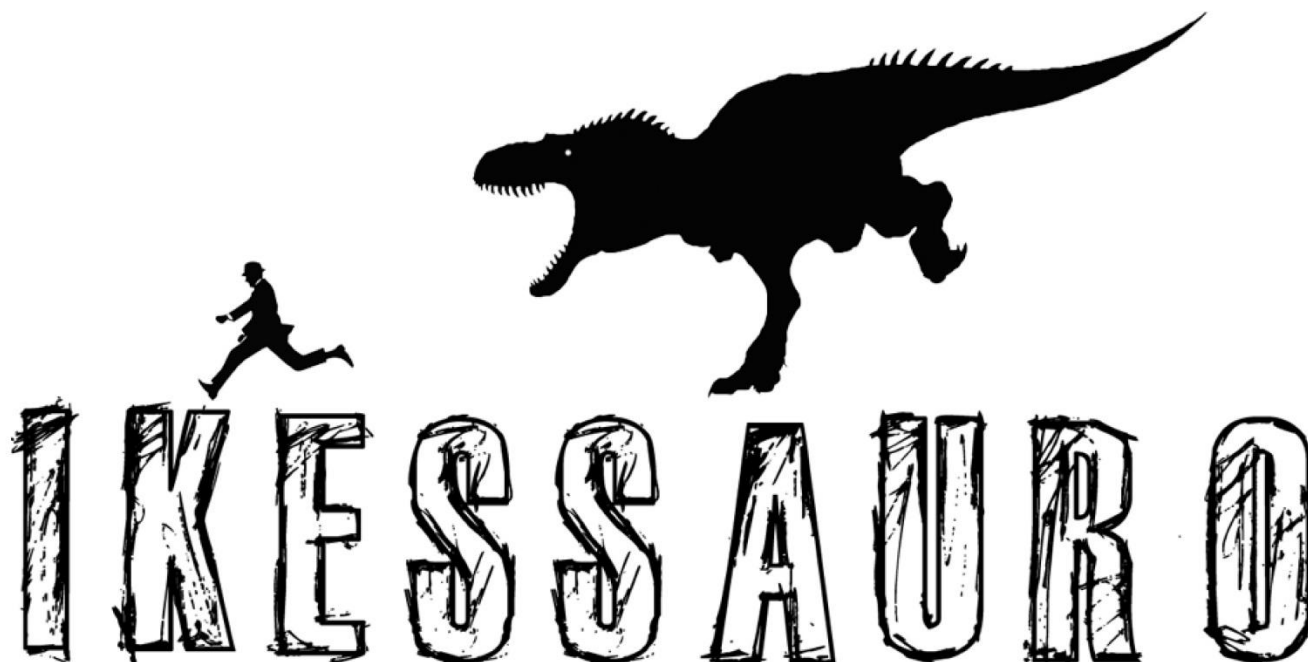


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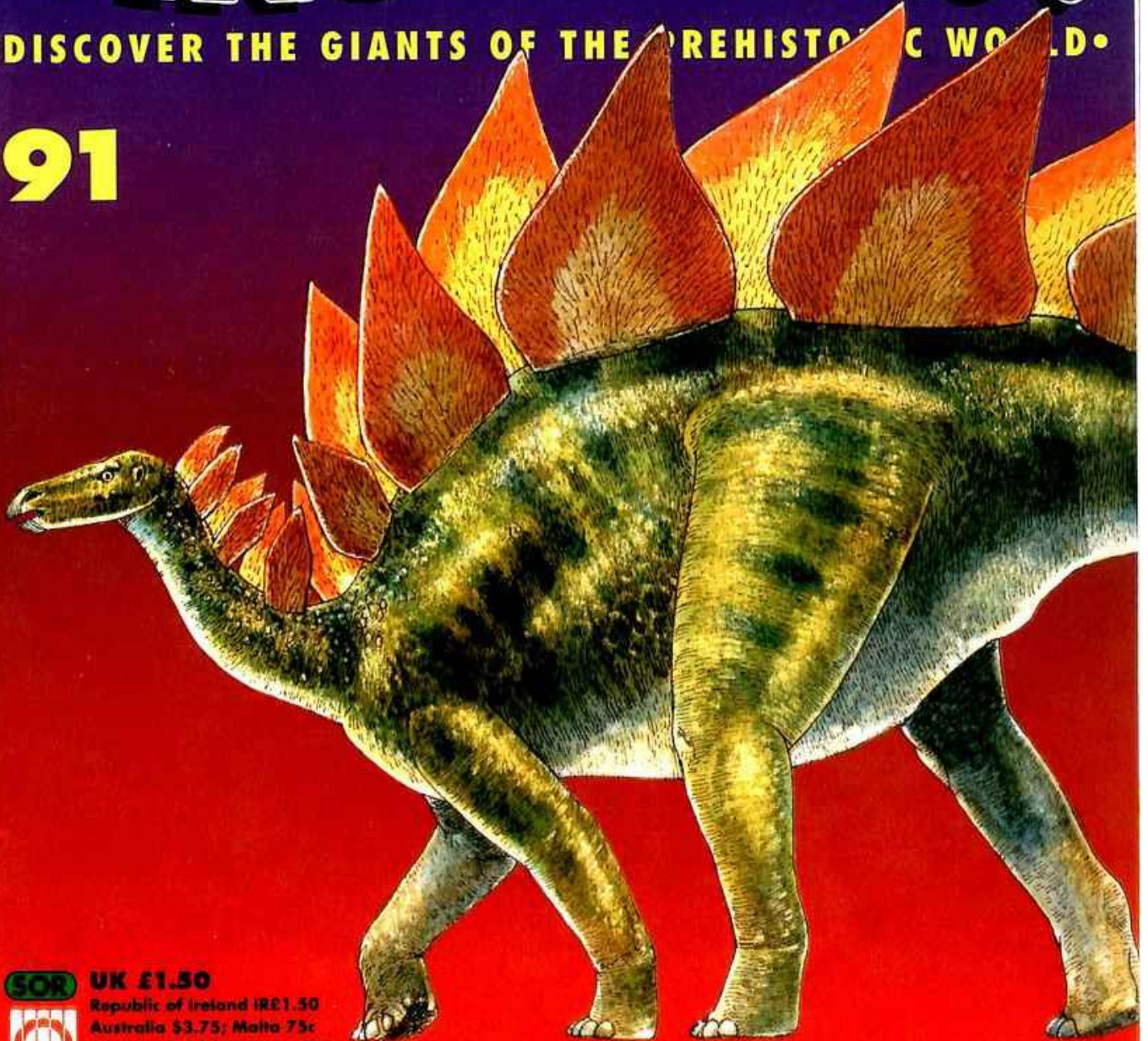
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IDENTIKIT

Learn all about two spiky monsters and a 'fish lizard'

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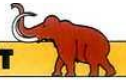
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IDENTIKIT



DOEDICURUS

Tank-like **Doedicurus** grazed the grasslands of South America two million years ago.

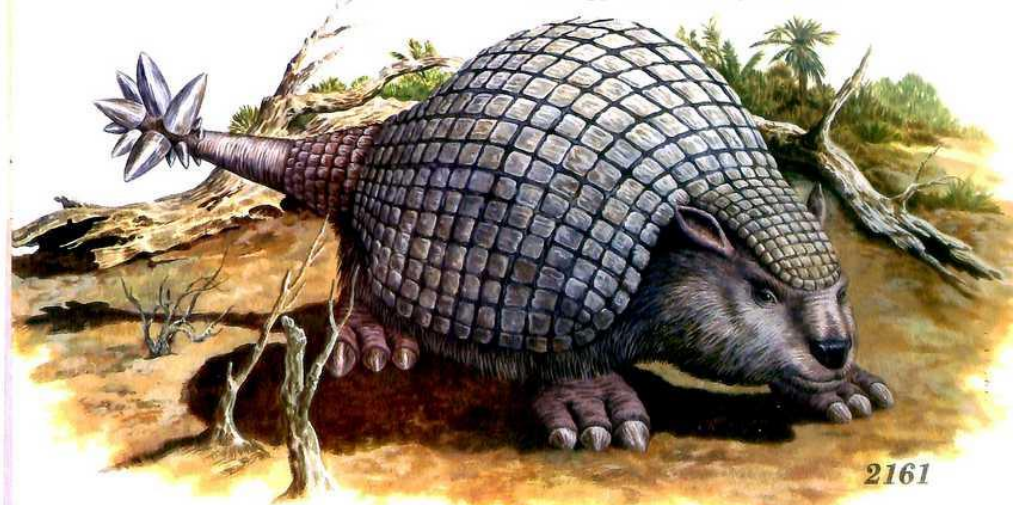
Doedicurus was a member of a strange-looking group of armoured reptiles called glyptodonts. The glyptodonts evolved about 20 million years ago and died out less than a million years ago.

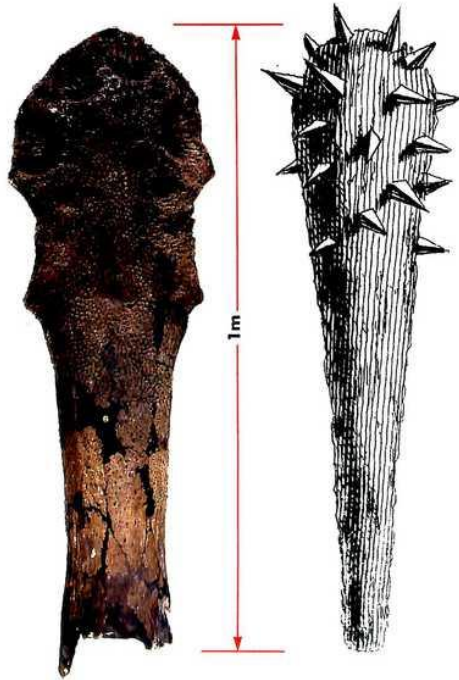
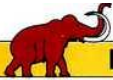
BIGGER AND BETTER
 The glyptodonts flourished in prehistoric South America. They were extremely successful plant-eaters. Some of the glyptodonts became very large. **Doedicurus** was one of the biggest. This mighty herbivore was built like an armoured tank. At about 4m long, it was as big as a modern estate car.

GENTLE GIANT
Doedicurus may have looked very frightening, but it was a peaceful plant-eater. This huge mammal, a relative of today's armadillo, used its powerful teeth to chew up tough grasses.

ARMED GUARD
Doedicurus needed its heavy body armour to protect itself from sabre-toothed, cat-like marsupials such as *Thylacosmilus*. Today's armadillos have hinged armour, but **Doedicurus** had a rigid, dome-shaped shell, covered in a sheath of horn.

CLUB CLASS
Doedicurus' most powerful weapon was its spiked tail club. The huge plant-eater probably used it to knock down enemies. A single forceful blow from its tail could have toppled an unwary attacker.





A 1m-long *Doedicurus* tail club from London's Natural History Museum.

Manmade cudgels from medieval times were very similar in size and shape.

IT'S A FACT

HEAVYWEIGHT

The bulky body armour of *Doedicurus* must have weighed it down very heavily. The big plant-eater probably weighed over two tonnes and nearly a quarter of that was its armour.

MIGHTY JAWS

Doedicurus had huge, deep jaws operated by powerful muscles. These helped it chew up tough grasses. But this big mammal had no front teeth. Instead, it had teeth at the back to grind tough vegetation.

ALL-DAY BUFFET

Like many herbivores today, *Doedicurus* probably spent most of the day eating. Otherwise it would not have been able to digest enough food to fuel its massive body.

LOOK-ALIKES

Doedicurus was the mammal equivalent of an armoured dinosaur. It was about the same size as a small ankylosaur. The ankylosaurs roamed around the Earth more than 140 million years before the glyptodonts evolved.

CLUB CULTURE

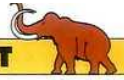
Ankylosaurs were plant-eaters like *Doedicurus*. Their body armour protected them from hungry tyrannosaurs. Many ankylosaurs had a club at the end of their tails similar to *Doedicurus*' club.

MEMORABLE MEETING

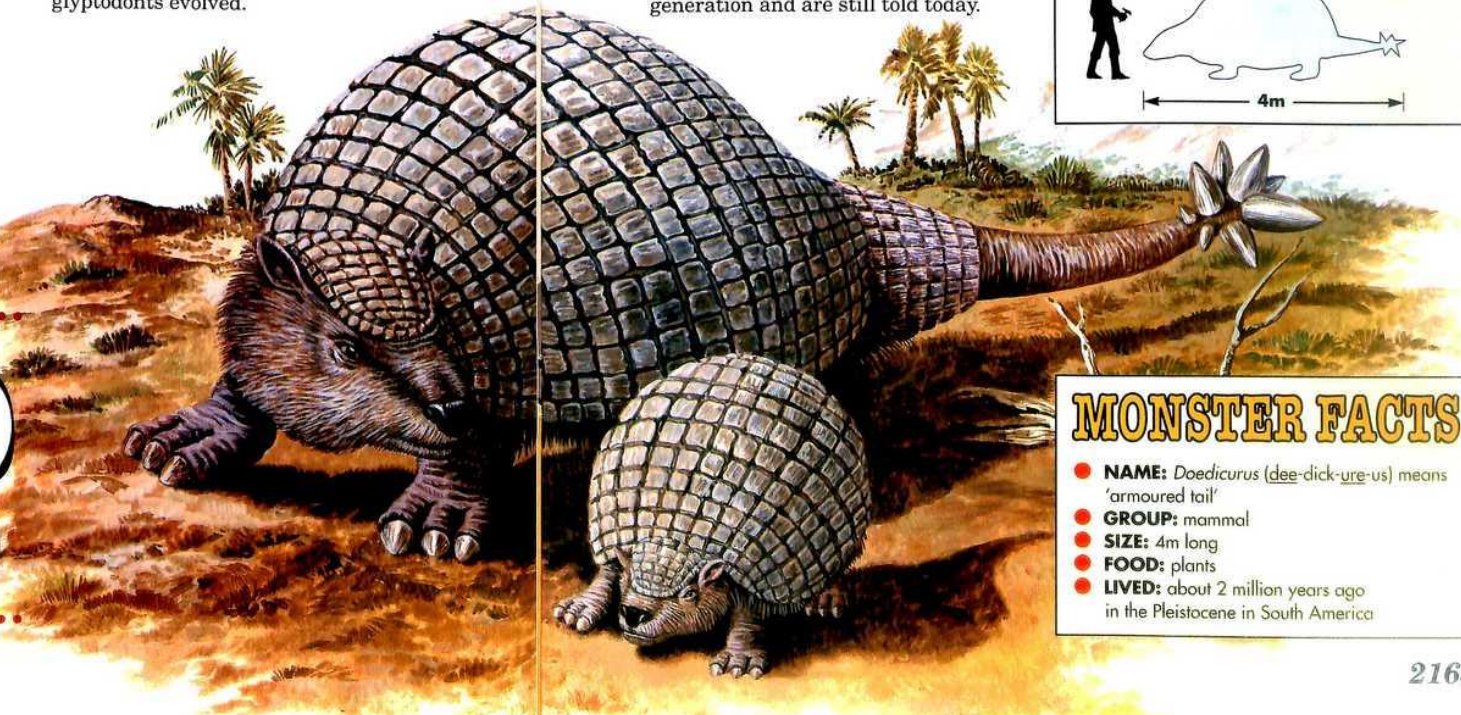
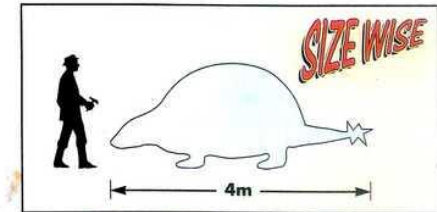
The last glyptodonts, such as *Doedicurus*, lived at the same time as the first humans, about two million years ago. The strange-looking animals made a great impression on early South American Indians.

TELLING STORIES

There are ancient South American stories about mysterious giant mammals, which may have been glyptodonts. These stories have been passed down from generation to generation and are still told today.



Six-banded armadillos from modern Brazil are descendants of the glyptodonts. But their armour is hinged, not rigid like *Doedicurus*' armour.



MONSTER FACTS

- **NAME:** *Doedicurus* (dee-dick-ure-us) means 'armoured tail'
- **GROUP:** mammal
- **SIZE:** 4m long
- **FOOD:** plants
- **LIVED:** about 2 million years ago in the Pleistocene in South America

PANOPLOSAURUS

Sharp shoulder spikes made *Panoplosaurus* one of the most fearsome-looking of the armoured dinosaurs.

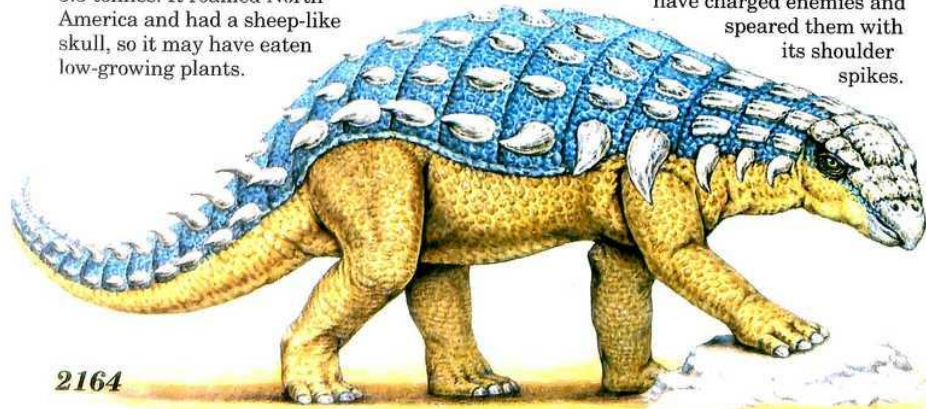
P*anoplosaurus* was the last-known nodosaur. The nodosaurs were plant-eating dinosaurs that survived for more than 120 million years. The earliest appeared in the Middle Jurassic Period, 185 million years ago. *Panoplosaurus* arrived just over 100 million years later and survived to the end of the Age of the Dinosaurs.

STUDS AND SPIKES

Panoplosaurus had a helmet of bony plates over its head, and bands of stud-covered plates over its barrel-shaped body and long tail. Spikes jutted from its shoulders.

LOW DOWN

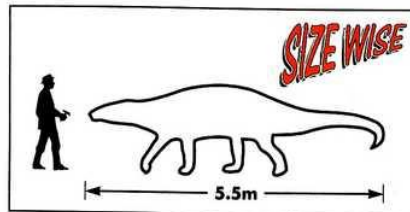
This nodosaur probably weighed about 3.5 tonnes. It roamed North America and had a sheep-like skull, so it may have eaten low-growing plants.



2164

MONSTER FACTS

- **NAME:** *Panoplosaurus* (pan-oh-pluh-saw-rus) means 'armoured lizard'
- **GROUP:** dinosaur
- **SIZE:** 5.5m long
- **FOOD:** plants
- **LIVED:** about 80 million years ago in the Late Cretaceous Period in North America



FULL CHARGE

When attacked, some nodosaurs lay down and hid under their body armour. But *Panoplosaurus* may have fought. It could have charged enemies and speared them with its shoulder spikes.

SHONISAURUS

Speedy *Shonisaurus* is the largest-known ichthyosaur, or 'fish lizard'.



Ichthyosaurs were reptiles, but they looked and acted more like fish. They were some of the most successful hunters in the Late Mesozoic seas.

FISH STARTER

Shonisaurus grew up to 15m long and was one of the earliest fish lizards. An almost complete skeleton was found in Nevada, USA, in rock that was 220 million years old.

TAIL POWER

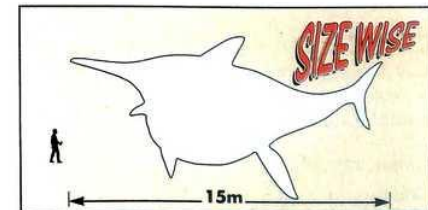
Advanced fish lizards had broad, short paddles (flippers). *Shonisaurus*, like all primitive fish lizards, had long, thin paddles. But it probably used its tail to move through water, as a shark does today.

FRONT TEETH

Shonisaurus had very long jaws. But, unlike most other ichthyosaurs, *Shonisaurus* had teeth only at the front of its jaws.

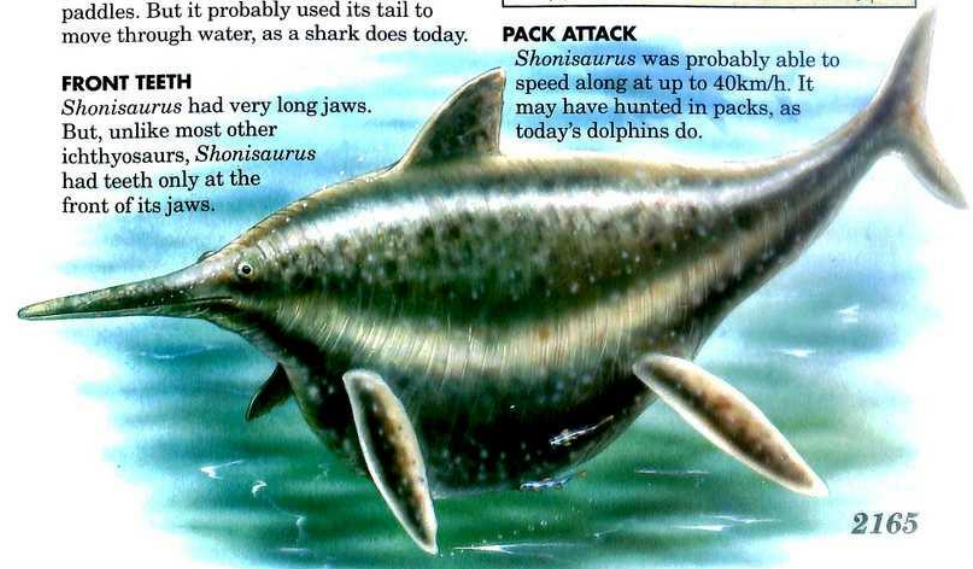
MONSTER FACTS

- **NAME:** *Shonisaurus* (show-nee-sore-us) means 'lizard from Shoni'
- **GROUP:** reptile
- **SIZE:** 15m long
- **FOOD:** fish
- **LIVED:** about 220 million years ago in the Late Triassic Period in North America.



PACK ATTACK

Shonisaurus was probably able to speed along at up to 40km/h. It may have hunted in packs, as today's dolphins do.



2165

DINOSAUR SAFARI

Early Cretaceous Western Europe

Step back in time to Europe 130 million years ago and go white-water rafting through a strange, prehistoric land.

It is the Early Cretaceous and the part of the world that is western Europe today is a totally different place. Stretching from southern England across to Belgium and northern France is a region of upland. Geologists call this the London Platform. Your prehistoric raft trip starts here, on a swirling stream that gushes down a deep, steep-sided canyon.

LOOK AROUND

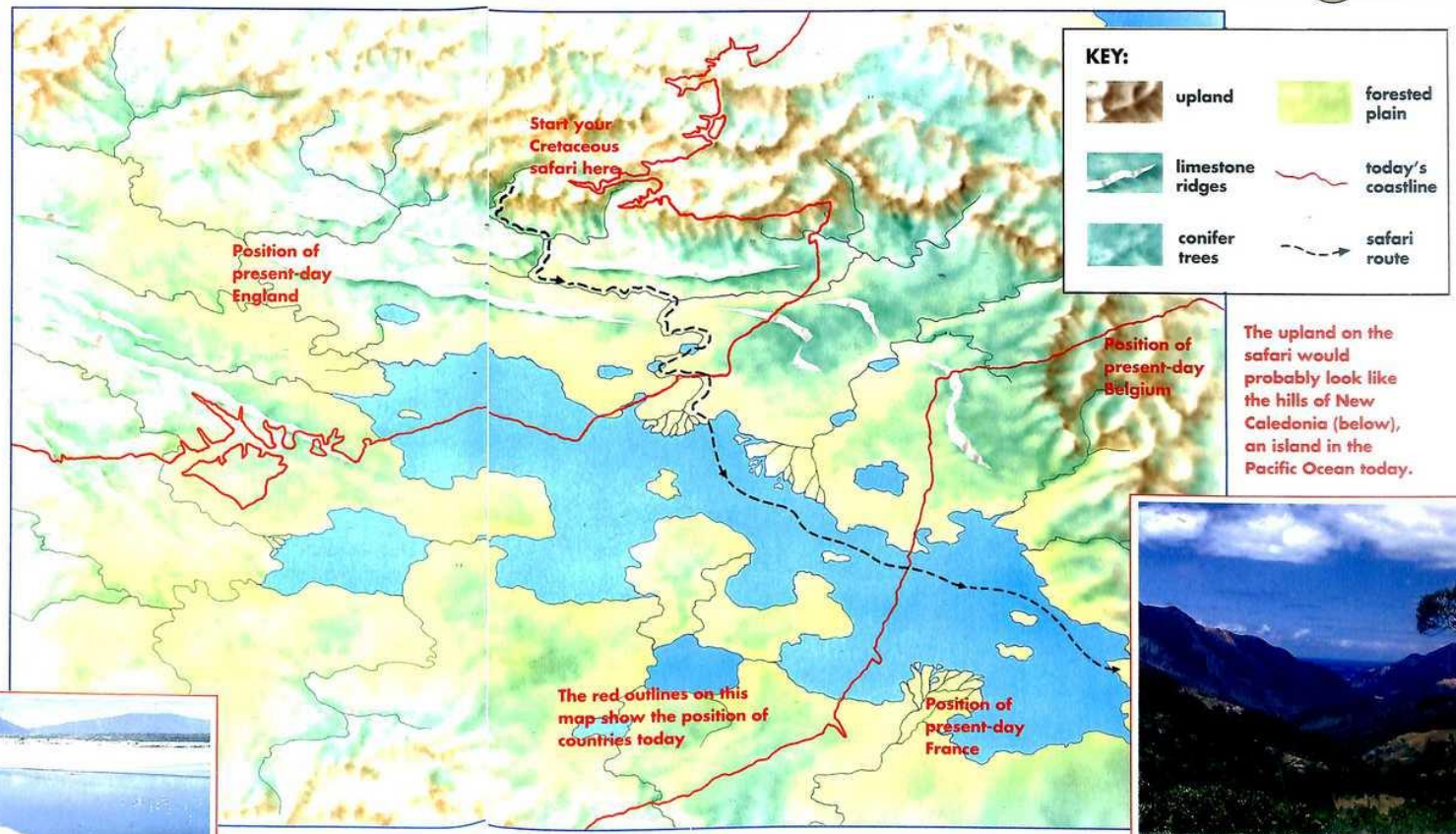
The canyon opens out on to a broad plain, and the river slows. You can put down your paddles for a while and take a look around. Limestone ridges, clothed in conifer trees, border the misty plain.



WHAT CAN YOU SEE?

The river runs between the limestone ridges. You can see ammonite fossils buried in the rocks. They show you that the limestone was laid down in the Jurassic Period, 20 million years before. Huge pterosaurs wheel and turn in the sky above your raft. Are they waiting for you to fall in and drown? No – fish-eating *Ornithodesmus* would not be able to eat human flesh.

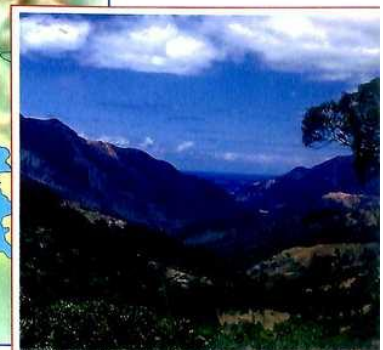
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KEY:

	upland		forested plain
	limestone ridges		today's coastline
	conifer trees		safari route

The upland on the safari would probably look like the hills of New Caledonia (below), an island in the Pacific Ocean today.



During the safari, the river runs through small lakes. They probably looked like this one (left) in Kenya today.

FISHING DINOSAUR

The main river changes direction as it meets a smaller river and passes through a gap in the ridge. Another fish-eater comes into view. It is a 10m-long theropod, with long, narrow jaws like a crocodile's.

FOOD OR FOE?

It is *Baryonyx* waiting on the bank for fish to swim by. It hooks them out with its huge claw. As you pass it looks up, unsure if you are a threat or its next meal.

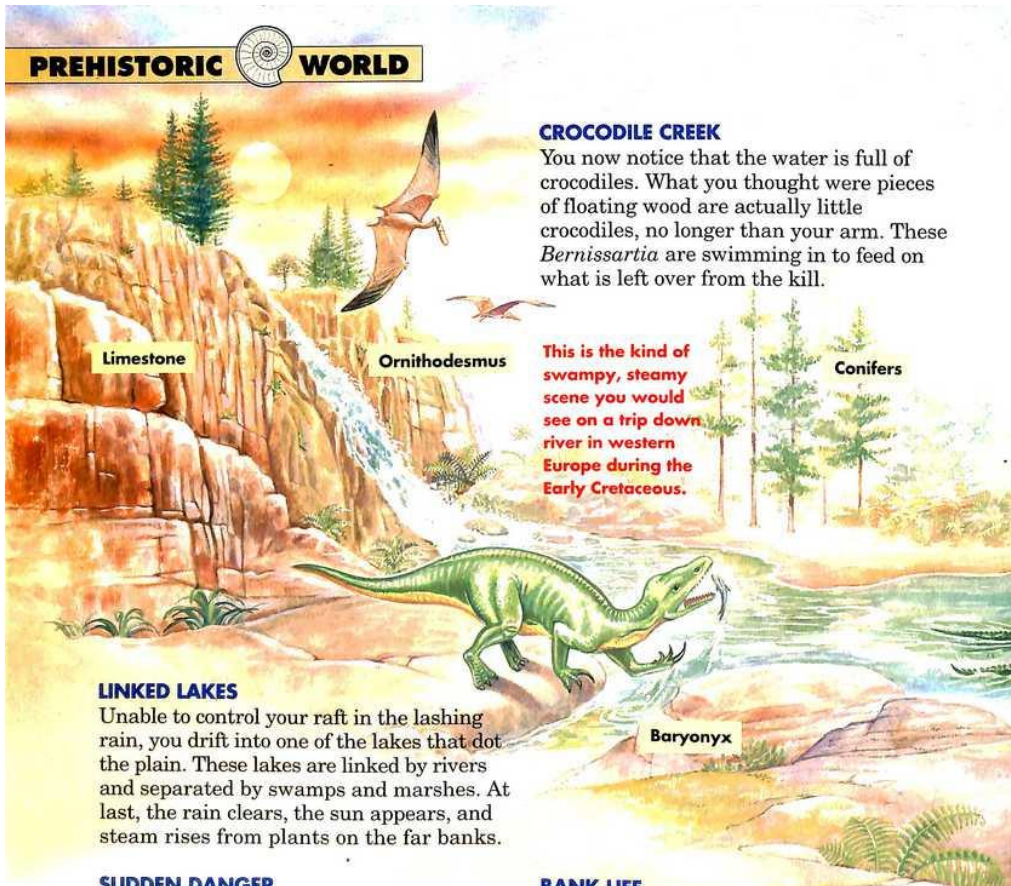
OUT OF THE FRYING PAN...

One crisis is over, but there will be other big meat-eaters about. Dinosaurs, such as *Acrocantosaur* and the fin-backed *Becklespinax*, roam the forests on the plain.

RAFTING IN THE RAIN

Soon the limestone disappears and the river becomes wide and slow. Conifers, cycad-like trees and ferns crowd the banks. The soil, washed down from the London Platform, is deep and fertile. Big raindrops patter into the water from the dark clouds gathering overhead. Soon you are caught in a sub-tropical rainstorm. The rain is so heavy the river banks completely disappear from view.

2167



Limestone

Ornithodesmus

Conifers

CROCODILE CREEK

You now notice that the water is full of crocodiles. What you thought were pieces of floating wood are actually little crocodiles, no longer than your arm. These *Bernissartia* are swimming in to feed on what is left over from the kill.

This is the kind of swampy, steamy scene you would see on a trip down river in western Europe during the Early Cretaceous.

Baryonyx

LINKED LAKES

Unable to control your raft in the lashing rain, you drift into one of the lakes that dot the plain. These lakes are linked by rivers and separated by swamps and marshes. At last, the rain clears, the sun appears, and steam rises from plants on the far banks.

SUDDEN DANGER

Several *Hypsilophodon* gather to drink on a muddy strip of land. Suddenly, there is a loud splash and one of the pack crashes into the water. The rest turn and run, sprinting on their long, hind legs.

BLOOD STAINS

The unlucky victim has been seized by *Goniopholis*, a kind of crocodile. As its cry pierces the air, the *Hypsilophodon* is dragged below the surface of the lake. It leaves nothing behind but a pool of blood spreading through the water.

BANK LIFE

Freshwater turtles live on the banks, protected from the crocodiles by their shells. Pterosaurs with broad jaws skim the water for tiny creatures.

I SPY IGUANODON

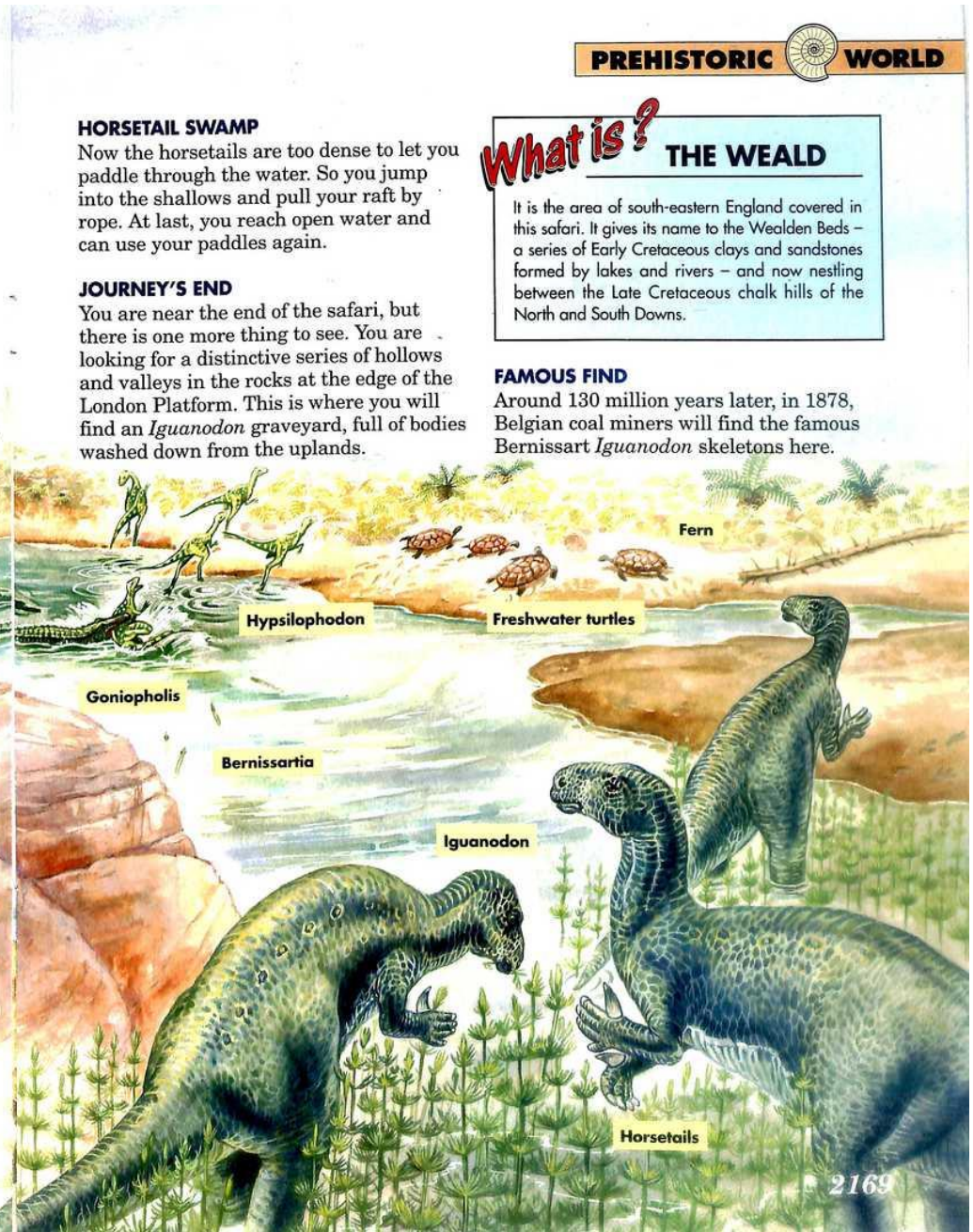
A little further on, you come to a larger lake. Beds of horsetails stretch on as far as the eye can see. Here, you see a herd of about 20 *Iguanodon* feeding. Each one is knee-deep in mud and water, and leaves a trampled path as it moves through the shallows, grazing on the horsetails.

What is? THE WEALD

It is the area of south-eastern England covered in this safari. It gives its name to the Wealden Beds – a series of Early Cretaceous clays and sandstones formed by lakes and rivers – and now nestling between the Late Cretaceous chalk hills of the North and South Downs.

FAMOUS FIND

Around 130 million years later, in 1878, Belgian coal miners will find the famous Bernissart *Iguanodon* skeletons here.



Hypsilophodon

Freshwater turtles

Fern

Goniopholis

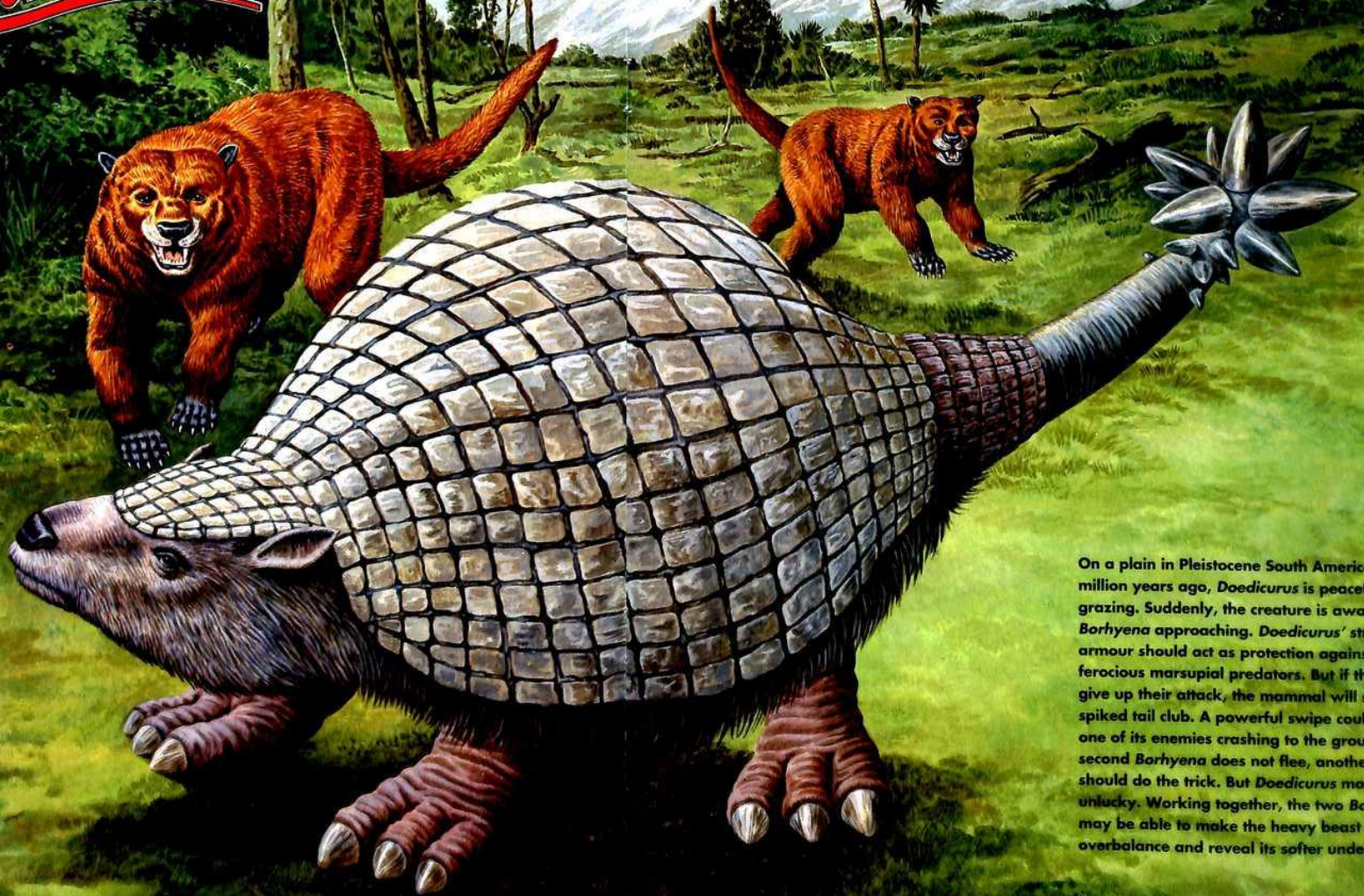
Bernissartia

Iguanodon

Horsetails

GIANTS OF THE PAST

DOEDICURUS



On a plain in Pleistocene South America, two million years ago, *Doedicurus* is peacefully grazing. Suddenly, the creature is aware of two *Borhyaena* approaching. *Doedicurus*' strong body armour should act as protection against these ferocious marsupial predators. But if they do not give up their attack, the mammal will swing its spiked tail club. A powerful swipe could bring one of its enemies crashing to the ground. If the second *Borhyaena* does not flee, another blow should do the trick. But *Doedicurus* may be unlucky. Working together, the two *Borhyaena* may be able to make the heavy beast overbalance and reveal its softer underside.

2170

2171

3-D Gallery 100

AMARGASAURUS

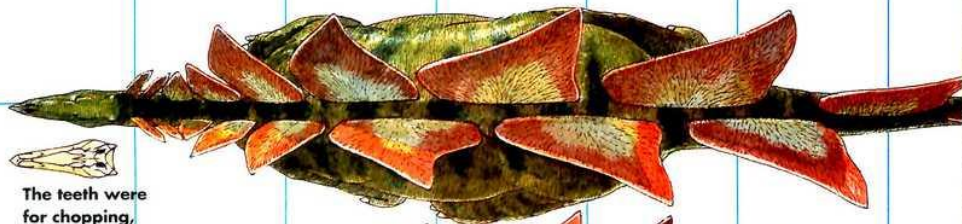


In an Early Cretaceous swamp, in what is now Brazil, a flock of *Tropeognathus* is circling, looking for fish to dive-bomb. The pterosaurs are suddenly disturbed by *Amargasaurus*, splashing through the swamp to get to the lush vegetation.

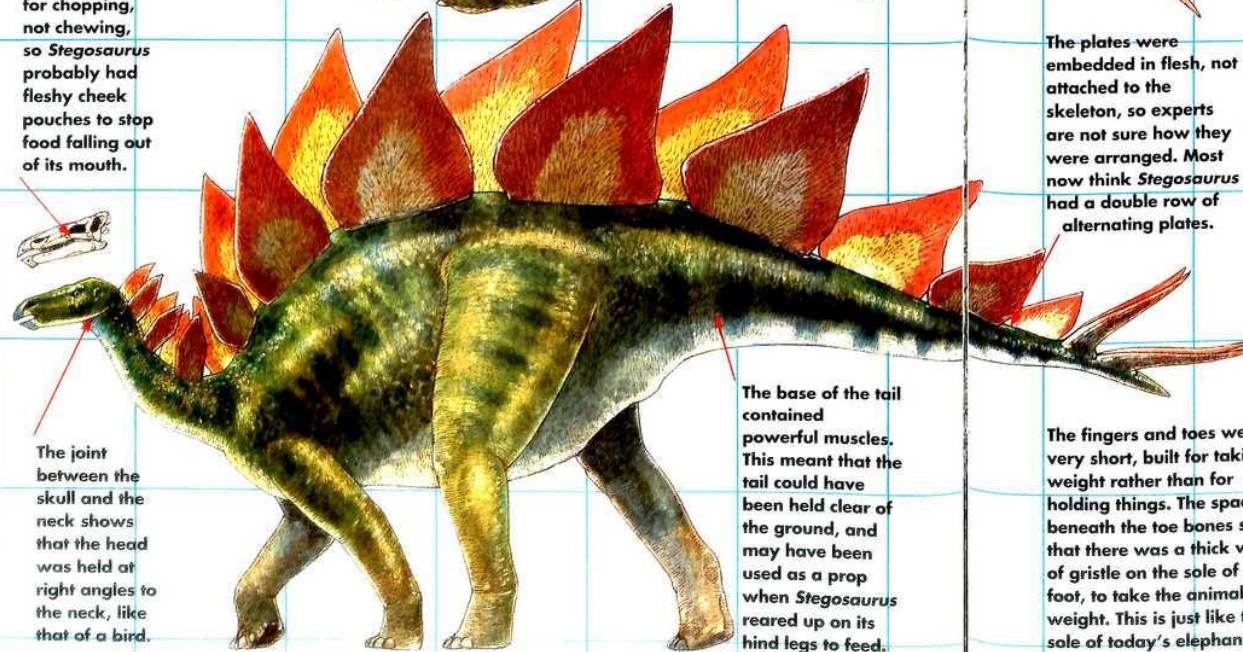


Dino-graph: Stegosaurus

Quite a few *Stegosaurus* skeletons have been found. Most are incomplete but by putting them together, scientists have formed a good idea of how a living *Stegosaurus* looked. Even so, some guesses still have to be made.



The teeth were for chopping, not chewing, so *Stegosaurus* probably had fleshy cheek pouches to stop food falling out of its mouth.

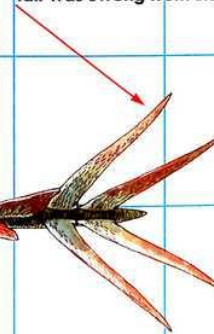


The joint between the skull and the neck shows that the head was held at right angles to the neck, like that of a bird.

The base of the tail contained powerful muscles. This meant that the tail could have been held clear of the ground, and may have been used as a prop when *Stegosaurus* reared up on its hind legs to feed.



The tail spines probably stuck out at the sides. They would have made good weapons when the tail was swung from side to side.



No one knows what colour the plates were, but they were probably brightly coloured. They may have been used to communicate with other *Stegosaurus*.

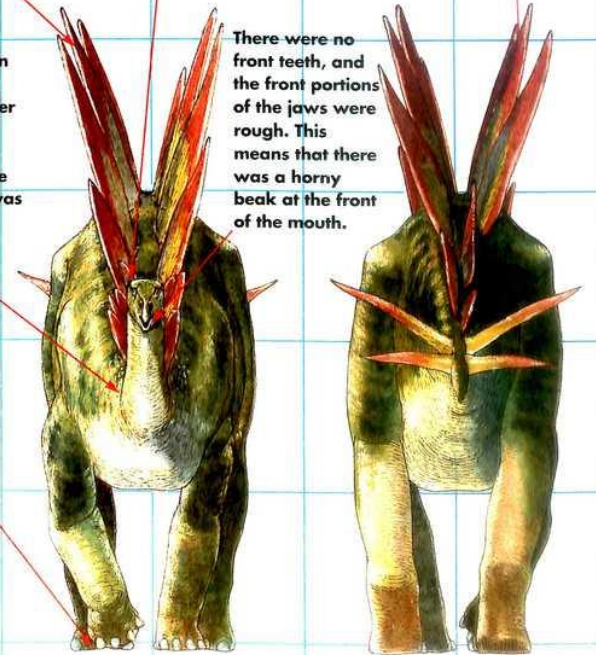
Small plates of bone found near the skeleton may have been embedded in the skin, especially around the neck, for protection.

Channels and spaces in the bone of the plates show that they were either covered in horn or in skin. If covered in horn, they would have been used for defence. If covered in skin, they would have been used as heat controllers.

The plates were embedded in flesh, not attached to the skeleton, so experts are not sure how they were arranged. Most now think *Stegosaurus* had a double row of alternating plates.

The position of the shoulder bones show that the neck was quite long.

There were no front teeth, and the front portions of the jaws were rough. This means that there was a horny beak at the front of the mouth.



The fingers and toes were very short, built for taking weight rather than for holding things. The space beneath the toe bones shows that there was a thick wedge of gristle on the sole of the foot, to take the animal's weight. This is just like the sole of today's elephant.

The name game

How do the experts decide what a dinosaur should be called?

When we call a dinosaur by a name – *Triceratops*, for example – we are putting it into a group of animals called a genus (jen-us). Animals in the same genus share lots of characteristics. The genus can be split into smaller groups called species (spee-sheez). Animals in the same species are even more like each other than animals from the same genus.

A LIVING EXAMPLE

All today's cats belong to the same genus, which is given the name *Felis*. The domestic cat is a particular species of cat, called *Felis catus*. The lynx is another, called *Felis lynx*. So when scientists talk about a particular species they give it two names – a genus name and a species name.

HOW WE TELL A SPECIES

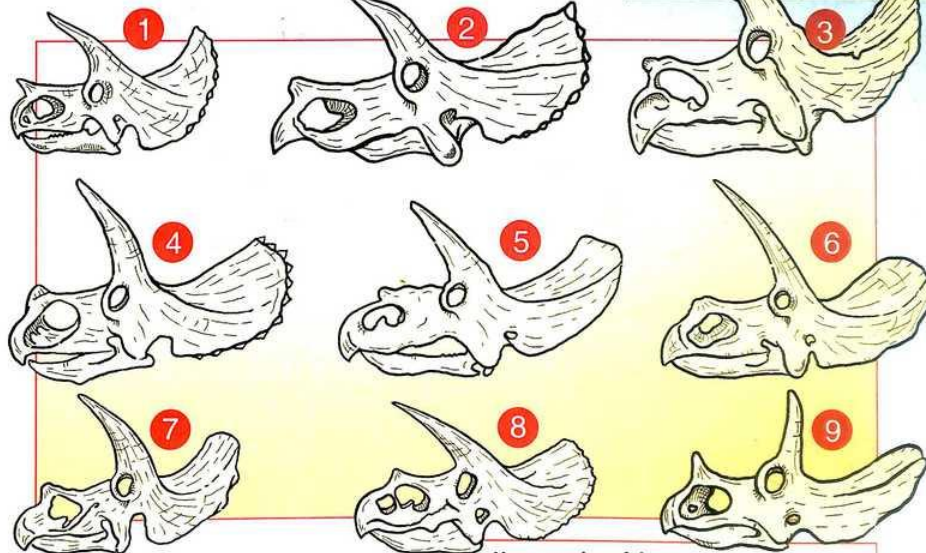
Individuals of different species cannot breed with one another – that is what defines a species. A domestic cat, for example, cannot breed with a lynx. They are different species even though they belong to the same genus. Fossil records cannot tell us which dinosaurs could breed with one another, so experts have to look for other clues.

SKULL CLUES

The best known of the horned dinosaurs is probably *Triceratops*. Dozens of specimens have been discovered, and it is often the skull that has been preserved as a fossil. This is because *Triceratops*' skull was a solid mass of bone.

QUITE A VARIETY

Scientists have noticed many differences between the *Triceratops*' skulls. They all have three horns and a solid frill, but in some skulls the horns above the eyes point straight upwards, while in others they point forwards. The size and shape of the horns and snouts also varies. Scientists concluded that they were looking at more than one species of *Triceratops*. Sixteen types of *Triceratops* have been found, and each has its own species name. The biggest is *Triceratops horridus* and the smallest is *Triceratops prorsus*.



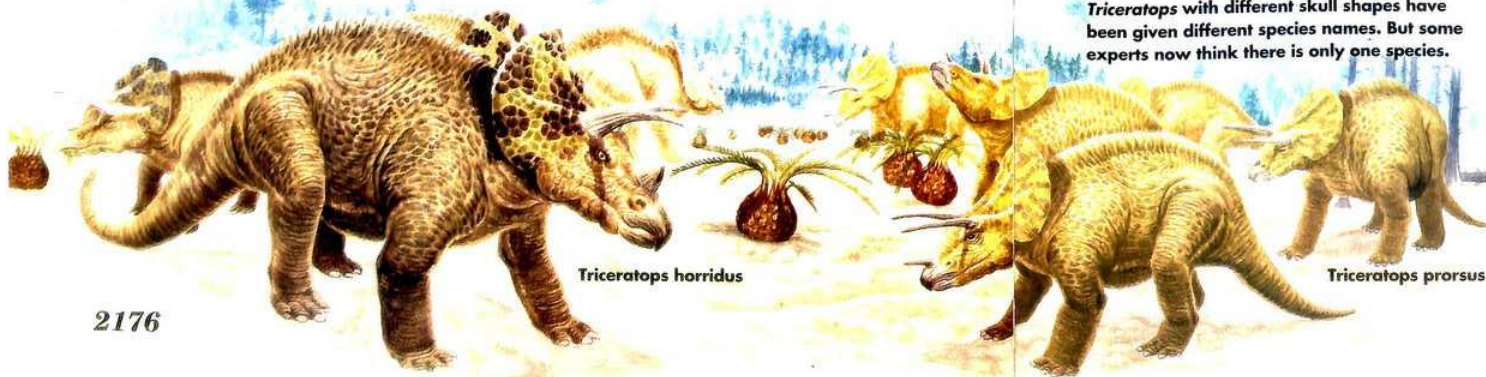
OR JUST ONE?

It is possible that all the different *Triceratops*' head shapes are only variations within the same species. Think about today's domestic cat. It comes in many shapes, sizes and colours, even though all domestic cats are members of the same species. In fact, many experts now think that there was only one species of *Triceratops* – *Triceratops horridus*.

Triceratops with different skull shapes have been given different species names. But some experts now think there is only one species.

Here are nine of the 16 *Triceratops* species that have been named. Some experts think they are not separate species, but variations of one species – *Triceratops horridus*.

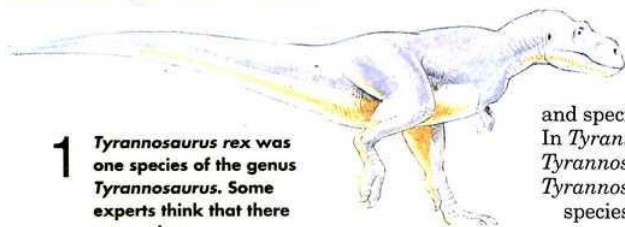
- 1 *Triceratops prorsus*
- 2 *Triceratops serratus*
- 3 *Triceratops elatus*
- 4 *Triceratops flabellatus*
- 5 *Triceratops obtusus*
- 6 *Triceratops eurycephalus*
- 7 *Triceratops calicornis*
- 8 *Triceratops horridus*
- 9 *Triceratops albertensis*



IT'S A FACT

A DIFFERENT SLANT

Both genus and species names are written in italics. The genus name has a capital letter, but the species name does not.



1 *Tyrannosaurus rex* was one species of the genus *Tyrannosaurus*. Some experts think that there were others.

DINOSAUR DOUBLE

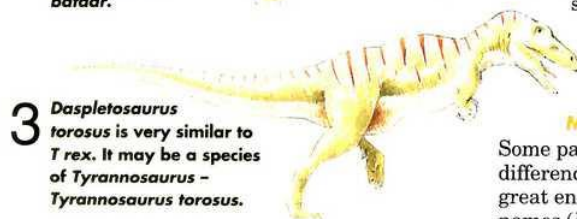
Where do you most often see this double name – genus name and species name – applied to a dinosaur? In *Tyrannosaurus rex*’ name of course! *Tyrannosaurus rex* was one species of *Tyrannosaurus*, but were there any other species? Some experts think so.



2 Some experts think *Tarbosaurus bataar* is another species of *Tyrannosaurus* – *Tyrannosaurus bataar*.

MANY TYRANTS

Tyrannosaurus rex (1) was the largest of a big group of ferocious meat-eating dinosaurs called the tyrannosaurs. This dinosaur family also included massive *Tarbosaurus bataar* (2), snaggle-toothed *Daspletosaurus torosus* (3), long-snouted *Albertosaurus libratus* (4), tiny *Nanotyrannus lancensis* (5), and *Alectrosaurus olseni* (6), among others.



3 *Daspletosaurus torosus* is very similar to *T rex*. It may be a species of *Tyrannosaurus* – *Tyrannosaurus torosus*.

MORE CLOSELY RELATED

Some palaeontologists think the differences between these animals are not great enough to give them different genus names (*Daspletosaurus*, *Nanotyrannus*, and so on). They think some of them are just species of *Tyrannosaurus* and others are species of *Albertosaurus*.

NEW NAMES

If this is the case, they should have new names to show which genus they belong to. Dinosaurs (2) and (3) should be *Tyrannosaurus bataar* and *Tyrannosaurus torosus*, and dinosaurs (5) and (6) should be called *Albertosaurus lancensis* and *Albertosaurus olseni*.

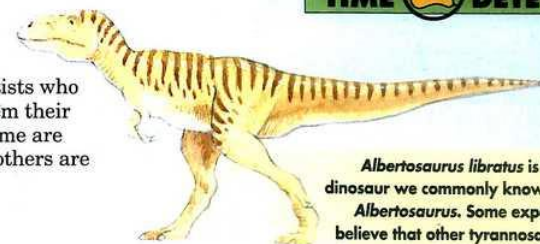
ALWAYS CHANGING

The way that dinosaurs are classified is always under review. Studies reveal new similarities or new differences between dinosaurs and the names keep changing.

IT'S A FACT

DINO DILEMMA

The word 'dinosaur' is not a scientific name. Originally, the name 'Dinosauria' was thought up to cover the new reptile-like remains that were beginning to be found in the 1800s – particularly *Iguanodon* and *Megalosaurus*. Since then, scientists have found that the group of animals we call the dinosaurs is too diverse to be covered by just one scientific term.



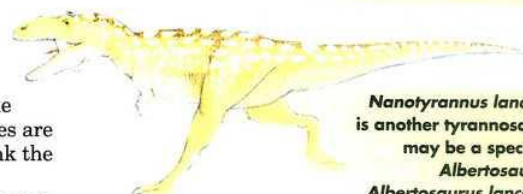
4 *Albertosaurus libratus* is the dinosaur we commonly know as *Albertosaurus*. Some experts believe that other tyrannosaurs are just species of *Albertosaurus*.

LUMPERS OR SPLITTERS

Dinosaur systematists – scientists who classify dinosaurs and give them their names – come in two types. Some are thought of as 'lumpers', while others are thought of as 'splitters'.

ALL TOGETHER

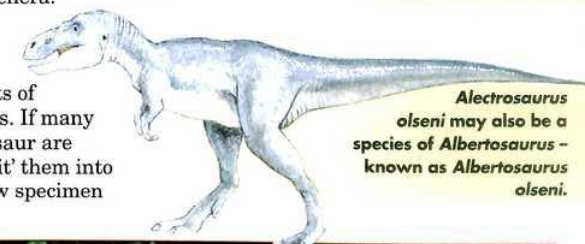
Lumpers tend to 'lump' many different species or genera (the word for more than one genus) into a single species or genus. The scientists who think that all the *Triceratops* belong to one species are lumpers. So are those that think the tyrannosaur family should be divided up into only a few genera.



5 *Nanotyrannus lancensis* is another tyrannosaur. It may be a species of *Albertosaurus* – *Albertosaurus lancensis*.

LOTS AND LOTS

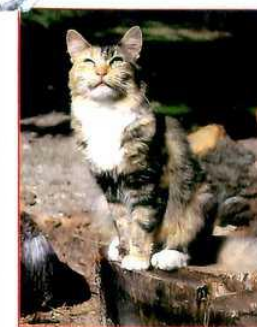
The splitters, on the other hand, think that there were lots of different species within a genus. If many specimens of a particular dinosaur are found, these scientists will 'split' them into many different species. If a new specimen is found, it is usually given a new species name – if not a new genus name.



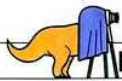
6 *Alectrosaurus olseni* may also be a species of *Albertosaurus* – known as *Albertosaurus olseni*.

DIFFICULT DECISIONS

The problem is that experts only have bones to go on. If we could see dinosaurs in the flesh, we would probably recognise the animals of the same species straight away, and see the differences that put them into different genera. If we knew which animal bred with which, that would really settle the matter! But that is something we are never likely to know.



The lynx and the domestic cat belong to the same genus, *Felis*, but they are different species – *Felis lynx* and *Felis catus*.



A DINOSAUR CALLED SUE!

LATE ONE AFTERNOON, IN AUGUST 1990, IN THE BADLANDS OF DAKOTA, A TEAM OF PALAEOANTHROPOLOGISTS DECIDED TO PACK UP FOR THE DAY...

SUSAN HENDRICKSON, WHO WORKED FOR A COMPANY THAT FINDS, CLEANS AND SELLS FOSSILS, CAME TO A HILL WHERE SOME TRICERATOPS BONES HAD BEEN FOUND A FEW DAYS BEFORE,

SUE SET TO WORK... THEY'RE HUGE! AT LEAST FIVE OR SIX INCHES WIDE!

SUE CARRIED THE BONES BACK TO CAMP, THEN LED THE EAGER TEAM BACK TO THE CLIFF WHERE SHE HAD FOUND THE VERTEBRAE...

LOOKS LIKE A FELVIS AND BACKBONES TO ME.

TIME TO CALL IT A DAY!
WHERE ARE YOU OFF TO, SUE?
I'M JUST GOING FOR A WALK!

WHAT ON EARTH IS THAT?

PRESIDENT OF THE COMPANY, PETE LARSON, KNEW EXACTLY WHAT IT WAS...

PETE AND HIS MEN DUG A HOLE 10M DEEP, AND 8M WIDE...

WOW! LOOK AT THIS SKULL!



SUE'S SKULL, COMPLETE WITH BLACKENED TEETH, WAS IN TERRIFIC SHAPE

IT'S TREX! AND AS SUE FOUND IT, WE'D BETTER CALL IT SUE!

WHAT HAVE WE GOT SO FAR?

A FRONT LIMB AND 35 TAIL VERTEBRAE!

SUE TURNED OUT TO BE ONE OF THE MOST COMPLETE T REX SKELETONS EVER FOUND,

IT MUST HAVE BEEN 40FT LONG!

DO YOU THINK THAT GROWTH ON THE LEFT SHIN MEANS SHE BROKE HER LEG AND IT HEALED—OR WAS IT ARTHRITIS?

BUT, BEFORE THESE AND OTHER QUESTIONS COULD BE ANSWERED...

WHAT DO YOU MEAN F.B.I?—YOU CANNOT BE SERIOUS!



SORRY, SIR— YOU SHOULD HAVE GOT A PERMIT BEFORE YOU STARTED DIGGING!

SUE WAS TAKEN AWAY BY THE U.S GOVERNMENT. THE DISPUTE STILL RAGES AS TO WHO OWNS HER!

WHAT ABOUT THESE FOSSIL LEAVES WE FOUND AT THE SITE—DID T REX LIVE IN FORESTS?

THE LAND WHERE YOU FOUND THESE BONES BELONGS TO THE SIOUX INDIANS!

I PAID THEM \$5,000 FOR THE EXCAVATION RIGHTS!

Improve and test your knowledge with... FACT FILE

Follow the footprints on the mammoth's back and answer the questions posed!

Lighter bones

The skeleton of a 25m-long whale weighs 9,000kg, while that of a dinosaur of the same length would have been about 5,000kg.

Elephant soup
The tar pits in Rancho la Brea in California are so full of animal remains that 17 elephants were found in a volume of tar measuring 8m long, 5m wide and 10m deep.

1 Goniopholis was a kind of:
a) crocodile
b) jellyfish
c) turtle

4 Spikes jutted from Panoplosaurus':
a) nose
b) tail
c) shoulders

7 What was Titanosaurus?
a) a plant-eating dinosaur
b) a fish-eating pterosaur
c) a meat-eating thecodont

2 The sole of Stegosaurus' foot was like that of:
a) an elephant
b) an Olympic sprinter
c) a dog

5 Doedicurus' most powerful weapon was its:
a) spiked tail club
b) razor-sharp teeth
c) dagger-like horn

8 Shonisaurus' paddles were:
a) broad and short
b) long and thin
c) thick and curved

3 The T rex skeleton found in the Badlands of Dakota was called:
a) Bertha
b) Diana
c) Sue

6 All Triceratops had:
a) three frills and a horn
b) three horns and a frill
c) one horn and a frill

9 Where was the London Platform?
a) Europe
b) Africa
c) Asia

10 The remains of 17 elephants were found in the tar pits of:
a) Tusksville
b) Rancho la Brea
c) Asphalt-under-Lyme

A precious jewel



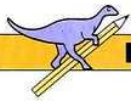
An astonishing variety of animals and plants has been found in Germany's Messel Oil Shale. One of the fossil finds is this jewel beetle, which is 48 million years old. Its beautiful colours can still be seen, and where its glistening wing cases have been torn, its blue abdomen is revealed.

Palaeontological poet

In 1850, the poet Tennyson wrote about 'Dragons of the prime that tear each other in their slime', as a reference to newly discovered dinosaurs.

The living and the dead
Richard Swann Lull of Yale University said: 'Footprints are fossils of living beings, while all the other relics are those of the dead.' What he meant was that you could tell, from fossil footprints, something about what a dinosaur was doing when it was alive. Fossil bones were just parts of a dead animal.

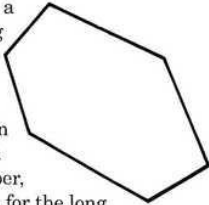
Answers to the questions on inside back cover



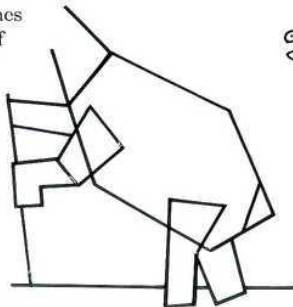
HOW TO DRAW

TITANOSAURUS

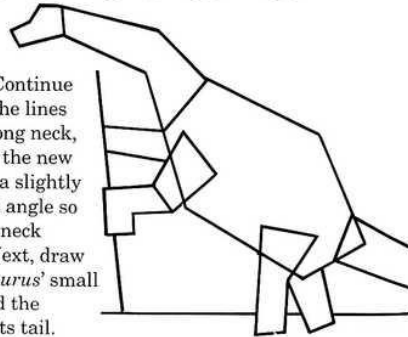
1 Start by doing a pencil drawing of *Titanosaurus*, using just straight lines and very simple shapes. Draw the main part of its body first in the middle of your paper, leaving plenty of room for the long neck and tail. The body is a bit like a rectangle, but it gets narrower at each end.



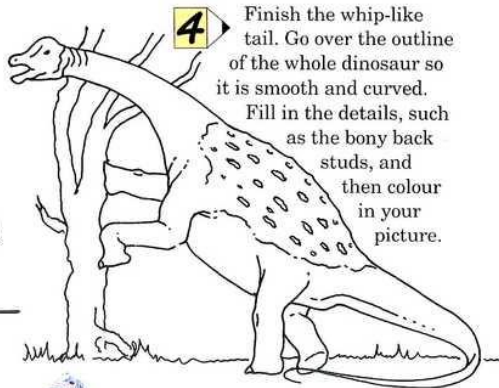
2 Now add two lines for the start of the neck. Then draw simple shapes for the legs. Because the rear front leg is bent, it can be drawn as two shapes – an 'L'-shape and a rectangle joined together.



3 Continue the lines for the long neck, drawing the new parts at a slightly different angle so that the neck bends. Next, draw *Titanosaurus*' small head and the start of its tail.



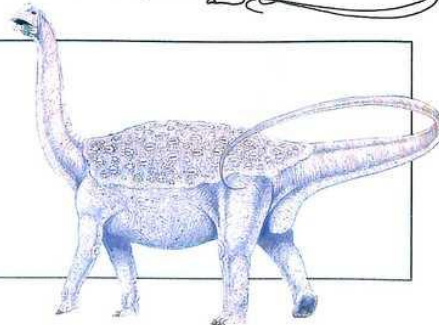
4 Finish the whip-like tail. Go over the outline of the whole dinosaur so it is smooth and curved. Fill in the details, such as the bony back studs, and then colour in your picture.



Fact box

Titanosaurus was a huge, plant-eating dinosaur.

- **NAME:** *Titanosaurus* (tie-tan-oh-saw-rus)
- **GROUP:** dinosaur
- **SIZE:** about 12m long
- **FOOD:** plants
- **LIVED:** about 80 million years ago in the Late Cretaceous in India, Hungary and Argentina

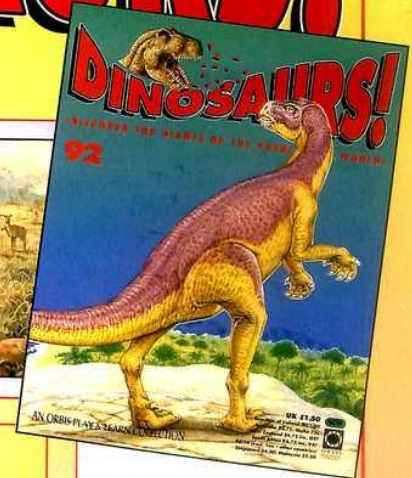
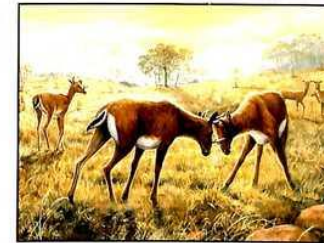


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COMING IN PART 92 OF

DINOSAURS!

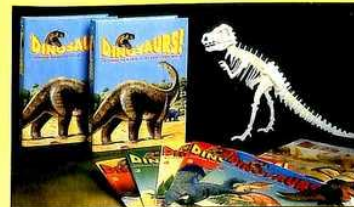
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PLUS

ASK THE EXPERT – your questions answered by Dr David Norman And HISTORY IN PICTURES 3-D GALLERY GIANTS OF THE PAST

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ANSWERS TO FACT FILE QUESTIONS: 1.a 2.a 3.c 4.c 5.a 6.b 7.a 8.a 9.a 10.b



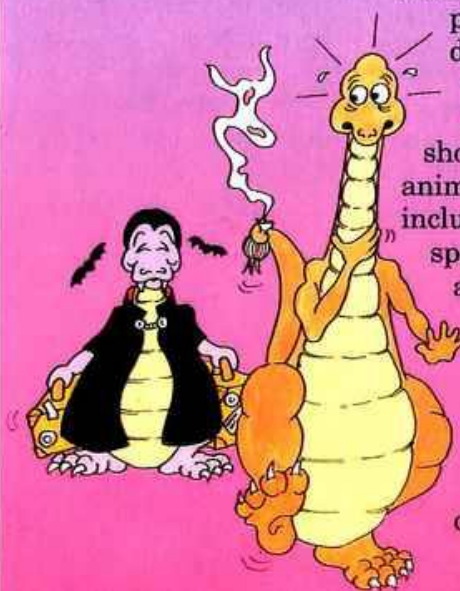
Dr. David Norman of Cambridge University answers your dinosaur questions

ASK THE EXPERT

Is it true that dwarf dinosaurs have been discovered in Transylvania?

A number of smaller-than-average species of dinosaur have been discovered in Transylvania in Romania. There is a strong suspicion that there was a network of islands in this part of Europe during the Late Cretaceous.

Studies have shown that island animals often include dwarf species of large animals (dwarf elephants for example), so perhaps some species of dinosaur were island dwarfs, too.



What were the sauropodomorphs?

These were the plant-eating saurischian (lizard-hipped) dinosaurs of the Mesozoic Era. They include the group known as sauropods, found in rocks of Late Jurassic and Cretaceous times, and the group known as prosauropods, found in rocks of Late Triassic and Early Jurassic times. The name was created to indicate certain basic similarities between the two groups.

Which could run faster – Velociraptor or a man?

This is quite a simple one. I think that *Velociraptor* would have won without much difficulty. Humans' bodies and legs are built for long-distance jogging, rather than really fast sprinting. *Velociraptor*, on the other hand, was designed for sprinting, to help it to catch fast-moving prey. So, while *Velociraptor* would win the short dash, a human would be able to catch up with, and overtake, the little predator in a 400m or 800m race.

