Pterodactylus

(ter-uh-DAK-tuh-luss) "wing finger"
Archosauria • Pterosauria • Pterodactyloidea
Late Jurassic • Germany • 2-foot wingspread

The first wave of pterosaurs, the rhamphorhynchoids (see *Eudimorphodon*, page 21, and *Dimorphodon*, page 35), had long tails, relatively short necks, short hands, short heads, and a long fifth toe. Just prior to the dawn of the Cretaceous, the second wave of pterosaurs, the pterodactyloids, arrived in the form of tiny *Pterodactylus*, the smallest of them all. It had a long face, neck, and hands, a tiny tail, and a tiny fifth toe. Evidently *Pterodactylus*'s wing membrane extended to halfway down its thigh, which allowed the leg muscles to control the wing's lift and braking, acting like the flaps on the trailing edge of an airplane wing. Only pterodactyloids survived into the Cretaceous.

Except for lacking feathers, *Pterodactylus* was very much like a big sandpiper. It probably flitted from beach to beach, riding the gentle breezes coming in off the oceans. Its long, toothy bill would have made an effective probe for sandworms and small crustaceans.

Pteranodon

(ter-AN-uh-don) "wings without teeth"
Archosauria • Pterosauria • Pterodactyloidea
Late Cretaceous • Kansas • up to 24-foot wingspread

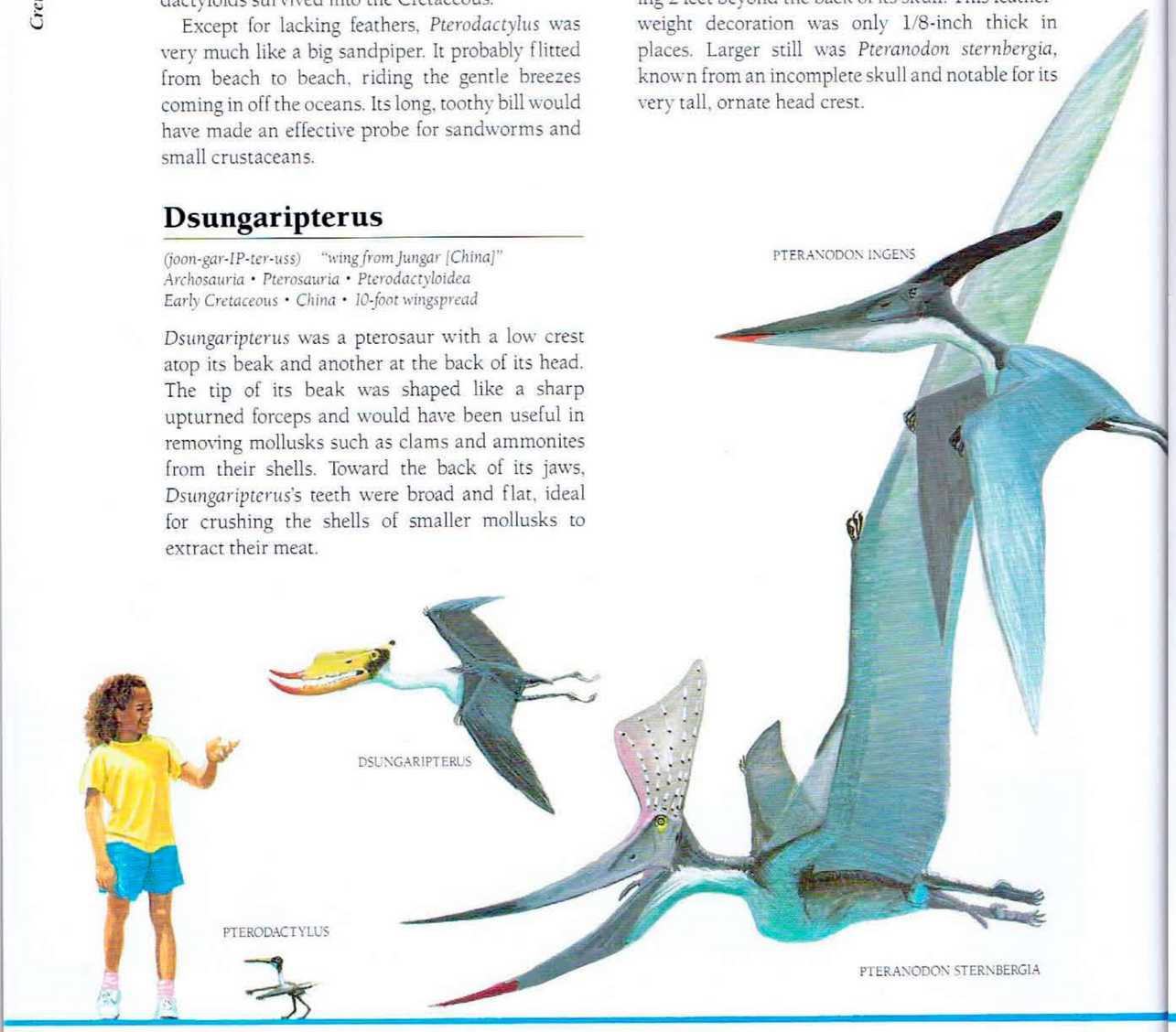
Like a giant albatross, *Pteranodon* soared above the inland seas that once covered the grain belt of mid-America. Skimming the surface, *Pteranodon* plucked out squidlike mollusks, fish, and other small animals for lunch. The catch was saved in a shallow, pelicanlike throat sack beneath its long beak. Like many later pterosaurs, *Pteranodon* had no teeth.

Seabirds are the least colorful of birds, and perhaps coast-dwelling pterosaurs were similarly drab. *Pteranodon*'s distinctive crest would then have been useful in attracting mates of its own species. *Pteranodon ingens* had a long crest extending 2 feet beyond the back of its skull. This featherweight decoration was only 1/8-inch thick in places. Larger still was *Pteranodon sternbergia*, known from an incomplete skull and notable for its very tall, ornate head crest.

Dsungaripterus

(joon-gar-IP-ter-uss) "wing from Jungar [China]"
Archosauria • Pterosauria • Pterodactyloidea
Early Cretaceous • China • 10-foot wingspread

Dsungaripterus was a pterosaur with a low crest atop its beak and another at the back of its head. The tip of its beak was shaped like a sharp upturned forceps and would have been useful in removing mollusks such as clams and ammonites from their shells. Toward the back of its jaws, *Dsungaripterus*'s teeth were broad and flat, ideal for crushing the shells of smaller mollusks to extract their meat.



Quetzalcoatlus

(ket-sahl-koe-AHT-luss) "[Aztec] feathered serpent god"
Archosauria • Pterosauria • Pterodactyloidea
Late Cretaceous • Texas • 35-to-40-foot wingspread

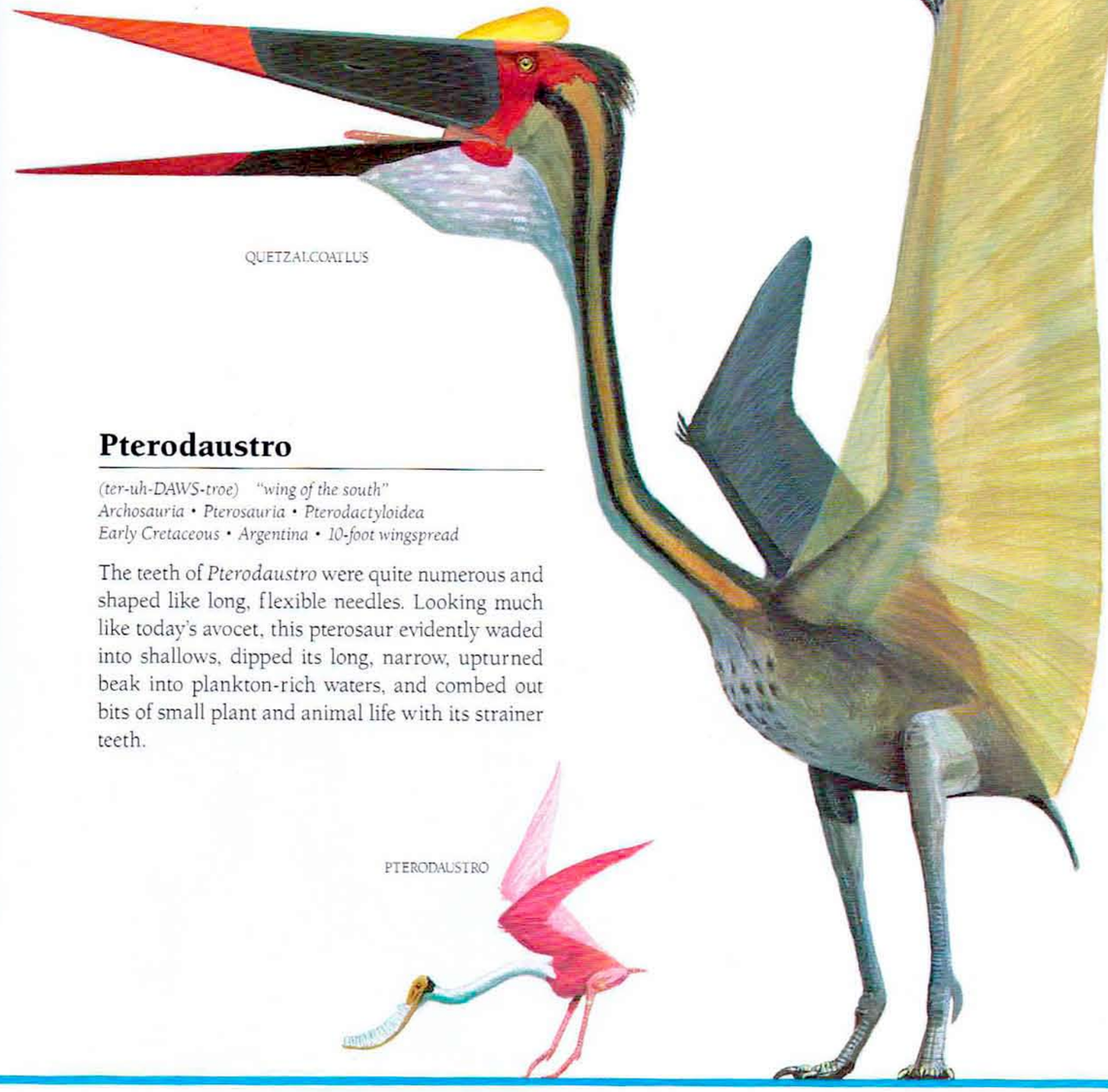
The largest flying animal of all time was *Quetzalcoatlus*. With a wingspread rivaling that of a small private plane and a weight estimated at only 150 pounds, this storklike pterosaur must have been able to soar effortlessly for hours, ranging dozens of miles each day. Unlike fossils of other pterosaurs, those of *Quetzalcoatlus* were found far from the ancient seacoast. Like a great egret, this flyer may have fished in inland streams and lakes. It had a toothless bill measuring 7 feet in length, which may have been used to spear fish. Its long neck had little flexibility from side to side, which helped *Quetzalcoatlus*'s head resist crosswinds that would have twisted it like a weather vane. Among pterosaurs, only *Quetzalcoatlus* is known to have survived until the very end of the Cretaceous Period.

Of the very few birds that are known to have been the contemporaries of pterosaurs during the Cretaceous, all are shore birds and some had teeth Birds are only distant cousins of pterosaurs, however; they are much more closely related to dinosaurs. (See *Archaeopteryx*, page 37.)

Pterodaustro

(ter-uh-DAWS-troe) "wing of the south"
Archosauria • Pterosauria • Pterodactyloidea
Early Cretaceous • Argentina • 10-foot wingspread

The teeth of *Pterodaustro* were quite numerous and shaped like long, flexible needles. Looking much like today's avocet, this pterosaur evidently waded into shallows, dipped its long, narrow, upturned beak into plankton-rich waters, and combed out bits of small plant and animal life with its strainer teeth.



Iguanodon

(ih-GWAN-uh-don) "iguana tooth"
Archosauria • Dinosauria • Ornithischia • Ornithopoda
Early Cretaceous • Europe, Asia, North Africa • 30 feet long

In the 1820s an English country doctor named Gideon Mantell compared fossil teeth he had found to those of the living iguana and concluded that his fossils had come from a 40-foot-long prehistoric lizard. He named it *Iguanodon*. This was, instead, one of the first dinosaurs to be discovered, though the term "dinosaur" was not to be coined for another 20 years.

Iguanodon was one of the ornithopods, unarmored, beaked plant eaters that were later relatives of *Fabrosaurus* (page 23). *Iguanodon* was larger and so walked on all fours, at least part of the time. *Iguanodon* had an upper horny beak to match its lower one, which made cropping low-growing plants easier. Behind its beak was a single row of plant-chopping teeth. Cheeks kept the chopped-up bits from falling out.

Iguanodon's middle three fingers were bound together in a "mitten" that gave its handprint a crescent shape. Its fifth finger remained free, perhaps to grasp branches against the palm. Its first digit was a large horn-shaped spike of bone that stuck out at a right angle to the hand. *Iguanodon* was not particularly fast and, lacking horns and armor, may have defended itself by jabbing its "thumb" spike into its attackers.

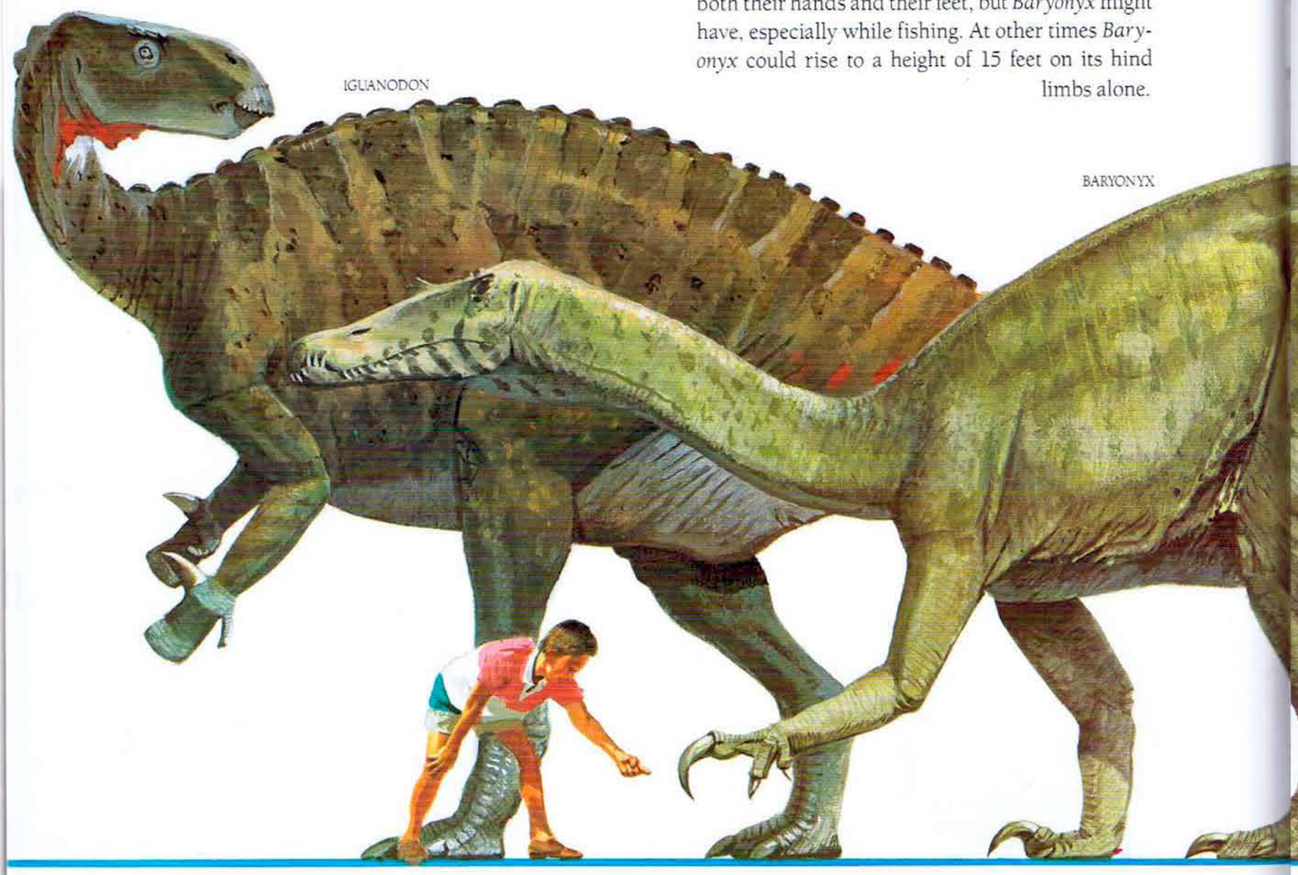
Baryonyx

(bar-ee-ON-iks) "heavy claw"
Archosauria • Dinosauria • Saurischia • Theropoda
Early Cretaceous • England • 30 feet long

Recently discovered *Baryonyx* was unlike any other meat-eating theropod. Instead of chasing prey on land, this 4,000-pound dinosaur may have been a fish eater that waded out in shallow water, like a grizzly bear, to gaff passing fish with its huge 12-inch claws.

Baryonyx had a long, low head like that of a crocodile, but its nostrils were far from the tip of its snout. This predator could continue breathing while its spoon-shaped mouth probed the waters. Compared to other theropods, *Baryonyx* had nearly twice the usual number of teeth in its jaws. To top it all off, a small horn rose above the middle of its muzzle.

Meat-eating dinosaurs usually did not walk on both their hands and their feet, but *Baryonyx* might have, especially while fishing. At other times *Baryonyx* could rise to a height of 15 feet on its hind limbs alone.



Segnosaurus

(seg-noe-SOR-uss) "slow lizard"
Archosauria • Dinosauria • Segnosauria
Late Cretaceous • Mongolia • 20 feet long (est.)

Not enough is known yet to classify *Segnosaurus* as either a saurischian or an ornithischian dinosaur. It had a strange mix of body parts from both groups. It was not an evolutionary link between the two groups because it lived 130 million years after they separated.

Like the saurischian *Plateosaurus* (page 23), *Segnosaurus* had a small head on the end of a slender neck and four toes armed with long claws on each hind foot. It could walk on all fours or rise to its hind legs alone, displaying an even larger set of daggerlike claws on its hands. Powerful defensive weapons, these claws may also have been used to tear down branches. One supposed segnosaur, known only from a single forelimb, had front claws 27 inches long, the longest among dinosaurs.

Like that of the ornithischian *Iguanodon*, *Segnosaurus*'s snout was tipped with a horny, toothless beak. Its hipbones were shaped like saurischian hips but were positioned like those of ornithischians. The hips and ribs flared widely to either side, giving *Segnosaurus* an unusually large gut for digesting a big batch of plant food.

In the Late Cretaceous the plains of Mongolia were seasonally dry, with numerous streams crossing the countryside. Many kinds of dinosaurs roamed these plains, but *Segnosaurus* would have feared only large tyrannosaurs and small flocks of birdlike dinosaurs similar to *Deinonychus*.

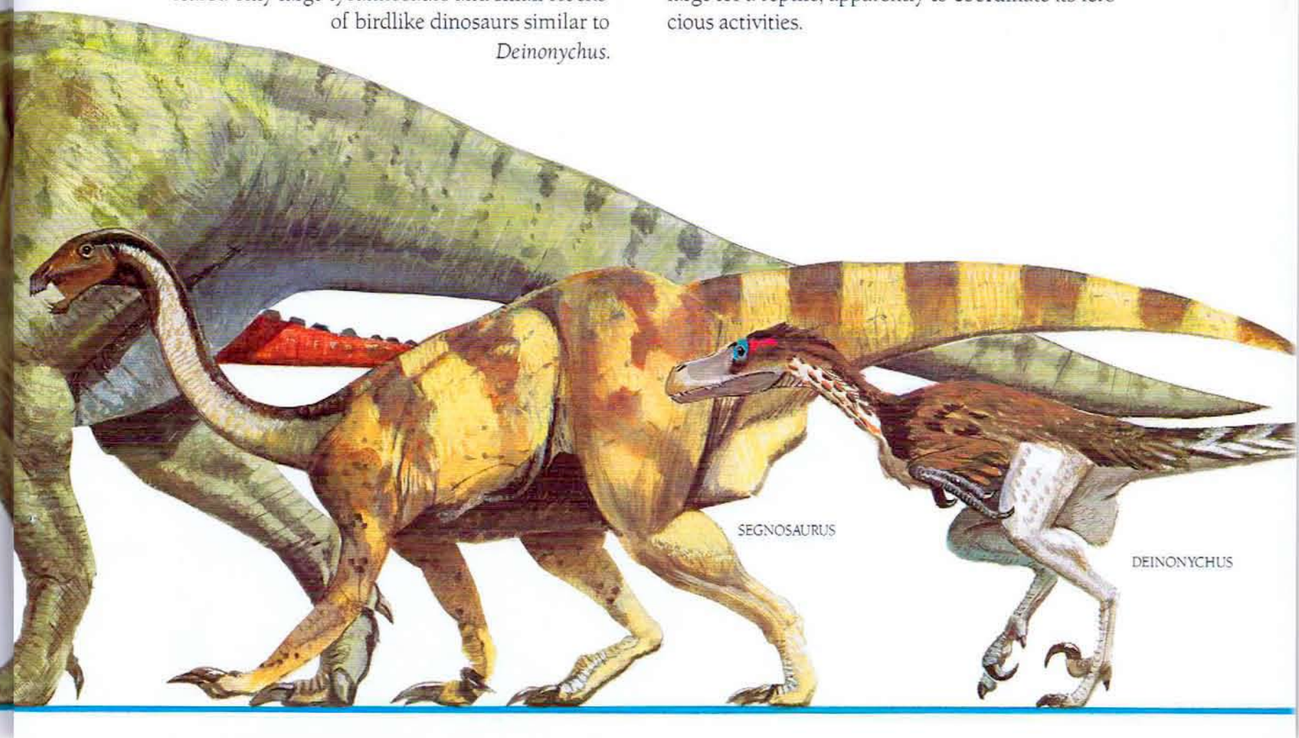
Deinonychus

(die-NON-ee-kuss) "terrible claw"
Archosauria • Dinosauria • Saurischia • Theropoda
Early Cretaceous • Montana • 13 feet long

Unlike all other theropods, *Deinonychus* had hips set in a birdlike position with the pubic bone pointing backward rather than forward. Birds, such as *Archaeopteryx*, had similar hips. This feature, and others, points to *Deinonychus*'s kinship with birds. This 100- to 150-pound creature was possibly warm-blooded and may, in fact, have been one of the first flightless birds.

Deinonychus would have made a superb killing machine using its teeth, clawed fingers, and toes as weapons. The second toe of each foot bore an extra-large curved claw that was carried in a retracted position so that it was never dulled by contact with the ground. Running in vicious flocks or packs, *Deinonychus* could ambush dinosaurs the size of *Iguanodon*. Leaping on its prey, it locked on with long fingers and claws like grappling hooks and slashed its victim to death with its extra-large toe claws.

Deinonychus had special interlocking vertebrae that stiffened its tail, letting the tail move as a unit and act as a balancing pole. This was very important to a predator that stood and balanced on one foot while kicking and slashing with the other. Unlike those of most dinosaurs, *Deinonychus*'s eyes pointed partly forward, which helped it judge distances while leaping. Its brain was particularly large for a reptile, apparently to coordinate its ferocious activities.



Saltasaurus

(salt-uh-SOR-uss) "Salta [province of Argentina] reptile"
Archosauria • Dinosauria • Saurischia • Sauropodomorpha
Late Cretaceous • Argentina • 40 feet long

Saltasaurus is the first sauropod (long-necked saurischian plant eater) known to have been armored with bony scutes, like those of *Sauropelta* (next page). This armor came in two sizes: pebble-size nodules and saucer-size plates. Armor plating protected peaceful *Saltasaurus* from attacks by fierce meat eaters such as *Carnotaurus*. In addition the long, thin portion at the end of its tail could whip large aggressors and knock down smaller ones.

Distantly related to *Dicraeosaurus* (page 34), *Saltasaurus* was one of the titanosaurs, widespread sauropods with steeply sloping faces, tiny pencil-like teeth only in the front of their jaws, and relatively short neck bones. Titanosaurs laid eggs that were about the size of a football. Hatchlings must have grown quickly!

Saltasaurus, like all sauropods, had a body resembling that of an elephant: big in the belly and slender in the legs. Its rear feet bore three large claws that could be kicked at aggressors. Its buttonlike "fingers" were wrapped together in a single "mitten" that rested on a crescent-shaped pad.

Pachycephalosaurus

(pak-ee-sef-uh-loe-SOR-uss) "thick-headed reptile"
Archosauria • Dinosauria • Ornithischia • Pachycephalosauria
Late Cretaceous • Western United States • 17 feet (est.)

Pachycephalosaurus was an unusual unarmored, beaked plant eater. It had a distinctive domed skull, filled not with brains but with up to 9 inches of solid bone. Evidently *Pachycephalosaurus* used its "dome head" as a ramming weapon against both rivals and enemies. In most reptiles the neck attaches at the back of the head, but *Pachycephalosaurus*'s neck attached to the bottom of its skull, as in humans. When *Pachycephalosaurus* lowered its head for a charge, its neck was lined up with its backbone to absorb the shock of impact. Above its beaked snout and along the back of its skull a number of small conical horns, too short to have punctured anything, acted as intimidating decorations.

Only the skull is known from this, the largest of all pachycephalosaurs. Related smaller species indicate that its body was probably similar to those of other two-legged plant eaters only much wider, especially just fore and aft of the hips. The ribs flared widely to enclose a huge gut. Pachycephalosaurs had wide-flaring tail ribs, too, like no other animals ever. Possibly these provided an additional chamber for a portion of the intestines aft of the hips.

The end of *Pachycephalosaurus*'s tail was quite narrow and stiffened with a mass of bony tendons similar to those that corseted the back and hips of most ornithischians. These made the tail into a balancing rod that may have improved this dinosaur's stability while running, especially when cornering.

Carnotaurus

(kar-noe-TOR-uss) "meat-eating bull"
Archosauria • Dinosauria • Saurischia • Theropoda
Late Cretaceous • Argentina • 30 feet long

Carnotaurus of South America was a ferocious midsize meat eater with a short snout, a high skull, and two large horns over its eyes. No other meat eater had horns as large as these. They weren't large enough or sharp enough to have killed prey, so they may have been purely decorative.

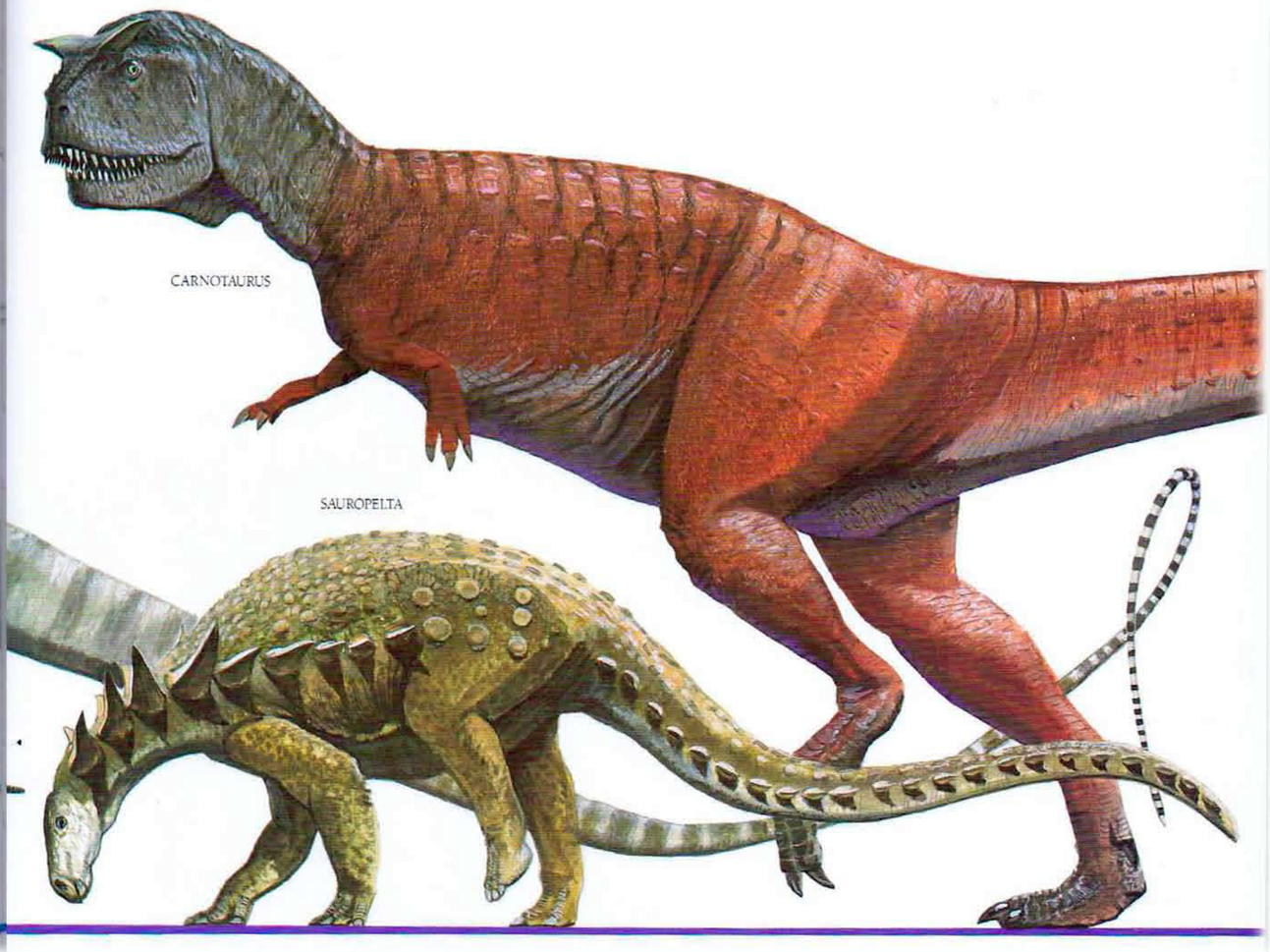
Carnotaurus had a large crest at the back of its skull, forming a sturdy support for heavy neck muscles. Large muscles also drove its large hind legs across the floodplains as *Carnotaurus* sought sauropods and hadrosaurs to kill and eat. Despite its narrow mouth, flexible joints in the middle of its lower jaw enabled *Carnotaurus* to swallow large chunks of meat whole.

Sauropelta

(sor-uh-PEL-tah) "reptile with shield"
Archosauria • Dinosauria • Ornithischia • Ankylosauria
Early Cretaceous • Montana • 17 feet long

Peaceful ankylosaurs were the most heavily armored of the four-legged, beaked plant eaters. One of the largest, *Sauropelta*, had its entire upper body covered in bony scutes. Even the head and eyelids had an extra layer of protective bone. Like those of other ankylosaurs, *Sauropelta*'s hipbones folded over to become protective plates covering its wide rump.

In contrast to its cousin *Euoplocephalus* (page 55), *Sauropelta* had a narrow pear-shaped skull and large, sharp spikes lining its neck. This heavily muscled tanklike dreadnought may have charged at adversaries, intent on damaging them with its spikes. Most of the time, however, it browsed quietly on soft plants in the deep forests.



Protoceratops

(pro-toe-SER-uh-tops) "first horned face"
Archosauria • Dinosauria • Ornithischia • Ceratopsia
Late Cretaceous • Mongolia • 6 feet long

Parts of Mongolia have been particularly rich sources of fossils because periodic floods and sandstorms buried many species.

Protoceratops was one of the earliest ceratopsians. These bird-hipped plant eaters had a parrotlike beak and a large shield formed by an extension of the upper skull bones. Primarily the powerful jaw muscles originated from this shield, but it also served to protect the neck, intimidate rivals and enemies, and attract mates. With the strongest jaws of all dinosaurs, ceratopsians could have eaten almost any kind of plant. The cheek teeth acted like scissors to slice food into tiny strips while fleshy cheeks kept the pieces from falling out.

The first dinosaur eggs ever discovered were those of *Protoceratops* in the 1920s. They were leathery and oblong, laid in a circle within a shallow sandy pit in the Mongolian desert. Colonies of this dinosaur nested together, guarding their eggs from nest robbers like *Oviraptor* (page 54).

Shantungosaurus

(shan-tung-uh-SOR-uss)
"Shantung [province of China] reptile"
Archosauria • Dinosauria • Ornithischia • Ornithopoda
Late Cretaceous • China • 56 feet long

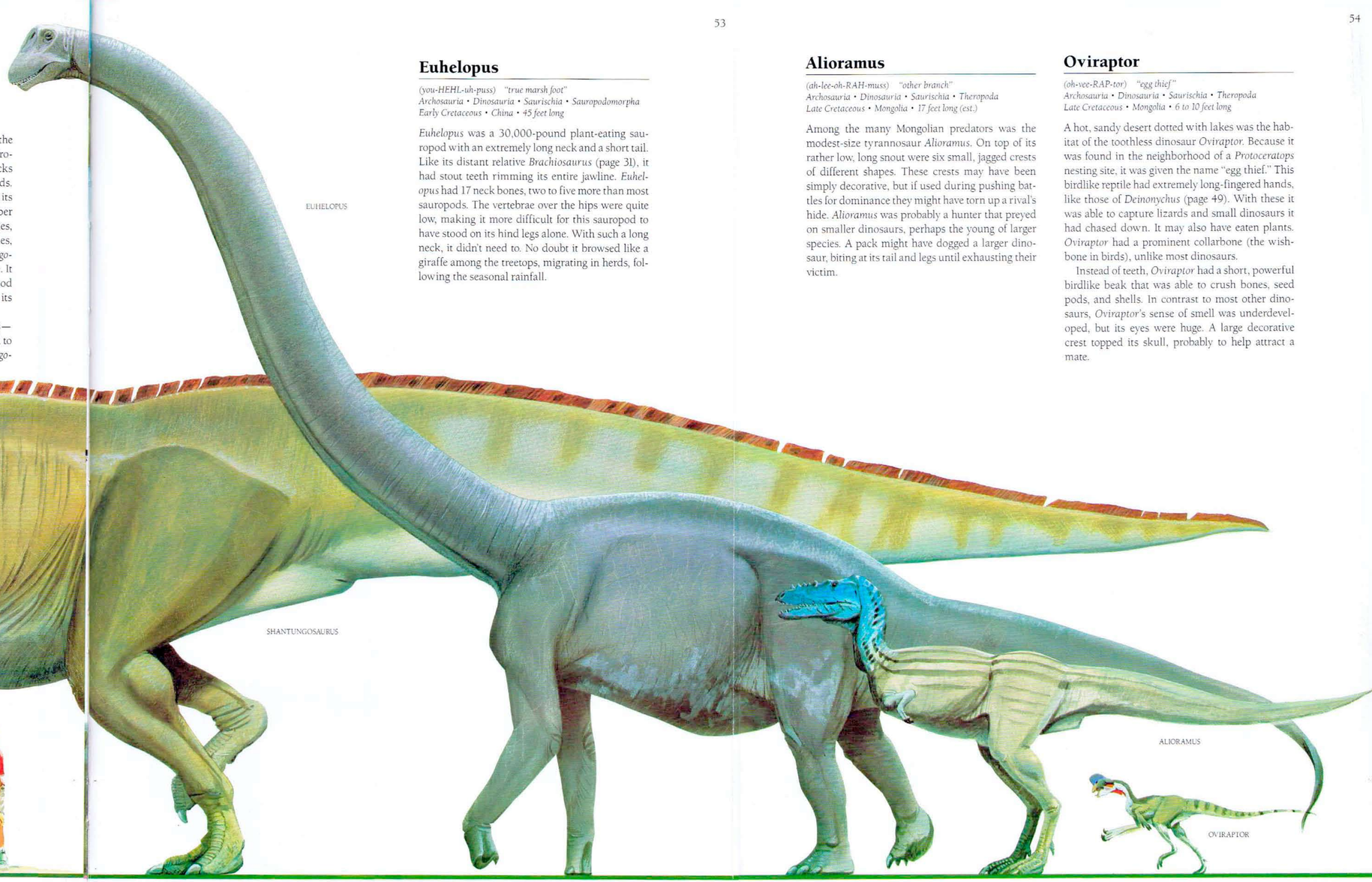
Shantungosaurus was one of the largest of all the hadrosaurs, or duck-billed dinosaurs. A hadrosaur's snout only looked like a duck's bill. Ducks have no teeth, but hadrosaurs had thousands. *Shantungosaurus* was a better plant grinder than its relative *Iguanodon* (page 48). Not one, but a number of rows of teeth were exposed to act like millstones, crushing and pulverizing conifer cones, needles, and twigs. With its wide "duck bill," *Shantungosaurus* was able to crop large mouthfuls at a time. It might not have needed a large gut because its food was so thoroughly processed before entering its stomach.

Apart from its size—up to 40,000 pounds—*Shantungosaurus* was defenseless. Perhaps it fled to the swamps whenever danger lurked. *Shantungosaurus* could run on its hind legs alone, using its tall, narrow tail as a counterbalance.

Euhelopus

(you-HEHL-uh-puss) "true marsh foot"
Archosauria • Dinosauria • Saurischia • Sauropodomorpha
Early Cretaceous • China • 45 feet long

Euhelopus was a 30,000-pound plant-eating sauropod with an extremely long neck and a short tail. Like its distant relative *Brachiosaurus* (page 31), it had stout teeth rimming its entire jawline. *Euhelopus* had 17 neck bones, two to five more than most sauropods. The vertebrae over the hips were quite low, making it more difficult for this sauropod to have stood on its hind legs alone. With such a long neck, it didn't need to. No doubt it browsed like a giraffe among the treetops, migrating in herds, following the seasonal rainfall.



Alioramus

(ah-lee-oh-RAH-muss) "other branch"
Archosauria • Dinosauria • Saurischia • Theropoda
Late Cretaceous • Mongolia • 17 feet long (est.)

Among the many Mongolian predators was the modest-size tyrannosaur *Alioramus*. On top of its rather low, long snout were six small, jagged crests of different shapes. These crests may have been simply decorative, but if used during pushing battles for dominance they might have torn up a rival's hide. *Alioramus* was probably a hunter that preyed on smaller dinosaurs, perhaps the young of larger species. A pack might have dogged a larger dinosaur, biting at its tail and legs until exhausting their victim.

Oviraptor

(oh-vee-RAP-tor) "egg thief"
Archosauria • Dinosauria • Saurischia • Theropoda
Late Cretaceous • Mongolia • 6 to 10 feet long

A hot, sandy desert dotted with lakes was the habitat of the toothless dinosaur *Oviraptor*. Because it was found in the neighborhood of a *Protoceratops* nesting site, it was given the name "egg thief." This birdlike reptile had extremely long-fingered hands, like those of *Deinonychus* (page 49). With these it was able to capture lizards and small dinosaurs it had chased down. It may also have eaten plants. *Oviraptor* had a prominent collarbone (the wishbone in birds), unlike most dinosaurs.

Instead of teeth, *Oviraptor* had a short, powerful birdlike beak that was able to crush bones, seed pods, and shells. In contrast to most other dinosaurs, *Oviraptor*'s sense of smell was underdeveloped, but its eyes were huge. A large decorative crest topped its skull, probably to help attract a mate.

Euoplocephalus

(you-o-pluh-SEF-uh-luss) "well-armored head"
Archosauria • Dinosauria • Ornithischia • Ankylosauria
Late Cretaceous • Alberta • 20 feet long

The dinosaurs on these three pages all died in lush tropical rain forests dotted with marshes, ponds, and brooks, ideal places for fossilization to take place.

"Well-armored" *Euoplocephalus* was one of the largest of the ankylosaurs. In contrast to *Sauropelta* (page 51), *Euoplocephalus* had no flank spikes and its tail had a bony club, shaped like twin spheres, at its tip. It probably swung this club at attacking tyrannosaurs to trip them up. *Euoplocephalus*'s head was broader than it was long, and large pyramidal horns made corners out of the back of the skull. *Euoplocephalus* might easily have smelled an approaching enemy because its nasal passages were long and complex, increasing its sensitivity to odors. Perhaps these passages also formed a resonating chamber for producing strange nasal sounds.

Euoplocephalus was a slow-moving dinosaur that spent lazy days grazing on soft ground plants, cropped with its broad beak. But when attacked, *Euoplocephalus* could have moved with surprising agility, keeping its massive tail club aimed and ready to strike.

Lambeosaurus

(lam-bee-uh-SOR-uss) "[Lawrence] Lambe's reptile"
Archosauria • Dinosauria • Ornithischia • Ornithopoda
Late Cretaceous • Alberta, Baja California
up to 54 feet long (est.)

Lambeosaurus was a 50,000-pound, long-legged, hollow-crested hadrosaur. Its crest was an expansion of its nasal cavity, which might have amplified a squeal or a whistle to ear-shattering volume. Larger crests identified dominant members of a herd. Although *Lambeosaurus* fossils have been found in formerly marshy areas, its diet consisted of hard woody items such as conifer cones, needles, and stems, more likely to be found in upland regions. This hadrosaur's jaws ground food to bits by moving forward and back, as rodents' jaws do.

Like birds, lambeosaur hatchlings grew quickly, staying in the nest colony for the first few weeks while waiting for their parents to bring them partly digested foods.

Dromiceiomimus

(droe-me-see-o-ME-muss) "emu mimic"
Archosauria • Dinosauria • Saurischia • Theropoda
Late Cretaceous • Alberta • 11 feet long

Like an ostrich without feathers, slender *Dromiceiomimus* may have raced at speeds approaching 40 miles per hour, dodging through forest clearings on its long sprinter's legs. Perhaps it was the fastest of all dinosaurs. Like other ornithomimids ("bird mimics"), *Dromiceiomimus* had a tiny head, huge eyes, and a long, flexible skinny neck. On each long hand were three long-clawed fingers, two of which may have been wrapped together as a unit. They were not built for grasping or raking. *Dromiceiomimus*'s diet is unknown, but perhaps this dinosaur was a plant eater, hooking low fruit-laden branches with its claws and pulling them up to its toothless beak.

Parasaurolophus

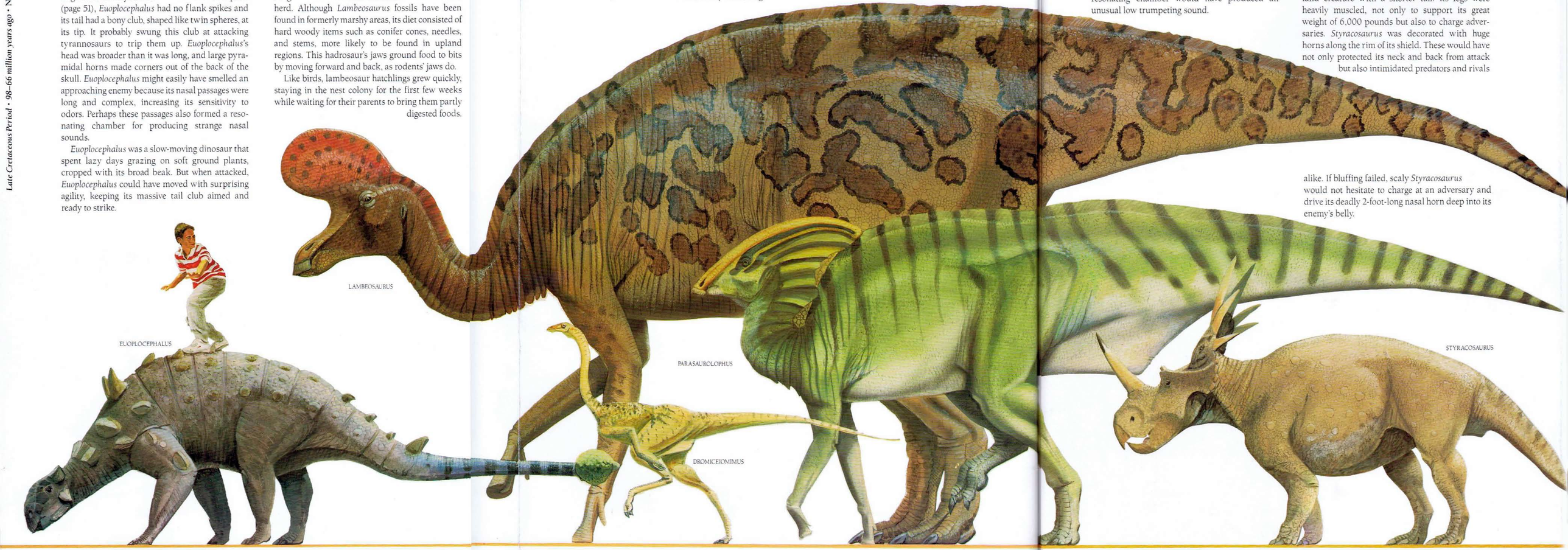
(pair-uh-sor-OL-uh-fuss) "similar to the reptile with a crest"
Archosauria • Dinosauria • Ornithischia • Ornithopoda
Late Cretaceous • Alberta, New Mexico, Utah • 33 feet long

This hadrosaur's hollow nasal crest was composed of twin tubelike nasal passages. They extended as far as 3½ feet behind *Parasaurolophus*'s head before doubling back along the underside to re-enter the skull between the eyes and above the throat. This resonating chamber would have produced an unusual low trumpeting sound.

Styracosaurus

(sty-rak-uh-SOR-uss) "spiked reptile"
Archosauria • Dinosauria • Ornithischia • Ceratopsia
Late Cretaceous • Alberta • 18 feet long

Styracosaurus was the most elaborately adorned of the ceratopsians, plant-eating dinosaurs identified by their large head shields, horns, and parrotlike beaks. In contrast to its desert-dwelling relative *Protoceratops* (page 52), *Styracosaurus* was a woodland creature with a shorter tail. Its legs were heavily muscled, not only to support its great weight of 6,000 pounds but also to charge adversaries. *Styracosaurus* was decorated with huge horns along the rim of its shield. These would have not only protected its neck and back from attack but also intimidated predators and rivals alike. If bluffing failed, scaly *Styracosaurus* would not hesitate to charge at an adversary and drive its deadly 2-foot-long nasal horn deep into its enemy's belly.



Triceratops

(try-SER-uh-tops) "three-horned face"
Archosauria • Dinosauria • Ornithischia • Ceratopsia
Late Cretaceous • Alberta to the Dakotas • 27 feet long

The largest, last, and most widespread of all the ceratopsians was *Triceratops*. Like *Styracosaurus* (page 57), this well-protected plant eater had a head shield, a parrotlike beak, and horns. In the case of *Triceratops* the nasal horn was rather small, but the pair over its eyes were huge, up to 3½ feet long. Two males might have locked horns like cattle, pushing and shoving each other until one gave up. Brow horns were also tremendous weapons for goring tyrannosaurs.

Weighing up to 12,000 pounds and standing 9½ feet tall at the shoulder, *Triceratops* was like a bull, dangerous when provoked. Its huge beak and powerful shearing teeth could slice fibrous and woody plant food that no other dinosaur could handle.

Tyrannosaurus

(tie-ran-uh-SOR-uss) "tyrant reptile"
Archosauria • Dinosauria • Saurischia • Theropoda
Late Cretaceous • Texas, Montana, Mongolia • 39 feet long

Standing 18 feet tall and weighing 15,000 pounds, *Tyrannosaurus* was the largest meat-eating land animal of all time. This bloodthirsty king of the dinosaurs attacked its prey headfirst, lunging with its monstrous jaws wide open, tearing great chunks of flesh from its terrified victims, dropping them in their tracks or bleeding them to death.

Tyrannosaurus was built much more massively than most other meat-eating dinosaurs. It was better able to withstand the shock of impact when colliding with prey or rival tyrannosaurs. Although its skull was huge, the bone was lightened with numerous air cavities. A midline crest near the back of the skull anchored powerful neck muscles. *Tyrannosaurus*'s cavernous mouth was filled with sharp, slender serrated teeth up to 7 inches long that sliced through raw flesh like steak knives. Only two clawed fingers tipped *Tyrannosaurus*'s tiny arms. These arms were so short they couldn't even lift food to its mouth.

The Final Extinction of Dinosaurs

Dinosaurs began their final decline in number and variety 15 million years before their eventual extinction. They may not have been able to tolerate the changes in weather patterns (droughts, intense heat and cold) brought about by the shifting of the continents. In North America at the time of *Tyrannosaurus*'s reign, only a few species, such as its number-one food source, *Triceratops,* remained.

Then out of the blue, 66 million years ago, catastrophe struck. Perhaps a huge meteorite, or several smaller ones, collided with the earth and disrupted the food chain (page 8). Whatever happened, dinosaurs disappeared from the fossil record at this point. Worldwide, this event marks the end of the Cretaceous Period, the last chapter in the Mesozoic Era, or Age of Reptiles.

Rhamphosuchus

(ram-foe-SOOK-uss) "prow beak crocodile"
Archosauria • Crocodilia • Eusuchia • Gavialdae
Pliocene • India • 50 to 60 feet long (est.)

Following the extinction of the dinosaurs, only the small, cold-blooded sprawling reptiles somehow survived. But the end of the Age of Reptiles did not mean an end to reptile giants. Though never as large as the giant dinosaurs, some of the largest specimens of lizards, snakes, turtles, and crocodilians evolved during the Age of Mammals.

The largest reptile of the Tertiary Period was *Rhamphosuchus*. Similar to the modern gavial, a 20-foot-long fish-eating crocodilian with an extremely narrow snout, *Rhamphosuchus* was nearly three times the length of a gavial. Only a few pieces of its 4-million-year-old fossil skeleton have been discovered, so we can only guess at what most of it looked like. Its long, slender snout suggests that *Rhamphosuchus* fed solely on fish that it snared with quick sideways snaps. Like modern crocodiles, *Rhamphosuchus* probably spent much of its time lurking near the surface of rivers and lakes or on the shoreline sunning itself. (See also pages 21 and 43-45.)

Champsosaurus

(champ-suh-SOR-uss) "crocodile reptile"
Choristodera • Champsosauridae
Late Cretaceous–Eocene • Western United States • 8 feet long

Living 50 million years ago, *Champsosaurus* was an aquatic near-lizard that looked like a small crocodile. With nostrils at the tip of its long, narrow, tooth-lined snout, this fish eater snorkled air while resting its feet at the bottom of shallow ponds. Its skull was quite broad and housed large jaw muscles. Although its feet were probably webbed, *Champsosaurus* used its tail to swim, like a crocodile.

Megalania

(megg-uh-LANE-ee-uh) "great ripper"
Lepidosauria • Squamata • Lacertilia • Varanoidea
Pliocene • Australia • up to 22 feet long (est.)

The largest land lizard of all time was *Megalania*, related to the largest living lizard, the 10-foot-long Komodo dragon. So far only fragments of *Megalania* have been discovered, but its resemblance to living species helps us figure out what it looked like. Armed with large curved and serrated teeth, this aptly named "great ripper" would have been the largest predator in Australia 2 million years ago when giant kangaroos and wombats roamed that continent.

Megalania had fewer but larger teeth than the Komodo dragon, larger legs, and a shorter tail. It may have been as good a swimmer as well. *Megalania* probably ambushed its prey by rushing out from its hiding place in the brush. Its large jaws could have clamped down on a small victim. A large marsupial could have escaped after being bitten, but probably would have died from loss of blood or infection some days later. A smelly carcass would have attracted every *Megalania* in the area. Like related lizards and snakes, this giant lizard had a deeply forked tongue that was always "tasting" the air for odors. (See also sea lizards, pages 40-42.)

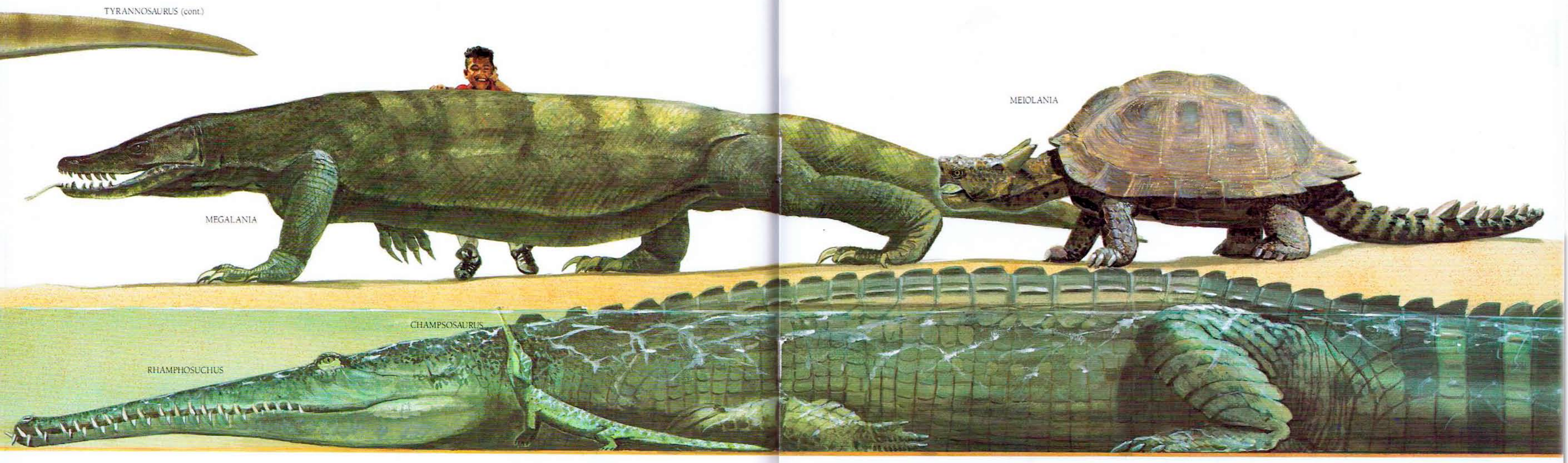
Meiolania

(my-o-LANE-ee-uh) "lesser ripper"
Testudinata • Chelonia • Cryptodira • Baenoidea
Pliocene • Australia • up to 14 feet long (est.)

Meiolania was one of the biggest land turtles of all time, and it was unlike any living today. Like many Australian animals, *Meiolania* was a "living fossil," with features seen in many primitive turtles, such as *Proganochelys* (page 19), which had become extinct 200 million years earlier.

Unlike most modern turtles, *Meiolania* was unable to withdraw its 2-foot-wide head beneath its shell. Instead, large cowlike horns projected from the rear of its skull to protect its neck. *Meiolania*'s long tail was hardened with rings of bone. At its tip was a bony club like that of the ankylosaur *Euoplocephalus* (page 55), which may have been used against attackers. *Meiolania*'s enemies would have included *Megalania* and crocodiles.

Originally *Meiolania*'s fossils were confused with those of the previously discovered *Megalania*, hence the misnomer "lesser ripper." Actually it was a peaceful, lumbering plant eater that lived on the continent and also on a tiny remote island free of predators near Tasmania, 2 million years ago.



Glossary

amniotes Backboned animals that protect their embryos in a closed sac formed by a thin tissue (the amniotic membrane); specifically reptiles, birds, and mammals.

amphibians Cold-blooded, backboned animals that breathe with gills underwater when young and with lungs on land as adults, such as frogs and salamanders.

archosaurs A group of reptiles that includes crocodilians, pterosaurs, dinosaurs, and their immediate ancestors; and also birds.

birds Warm-blooded, backboned animals with feathers and wings; most can fly. Descended from small meat-eating dinosaurs.

canine teeth Large, pointed teeth between the front teeth (incisors) and cheek teeth (or molars). Found in mammals and early synapsids such as cynodonts.

cheek teeth Teeth along the sides of the jaws. In mammals they are called molars and premolars.

cold-blooded Animals that get most of their body heat from their surroundings.

continental shelf The shallow underwater plains bordering the continents.

crocodilians A group of reptiles, usually with long, flat heads, that includes crocodiles, alligators, gavials, and their ancestors.

cycad A plant that looks like a palm or fern but has seed-bearing cones like a pine.

cynodonts Therapsids (synapsid reptiles) with many mammal-like features. Some were ancestors of the mammals.

dinosaurs Extinct land reptiles, usually large, with legs placed directly under their bodies instead of splayed out to the sides as in lizards.

embryo An unborn animal during the earliest stages of its development.

evolution Changes in the features of a group of living things, through time, that are passed on to the descendants.

extinct No longer existing; specifically, when all of the individuals of a particular species are presumed to be dead.

fangs Extra-long, sharp teeth.

fossil Any remains or traces of a once-living thing that have been preserved in rock.

gills The blood-filled organs that most fish and young amphibians use to obtain oxygen from water for breathing.

gizzard stones Rocks or grit deliberately swallowed and stored in a bird's or reptile's gizzard (a pouch in the lower stomach) and used to grind up unchewed food.

incisors The front teeth of mammals and early synapsids such as cynodonts, usually shaped for nipping or cutting.

insulation A covering such as feathers, hair, or blubber that keeps an animal warm.

invertebrates Animals without a backbone, such as insects, mollusks, and worms.

mammals Warm-blooded, backboned animals with fur or hair that feed their young with milk from the mother's body, such as humans, elephants, and whales.

mollusks Cold-blooded, backboneless animals with soft bodies that are usually enclosed in a hard shell, such as clams and snails.

membrane A thin, soft, skinlike sheet of plant or animal tissue.

metabolism The way the body uses air, water, and food as fuel for movement and growth.

meteorite A rock from space that reaches the earth's surface.

ornithischians Plant-eating dinosaurs that have a beak on the lower jaw, teeth shaped for cutting or chopping plants, and birdlike hipbones in which the pubic bone, when present, points toward the rear.

ORNITHISCHIAN HIP

palate The roof of the mouth in vertebrates. Advanced cynodonts, crocodiles, and mammals have a **secondary palate**, a shelf of bone that separates the nasal cavity from the mouth cavity.

palate teeth Teeth that grow from the roof of the mouth, not the edge of the jaws.

Pangaea A supercontinent formed by the collision of all the other continents. It lasted from the Permian Period through most of the Jurassic Period.

predator An animal that kills other animals for food.

prehistoric The time before written languages existed.

reptiles Air-breathing, backboned animals that lay hard-shelled or leathery eggs and are usually covered with scales, such as lizards, snakes, turtles, crocodilians, and a variety of extinct forms including dinosaurs.

SAURISCHIAN HIP

saurischians Plant-eating or meat-eating dinosaurs that have reptilelike hips in which the pubic bone points down and forward.

sauropsids The branch of reptiles that includes all but the ancestors of mammals and their kin (synapsids).

scales Small, thin, flat, rigid, and rounded (or many-sided) plates forming part of the body covering of most fish and reptiles.

scutes Bony or horny plates that develop in the skin, as in crocodiles.

serrated Notched along the edge like a saw.

species A group of animals or plants with similar characteristics and the ability to breed with one another and reproduce themselves; the basic unit of scientific classification.

synapsids The branch of reptiles that includes the ancestors of mammals and their kin (now extinct); and the mammals themselves.

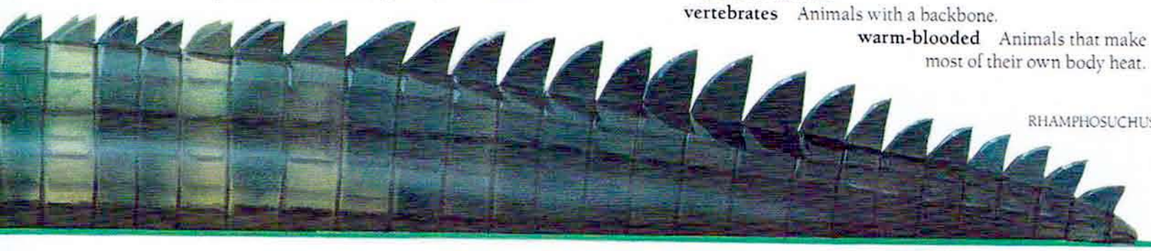
therapsids Synapsid reptiles with a "half-push-up" (semi-erect) or fully erect stance, and usually a short body and tail.

theropods Two-legged, predatory, saurischian dinosaurs.

vertebrae The bones of the backbone, including those of the neck and tail.

vertebrates Animals with a backbone.

warm-blooded Animals that make most of their own body heat.


RHAMPHOSUCHUS (cont.)

Index

Page numbers in *italic type* refer to illustrations.

David Peters' super-realistic style of animal portraiture was first seen in his previous book, *Giants of Land, Sea & Air, Past & Present*. He taught himself to paint after graduating from the School of Journalism at the University of Missouri in Columbia. A dinosaur lover since childhood, Mr. Peters devotes every spare moment to dinosaurs when not earning his living as a commercial artist. At present he is working on plans for a museum of prehistoric life. He lives in St. Louis, Missouri, with his wife and two daughters.

Stand under a dinosaur...

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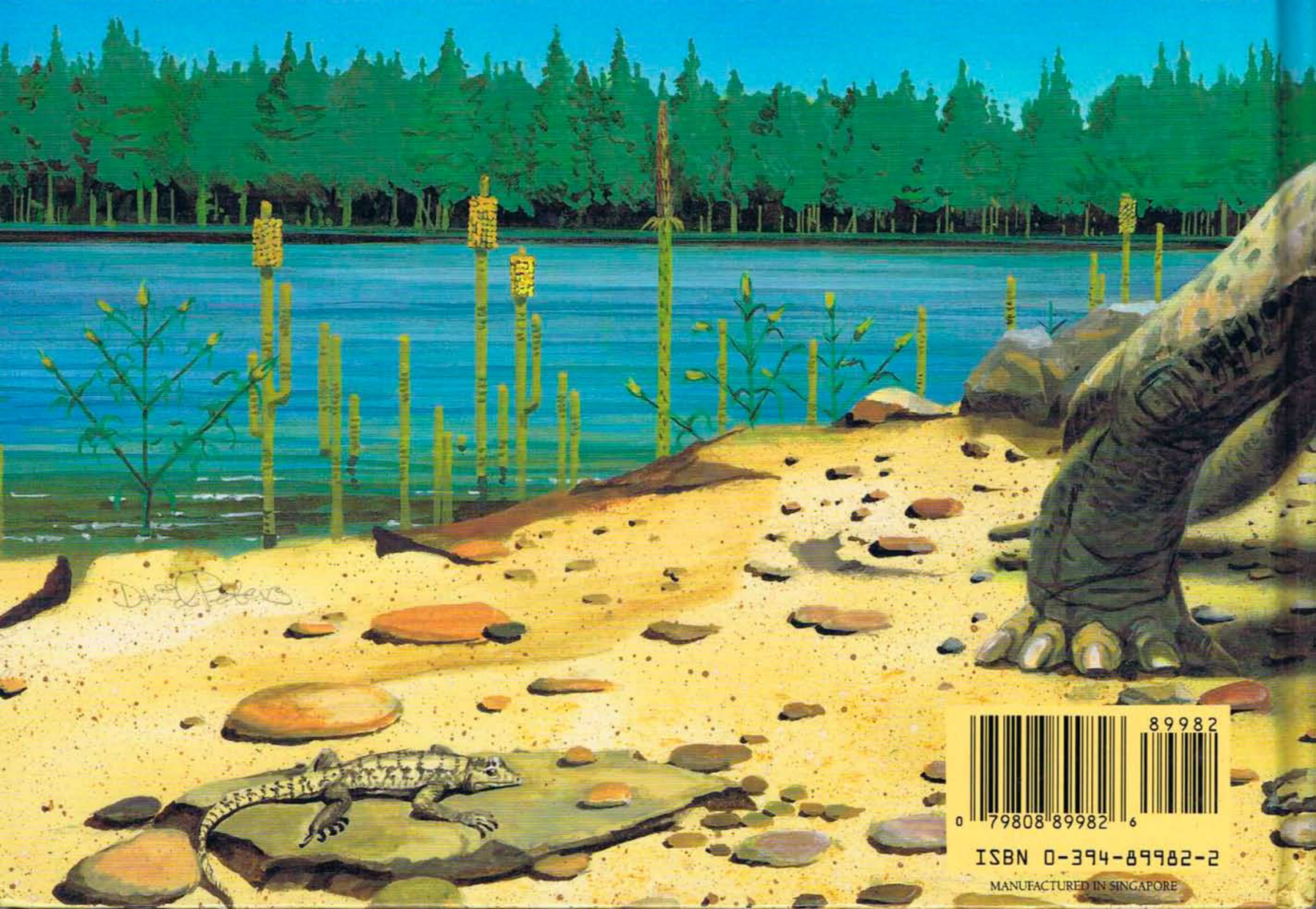

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