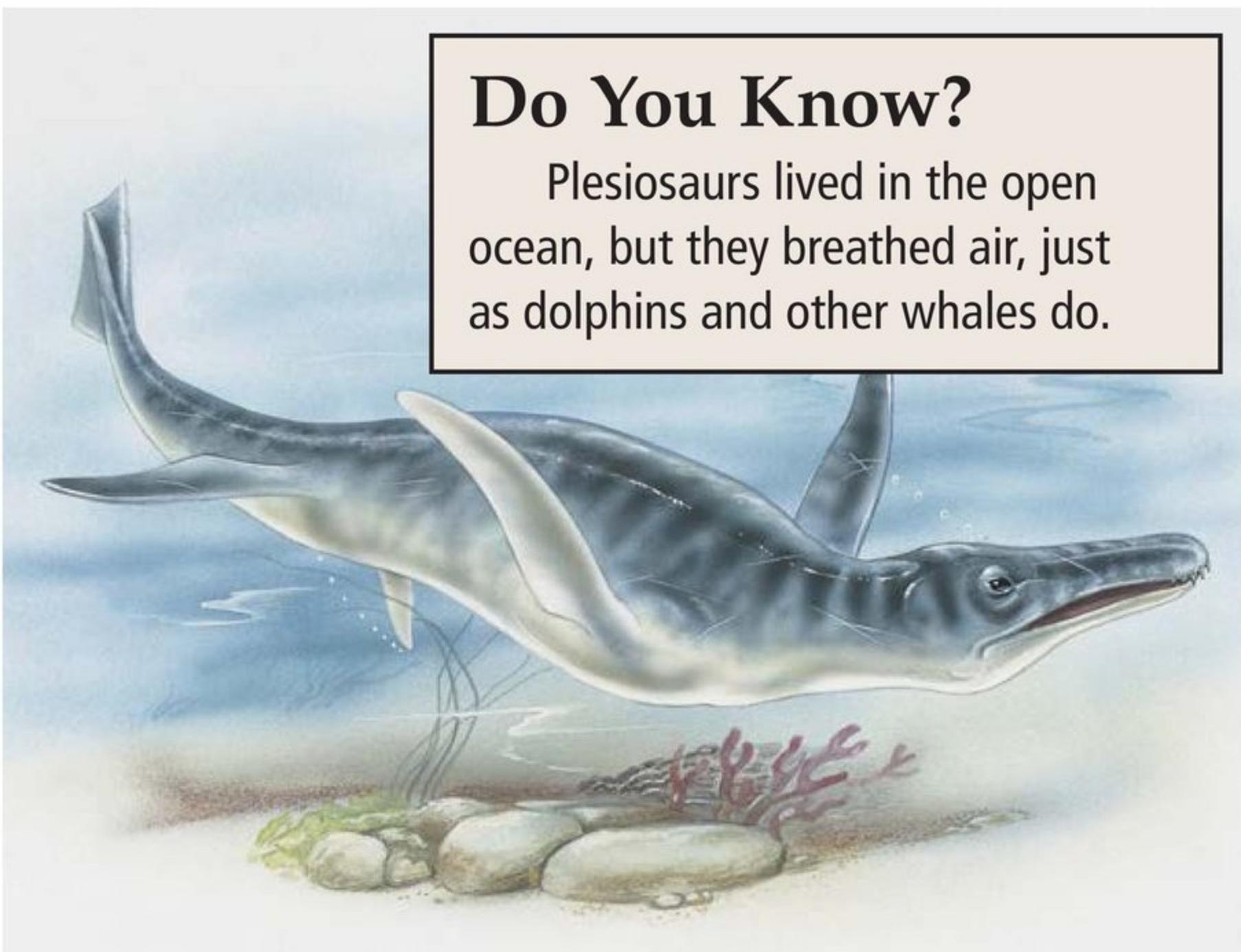
Cymbospondylus has a huge head with a long, pointed snout. Its jaws contain many rows of small teeth used for catching and holding fish and other animals that it hunts in deep waters.



Cymbospondylus had a huge head with a long, pointed snout. It hunted mostly small- and medium-sized fish and shellfish.

Do You Know?

Plesiosaurs lived in the open ocean, but they breathed air, just as dolphins and other whales do.



Liopleurodon—T. rex of the Seas

Travel forward from the time of *Cymbospondylus* but stay in the ocean—if you dare. The reptile *Liopleurodon* (LIE-oh-PLOOR-oh-don) swims in these salty waters, with a mouth about three times larger than that of the famous dinosaur *Tyrannosaurus rex* (tie-RAN-uh-SAW-russ rex). *Liopleurodon* can use its large, powerful jaws to kill any animal in the seas. Like a shark in your time, it can smell prey from a long distance away.

Part of a group of reptiles called plesiosaurs (PLEEZ-ee-uh-sorz), short-necked *Liopleurodon* lives 160 million to 155 million years ago. It can grow up to 49 feet (15 m) long.

Elasmosaurus—Long-Necked Hunter

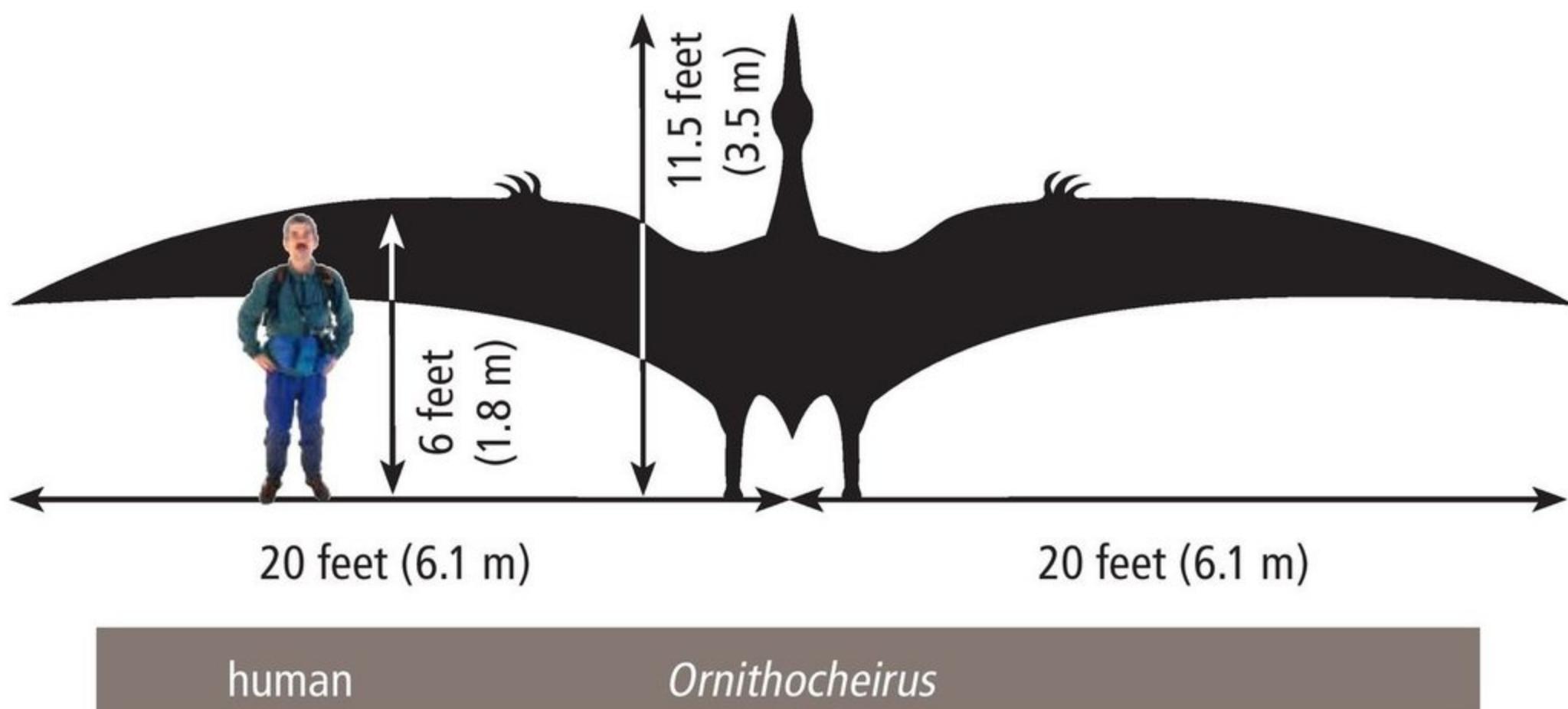
If you go swimming between 85 million and 65 million years ago, you might not even notice *Elasmosaurus* (eh-LAZ-mo-SAWR-us), even though it grows as long as 49 feet (15 m). Most of that length is in its neck and tail. This plesiosaur's long neck has 76 backbones in it. (The neck of a person has only seven backbones.)

Elasmosaurus can keep the bulk of its body far away from the fish it hunts. Its long neck allows it to sneak up under a school of fish without the fish knowing there is a giant under them!



Elasmosaurus swam with its long neck straight out. The reptile also had four diamond-shaped flippers.

How Big Was It?



Ornithocheirus—Flying Reptile

From out of the sky, a creature the size of a small airplane swoops down, dips its long beak below the water's surface, and swallows a fish whole before flying off again. A giant bird? No. You just witnessed *Ornithocheirus* (or-NITH-oh-KY-rus), a flying reptile that lives near sea coasts and lakes from 140 million to 70 million years ago. It may be the largest of the pterosaurs (TAIR-ah-sorz), which is a group of flying reptiles that live at the same time as the dinosaurs.

Ornithocheirus has a wingspan up to 40 feet (12.2 m) and a body about 11.5 feet (3.5 m) long. Although it is gigantic, it probably weighs only about as much as you do. That's because its bones are hollow, helping it to fly easily. Colonies of these giant flyers build nests on cliff tops.

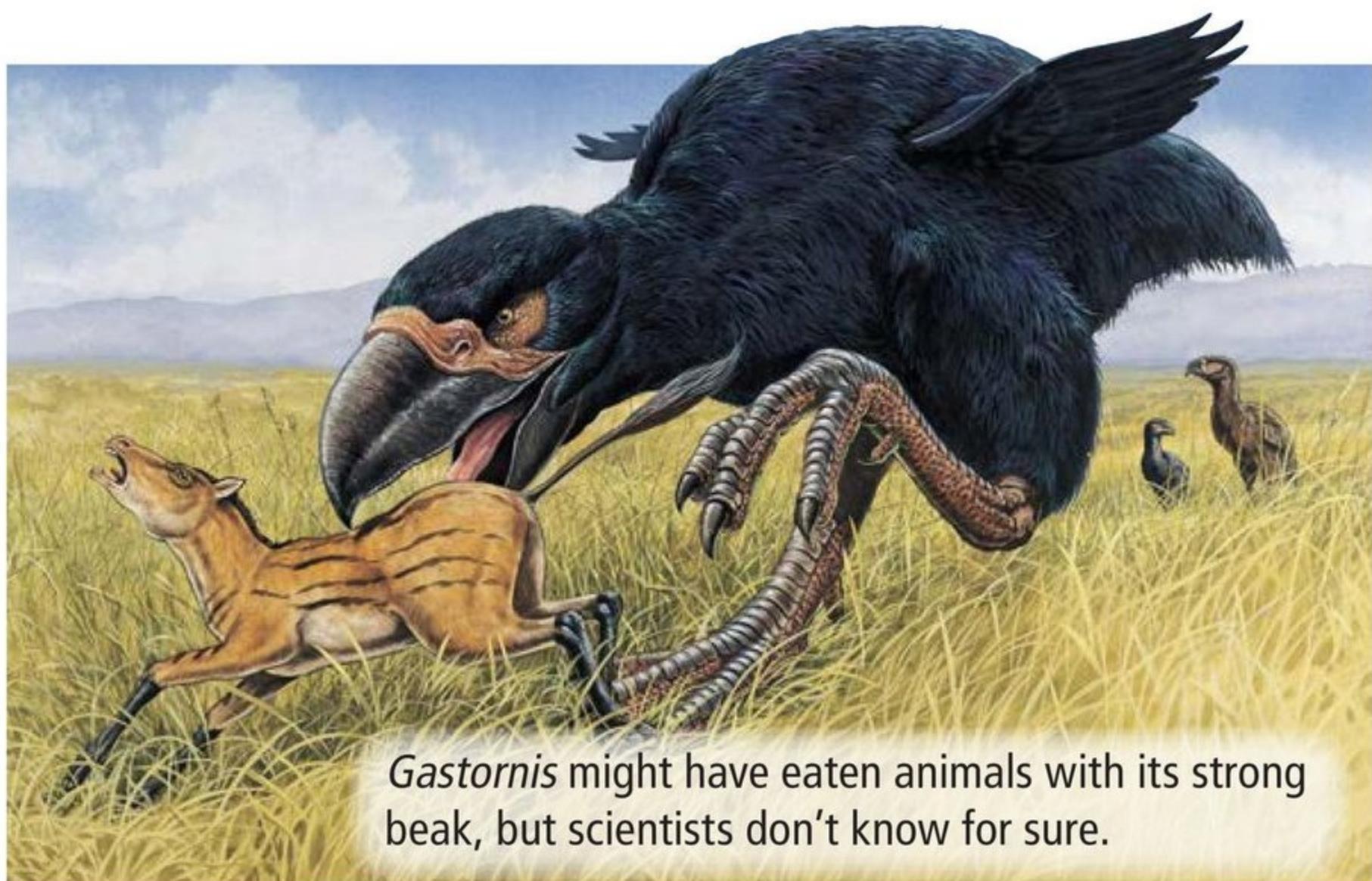
Giant Birds

You won't need binoculars to spot the enormous creatures called terror birds. Like today's ostriches, they are flightless, but unlike plant-eating ostriches, most (and maybe all) terror birds are **predators**.

Gastornis—A Ton of Terror

In the forests and swamps of 56 million to 41 million years ago, you will find *Gastornis* (gas-TOR-nis), a bird about 7 feet (2.1 m) tall. It is possibly one of the top predators in North America and Europe since dinosaurs are extinct in its time.

Modern scientists are not sure what this terror bird eats, but you can see its sharp, powerful beak, which can easily rip the flesh and crush the bones of small animals—if it can catch them. *Gastornis* may weigh more than 1 ton (0.9 metric tons).





Phorusrhacos had a short, sharp claw on each wing, though scientists do not know how it was used.

Phorusrhacos—Speedy and Deadly

Phorusrhacos (FOR-us-RAH-kus) is a terror bird that stands up to 10 feet (3 m) tall. It hunts small animals in plains and woodlands from 27 million to 2.5 million years ago, possibly catching such prey as young saber-toothed cats and small horses.

Phorusrhacos can move much faster than *Gastornis* because it doesn't weigh as much as that earlier terror bird. *Phorusrhacos* may be able to run after its prey at 43 miles (69 km) per hour, faster than a car usually travels down a city street.

Giant Mammals

After the extinction of the giant reptiles, giant mammals began to rule the world. Many scientists believe terror birds went extinct later in the Cenozoic era because mammals were better hunters—they ate all the food! But the giant mammals you are about to meet are **herbivores**, meaning they eat only plants, so don't be afraid to get close.

Indricotherium—Dino-Sized Rhino

Climb a tree to get a good look at *Indricotherium* (IN-drik-oh-THEER-ee-um), a relative of today's rhinoceros. This giant mammal uses its long neck, like a giraffe, to eat leaves and branches at the tops of trees.

Living from 30 million to 25 million years ago, *Indricotherium* is at least 15 feet (4.5 m) tall—bigger than a one-story house—and it weighs 16 tons (15 metric tons).

The big body of *Indricotherium* allows it to store a great amount of fat and water. This helps the big animal survive long hot and dry seasons.



Indricotherium is one of the largest mammals.

Gigantopithecus—The Real King Kong

King Kong was a big ape in a movie, but *Gigantopithecus* (jeye-GANT-o-PIHTH-uh-kuhs) is a real giant ape that lives from about 8 million to 100,000 years ago. Some males stand 10 feet (3 m) tall on their hind legs and weigh more than 1,000 pounds (454 kilograms). You can tell which ones are females. They are half this size.

Gigantopithecus is a gentle giant. It eats bamboo, fruit, seeds, and other plant food in tropical rainforests in Asia.

While you're here, you might even spot an early type of human called *Homo erectus*, who is living at the same time and in the same places as *Gigantopithecus*. These humans may end up using so much bamboo for food and to make tools that not enough will be left for *Gigantopithecus* to eat. This is one possible reason why *Gigantopithecus* will become extinct.

Do You Know?

Could *Gigantopithecus* still be alive? Hundreds of people have claimed to see a huge, hairy apelike creature in the northwestern United States and in Canada. Because of the 16-inch (41-cm) footprints that have been seen in these areas, this creature is called Bigfoot. In Asia, many people have seen a similar creature, which is called Yeti. Most scientists doubt these creatures really exist.



An African elephant (left) stands with the woolly mammoth and three of their closely related ancestors. How are they different from each other?

***Mammuthus*—Woolly Mammoth and Its Relatives**

Time to move forward again to between 4 million and 10,000 years ago, during the last **ice age**, to catch a glimpse of a woolly mammoth, a species of *Mammuthus* (MA-muh-thus). Keep your eyes peeled for a creature that looks like a huge, hairy elephant with long, curved tusks. There it is, using its tusks to clear paths through snow, probably searching for plant food. The woolly mammoth stands almost 12 feet (3.6 m) tall, but another *Mammuthus* species can grow as tall as 14 feet (4.3 m).

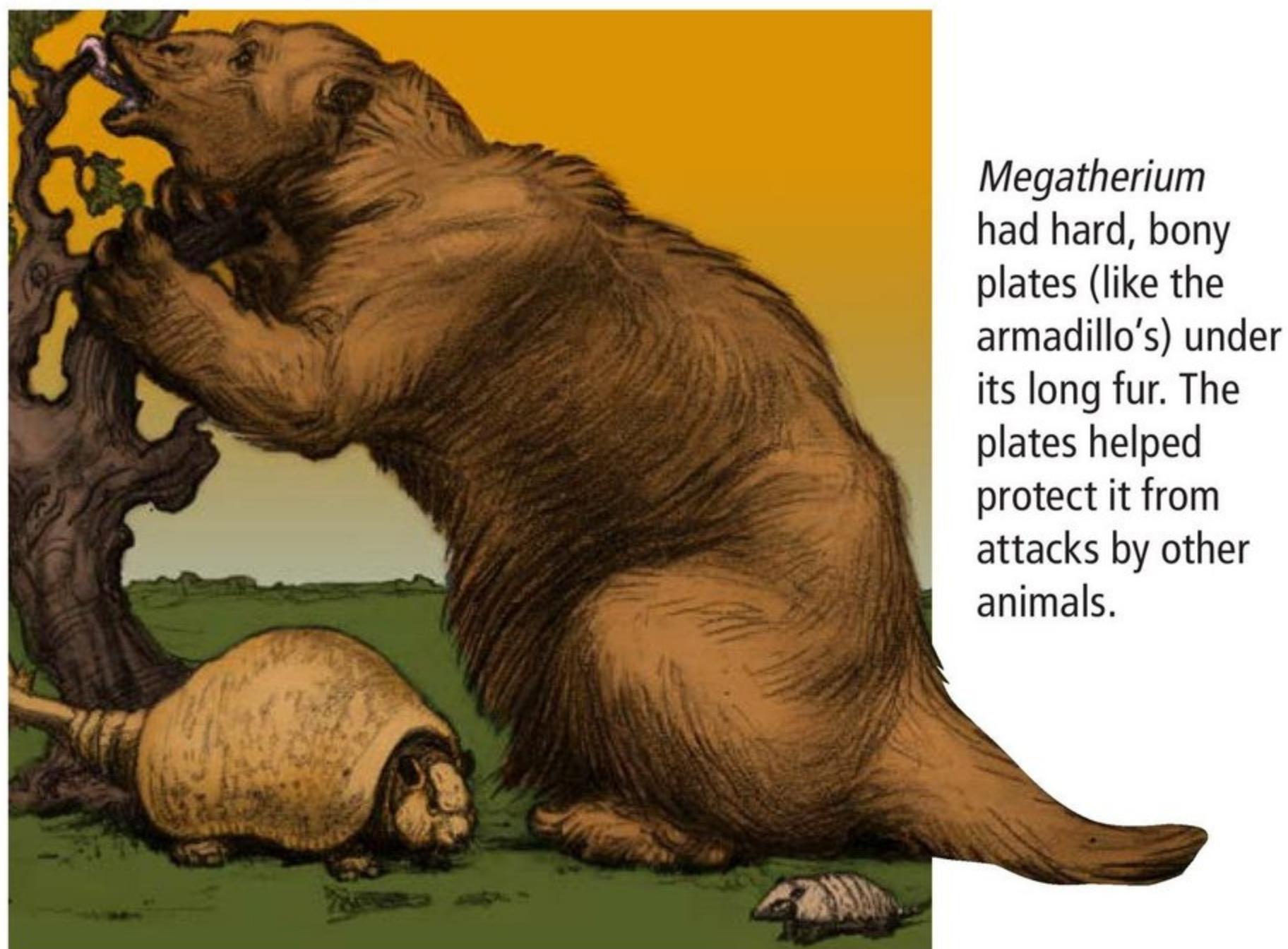
Early humans hunt mammoths and paint pictures of them, which can still be seen on cave walls in modern Europe. Mammoths will become extinct at the end of the ice age, when the weather becomes too warm for them.

***Megatherium*—Giant Ground Sloth**

Don't take off your winter coat yet. Another huge mammal that lives during the last ice age is *Megatherium* (meg-ah-THEER-ee-um), a giant ground sloth. It lives about 2 million to 8,000 years ago and is almost 20 feet (6 m) long.

Megatherium is related to the much smaller tree sloths that live in South America today. The one you're watching is standing on its hind legs, using its tail for balance, which shouldn't surprise you. Fossil footprints found in your time show that it could stand and even walk upright.

And speaking of your time, you should probably be getting back . . .

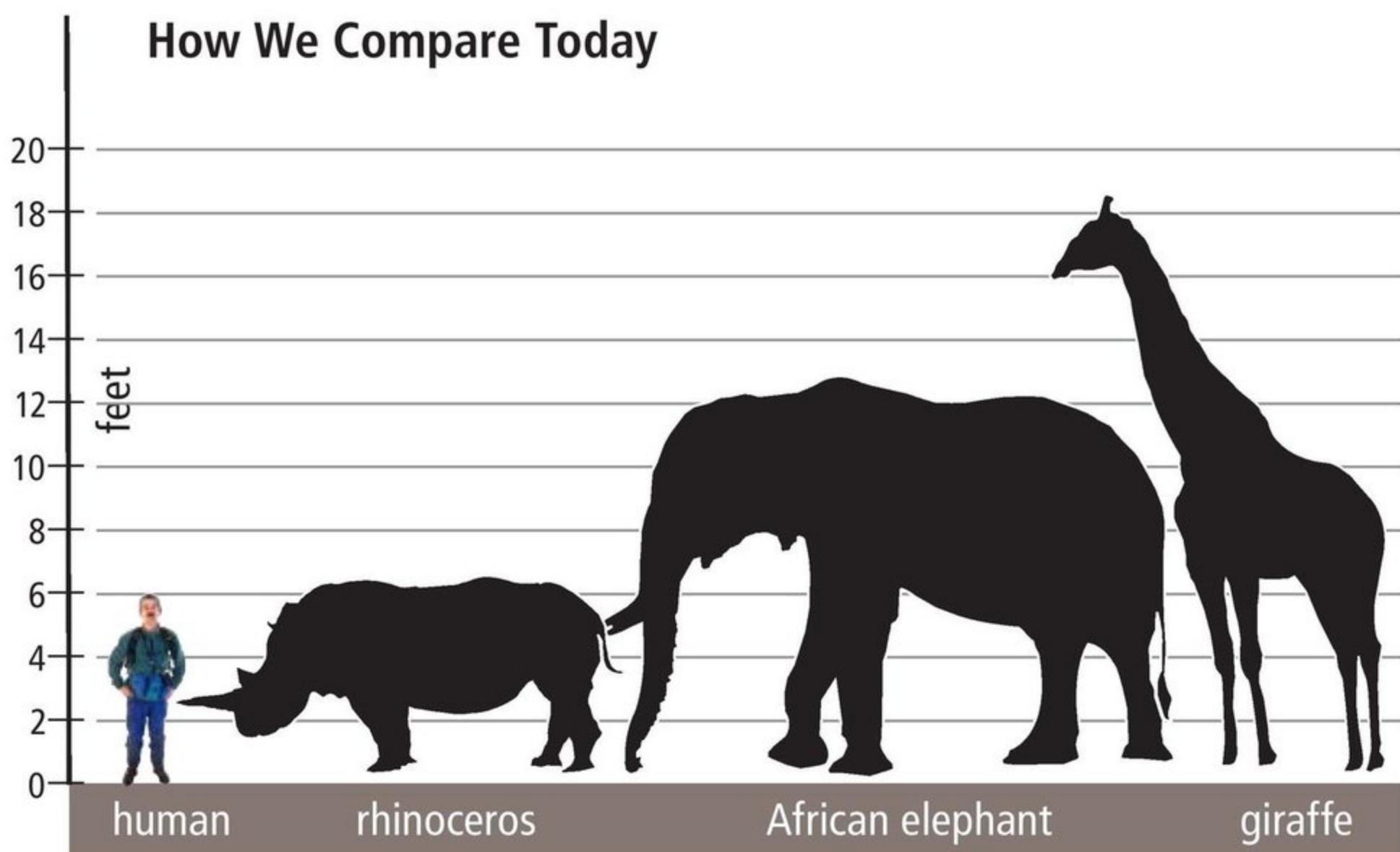


Megatherium had hard, bony plates (like the armadillo's) under its long fur. The plates helped protect it from attacks by other animals.

A World Without Giants?

Isn't it amazing to think that giants such as the ones in this book once walked on Earth and swam in the ocean? It's too bad we can't see these huge creatures today.

However, you don't have to get in a time machine to see very large animals. Blue whales, great white sharks, giant squids, grizzly bears, elephants, giraffes, ostriches, condors, and anacondas are some of the large animals that share the planet with us today. Unfortunately, many of these animals are threatened with extinction because their populations are so small. It's important to protect these animals, mainly by preserving their habitats. That way, we can be sure that we'll never live in a world without giants.



Glossary

amphibians (<i>n.</i>)	cold-blooded animals with backbones that generally spend some time in water and some time on land (p. 4)
arthropod (<i>n.</i>)	a member of a group of invertebrates that have a segmented body, an exoskeleton, and jointed limbs; includes insects, arachnids, and crustaceans (p. 9)
DNA (<i>n.</i>)	a code that carries genetic information about a living thing; abbreviation of deoxyribonucleic acid (p. 4)
eras (<i>n.</i>)	large divisions of time in Earth's history: Paleozoic, Mesozoic, and Cenozoic (p. 5)
extinct (<i>adj.</i>)	no longer in existence; completely wiped out (p. 10)
habitat (<i>n.</i>)	the natural environment of a plant or animal (p. 11)
herbivores (<i>n.</i>)	animals that eat only plants (p. 18)
ice age (<i>n.</i>)	a period in Earth's history when ice sheets covered large areas of land (p. 20)
invertebrates (<i>n.</i>)	animals that do not have backbones (p. 6)
marine (<i>adj.</i>)	of or relating to the sea (p. 12)
paleontologists (<i>n.</i>)	people who study plant and animal fossils (p. 4)
periods (<i>n.</i>)	divisions of time that make up larger eras of time in Earth's history (p. 5)
predators (<i>n.</i>)	animals that hunt and eat other animals (p. 16)
prehistoric (<i>adj.</i>)	of or relating to the time before recorded or written history (p. 4)
species (<i>n.</i>)	a group of living things that are physically similar and can reproduce (p. 4)

tentacles (<i>n.</i>)	long, flexible limbs on an animal, especially an invertebrate (p. 6)
trilobites (<i>n.</i>)	common prehistoric sea animals that were covered with a soft shell (p. 6)

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Prehistoric Giants (Other Than Dinosaurs)

A *Reading A-Z Level Z1 Leveled Book*

Word Count: 2,155

Connections

Writing

Research an era described in the book.

Create a pamphlet persuading someone to vacation there. Include facts about the era and what a visitor should bring along to be prepared.

Science

Do further research on the adaptations of one animal from the book. Describe how the adaptations allowed the animal to survive in the era in which it lived.



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