

## My First Library of Knowledge

# Dinosaurs

and other prehistoric life



 Orpheus

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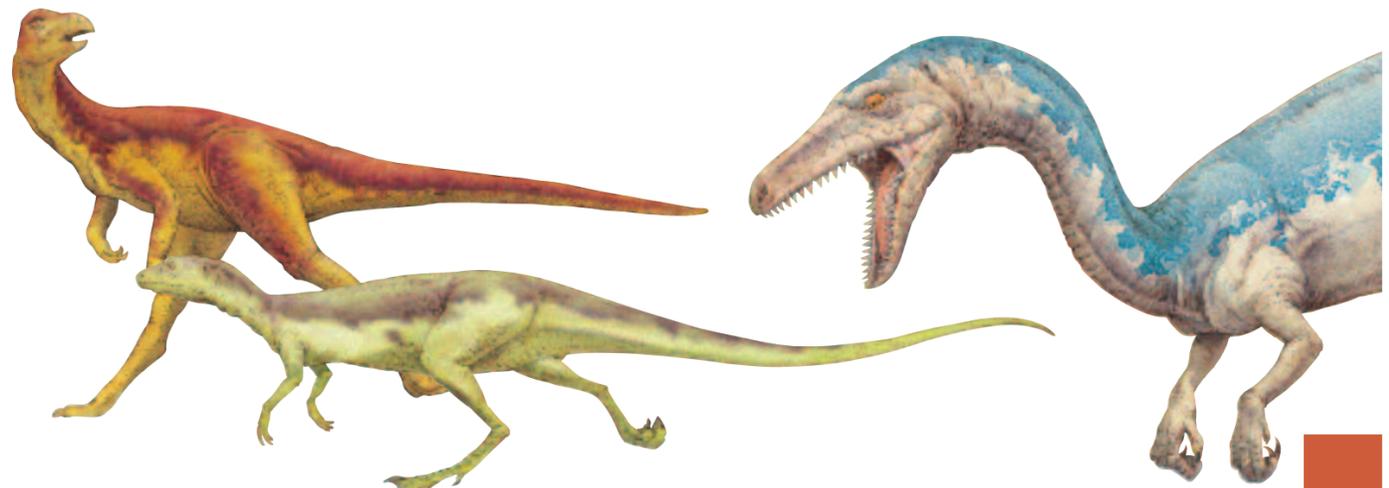
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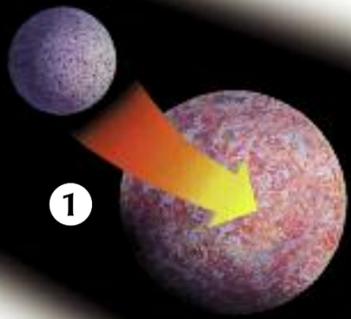
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# INTRODUCTION

**E**ARTH is 4600 million years old. Life on our planet probably began about 3800 million years ago. The first life forms were microscopic things, neither animals nor plants. It took another 3600 million years before a certain kind of reptile appeared. Some of these reptiles were the largest and fiercest creatures the world has ever seen. They were the dinosaurs.

# HOW THE EARTH BEGAN



1  
Soon after the Earth had formed another small planet (1) collided with it and exploded (2).



2  
The fragments collected in orbit round the Earth, which was by now a ball of melted rock (3).



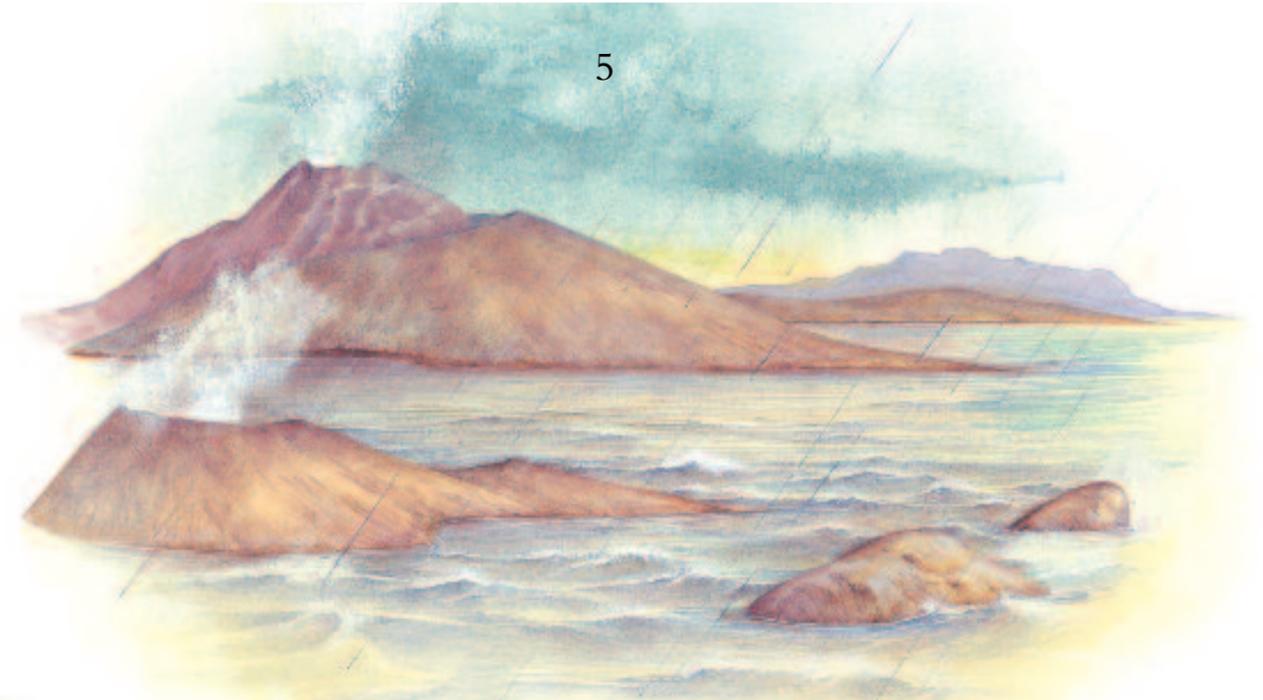
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The Earth's surface later cooled and turned back to solid rock. The orbiting fragments came together to form the Moon (4).

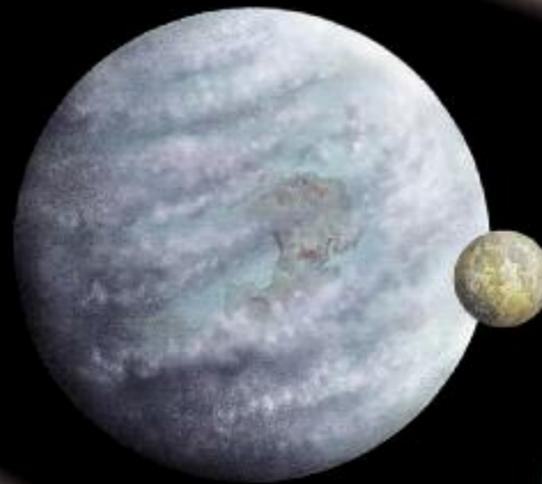


4

5  
All forms of life need water to survive. Life may have arisen in the Earth's warm, shallow seas.



To begin with, the Earth was a barren planet. But volcanoes blasted out gases from beneath its surface. One of these gases was water vapour. Clouds formed (5) and, later, rain fell. It rained for millions of years until basins filled to become the oceans (6).



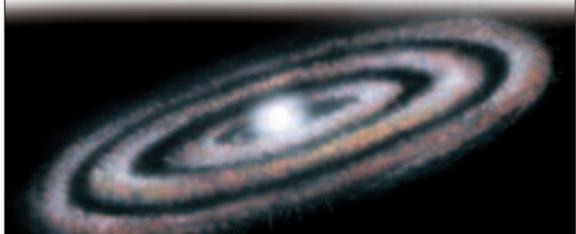
5



6

## THE SOLAR SYSTEM

The planets were once billions of small rocks whirling round the Sun. They "snowballed" into large, rocky globes.



LIKE all the planets, the Earth was formed about 4600 million years ago. In its early years, it had no water or life, just barren rock. Meteorites (large boulders), rained down from space. Life probably arose 3500 million years ago.

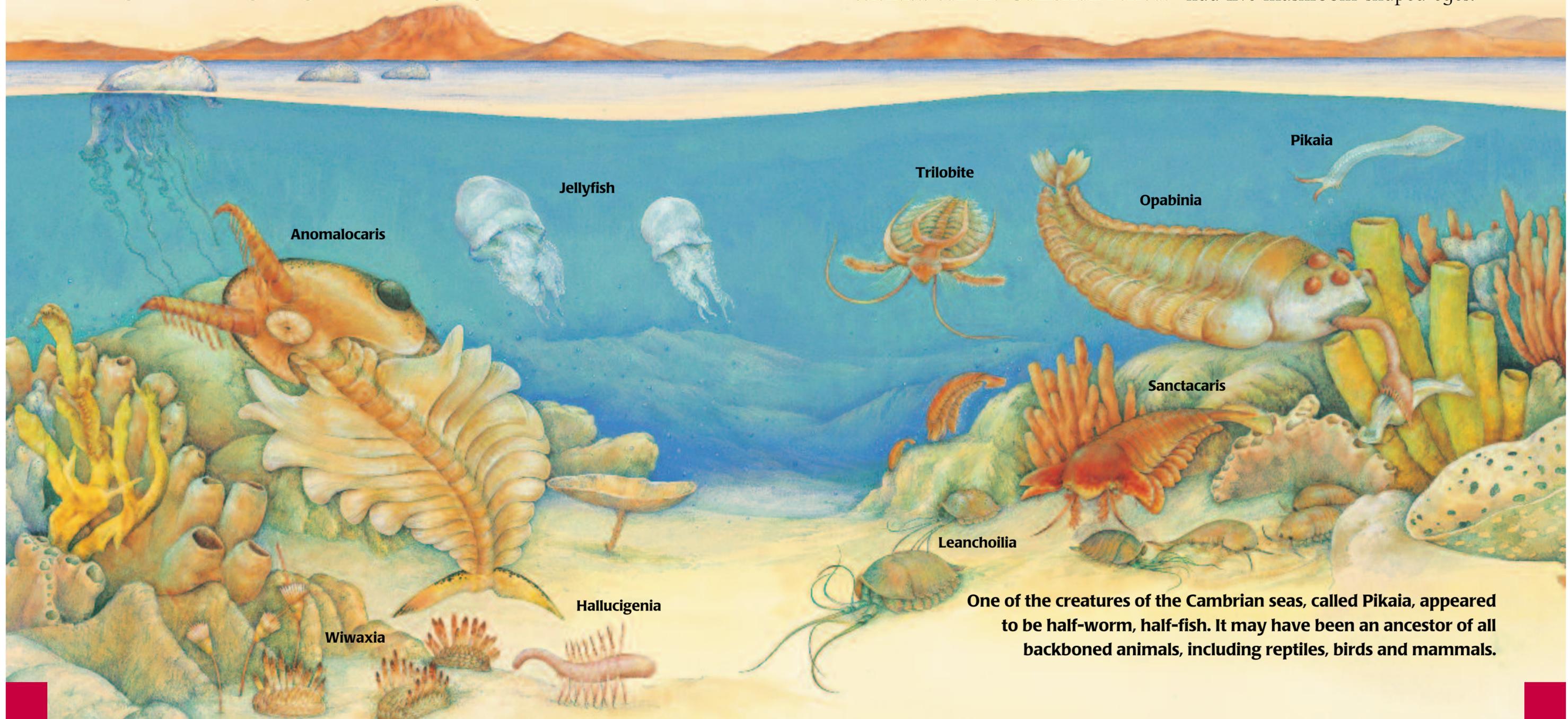
## THE FIRST LIVING THINGS

**T**HE FIRST living things appeared not on land, but in the oceans. They were very tiny life-forms called bacteria. The first animals were soft-bodied sea creatures, such as jellyfish and worms.

## THE CAMBRIAN SEAS

The first animals with hard parts—shells or bony skeletons—first appeared about 540 million years ago. This was at the beginning of a time in Earth's history that scientists call the Cambrian Period.

These animals lived in warm, shallow seas. They included shellfish, corals, starfish, molluscs and sponges. Some very strange-looking animals swam in the Cambrian seas! One, Opabinia, had five mushroom-shaped eyes.



One of the creatures of the Cambrian seas, called Pikaia, appeared to be half-worm, half-fish. It may have been an ancestor of all backboned animals, including reptiles, birds and mammals.

## THE FIRST FISH

**Water scorpions were fierce animals. They scuttled around on the sea floor hunting fish. They caught them in their claws.**

**T**HE FIRST fish had no fins or jaws. They swam with their mouths open sucking in things to eat.

**The first fish had bony armour-plating to defend them from attack.**

### TRILOBITES

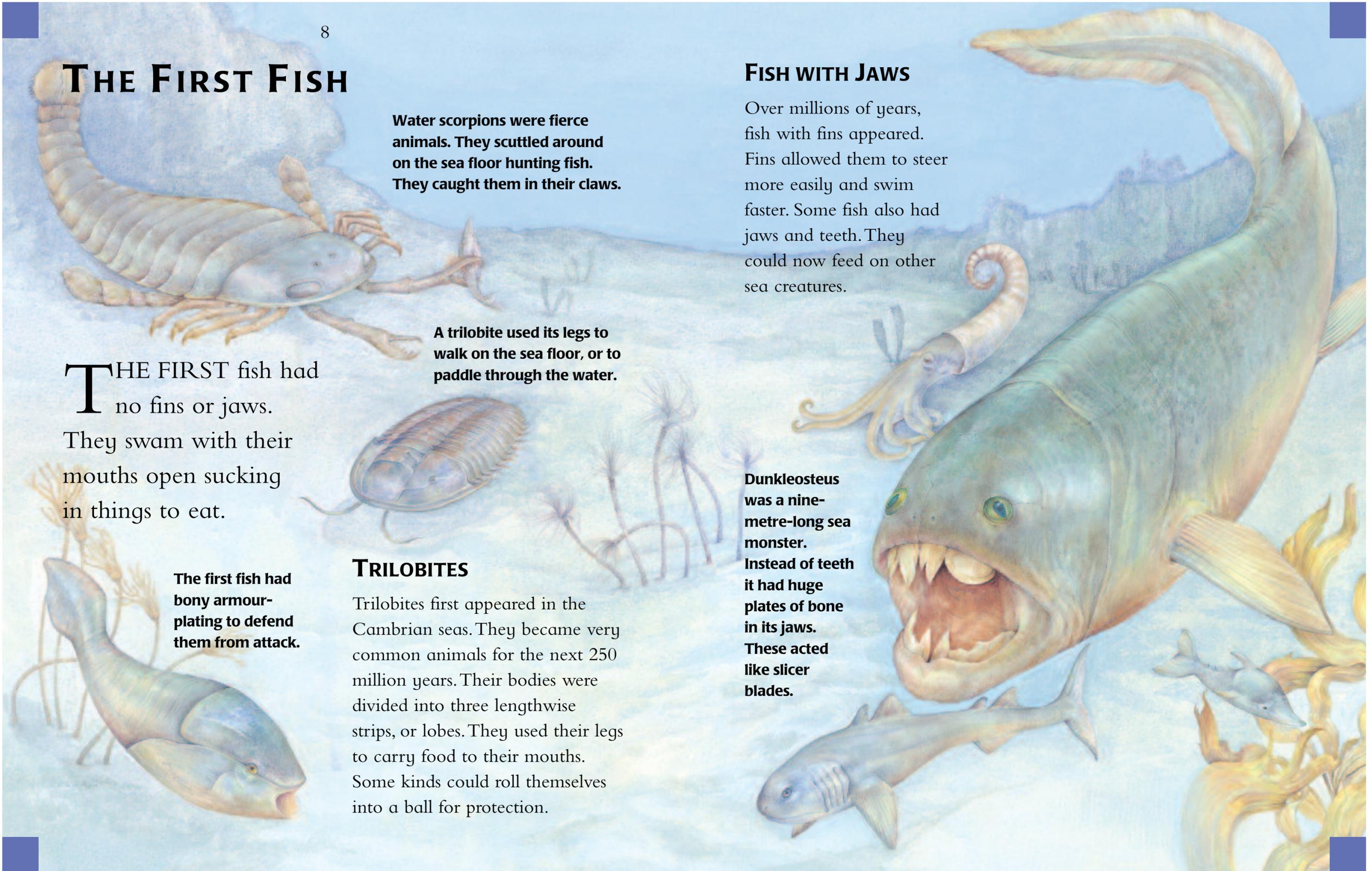
Trilobites first appeared in the Cambrian seas. They became very common animals for the next 250 million years. Their bodies were divided into three lengthwise strips, or lobes. They used their legs to carry food to their mouths. Some kinds could roll themselves into a ball for protection.

**A trilobite used its legs to walk on the sea floor, or to paddle through the water.**

## FISH WITH JAWS

Over millions of years, fish with fins appeared. Fins allowed them to steer more easily and swim faster. Some fish also had jaws and teeth. They could now feed on other sea creatures.

**Dunkleosteus was a nine-metre-long sea monster. Instead of teeth it had huge plates of bone in its jaws. These acted like slicer blades.**



## COAL SWAMPS

**A**BOUT 350 million years ago, some parts of the world were covered by hot, steamy jungle. Giant dragonflies flitted among the trees. Huge centipedes and

amphibians lurked in the swampy undergrowth. The coal we have today was formed from peat, a dark soil that is produced from layers of rotting plant matter in these swamps.

**Dendrerpeton**  
(ancient amphibian)

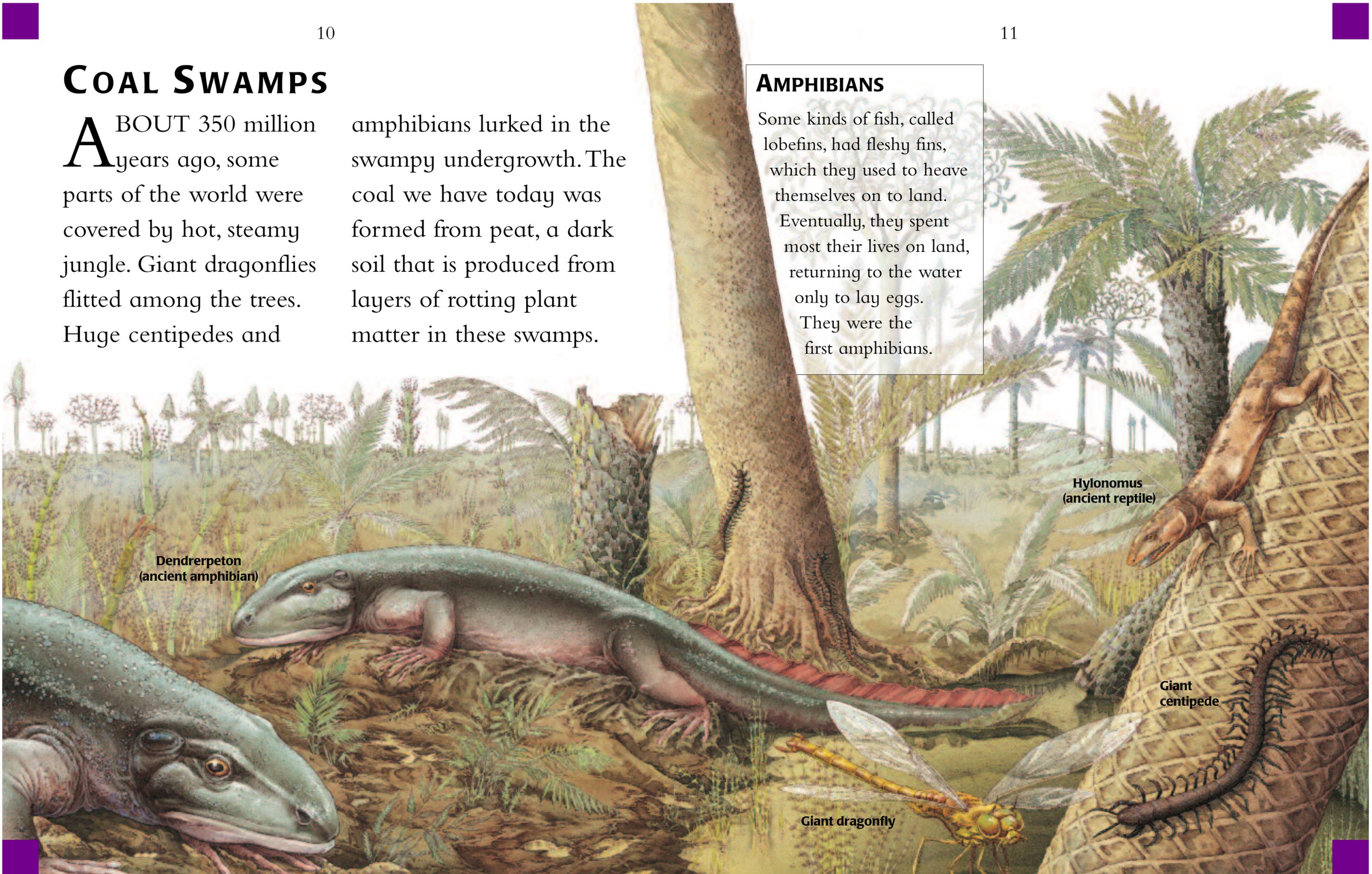
## AMPHIBIANS

Some kinds of fish, called lobefins, had fleshy fins, which they used to heave themselves on to land. Eventually, they spent most their lives on land, returning to the water only to lay eggs. They were the first amphibians.

**Hylonomus**  
(ancient reptile)

**Giant centipede**

**Giant dragonfly**



# THE FIRST DINOSAURS

SOME amphibians became able to lay their eggs on land, avoiding the need to return to water. Since they could live in dry

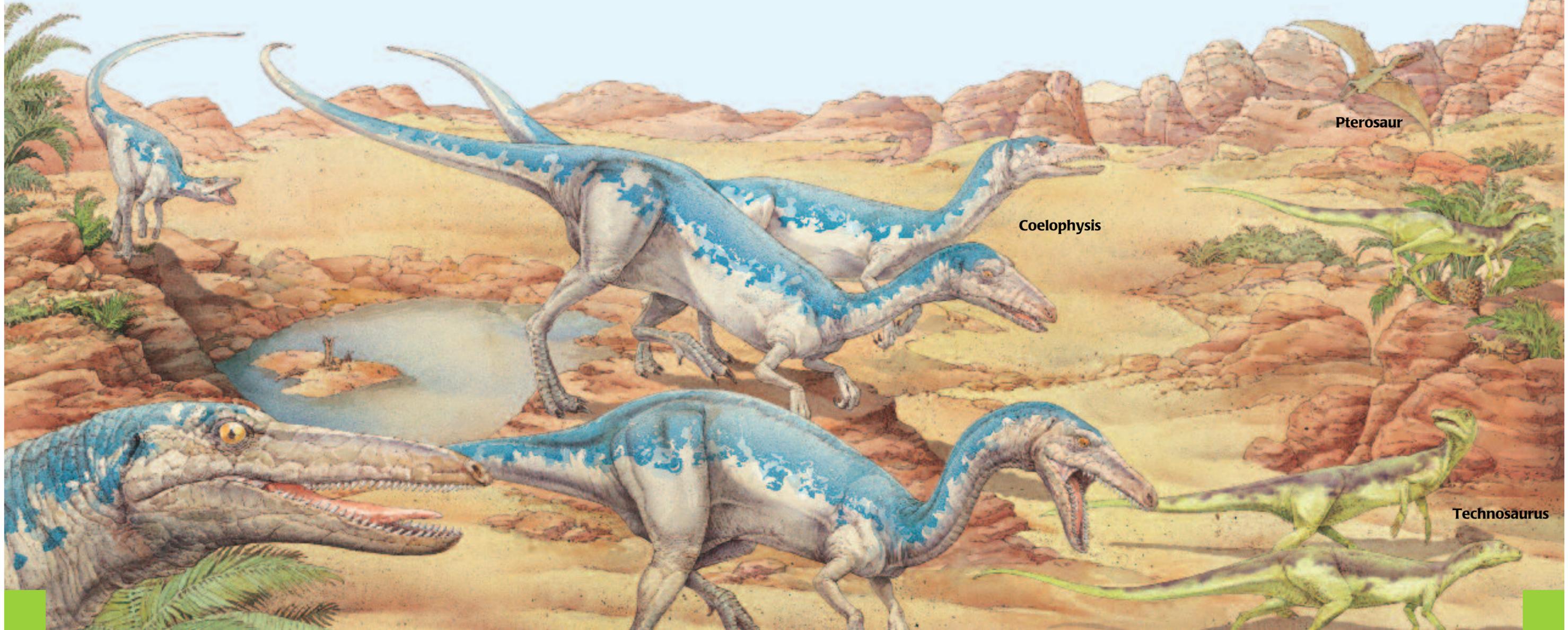
lands, these animals, the first reptiles, spread all over the world. Some kinds of reptile could run about on two legs. They were the first dinosaurs.

## WHAT IS A DINOSAUR?

Dinosaurs were reptiles that lived on land in the Triassic, Jurassic or Cretaceous Periods (250-65 million years ago). They walked upright like mammals or birds, not sprawling like other reptiles. Neither marine reptiles nor flying reptiles (pterosaurs) were dinosaurs.



**A modern reptile (above) has legs at the side of its body. A dinosaur (right) had straight, upright legs.**



Pterosaur

Coelophysis

Technosaurus

# JURASSIC DINOSAURS

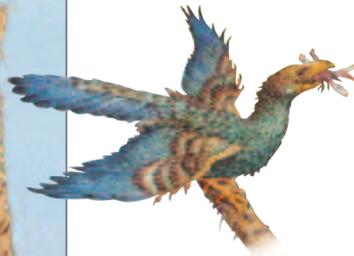
**T**HE first dinosaurs were flesh-eaters. But by the Jurassic Period there were also many plant-eating kinds. These included the long-necked

sauropods and the stegosaurus, dinosaurs with plates running down their backs. The 12-metre-long Allosaurus preyed on these plant-eaters.

## THE FIRST BIRDS

The first birds appeared in the Jurassic Period.

They were probably descended from small flesh-eating dinosaurs. Some of these dinosaurs are known to have had feathers.



**Diplodocus**  
(long-necked sauropod)

**Stegosaurus**

**Allosaurus**

**Allosaurus**

**Ornitholestes**

**Camarasaurus**



## PLANT-EATING DINOSAURS

**B**RACHIOSAURUS was a giant plant-eating sauropod. Taller than a four-storey building, its sheer size protected it from attack. Tiny Hypsilophodon lived in herds. It sprinted for safety whenever threatened.

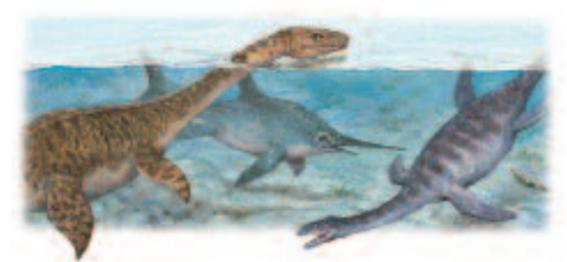
Brachiosaurus

Acrocanthosaurus

Iguanodon

## FIGHTING BACK!

No plant-eating dinosaur could afford to be off its guard. A flesh-eater might launch an attack at any time. An Iguanodon was neither quite large enough to put an attacker off, nor quick enough to run away. Instead, it had sharp spikes for thumbs. If any dinosaur dared to attack it, the Iguanodon would rear up on its back legs and jab a spike into the predator's body.



## MARINE REPTILES

Reptiles were also masters of the oceans. Ichthyosaurs looked like dolphins, while plesiosaurs, with their small heads and long necks, resembled dinosaurs.

Brachiosaurus

Iguanodon

Hypsilophodon

## FLESH-EATING DINOSAURS

**S**OME plant-eating dinosaurs had a covering of bony armour to protect them from attack. Sauropelta was covered in studs and

spikes. But a gang of Deinonychus knew how to overcome its defences. On each of their feet they had a massive, curved claw. Rushing at their

Deinonychus

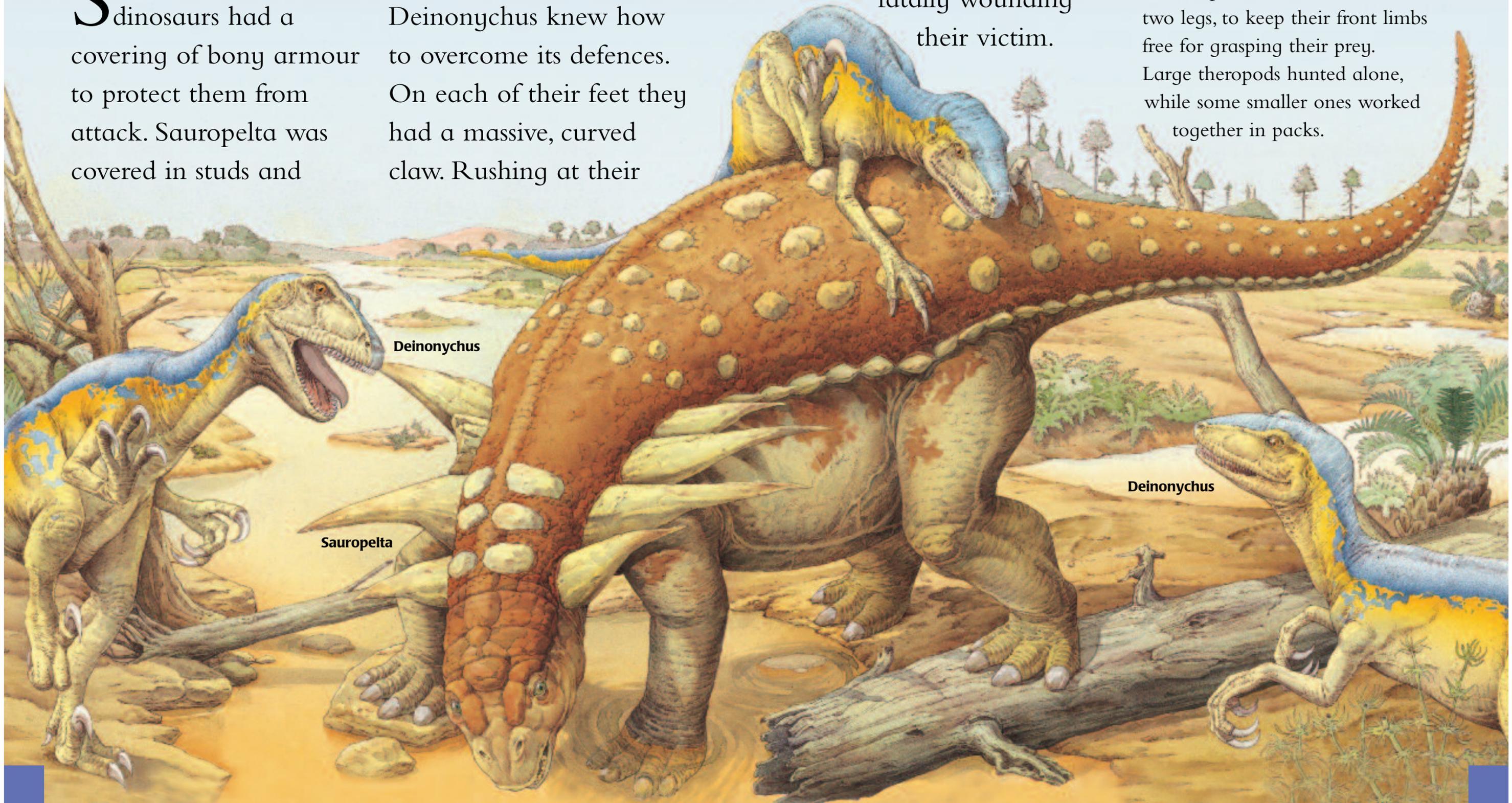
Sauropelta

prey, they used their claws to slash through the hide, fatally wounding their victim.

## DINOSAUR PREDATORS

The flesh-eating dinosaurs, known as theropods, all moved about on two legs, to keep their front limbs free for grasping their prey. Large theropods hunted alone, while some smaller ones worked together in packs.

Deinonychus



## DUCKBILLED DINOSAURS

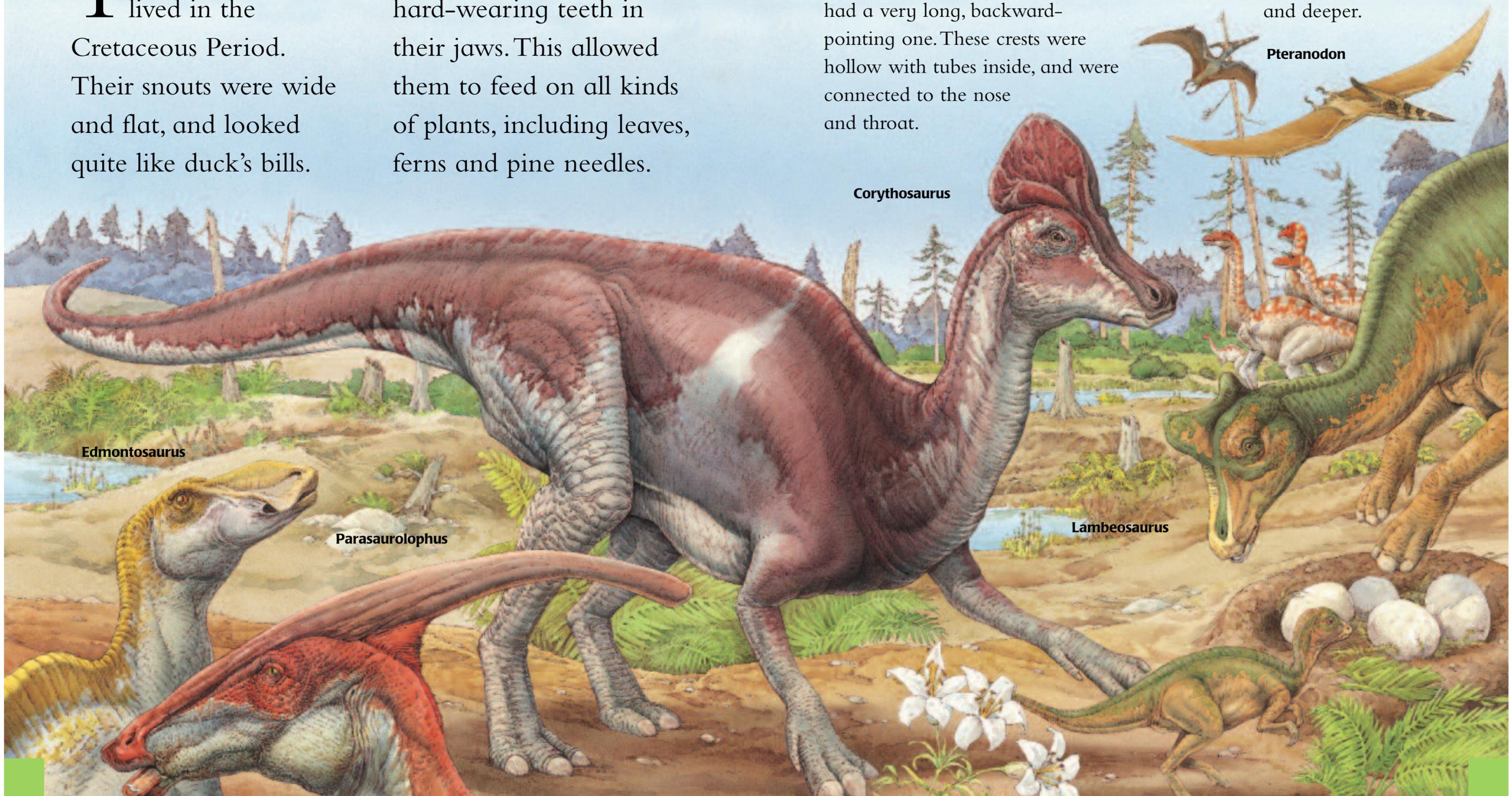
**T**HESE dinosaurs lived in the Cretaceous Period. Their snouts were wide and flat, and looked quite like duck's bills.

They had hundreds of hard-wearing teeth in their jaws. This allowed them to feed on all kinds of plants, including leaves, ferns and pine needles.

## HOLLOW CRESTS

Many duckbills had crests on top of their heads. Parasaurolophus had a very long, backward-pointing one. These crests were hollow with tubes inside, and were connected to the nose and throat.

They probably helped to make the dinosaur's warning calls to other members of its herd much louder and deeper.



Edmontosaurus

Parasaurolophus

Corythosaurus

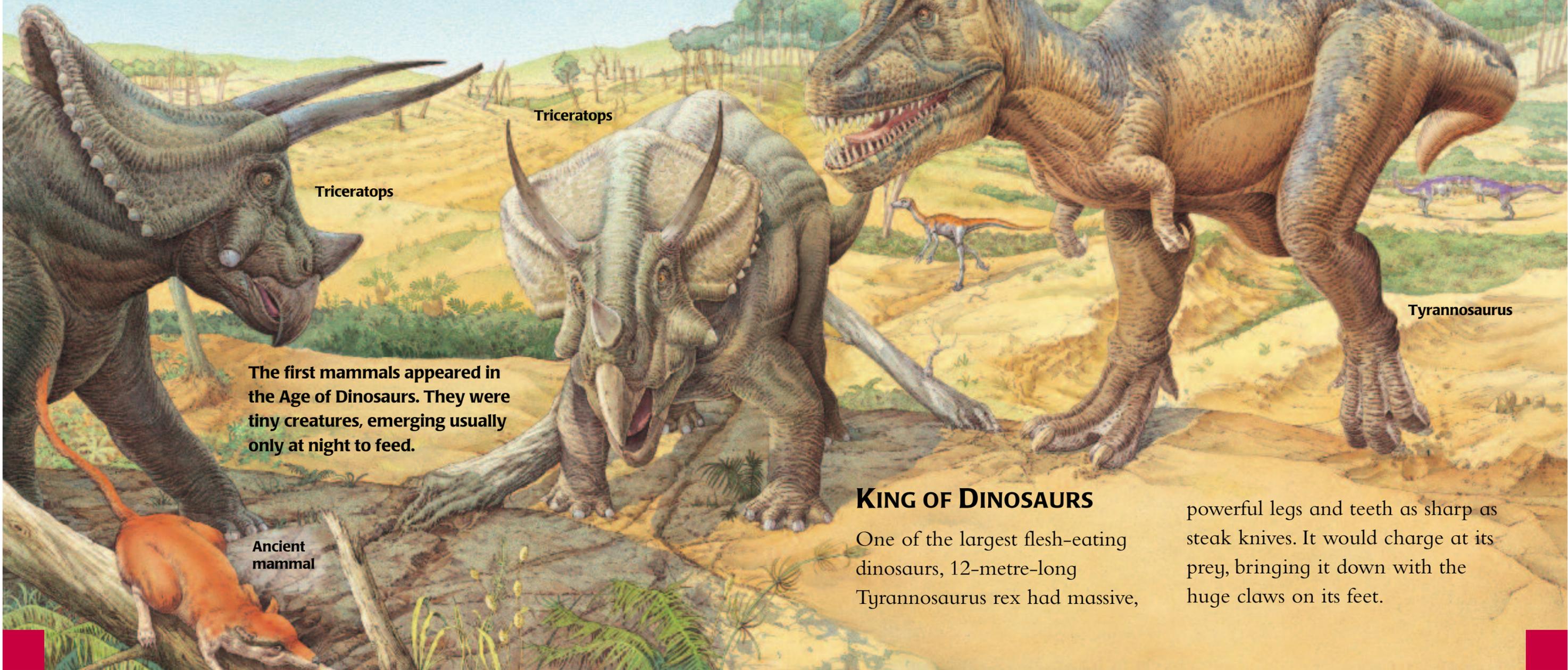
Lambeosaurus

Pteranodon

# CRETACEOUS DINOSAURS

**T**WO of the best-known dinosaurs lived at the end of the Cretaceous Period. The plant-eater, Triceratops,

had three horns on its head and a large neck frill. Tyrannosaurus was one of the few predators powerful enough to attack it.



Triceratops

Triceratops

Pteranodon

Tyrannosaurus

**The first mammals appeared in the Age of Dinosaurs. They were tiny creatures, emerging usually only at night to feed.**

Ancient mammal

While dinosaurs ruled on land, pterosaurs such as Pteranodon, flew in the skies. Sheets of skin between the fourth finger and body made up their wings. They used their beaks for seizing fish.

## KING OF DINOSAURS

One of the largest flesh-eating dinosaurs, 12-metre-long Tyrannosaurus rex had massive,

powerful legs and teeth as sharp as steak knives. It would charge at its prey, bringing it down with the huge claws on its feet.

## THE END OF THE DINOSAURS

**A**T THE END of the Cretaceous Period, all the dinosaurs suddenly died out. No one knows why this happened. It was not only dinosaurs that became extinct. Pterosaurs and many

kinds of sea creatures also disappeared forever. The world may have become a bleak, cold desert for a time, where only a few kinds of animals could survive.

**Tyrannosaurus**



### WHY DID THE DINOSAURS BECOME EXTINCT?

Many scientists think that a giant asteroid (a rocky object in space) that crashed to Earth at this time was the culprit. Millions of tonnes of rock and dust would have been thrown up high into the sky by the explosion. This would have blotted out the sun and changed the weather for years. The Earth would have become a frozen world.



## PREHISTORIC BIRDS AND MAMMALS

**B**IRDS and mammals survived when the dinosaurs were wiped out. Prehistoric kinds were very different to modern ones.

**Diatryma, a flightless bird, lived 60 million years ago.**

## GIANT BIRDS

When Tyrannosaurus became extinct, there were no giant predators—for a while. Then, massive, flightless birds, three metres tall, took their place. These fierce, fast-running beasts preyed on small horses, crushing them to death in their huge, pointed beaks.

## THE STORY OF MAMMALS

While the dinosaurs were around, mammals were tiny, shrew-like creatures. When dinosaurs disappeared, many kinds of mammals evolved (changed over time). They included the ancestors of horses, elephants, cats, whales, bats, monkeys—and humans.



**Hyracotherium**  
(a prehistoric horse)

**Diatryma**

**Chriacus**  
(a prehistoric mammal)

# THE FIRST HUMANS

**T**HE FIRST human- descended from apes, but, like creatures lived in Africa, probably more than four million years ago. They were unlike apes, they walked upright on two legs. Later humans spread to all parts of the world.



The first tools used by humans were stone blades. They were made by striking one stone against another to make a sharp edge.

## APE-MEN

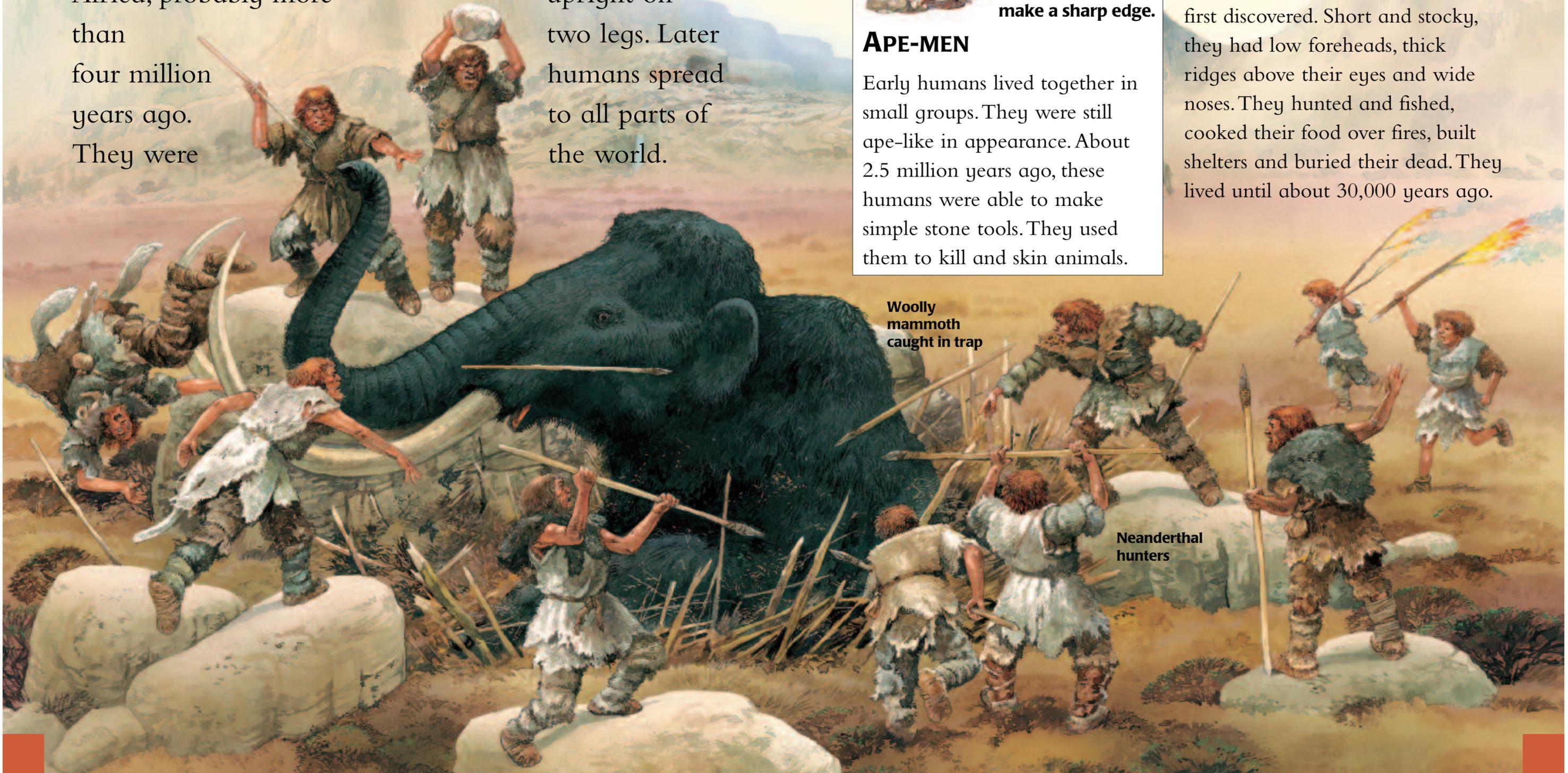
Early humans lived together in small groups. They were still ape-like in appearance. About 2.5 million years ago, these humans were able to make simple stone tools. They used them to kill and skin animals.

# NEANDERTHALS

Neanderthal humans evolved about 400,000 years ago. They were named after the valley in Germany where their bones were first discovered. Short and stocky, they had low foreheads, thick ridges above their eyes and wide noses. They hunted and fished, cooked their food over fires, built shelters and buried their dead. They lived until about 30,000 years ago.

Woolly mammoth caught in trap

Neanderthal hunters



## DINOSAUR FOSSILS

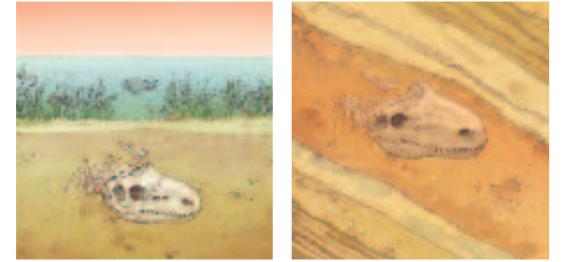
**D**INOSAURS may have died out 65 million years ago, but the search goes on today for their fossils (their remains, turned to stone). Scientists can find out all about dinosaurs—what they ate, how fast they ran, how brainy they were—from studying their fossils.

They look for fossils in rocks that were formed during the Age of Dinosaurs. Besides bones, they may also find footprints or eggs.

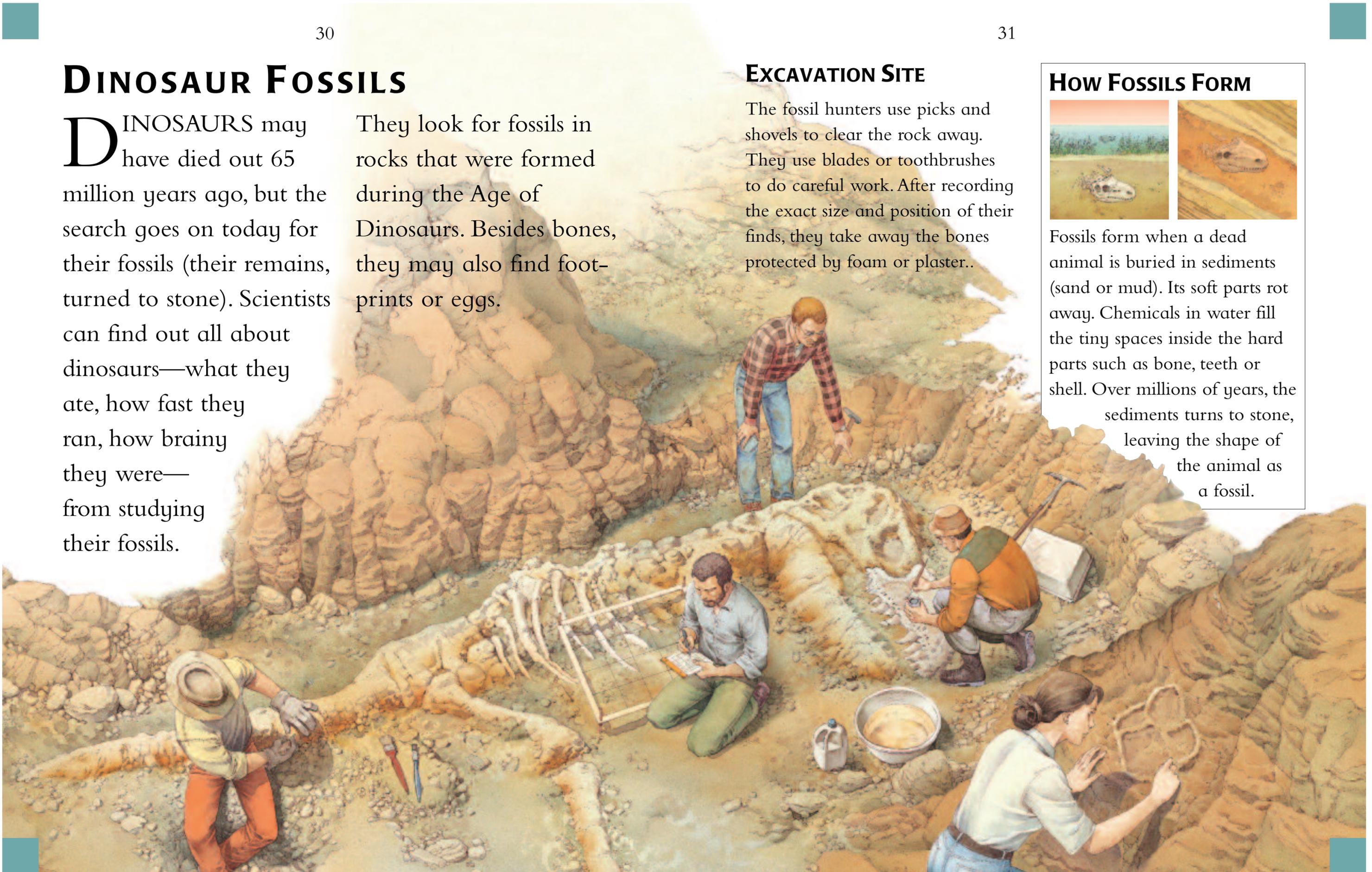
## EXCAVATION SITE

The fossil hunters use picks and shovels to clear the rock away. They use blades or toothbrushes to do careful work. After recording the exact size and position of their finds, they take away the bones protected by foam or plaster..

## HOW FOSSILS FORM



Fossils form when a dead animal is buried in sediments (sand or mud). Its soft parts rot away. Chemicals in water fill the tiny spaces inside the hard parts such as bone, teeth or shell. Over millions of years, the sediments turns to stone, leaving the shape of the animal as a fossil.



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