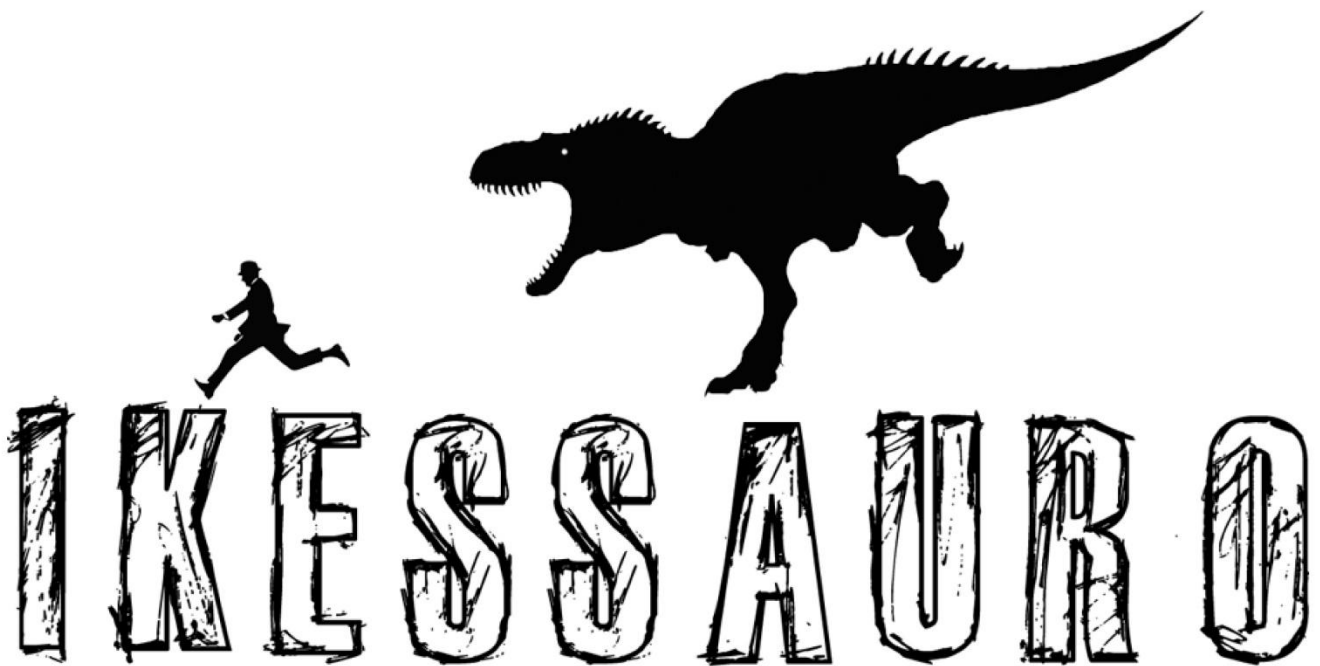



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IDENTIKIT

A vicious meat-eater, a peaceful plant-eater and a hairy mammal
LILIENSTERNUS 2281
NIPPONOSAURUS 2284
COELODONTA 2285



PREHISTORIC WORLD

During the second half of the Palaeozoic there was an amazing increase in LIFE ON LAND 2286



SPOTTER'S GUIDE

Name the predators and the prey in WHICH DINO DUNNIT? 2294



TIME DETECTIVE

Take a look at THE CHANGING FACE OF THE ICHTHYOSAURS 2296



HISTORY IN PICTURES

A baby *Dsungaripterus* is born in EGGING THEM ON 2300



HOW TO DRAW

Discover how to draw the amazing sail-backed dinosaur
Spinosaurus 2304

ASK THE EXPERT

Dr David Norman of Cambridge University answers more of your dinosaur queries BACK COVER

PLUS



A herd of *Liliensternus* is hungry for meat 2290

3-D Gallery

Two *Struthiomimus* are attacked by *Albertosaurus* 2292



More fascinating trivia and the weekly quiz 2302

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IDENTIKIT



LILIENSTERNUS

Liliensternus was one of the largest, early meat-eating dinosaurs.

The first flesh-eating dinosaurs were fast, active hunters. They were built for speed and sprinted after prey on powerful hind legs.

FRESH FIND

Recently, scientists were excited to discover the fossil remains of an unusual carnivorous dinosaur in New Mexico, USA. Remains of a similar dinosaur were found in Germany in 1934.

NEW SPECIES

The skeletons of both finds were incomplete, but the evidence from the new one was enough to convince experts that they had unearthed a new species of meat-eating dinosaur. In 1984, scientists named the dinosaur *Liliensternus*.

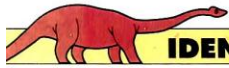
IN AT THE BEGINNING

The fossil bones of *Liliensternus* were excavated from Late Triassic rocks that were more than 220 million years old. This makes the dinosaur one of the earliest carnivores so far discovered.

PACK ATTACK

Liliensternus looked rather like *Coelophysis*, another early meat-eater, but it was almost twice as long. *Coelophysis* hunted its prey in packs, and probably pounced on the small lizards that scuttled across the desert plains.





MONSTER FACTS

- **NAME:** *Liliensternus* (li-ee-en-stur-nus) means 'Lilienstern's dinosaur'
- **GROUP:** dinosaur
- **SIZE:** 5m long
- **FOOD:** meat
- **LIVED:** about 220 million years ago in the Triassic Period in Germany and New Mexico

WORKING TOGETHER

Although larger than *Coelophysis*, *Liliensternus* may have hunted in packs, too. They could have overpowered small plant-eaters, such as *Sellosaurus*.

FAST AND FLEXIBLE

Speedy *Liliensternus* probably held its long tail stiffly out behind when it ran. This may have helped it to balance. The dinosaur had a long, flexible neck. It could have craned this upwards to see into the distance and track its prey.

LOOKALIKE

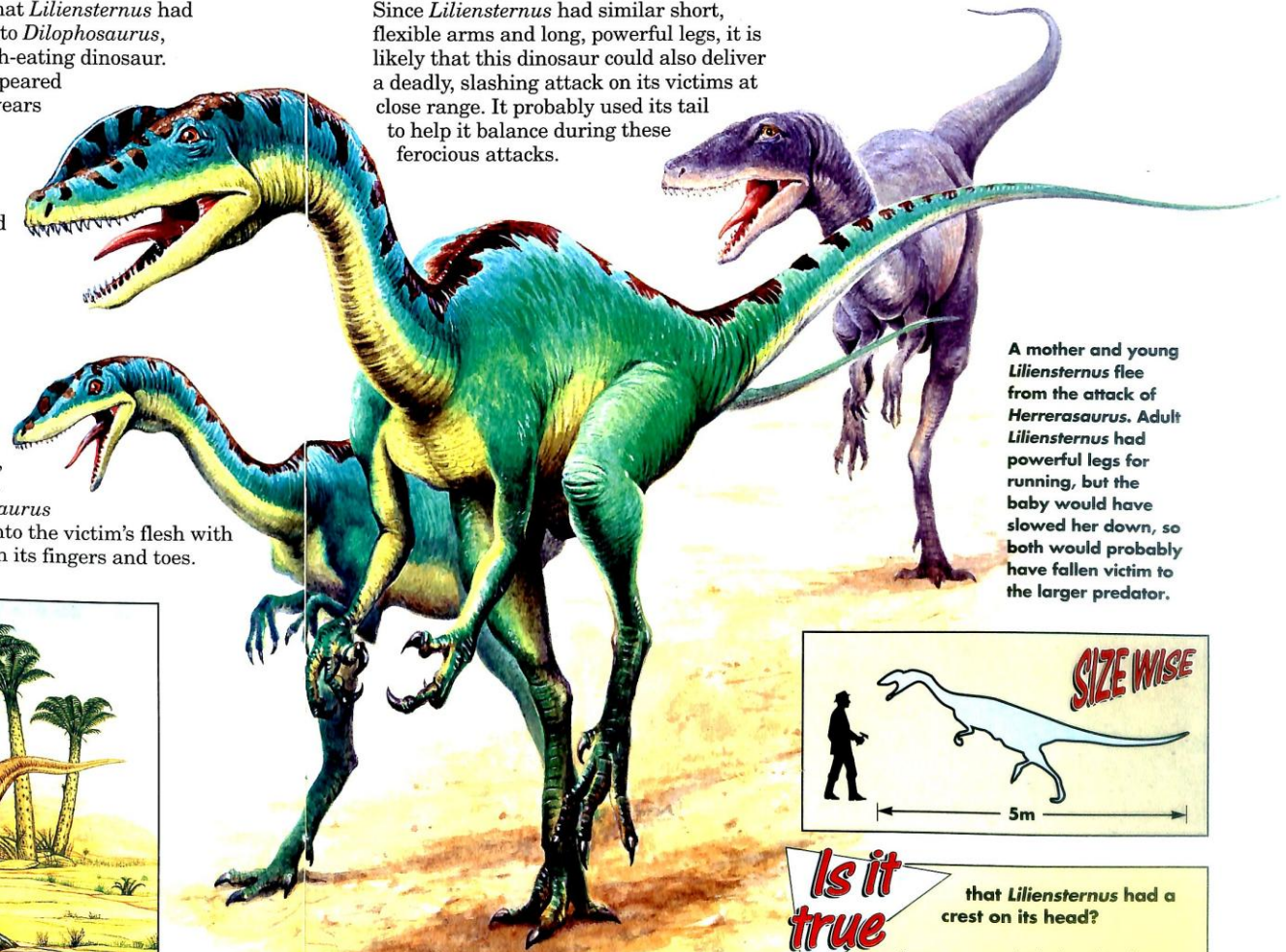
Experts noticed that *Liliensternus* had similar hip bones to *Dilophosaurus*, another early flesh-eating dinosaur. *Dilophosaurus* appeared about 20 million years later, but the two carnivores were about the same size, and they could have tackled their prey in a similar way.

MEAL TIME

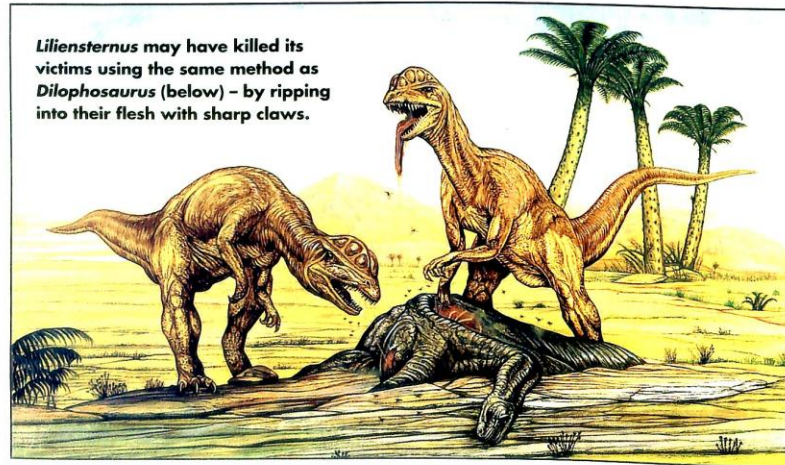
It is unlikely that *Dilophosaurus* killed its victims by biting them, as experts think some meat-eaters, such as *T rex*, did. Instead, *Dilophosaurus* probably ripped into the victim's flesh with the sharp claws on its fingers and toes.

SHARP CLAWS

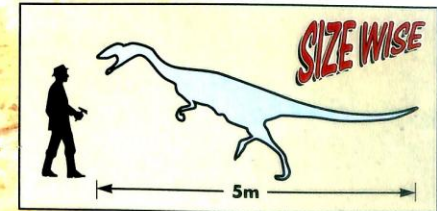
Since *Liliensternus* had similar short, flexible arms and long, powerful legs, it is likely that this dinosaur could also deliver a deadly, slashing attack on its victims at close range. It probably used its tail to help it balance during these ferocious attacks.



A mother and young *Liliensternus* flee from the attack of *Herrerasaurus*. Adult *Liliensternus* had powerful legs for running, but the baby would have slowed her down, so both would probably have fallen victim to the larger predator.



Liliensternus may have killed its victims using the same method as *Dilophosaurus* (below) - by ripping into their flesh with sharp claws.



Is it true

that *Liliensternus* had a crest on its head?

Some experts think that this dinosaur might have had a bony head crest like *Dilophosaurus*, but there is not enough fossil evidence yet to be sure of this.



NIPPONOSAURUS

This small duckbilled dinosaur was a very rare find – a Japanese dinosaur.

Nipponosaurus was a lambeosaurine duckbill. This group of plant-eating dinosaurs had high, domed heads, topped by strange-looking, hollow crests.

FAR OUT

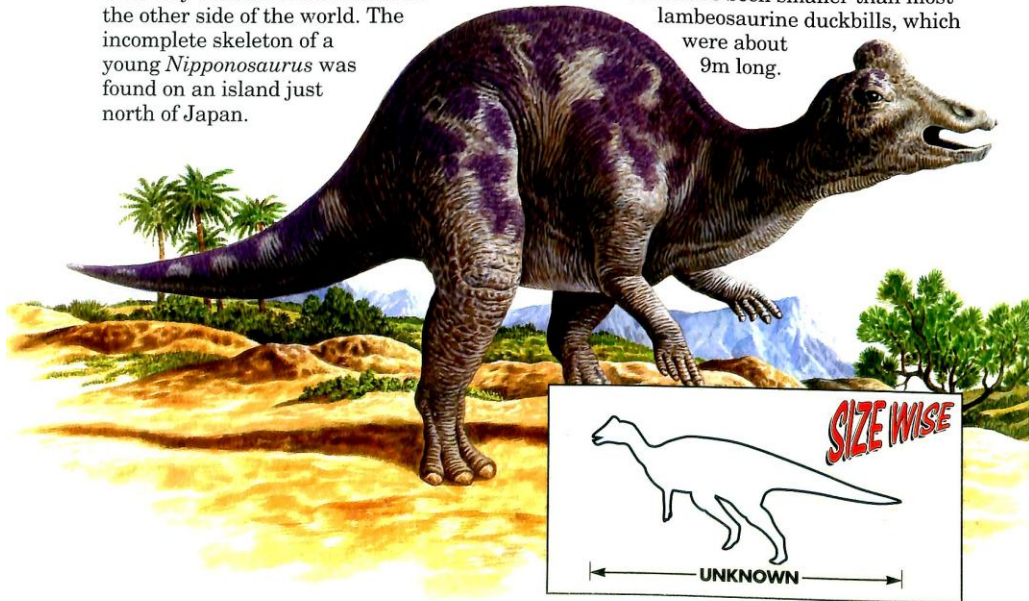
Lambeosaurine duckbills seem to have evolved in Late Cretaceous North America, and most of the fossils have been found there. *Nipponosaurus* was an exciting discovery because it was made on the other side of the world. The incomplete skeleton of a young *Nipponosaurus* was found on an island just north of Japan.

MONSTER FACTS

- **NAME:** *Nipponosaurus* (ni-pon-uh-saw-rus) means 'Japanese lizard'
- **GROUP:** dinosaur
- **SIZE:** unknown
- **FOOD:** plants
- **LIVED:** about 88 million years ago in the Late Cretaceous Period in Japan

SMALL IS BEAUTIFUL

Experts are not sure how large an adult *Nipponosaurus* was, but they believe it would have been smaller than most lambeosaurine duckbills, which were about 9m long.



2284



COELODONTA

Twin-horned *Coelodonta* roamed the icy north until about 10,000 years ago.



Coelodonta was a woolly rhinoceros from the Ice Age. It lived alongside mammoths and prehistoric man, and died out only 10,000 years ago.

THE BIG FREEZE

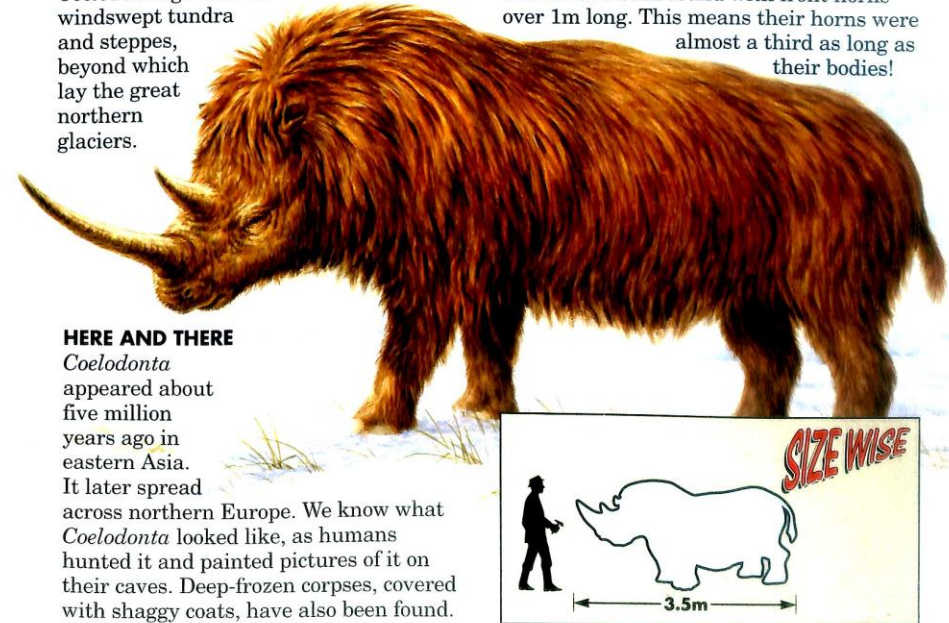
This huge plant-eater had two horns on its nose and a thick, hairy coat to keep it warm in the sub-zero temperatures. *Coelodonta* grazed the windswept tundra and steppes, beyond which lay the great northern glaciers.

MONSTER FACTS

- **NAME:** *Coelodonta* (seel-oh-dont-ah) means 'hollow tooth'
- **GROUP:** mammal
- **SIZE:** 3.5m long
- **FOOD:** plants
- **LIVED:** from 5 million years ago to 10,000 years ago in Europe and Asia

HUGE HORNS

The horns of *Coelodonta* were huge. Old males have been found with front horns over 1m long. This means their horns were almost a third as long as their bodies!



HERE AND THERE

Coelodonta appeared about five million years ago in eastern Asia. It later spread across northern Europe. We know what *Coelodonta* looked like, as humans hunted it and painted pictures of it on their caves. Deep-frozen corpses, covered with shaggy coats, have also been found.

2285

Life on land

During the second half of the Palaeozoic Era, between 362 and 245 million years ago, life on land really began to flourish.

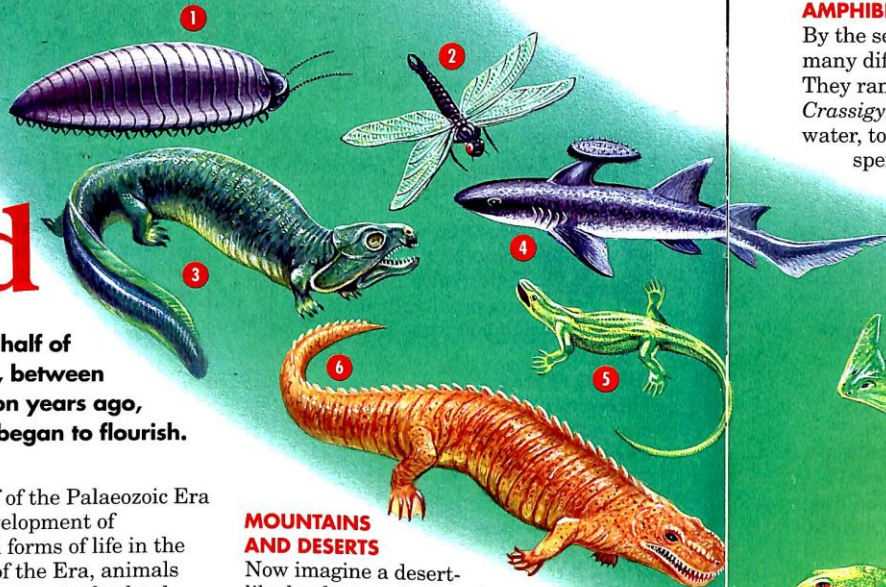
The first half of the Palaeozoic Era saw the development of complicated forms of life in the seas. By the middle of the Era, animals were beginning to move on to dry land.

SWAMPS AND FORESTS

Imagine a steamy, swampy forest. Huge bugs scabble about on the forest floor, dragonflies zoom overhead and giant newt-like creatures rest on mud banks. This is the Carboniferous Period (362–290 MYA), often called the Age of Amphibians.

Is it true that Palaeozoic amphibians were much larger than amphibians today?

Yes. Several Palaeozoic amphibians were about 2m long, while *Diadectes* reached 3m. *Eogyrinus* was about 4.5m long – it was one of the largest animals alive in the Carboniferous Period. The frogs, toads, newts and salamanders that are today's amphibians are much smaller.



MOUNTAINS AND DESERTS

Now imagine a desert-like landscape of red rocks, orange earth and sand. Here, giant reptiles warm their bodies at the start of the day. The only plants grow around lakes, ponds and rivers. This is the Permian Period (290–245 MYA). Together the Carboniferous and the Permian make up the second half of the Palaeozoic Era.

ADAPTING TO THE ENVIRONMENT

The first amphibian, *Ichthyostega*, appeared just before the Carboniferous Period. It crawled out of the water to hunt on land, but its bulky body was probably much more at home in the water. Once life had moved on to land, amphibians, and then reptiles, became the most important animals. The different environments, from the lush, wet Carboniferous Period to the hot, dry Permian Period, produced different kinds of animals.

AMPHIBIANS RULE OK

By the second half of the Palaeozoic Era, many different amphibians had appeared. They ranged from the heavy-skulled *Crassigyrinus*, which lived mostly in water, to sail-backed *Platyhystrix*, which spent most of its time on land.

Platyhystrix lived on insects and worms. Its sail helped it to warm up quickly.



INSECT WORLD

Insects and arthropods thrived in the second half of the Palaeozoic. Millipede-like creatures such as *Arthropleura* looked for food in the forests. Scorpions, spiders, and dragonflies such as *Meganeura* hunted insects, and cockroaches scavenged in the leaf litter beneath giant horsetails.

KEY

CARBONIFEROUS PERIOD

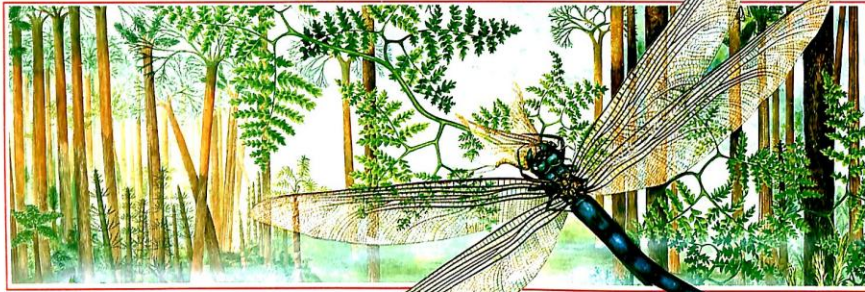
- 1 *Arthropleura*
- 2 *Meganeura*
- 3 *Crassigyrinus*

PERMIAN PERIOD

- 4 *Stethacanthus*
- 5 *Hylonomus*
- 6 *Eogyrinus*
- 7 *Diplocaulus*
- 8 *Mesosaurus*
- 9 *Platyhystrix*
- 10 *Diadectes*
- 11 *Scutosaurus*
- 12 *Elginia*
- 13 *Dimetrodon*

RISING REPTILES

Amphibians thrived throughout the Palaeozoic, but only a few survive today. During the Permian, the reptiles took over from the amphibians and began to dominate life on land. Their size and shape varied enormously, from spiky *Scutosaurus* to sail-backed *Dimetrodon*.



Meganeura was a giant dragonfly that lived in the Carboniferous.

LEGS, LEGS, LEGS

Many invertebrates of this time were much larger than their relatives today. *Arthropleura*, a giant millipede, was about 2m long. It must have made quite a noise as it scuttled along the forest floor looking for tasty morsels such as rotting leaves.

MONSTER OF THE DARK

Some amphibians were monsters, too. *Crassigyrinus*, a 2m-long amphibian, had tiny legs and huge eyes. It probably lived in murky swamps where its large eyes helped it to spot prey easily. Its huge mouth, full of sharp teeth, was well suited to snapping up slippery food.

MEAT-EATING MONSTERS

Meganeura was a monster of an insect, with the same wingspan as a parrot. While its larvae fed on water animals, *Meganeura* hunted smaller insects on land. *Eogyrinus*, a newt-like giant amphibian, probably used its long jaws to snap up fish, as today's alligators do.

STRANGE AMPHIBIANS

Some strange-looking amphibians lived in the late Palaeozoic. One of the strangest was *Platyhystrix*, which was about 1m long and had a spectacular sail along its spine. It may have absorbed heat through this sail to warm its blood.



Eogyrinus (left) hunted for fish in the swampy waters of the Carboniferous forests.

Scotosaurus (right) was a plant-eater that roamed the plains of Late Permian Russia.

Diplocaulus (below) was one of the strangest-looking Palaeozoic amphibians.



A BIG MOUTHFUL

Diplocaulus looked even stranger with its large, boomerang-shaped head. This may have protected the amphibian from predators – an enemy would need a very big mouth to swallow *Diplocaulus*!

HEAVYWEIGHT

Diadectes was a hefty amphibian. Some experts think that its bulky body shows that it ate plants. If it did, then it was the first plant-eating amphibian. All earlier amphibians were carnivores.

BRING ON THE REPTILES

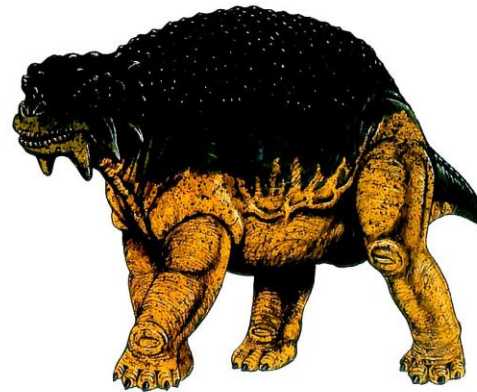
One of the earliest known reptiles was *Hylonomus*. This lizard look-alike was one of the first animals adapted to live entirely on land. This was a major step forward in animal evolution.

SPIKE-HEAD

Scotosaurus, a giant among early reptiles, had a bulky body supported on upright legs. A slow-moving plant-eater, it had bony armour for protection. Its much smaller relative, *Elginia*, also had a spiked head, but probably used it to impress females or ward off rival males.

WARMING UP FOR THE HUNT

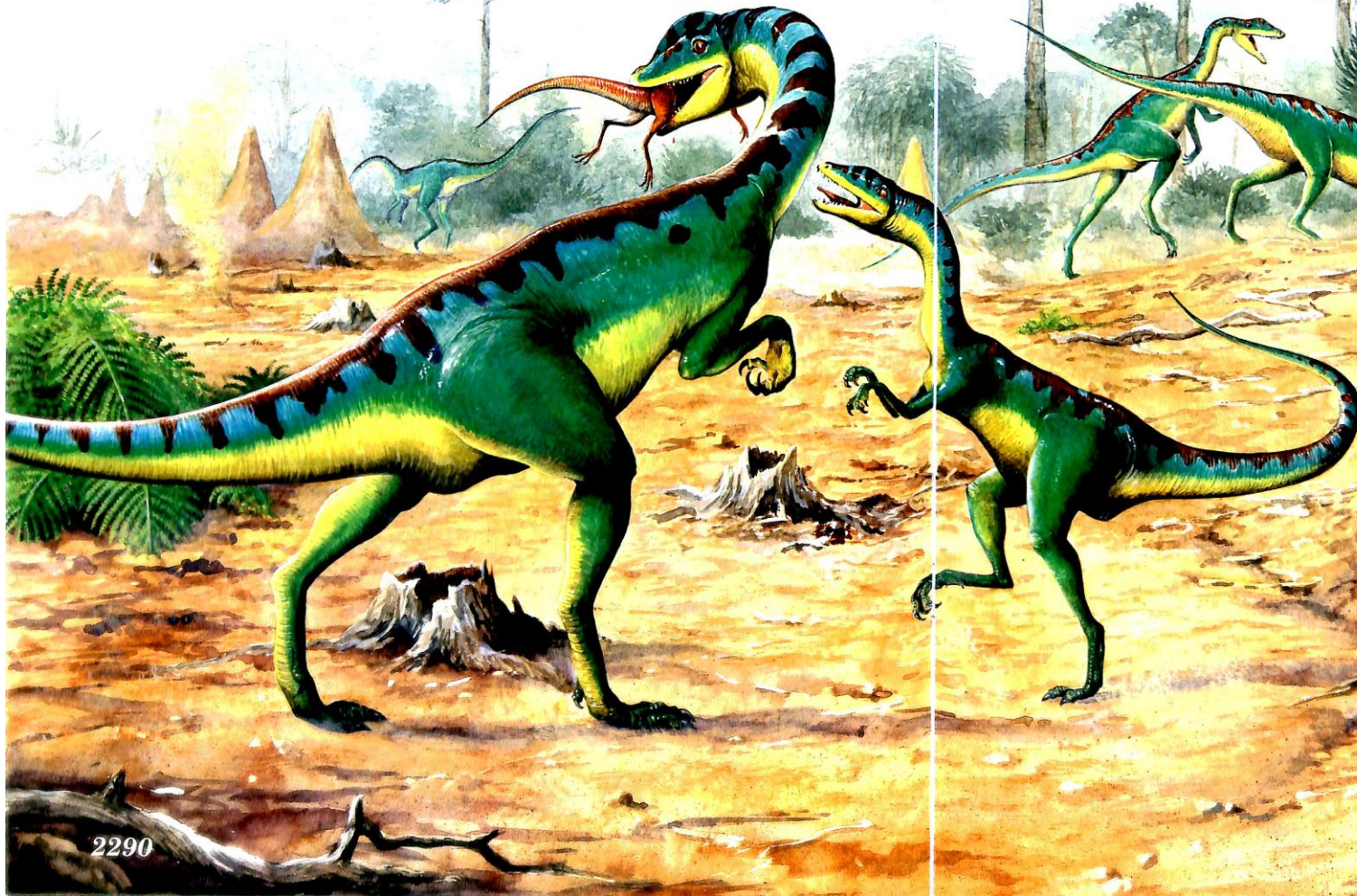
Razor-sharp front teeth meant that *Dimetrodon*, one of the largest of the early reptiles, could eat meat. It was probably quite a good hunter and used its 'sail' to warm up at the beginning of the day. Until it was warm, *Dimetrodon* could not move fast enough to catch the small reptiles and amphibians on which it lived.



Is it true that there were sharks in the Palaeozoic seas?

Yes. Fossils of strange-looking sharks, such as *Stethacanthus*, *Falcatus* and *Xenacanthus*, have been found in Palaeozoic rocks. Sharks are fish, but there were also some water-dwelling reptiles in the Palaeozoic Era. *Mesosaurus* is an example of an early aquatic reptile that was well adapted to living in the water.

GIANTS OF THE PAST



2290

LILIENSTERNUS

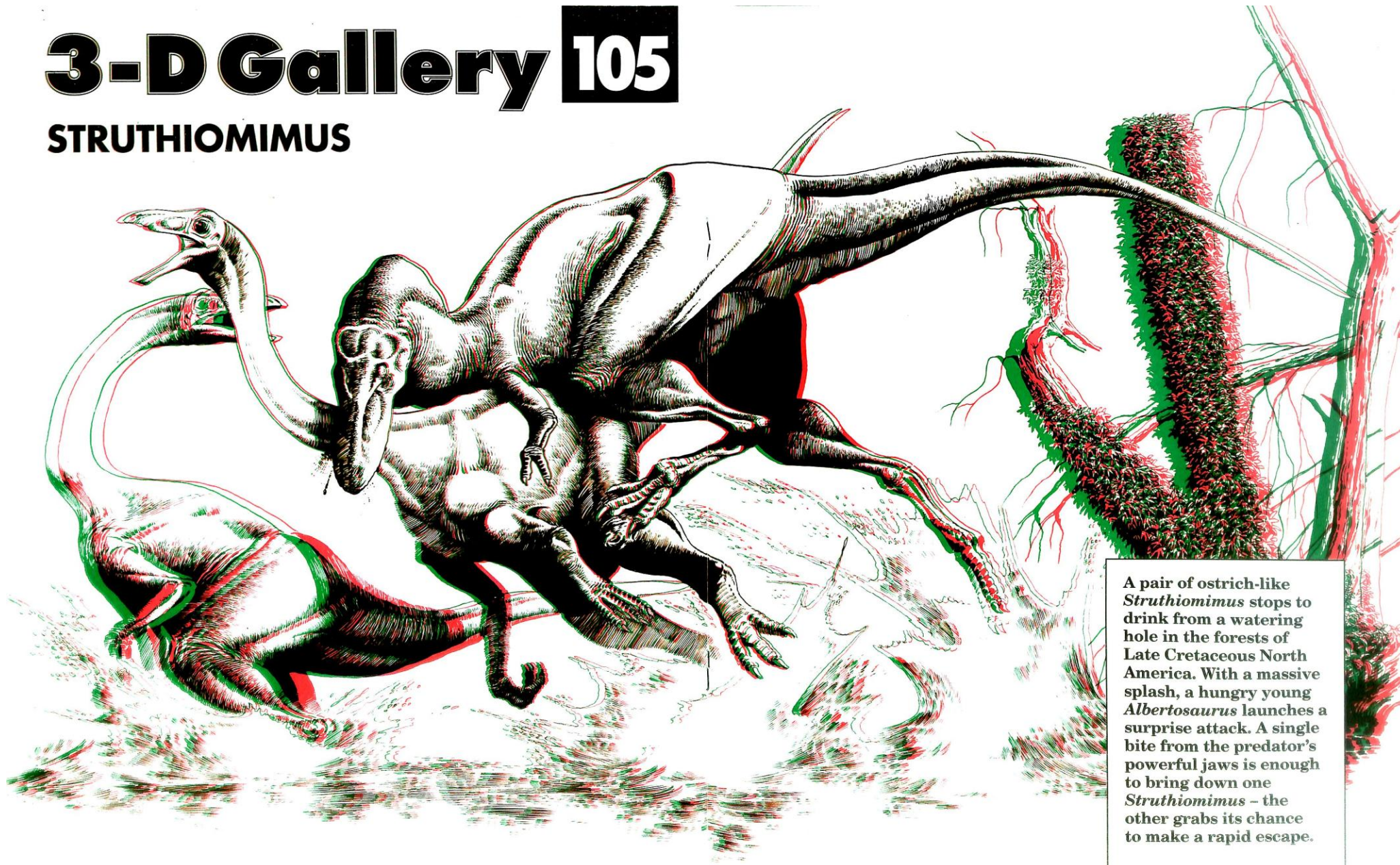


A herd of *Liliiensternus* has just thundered through a lush forest in late Triassic Europe, driving small mammals and reptiles before it. As the dinosaurs emerge into open ground, their prey scatters. Now, away from the safety of the trees and vegetation, the frightened creatures have only a few tree stumps in which to hide. One small reptile is unlucky; as no adult *Liliiensternus* seizes its victim in vicious jaws, a young *Liliiensternus* leaps up in excitement, hoping for a share of this tasty meal.

2291

3-D Gallery 105

STRUTHIOMIMUS

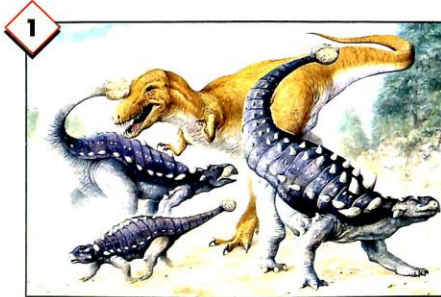


A pair of ostrich-like *Struthiomimus* stops to drink from a watering hole in the forests of Late Cretaceous North America. With a massive splash, a hungry young *Albertosaurus* launches a surprise attack. A single bite from the predator's powerful jaws is enough to bring down one *Struthiomimus* - the other grabs its chance to make a rapid escape.

Which dino dunnit?

Many dinosaurs were ferocious meat-eaters, attacking their plant-eating prey without mercy. Each one had its own special weapons and methods of defence. But who attacked whom?

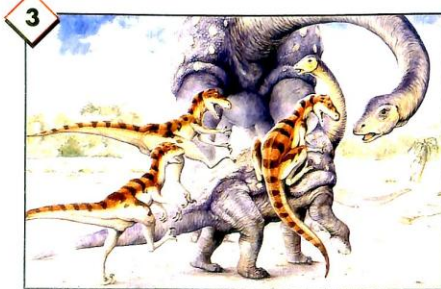
Have a go at being a dinosaur detective! Study the scenes below and read the clues. Then use your knowledge to name the predator and the prey. Check your answers with the ones opposite.



1
PERIOD: Late Cretaceous
PREDATOR: Named after a place in Canada
PREY: Had bony tail club for defence
CLUE: Predator was relative of *T rex*



2
PERIOD: Early Jurassic
PREDATOR: Agile dino with a very light skeleton
PREY: Peaceful dino with three kinds of teeth
CLUE: Predators were as tall as humans



3
PERIOD: Late Cretaceous
PREDATOR: Theropod with retractable claws
PREY: Stud-covered plant-eater
CLUE: Both dinos were found in Argentina

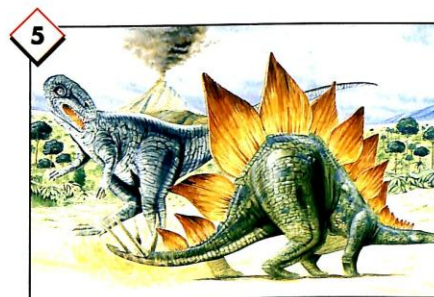


4
PERIOD: Late Cretaceous
PREDATOR: Like *T rex*, but with a bigger head
PREY: One of the smallest dinosaurs
CLUE: Both dinos were found in Mongolia

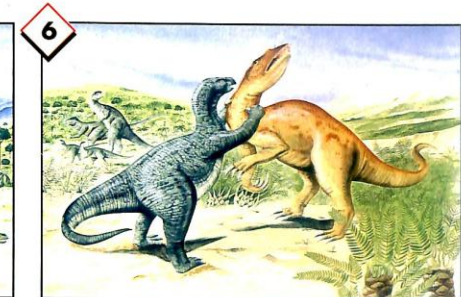
5 Predator: *Alliosaurus*
 Prey: *Stegosaurus*
6 Predator: *Baryonyx*
 Prey: *Iguanodon*
7 Predator: *Platnickysaurus*
 Prey: *Patagosaurus*
8 Predator: *Tarbosaurus*
 Prey: *Talarurus*

1 Predator: *Albertosaurus*
 Prey: *Ankylosaurus*
2 Predator: *Coelophysis*
 Prey: *Heterodontosaurus*
3 Predator: *Noasaurus*
 Prey: *Saltisaurus*
4 Predator: *Tarbosaurus*
 Prey: *Microceratops*

ANSWERS:



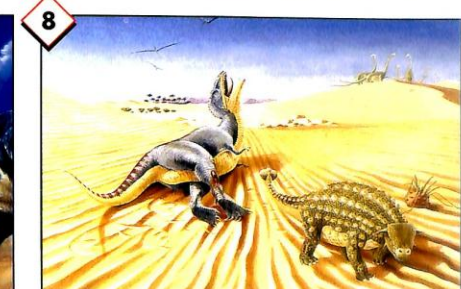
5
PERIOD: Late Jurassic
PREDATOR: Name means 'strange lizard'
PREY: Had powerful, spiked tail to defend itself
CLUE: Battle took place in North America



6
PERIOD: Early Cretaceous
PREDATOR: Could catch fish
PREY: Defended itself with sharp thumb spikes
CLUE: Both dinos found in southern England



7
PERIOD: Mid Jurassic
PREDATOR: Had large spaces in its skull
PREY: Name means 'Patagonian reptile'
CLUE: Both dinosaurs were found in Argentina



8
PERIOD: Late Cretaceous
PREDATOR: Same predator as in scene 4
PREY: Name means 'basket tail'
CLUE: Prey escaped thanks to heavy tail club

The changing face of the ichthyosaur

Land-dwelling crocodile or sea-dwelling reptile? Over the years, experts have changed their minds about the ichthyosaur.

We now know that ichthyosaurs ruled the seas when dinosaurs ruled the land. They first appeared in the Late Triassic and died out around the time that the dinosaurs disappeared. But for many years there was confusion about the creature we now call an ichthyosaur. Did it live in the sea or on land? Did it look like a crocodile or a dolphin?

BONE PUZZLE

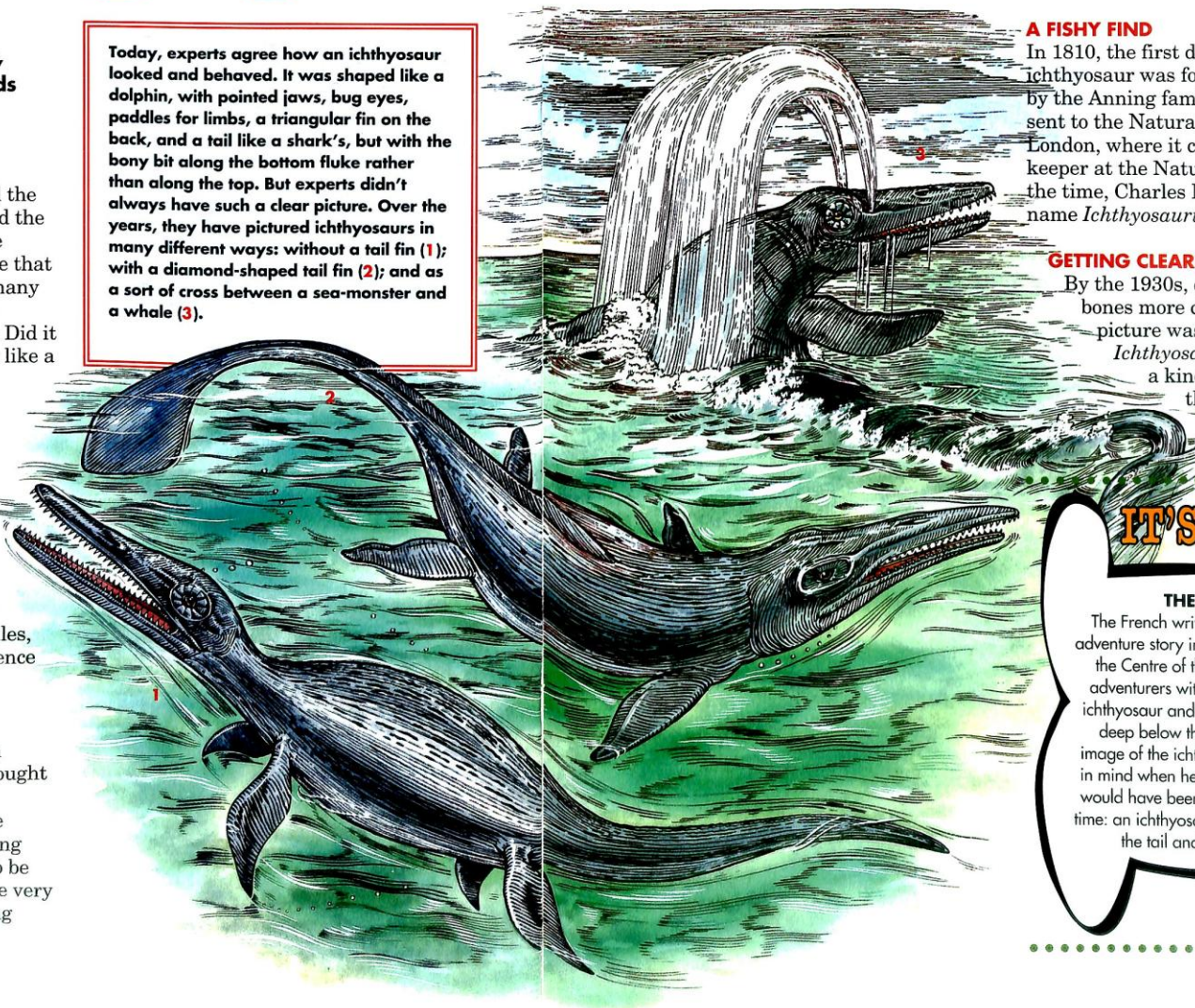
Before anybody knew about dinosaurs, or about all the other big reptiles that lived in the past, people wondered about the stone bones that were found in the ground, particularly in the south of England. They were thought to belong to crocodiles because some of them could be recognised as big reptiles, and the only big reptile known to science at that time was the crocodile.

LET'S CALL IT A CROCODILE!

Up to 1825, scientists had named ten species of fossil animals that they thought were crocodiles. One or two were dinosaurs, some are now known to be plesiosaurs (the long-necked swimming reptiles), but most later turned out to be ichthyosaurs. Ichthyosaurs' heads are very like those of crocodiles, with their long jaws and pointed teeth.

2296

Today, experts agree how an ichthyosaur looked and behaved. It was shaped like a dolphin, with pointed jaws, bug eyes, paddles for limbs, a triangular fin on the back, and a tail like a shark's, but with the bony bit along the bottom fluke rather than along the top. But experts didn't always have such a clear picture. Over the years, they have pictured ichthyosaurs in many different ways: without a tail fin (1); with a diamond-shaped tail fin (2); and as a sort of cross between a sea-monster and a whale (3).



A FISHY FIND

In 1810, the first detailed skeleton of an ichthyosaur was found in Dorset, England, by the Anning family. It was eventually sent to the Natural History Museum in London, where it can still be seen. The keeper at the Natural History Museum at the time, Charles Konig, came up with the name *Ichthyosaurus*, meaning 'fish-lizard'.

GETTING CLEARER

By the 1930s, experts had studied the bones more closely and a clearer picture was emerging.

Ichthyosaurus was not a fish but a kind of reptile that lived in the sea, and had paddles instead of limbs.

IT'S A FACT

THE BIG FIGHT

The French writer Jules Verne wrote an adventure story in 1864 called 'A Journey to the Centre of the Earth'. In the book, the adventurers witness a battle between an ichthyosaur and a plesiosaur in a cavern deep below the Earth's surface. The image of the ichthyosaur that Verne had in mind when he was writing this story would have been the one current at the time: an ichthyosaur with an irregular fin on the tail and no fin on the back.

2297

TAIL TROUBLE

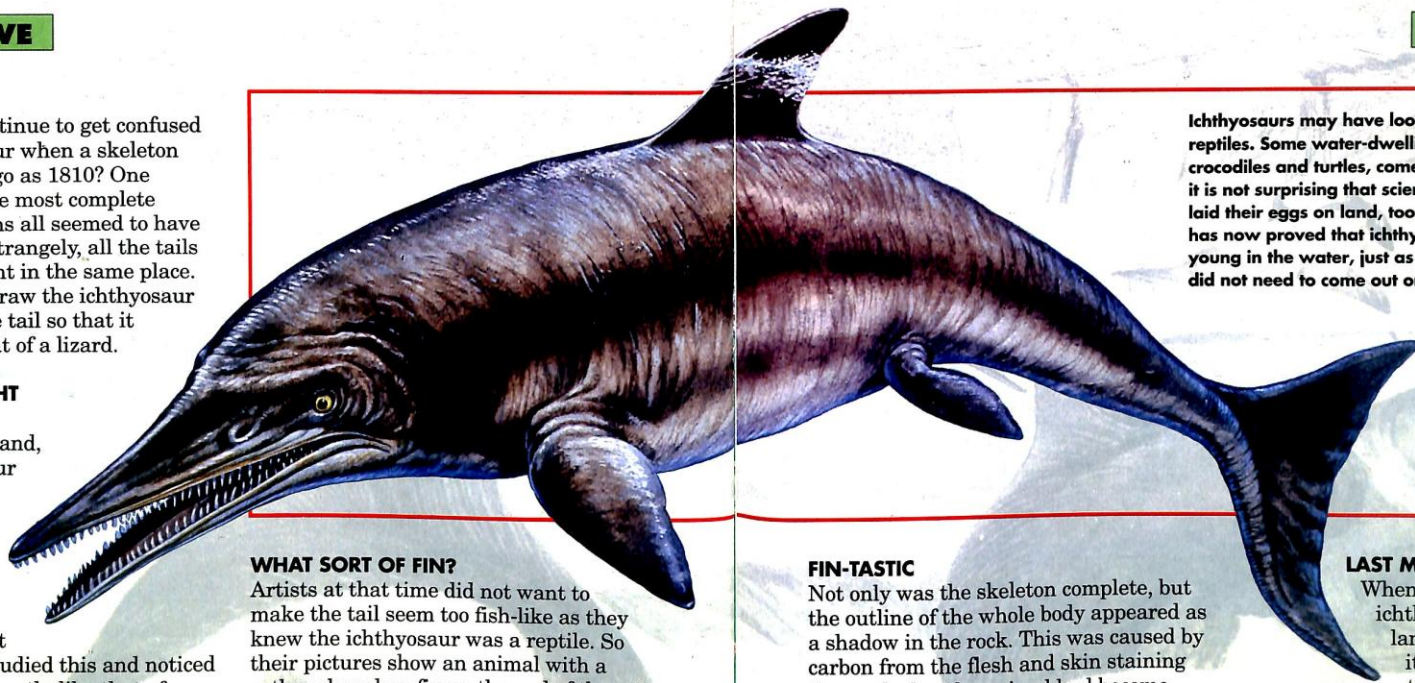
Why did experts continue to get confused about the ichthyosaur when a skeleton was found as long ago as 1810? One problem was that the most complete ichthyosaur skeletons all seemed to have their tails broken. Strangely, all the tails were broken and bent in the same place. The first artists to draw the ichthyosaur straightened out the tail so that it looked more like that of a lizard.

OWEN GETS IT RIGHT

One skeleton from Leicestershire, England, was of an ichthyosaur that had been buried in mud at the bottom of the sea. An impression of the skin had been left in the rocks. The anatomist Sir Richard Owen studied this and noticed that the skin was smooth, like that of a dolphin, and not scaly like other reptiles' skin. He also came to the correct conclusion about the bend in the tail. He said, in 1838, that this must have been due to the presence of a tail fin.



The Crystal Palace ichthyosaur model, made in 1853, can still be seen today.



WHAT SORT OF FIN?

Artists at that time did not want to make the tail seem too fish-like as they knew the ichthyosaur was a reptile. So their pictures show an animal with a rather shapeless fin on the end of the tail.

OUT OF WATER

Artists also pictured the ichthyosaur using its limbs to climb out on to land like a crocodile. When the famous sculptures of extinct animals were built for the Crystal Palace grounds in London in 1853, this is exactly how the ichthyosaur was made.

PERFECT!

The full, modern picture of the ichthyosaur started to appear in 1892 – the year of Owen's death. A perfect ichthyosaur skeleton was found in shales near Holzmaden in Germany.

FIN-TASTIC

Not only was the skeleton complete, but the outline of the whole body appeared as a shadow in the rock. This was caused by carbon from the flesh and skin staining the mud after the animal had become buried. There the tail fin was seen, just as Owen had predicted. However, this fin was no shapeless blob – it formed a half-moon sweep, like the tail fin of a shark. What's more, there was a triangular fin on the back – a dorsal fin – again just like that of a shark. Other ichthyosaurs, also perfectly preserved in the rocks, were dug up at Holzmaden and the last bit of evidence dropped into place.

An ichthyosaur skeleton.

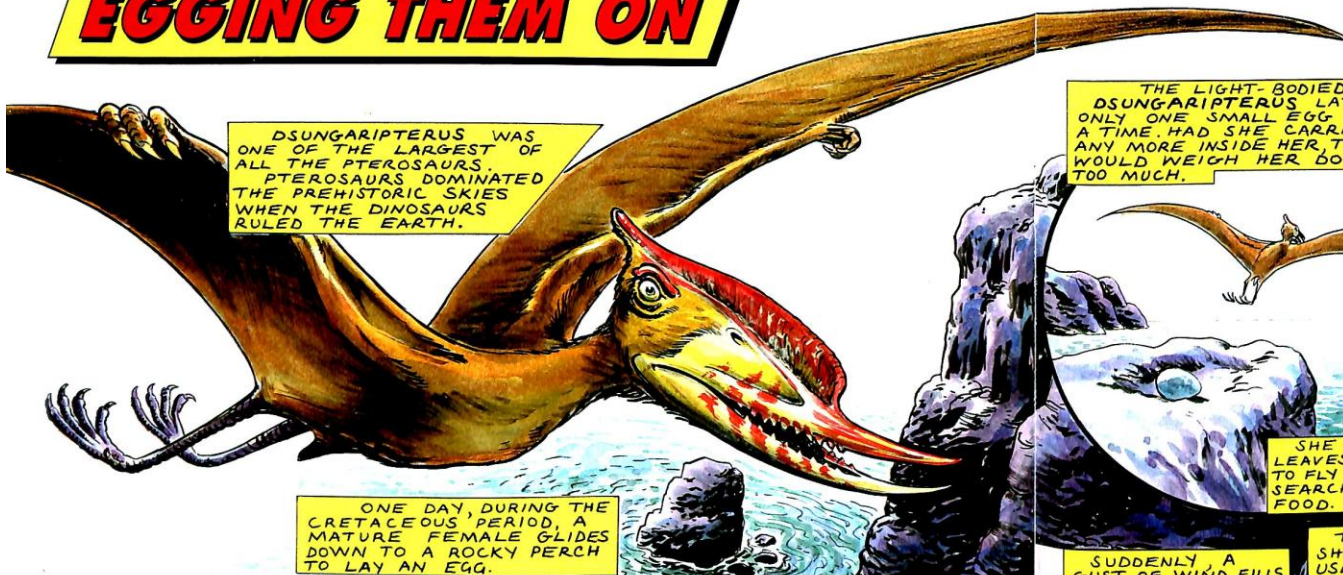
Ichthyosaurs may have looked like fish, but they were reptiles. Some water-dwelling reptiles, such as crocodiles and turtles, come out on land to lay eggs, so it is not surprising that scientists thought ichthyosaurs laid their eggs on land, too. However, fossil evidence has now proved that ichthyosaurs gave birth to live young in the water, just as dolphins do today. So they did not need to come out on to the land.

LAST MYSTERY SOLVED

When people pictured ichthyosaurs coming out on to land – as at Crystal Palace – it was because experts thought that the ichthyosaur would have to come on to the beach to lay eggs, just as turtles do today. However, some of the Holzmaden ichthyosaurs had baby ichthyosaurs growing inside them. This means they must have given birth to live young at sea, just as dolphins do.



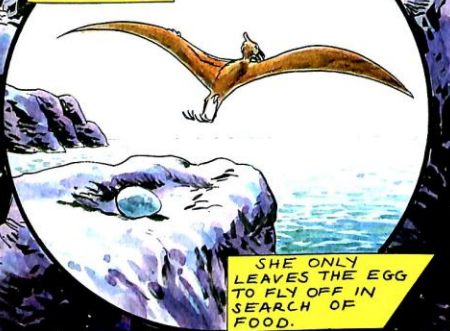
EGGING THEM ON



DSUNGARIPTERUS WAS ONE OF THE LARGEST OF ALL THE PTEROSAURS. PTEROSAURS DOMINATED THE PREHISTORIC SKIES WHEN THE DINOSAURS RULED THE EARTH.

THE LIGHT-BODIED DSUNGARIPTERUS LAYS ONLY ONE SMALL EGG AT A TIME. HAD SHE CARRIED ANY MORE INSIDE HER, THEY WOULD WEIGH HER DOWN TOO MUCH.

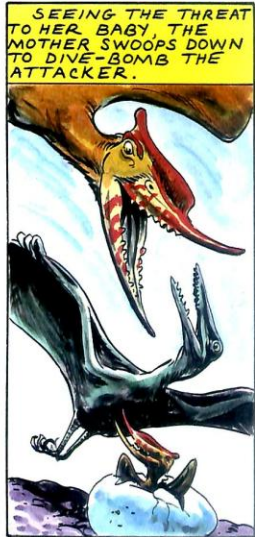
ONE DAY, DURING THE CRETACEOUS PERIOD, A MATURE FEMALE GLIDES DOWN TO A ROCKY PERCH TO LAY AN EGG.



SHE ONLY LEAVES THE EGG TO FLY OFF IN SEARCH OF FOOD.



WHEN IT HATCHES, THE LITTLE DSUNGARIPTERUS IS DEFENCELESS.



SEEING THE THREAT TO HER BABY, THE MOTHER SWOOPS DOWN TO DIVE-BOMB THE ATTACKER.

THE HATCHLING CANNOT CATCH ITS OWN FOOD, SO ITS MOTHER STORES CRUSHED SHELLFISH AND CRUSTACEANS IN A POUCH AT THE BACK OF HER THROAT.



THE YOUNG DSUNGARIPTERUS PUSHES ITS LONG BEAK INTO THE MOTHER'S MOUTH TO GET AT THE FOOD.

A FEW DAYS LATER, THE YOUNG DSUNGARIPTERUS IS STRONG ENOUGH TO RUN, BUT ITS WINGS ARE NOT YET STRONG ENOUGH TO LET IT FLY, NO MATTER HOW HARD IT FLAPS THEM.



BUT WITHIN A WEEK OR TWO, ITS WINGS HAVE GROWN.



SUDDENLY, A GUST OF WIND FILLS THE YOUNG ANIMALS WINGS AND, AFTER SOARING UPWARDS FOR A MOMENT OR TWO, IT PLUNGES DOWNWARDS.



JUST IN TIME, IT DESPERATELY FLAPS ITS WINGS AND FINDS ITSELF FLYING UP ALONGSIDE ITS MOTHER.

THE MOTHER DSUNGARIPTERUS SHOWS HER OFFSPRING HOW TO USE ITS BEAK TO PLUCK SHELLFISH AND CRUSTACEANS FROM THE ROCKY POOLS.



IT'S NOT LONG BEFORE THE YOUNG DSUNGARIPTERUS FLIES OFF TO LEAD ITS OWN LIFE. MAYBE TO DIE IN THE CLAWS AND JAWS OF A HUNGRY PREDATOR OR, HOPEFULLY, TO PRODUCE YOUNG OF ITS OWN.

Improve and test your knowledge with... FACT FILE

Fascinating facts to read and 10 fun questions to answer!

1 *Dsungaripterus* was one of the largest:
a) dinosaurs
b) plesiosaurs
c) pterosaurs

2 The Glen Rose trackway in Texas is famous for:
a) fossilized flowers
b) dinosaur footprints
c) dinosaur nests

3 *Nipponosaurus'* head was:
a) horned
b) domed
c) spiked

4 Which of the following is a plant-eater?
a) *Albertosaurus*
b) *Talarurus*
c) *Noasaurus*

5 Where did ichthyosaurs give birth to their young?
a) on land
b) in the air
c) under water

6 *Liliensternus* had hip bones similar to:
a) *Dilophosaurus*
b) *Dsungaripterus*
c) *Diplocaulus*

7 Which of these dinosaurs had a sail-back?
a) *Struthiomimus*
b) *Liliensternus*
c) *Spinosaurus*

8 *Diplocaulus'* head was shaped like:
a) a boomerang
b) a shield
c) a javelin

9 *Coelodonta* was a:
a) scaly anteater
b) hairy hippopotamus
c) woolly rhinoceros

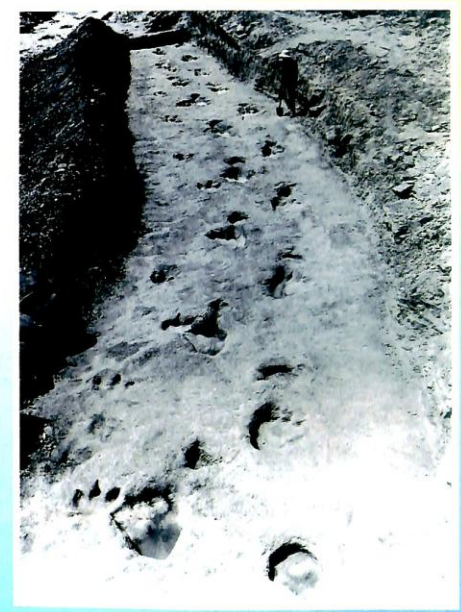
10 Ichthyosaurs became extinct:
a) when dinosaurs died out
b) long after dinosaurs died out
c) long before dinosaurs lived

Playful prints
At a sauropod track site in South Korea, the big prints show the adults striding along in a line, while the little footprints are all over the place. So the youngsters must have been playing around.

Hot and cold clues
Reptiles have smaller muscles than birds or mammals because a cold-blooded animal does not need so much muscle power. Some scientists are trying to work out whether dinosaurs were warm- or cold-blooded by calculating the size of their muscles.

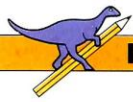
American cousin
The armoured dinosaur *Polacanthus* was, until recently, only known from two specimens from the Early Cretaceous Period of southern England. It has now turned up in Early Cretaceous rocks in North America.

Making tracks



The Glen Rose trackway in Texas, USA, is famous for its beautifully preserved dinosaur footprints. These were created when a theropod (three-toed prints) chased a sauropod (oval prints).

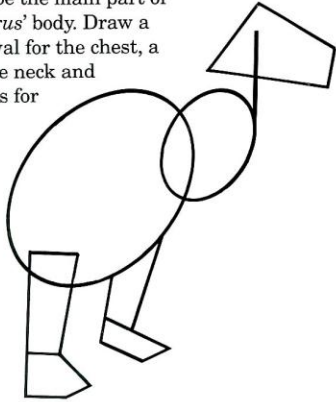
Tough name
A basketball team in Canada have called themselves the 'Toronto Raptors', after the Velociraptors in the film 'Jurassic Park'.



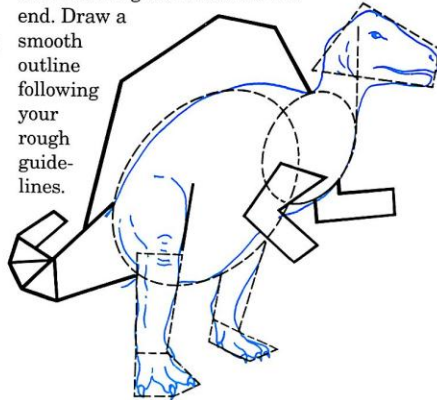
HOW TO DRAW

SPINOSAURUS

1 Using a pencil, lightly draw a large oval in the middle of your paper. This will be the main part of *Spinosaurus*' body. Draw a smaller oval for the chest, a line for the neck and box shapes for the head and back legs.



2 Draw more guidelines for the position of the sail, tail and front legs. Notice that the tail gets thinner at the end. Draw a smooth outline following your rough guidelines.

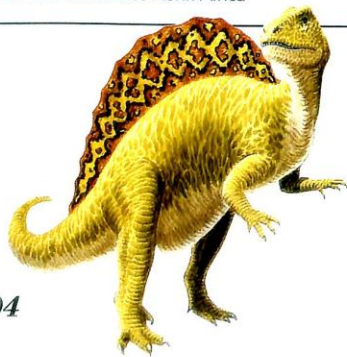
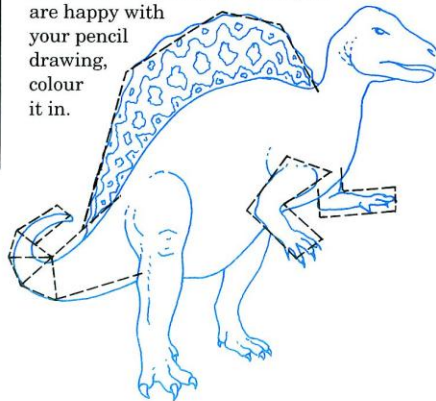


Fact box

Spinosaurus was a sail-backed meat-eater.

- **NAME:** *Spinosaurus* (spine-o-saw-rus) means 'thorn reptile'
- **GROUP:** dinosaur
- **SIZE:** about 10–12m long
- **FOOD:** meat and possibly fish
- **LIVED:** Cretaceous North Africa

3 Finish off the outline and then start to draw details of patterns and textures on the dinosaur's skin. When you are happy with your pencil drawing, colour it in.

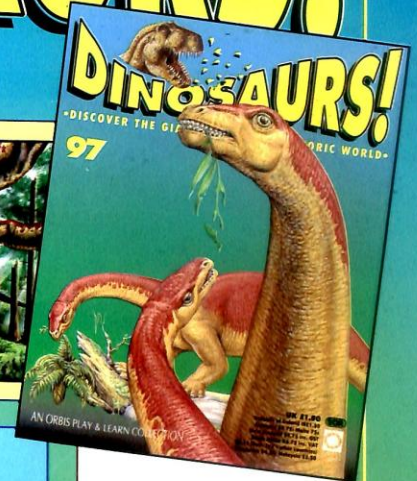


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COMING IN PART 97 OF

DINOSAURS!

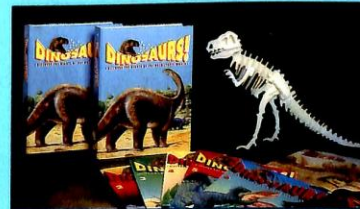
PREHISTORIC WORLD takes you on a dino-tour of South America. Duckbill dinosaurs in detail in **SPOTTER'S GUIDE**.



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PLUS

Three amazing creatures in **IDENTIKIT** and **GIANTS OF THE PAST** 3-D GALLERY **HISTORY IN PICTURES**

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Dr David Norman of Cambridge
University answers your
dinosaur questions

ASK THE EXPERT

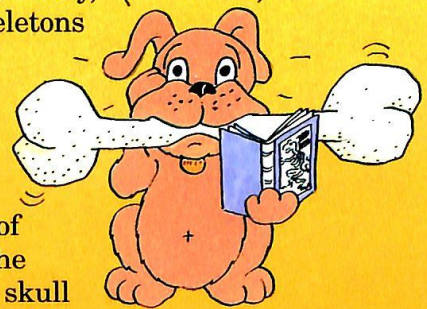
Which noises could dinosaurs hear?

Dinosaurs had the same sort of ear structure as today's reptiles, such as lizards and crocodiles, and birds. This means we can be fairly sure dinosaurs could hear at least as well as these animals, and so would have been able to pick up the majority of sounds around them. However, they may have missed the higher-pitched sounds made by some insects and mammals.



How can you tell a dinosaur fossil from the fossil of any other prehistoric animal?

There are a number of scientific rules to help tell dinosaur fossils from those of other creatures. Firstly, dinosaur fossils are found only in rocks that date from the end of the Triassic to the end of the Cretaceous. Secondly, their fossil skeletons are typical reptile skeletons – we can tell this from the arrangement of the bones in the legs, hips and skull in particular. Next, dinosaurs lived only on land – so any other reptile, whether it was a flying or swimming type, would not be a dinosaur. Finally, dinosaurs all walked with their legs tucked beneath their bodies so that they acted like pillars to support the dinosaurs' weight. Using all these rules, it should be possible to tell if a fossil belongs to a dinosaur.



Did different dinosaur species ever live in the same herd?

Most animals do not move in mixed herds. Although you see photographs of zebra grazing with wildebeest on the plains of Africa, the two species usually separate when they move off to search for other places to feed. This is for their own safety and protection.

So it is not likely that dinosaurs herded in mixed groups.

