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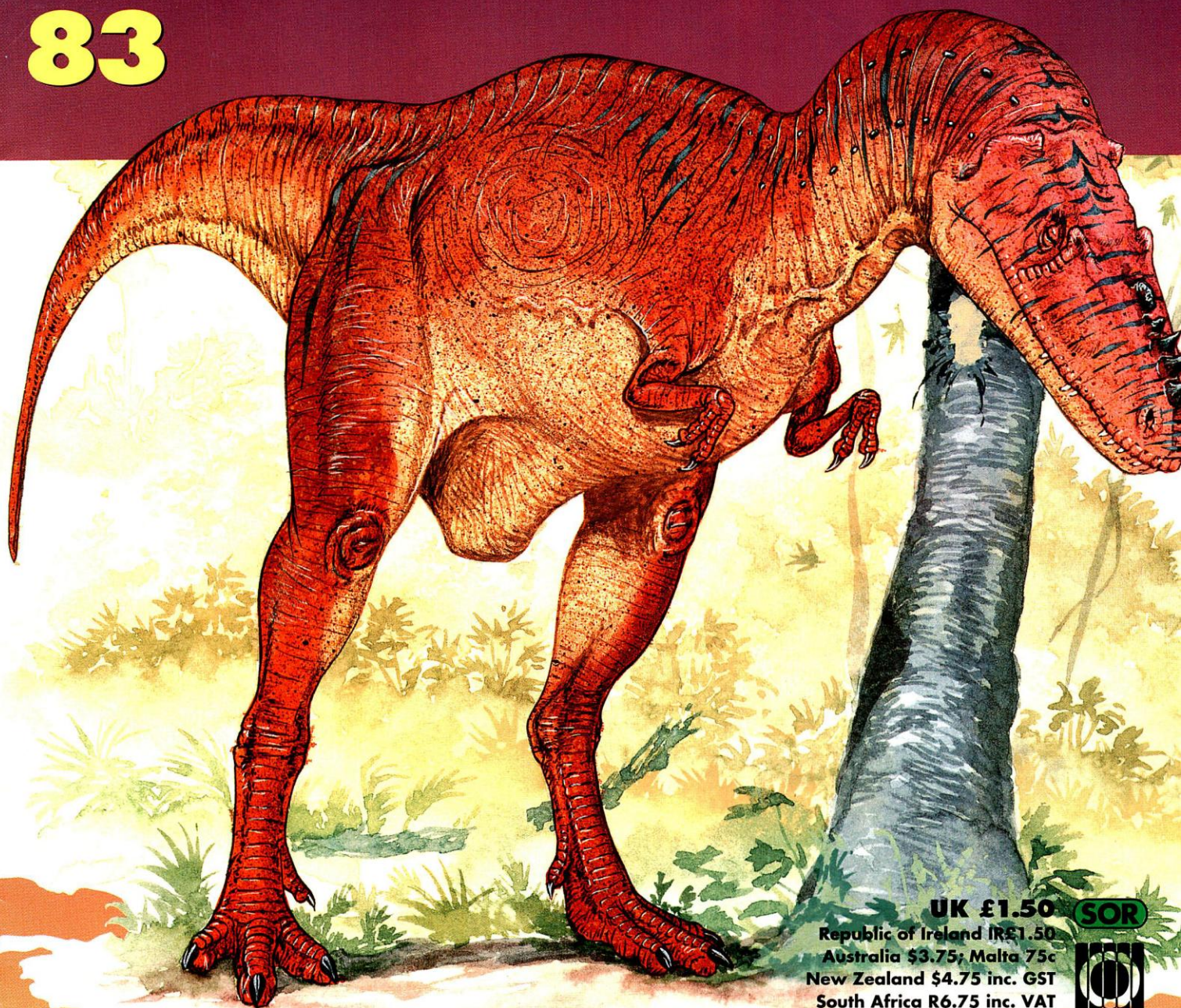
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DINOSAURS!

• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •

83



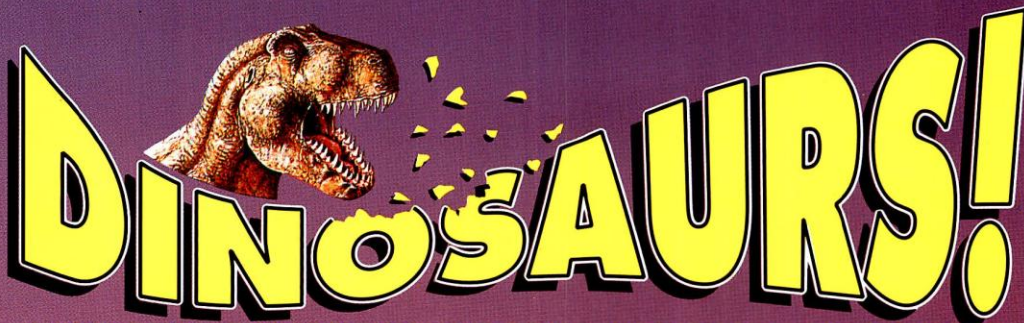
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DINOSAURS!

• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •



IDENTIKIT

Meet three more amazing prehistoric creatures:

LOTOSAURUS	1969
ALIORAMUS	1972
SIVATHERIUM	1973



PREHISTORIC WORLD

Put dinosaurs on the map in
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SPOTTER'S GUIDE

Discover why crocodiles are the
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Dr David Norman of Cambridge University answers more of your dinosaur queries BACK COVER

PLUS

GIANTS OF THE PAST

A herd of *Lotosaurus* feeds beside a prehistoric lake 1978

3-D Gallery

Styracosaurus is no match for ferocious *Albertosaurus* 1980

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More fascinating trivia and the weekly quiz 1990

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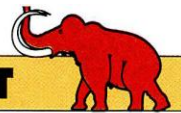
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DINOSAURS! is published by Orbis Publishing Ltd
Griffin House
161 Hammersmith Rd
London W6 8SD
© 1994 Orbis Publishing

EDITORIAL & DESIGN by Tucker Slingsby
3G London House
66-68 Upper Richmond Rd
London SW15 2RP

N83 94 11 03
ISBN 0 7489 1683 0

Printed in Italy by Officine Grafiche De Agostini, Novara



LOTOSAURUS

Sail-backed *Lotosaurus* was one of the early reptiles that ruled the land before the Age of the Dinosaurs.



The fossil skeleton of an extraordinary animal was discovered in Hunan province, China. It was named *Lotosaurus*, which means the 'lizard from Loto', after the place where it was found.

DINOSAUR ANCESTORS

Lotosaurus was a member of a group of animals called the thecodonts. They were a very important order of reptiles. The thecodonts gave rise to the crocodiles, dinosaurs and pterosaurs.

ALL-POWERFUL

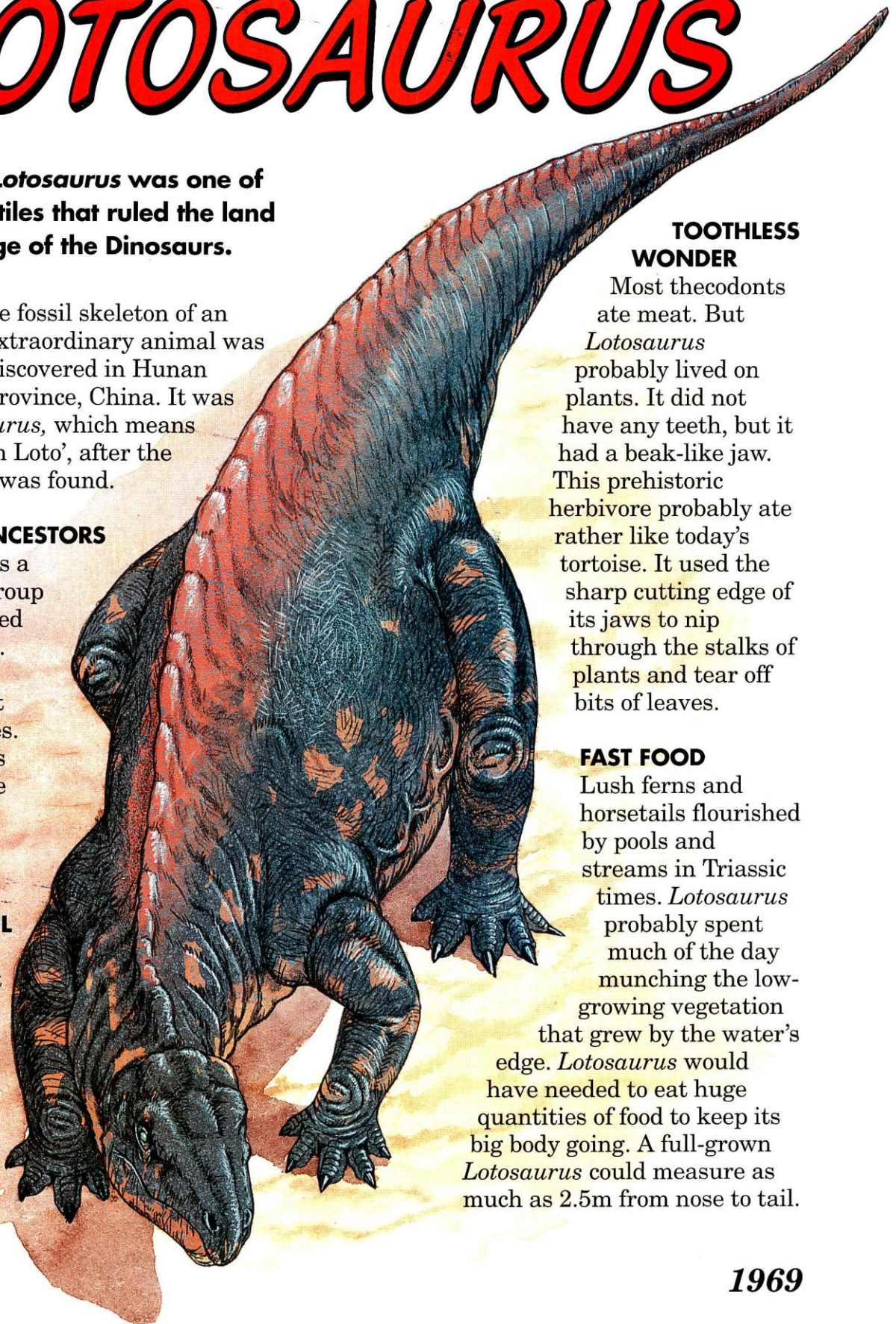
There were many different groups of thecodonts. Together they dominated the whole Triassic world, about 230 million years ago.

TOOTHLESS WONDER

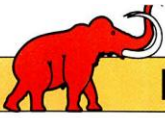
Most thecodonts ate meat. But *Lotosaurus* probably lived on plants. It did not have any teeth, but it had a beak-like jaw. This prehistoric herbivore probably ate rather like today's tortoise. It used the sharp cutting edge of its jaws to nip through the stalks of plants and tear off bits of leaves.

FAST FOOD

Lush ferns and horsetails flourished by pools and streams in Triassic times. *Lotosaurus* probably spent much of the day munching the low-growing vegetation that grew by the water's edge. *Lotosaurus* would have needed to eat huge quantities of food to keep its big body going. A full-grown *Lotosaurus* could measure as much as 2.5m from nose to tail.

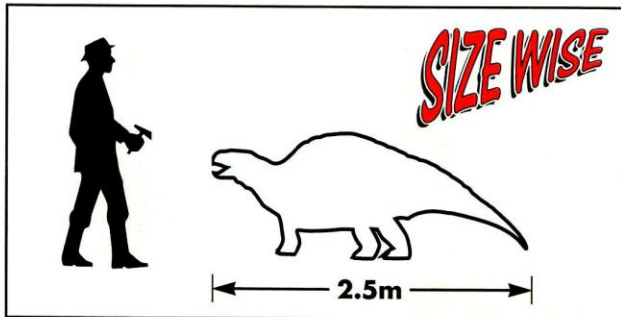


1969



MONSTER FACTS

- **NAME:** *Lotosaurus* (low-toe-saw-rus) means 'lizard from Loto'
- **GROUP:** reptile
- **SIZE:** up to 2.5 m long
- **FOOD:** plants
- **LIVED:** about 230 million years ago in the Mid Triassic Period in China



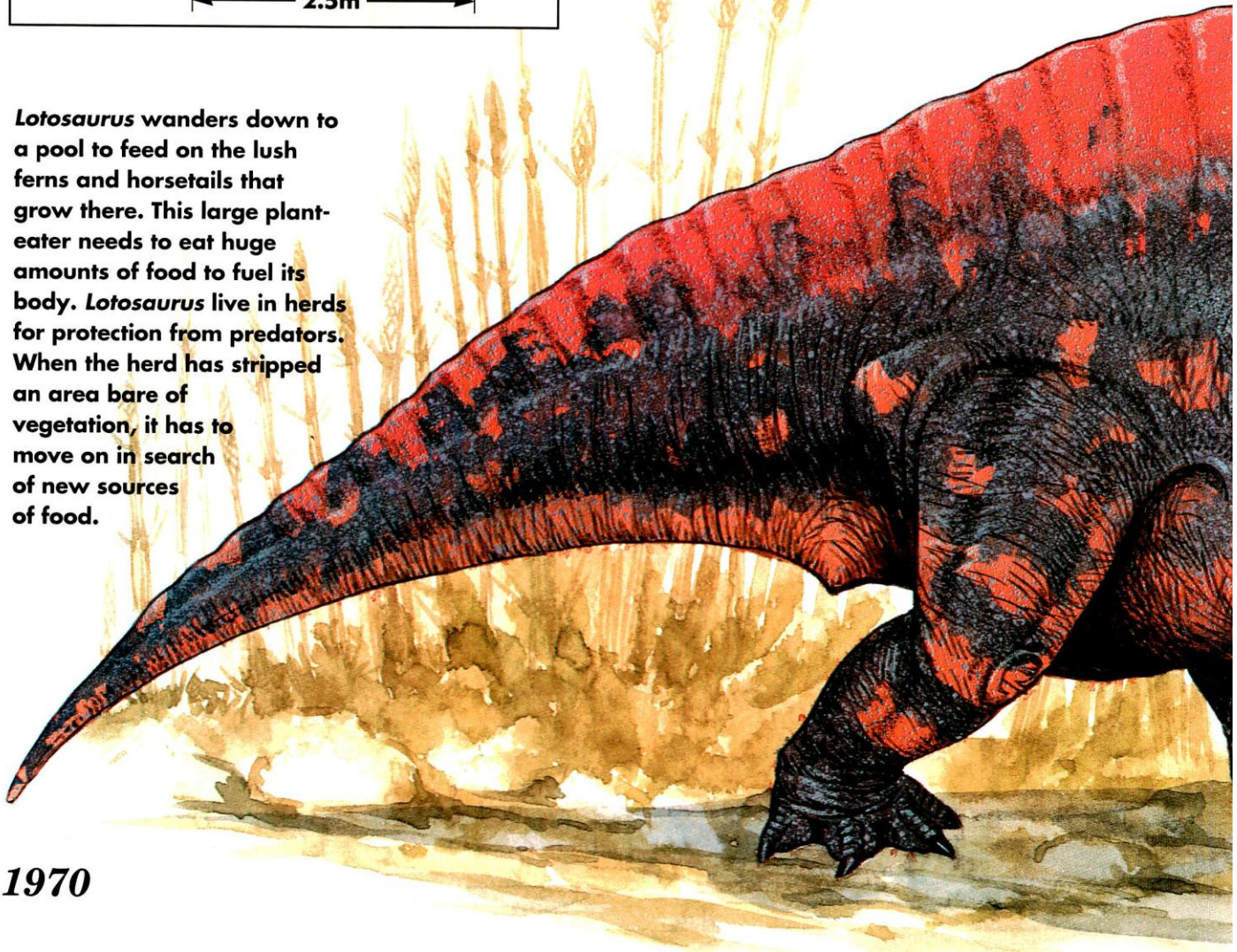
Lotosaurus wanders down to a pool to feed on the lush ferns and horsetails that grow there. This large plant-eater needs to eat huge amounts of food to fuel its body. *Lotosaurus* live in herds for protection from predators. When the herd has stripped an area bare of vegetation, it has to move on in search of new sources of food.

SAFETY IN NUMBERS

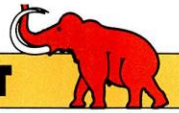
Lotosaurus did not have sharp teeth or tusks to defend itself. This slow, peaceful plant-eater would have made an easy target for hungry meat-eating reptiles, such as *Cynognathus*. *Lotosaurus* may have lived in herds for protection against predators. They would have roamed around in large groups, foraging for food.

SAILING ALONG

When experts discovered the *Lotosaurus* fossils, they were fascinated by the long spines that ran all the way down the *Lotosaurus*' back. These bony 'swords' may have supported a skin 'sail'. *Lotosaurus* was not the only sail-backed thecodont. The smaller, lizard-like *Longisquama* had an amazing fan of tall, stiff scales.



1970



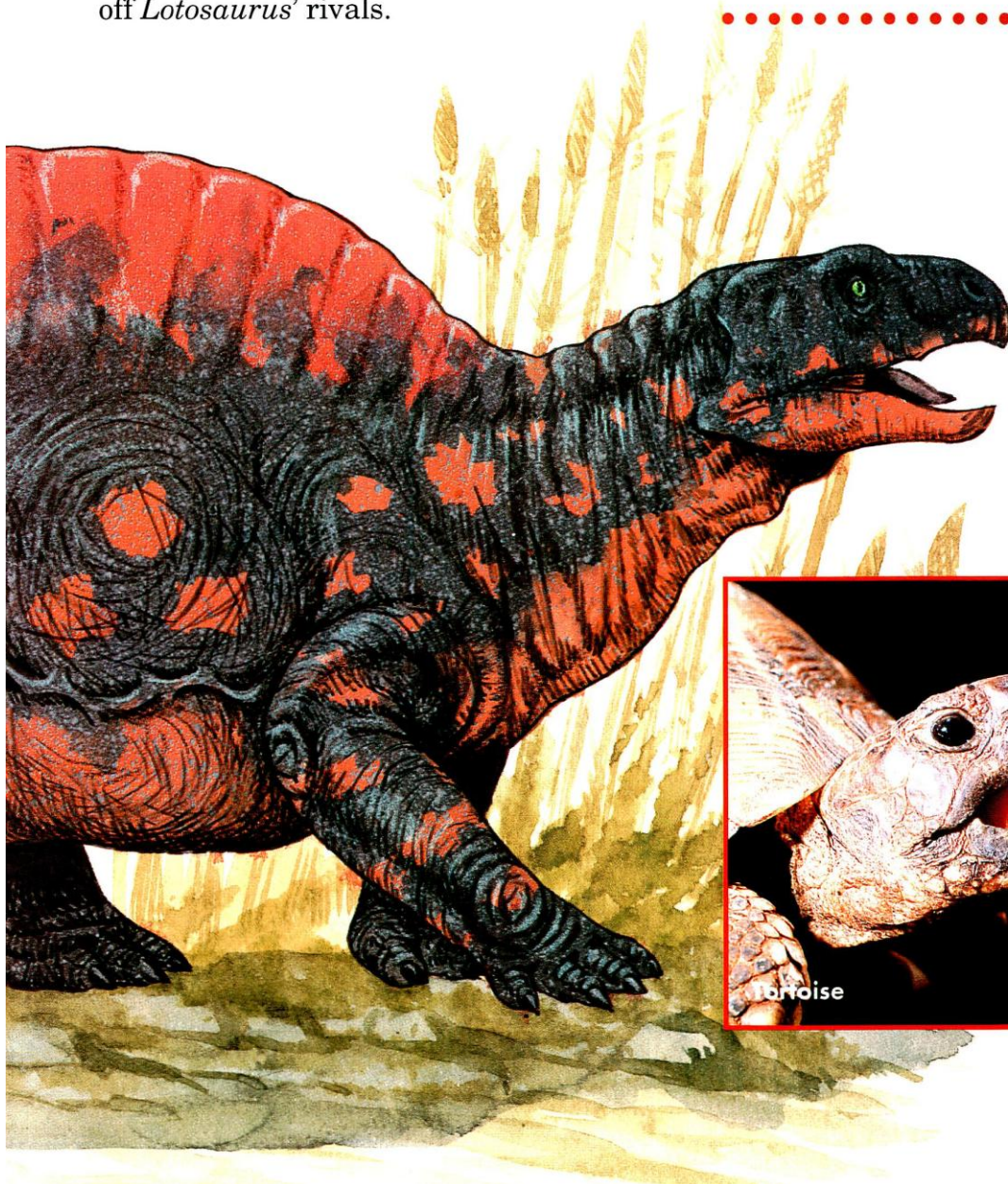
SOLAR PANEL

Scientists are not really sure what *Lotosaurus*' sail was used for. It may have stored heat from the sun, like a solar panel. This would have allowed *Lotosaurus* to be active in the early morning when most reptiles are quite slow-moving. Reptiles are cold-blooded, which means they need warmth to stay active. That is why most reptiles live in hot, sunny countries. It may be that the sail also stopped the plant-eater overheating when the sun blazed down. There is another theory that the sail was used to attract mates, or to scare off *Lotosaurus*' rivals.

IT'S A FACT

WALK TALK

Over millions of years, thecodonts changed the way they moved. Gradually, their legs changed position – they started growing more directly underneath their bodies, instead of sprawling out to the side. Some later varieties could even walk on two legs. Experts believe these thecodonts are the ancestors of the dinosaurs.

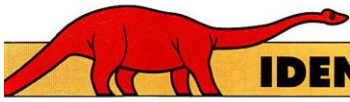


Lotosaurus probably ate in the same way as today's tortoise, nipping through plant stalks and tearing off leaves.



Tortoise

1971



IDENTIKIT

ALIORAMUS

Alioramus was one of the strangest-looking tyrannosaurs.



giant *T rex* and most other tyrannosaurs had huge heads and short snouts, but not *Alioramus*. Not only did this tyrannosaur have a unique ridge of horns on its nose, it also had a long, thin head.

THE TERRIBLE TYRANTS

The tyrannosaurs were the largest carnivores that ever lived on land. So far, about 12 different types have been found. They all had strong bodies and weak arms.

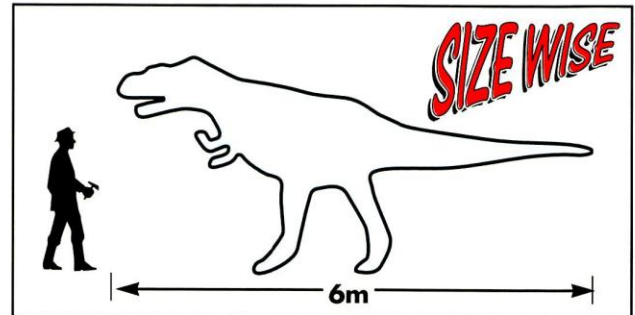
MEAT SLICER

Alioramus had sharp, curved teeth for slicing up flesh. Its lower jaw was longer and slimmer than other tyrannosaurs', so its bite was less powerful.

NOSE JOB

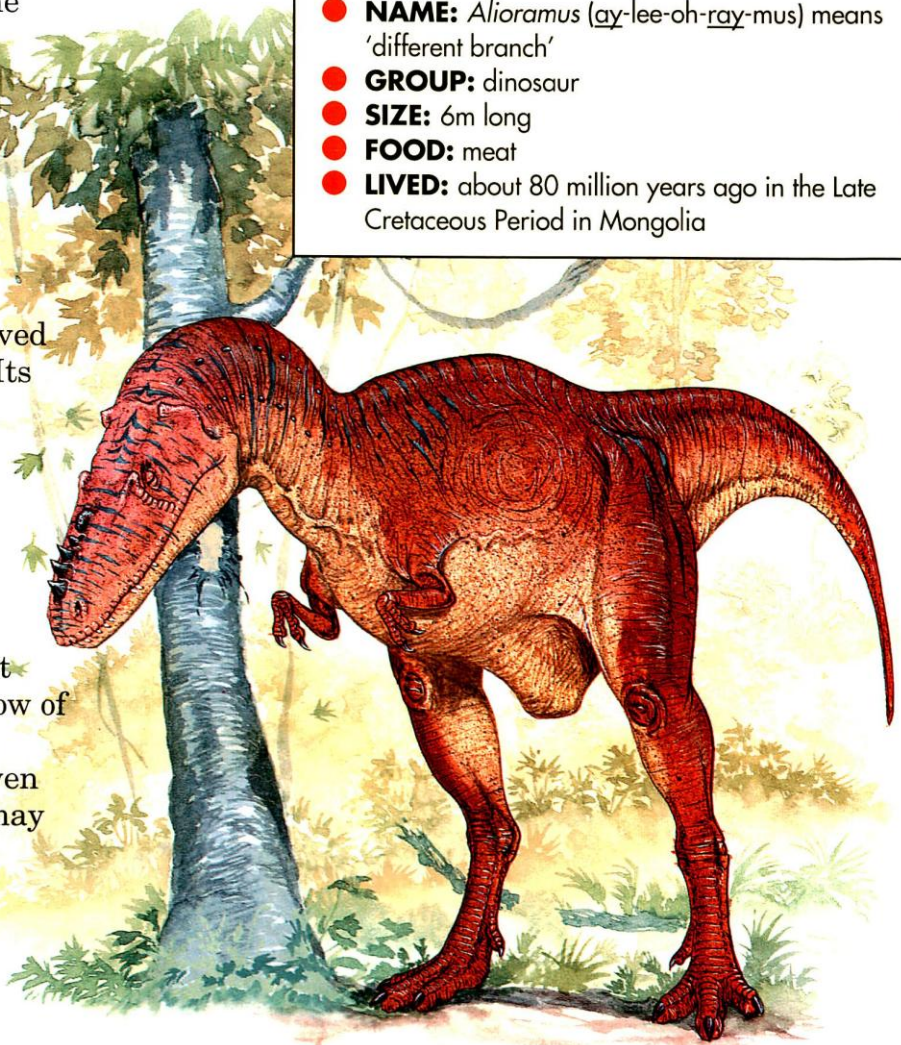
Alioramus was about half as long as *T rex*, but it was still enormous. The row of bony knobs along its nose must have made it look even more scary. These horns may have been for display, for distinguishing males from females.

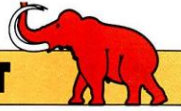
1972



MONSTER FACTS

- **NAME:** *Alioramus* (ay-lee-oh-ray-mus) means 'different branch'
- **GROUP:** dinosaur
- **SIZE:** 6m long
- **FOOD:** meat
- **LIVED:** about 80 million years ago in the Late Cretaceous Period in Mongolia





SIVATHERIUM

This prehistoric giraffe looked more like today's moose.



There are only two types of giraffe around today – the long-necked giraffe we all know, and the okapi. Millions of years ago there were many more varieties. They spread from Africa to Asia.

FOUR HORNS

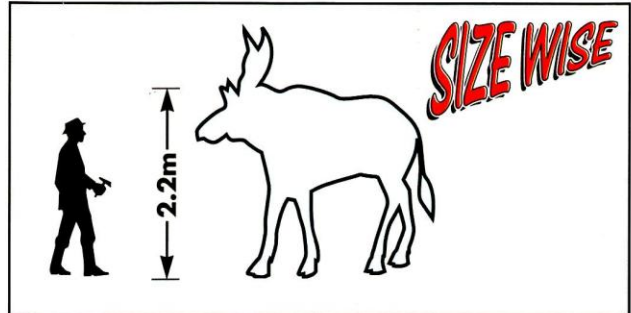
Sivatherium fossils were first found in India, and it was named after the Hindu god Siva. It had two pairs of horns – two short ones and two long ones.

SHORT AND STOUT

Sivatherium had a short neck and legs. It also had a big body and powerful shoulders to support its huge head.

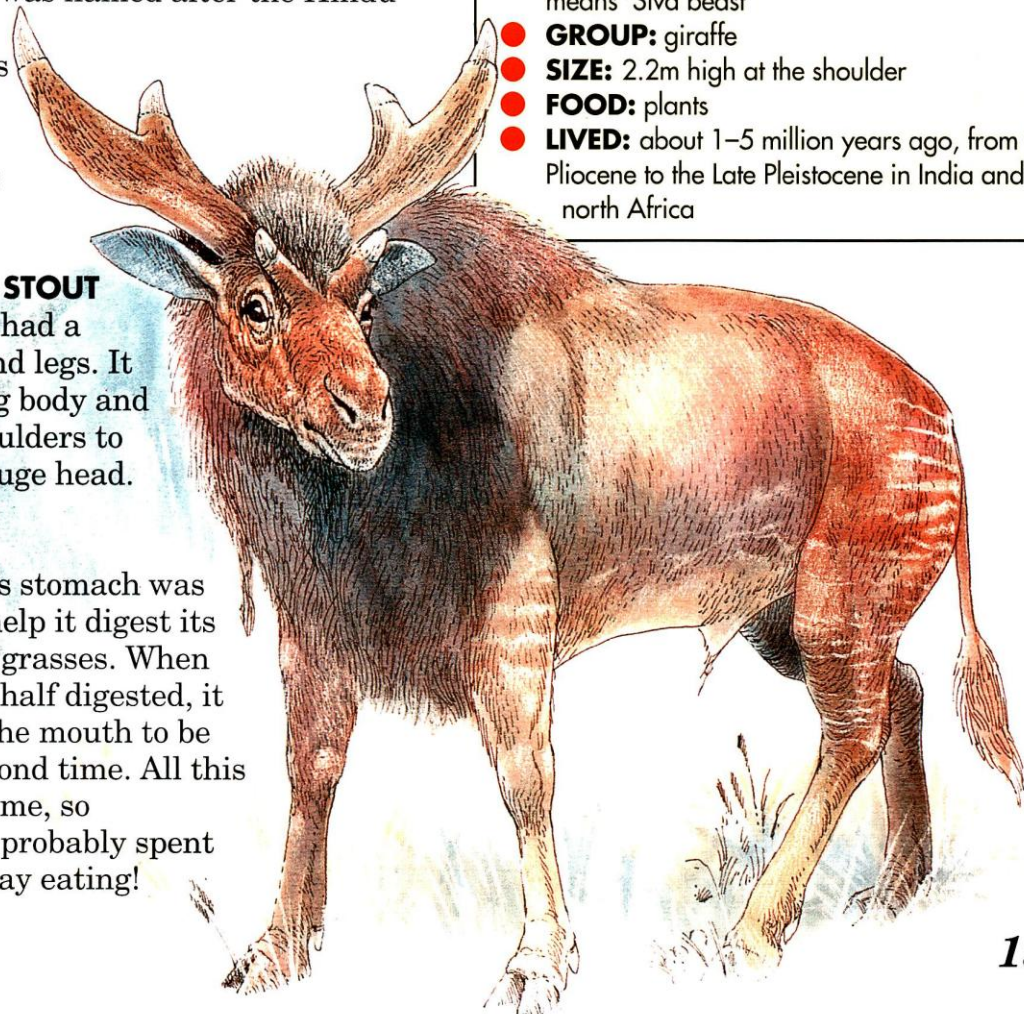
CHEW IT UP

Sivatherium's stomach was designed to help it digest its diet of tough grasses. When the food was half digested, it returned to the mouth to be chewed a second time. All this took a long time, so *Sivatherium* probably spent most of the day eating!



MONSTER FACTS

- **NAME:** *Sivatherium* (siv-ah-thee-ree-um) means 'Siva beast'
- **GROUP:** giraffe
- **SIZE:** 2.2m high at the shoulder
- **FOOD:** plants
- **LIVED:** about 1–5 million years ago, from the Pliocene to the Late Pleistocene in India and north Africa



1973

Atlas of finds

ASIA

Some of the most spectacular finds from the prehistoric world have been uncovered in Asia.

Many of the prehistoric animals found in Asia are dinosaurs. And, of all the Asian countries, China has had the most dinosaur finds. Most of the creatures found there are unknown anywhere else in the world. Expeditions to the Gobi Desert in Mongolia have uncovered fantastic dinosaurs, as well as other prehistoric creatures. Indian dinosaurs range from the huge sauropod *Barapasaurus* to the armour-plated stegosaur *Dravidosaurus*. Dinosaurs have been found in Siberia, too, but the most astonishing Siberian finds are the frozen mammoths. There are still many more discoveries to be made in Asia.

1974

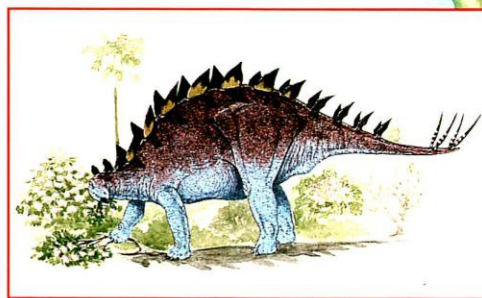


SIBERIA

One of the coldest places on Earth has given us some of the most exciting prehistoric finds. Since 1901, when the first complete frozen mammoth (1) was discovered, about 25 deep-frozen bodies have been found.

MONGOLIA

Khermeen Tsav in the Gobi Desert was the site of the first American expedition to Mongolia. It was led by Roy Chapman Andrews in 1923, and the team discovered the dinosaur *Oviraptor* (2). It was lying next to a nest full of *Protoceratops*' eggs and its skull was smashed. Scientists think it was caught stealing eggs, and was killed by the mother.

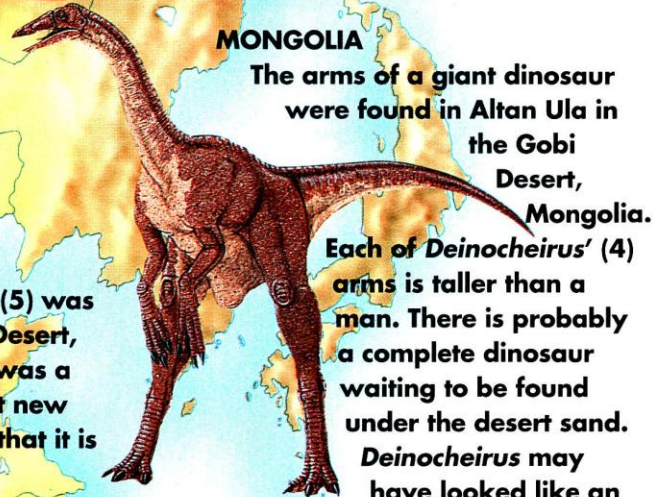


INDIA

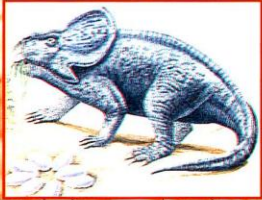
The stegosaur *Dravidosaurus* (9) was discovered in Tiruchirapalli, southern India, in 1971. Like *Tuojiangosaurus*, its Chinese cousin, *Dravidosaurus* was covered in protective armour and spikes.



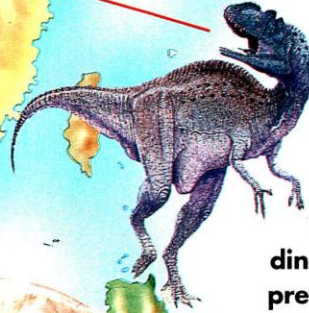
MONGOLIA
When *Mononykus* (5) was found in the Gobi Desert, experts thought it was a small dinosaur. But new evidence suggests that it is a wingless bird.



MONGOLIA
The arms of a giant dinosaur were found in Altan Ula in the Gobi Desert, Mongolia. Each of *Deinocheirus'* (4) arms is taller than a man. There is probably a complete dinosaur waiting to be found under the desert sand. *Deinocheirus* may have looked like an enormous ostrich dinosaur.

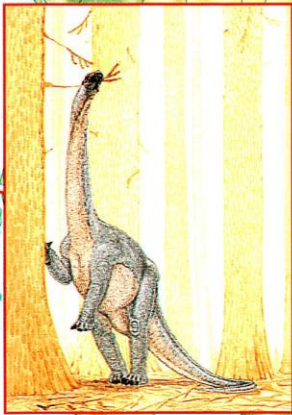


MONGOLIA
A nest of *Protoceratops'* (3) eggs was discovered on a 1923 expedition to the Gobi Desert. Until this find no one knew that dinosaurs laid eggs.



CHINA
An almost complete skeleton of *Yangchuanosaurus* (6), was found in Yangchuan, China, in the 1970s. This dinosaur was a fearsome predator with massive jaws and razor-sharp teeth.

CHINA
Mamenchisaurus (7) was found in Sichuan Province, China, in the early 1950s. This sauropod breaks a record by having the longest neck (over 15m) of any known animal.

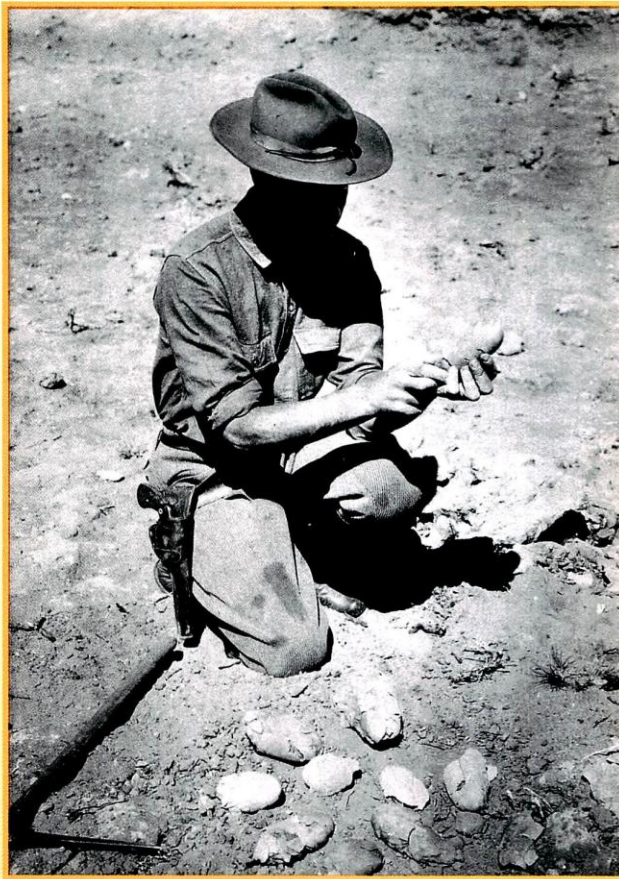


INDIA
Barapasaurus (8) was found in Kota, central India, in 1961. This 18m-long sauropod lived about 190 million years ago in the Jurassic Period.

IT'S A FACT

IT'S A LONG JOB

It can take years from the time a dinosaur is found to the time it goes on display in a museum. It may take months to dig it out of the ground, and years to study and write about it. Eventually it is given an official name, announced to the world and displayed in a museum.



Roy Chapman Andrews (left) is studying the nest of *Protoceratops*' eggs he found in Mongolia in 1923.

EGGS IS EGGS

Andrews' most important discovery was a nest of 13 *Protoceratops*' eggs found in 1923. They were the first dinosaur eggs ever seen. At first, the expedition members didn't believe the strange oval 'stones' were eggs. But Andrews wrote later, 'we had to agree that eggs is eggs'.

BURIED TREASURE

When Altangerel Perle, the Mongolian palaeontologist, and a Polish expedition were digging in the great Mongolian desert in the 1970s, they uncovered two fossilized skeletons in the same place. It was obvious from the position of the skeletons that *Velociraptor* and *Protoceratops* had died fighting each other. Some experts think they died of their terrible wounds, but others think they were buried alive by a sudden sandstorm.

GREAT GOBI

The Gobi Desert, which is partly in China and partly in Mongolia, has marvellous fossils. This part of the world has never been crunched up by one continent crashing into another, so the desert sandstone has remained undisturbed for millions of years. There are probably many exciting fossils still waiting to be found.

DASHING DISCOVERER

Roy Chapman Andrews began his career in palaeontology by scrubbing the floor of the American Museum of Natural History in New York. But he went on to discover lots of wonderful dinosaurs in Mongolia. In between digs he dashed around the desert in a car and fought off bandits. He became a hero and the inspiration for the character Indiana Jones.

1976

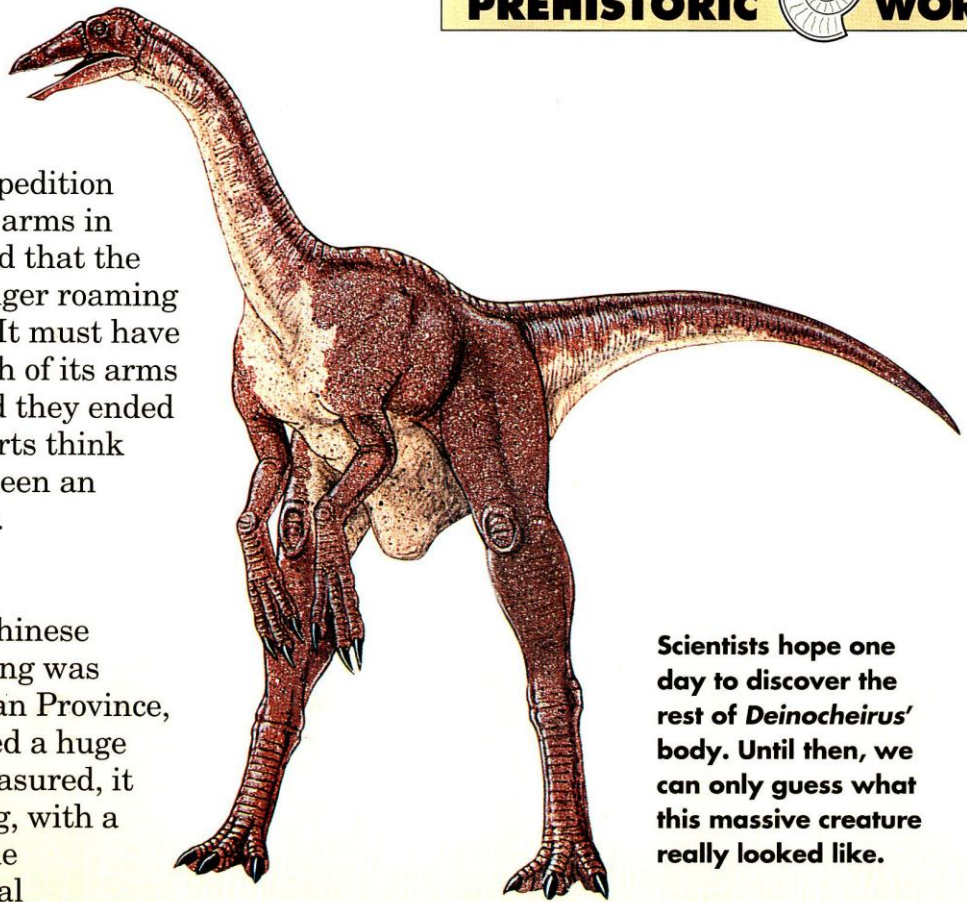
Protoceratops





MONSTER OF THE DESERT

The Polish Mongolian expedition that found *Deinocheirus*' arms in 1965 must have been glad that the creature itself was no longer roaming around the Gobi Desert. It must have been a real monster! Each of its arms was about 2.6m long, and they ended in enormous claws. Experts think *Deinocheirus* may have been an 8m-long ostrich dinosaur.



Scientists hope one day to discover the rest of *Deinocheirus*' body. Until then, we can only guess what this massive creature really looked like.

CHINESE DISCOVERY

In the early 1950s, the Chinese palaeontologist C. C. Young was searching rocks in Sichuan Province, China, when he uncovered a huge fossil skeleton. When measured, it turned out to be 22m long, with a 15m-long neck. This is the longest neck of any animal (a giraffe's neck is only 2m long). C. C. Young named the dinosaur *Mamenchisaurus*. It was so huge it took three months to dig it out. Professor Young found and named many dinosaurs, including *Lufengosaurus* and *Tsintaosaurus*. He is known as the 'father of Chinese palaeontology'.

IS IT A DINOSAUR...OR IS IT A BIRD?

Fossils of a strange animal were found in the Gobi Desert in 1923. At first, experts thought it was a dinosaur. Experts are now convinced that this Mongolian fossil is a bird. *Mononykus* did not have wings, so it is a very primitive bird. But it lived millions of years after *Archaeopteryx* – an early bird that did have wings. Did

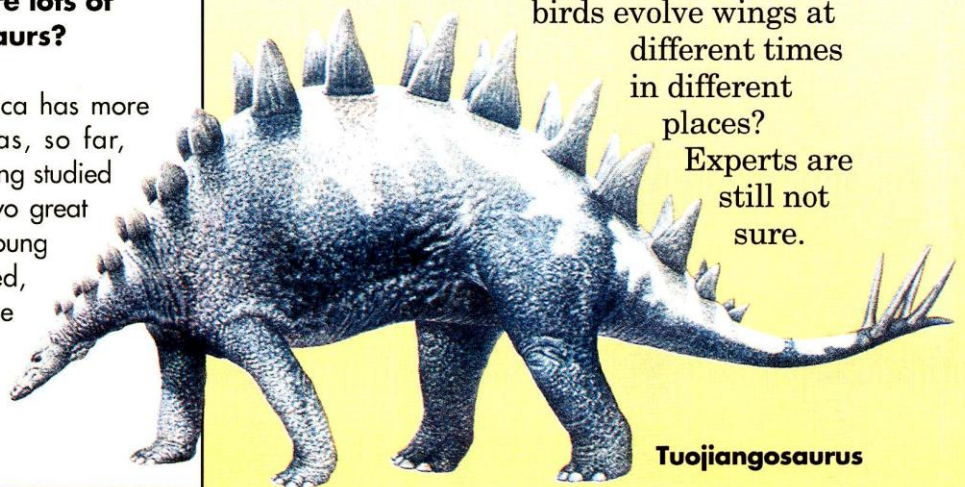
birds evolve wings at different times in different places?

Experts are still not sure.

Is it true

that there are lots of Chinese dinosaurs?

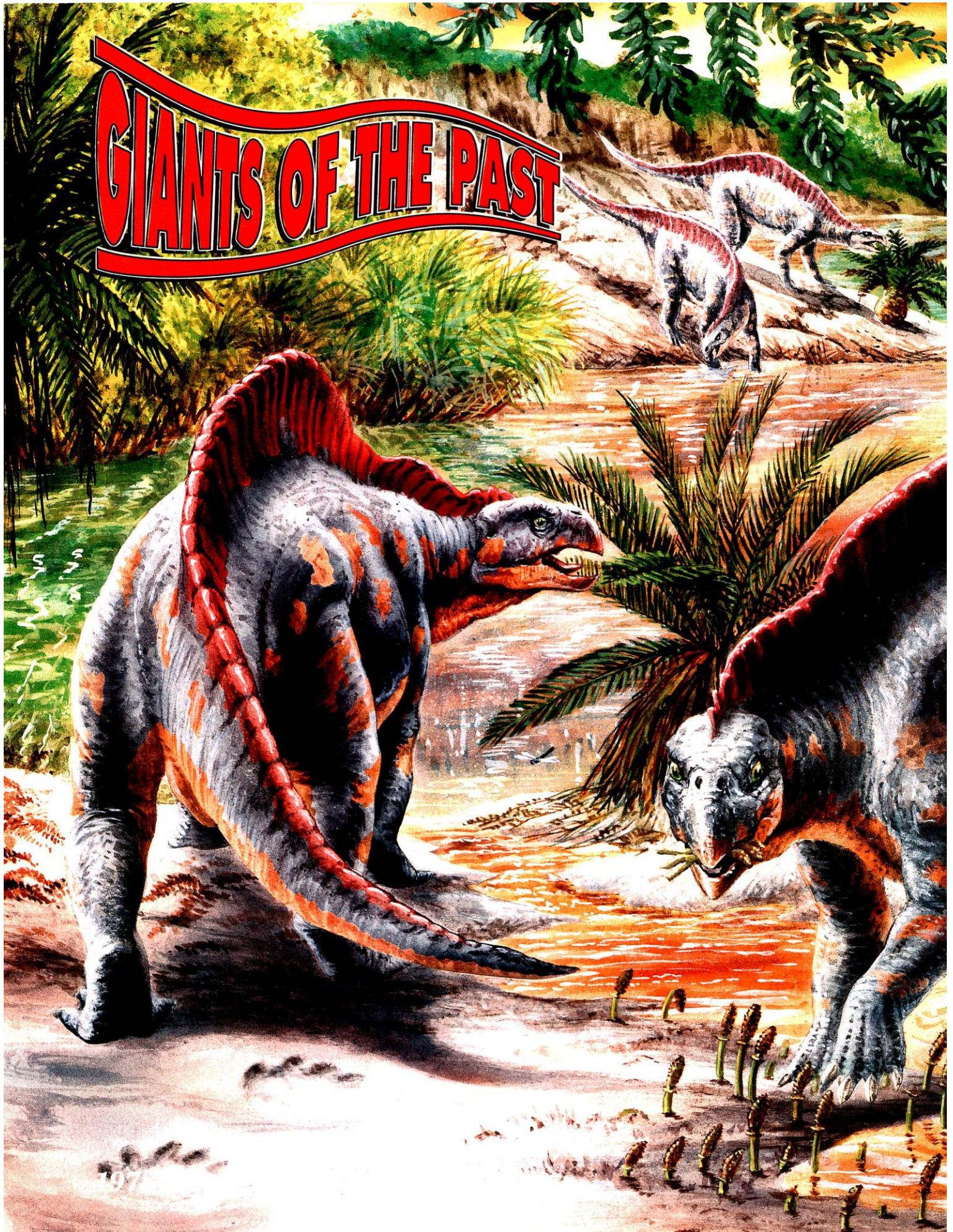
Yes. Only North America has more named dinosaurs. China has, so far, named about 95. But more are being studied and have not yet been named. Two great Chinese palaeontologists – C. C. Young and Dong Zhiming – have studied, described and named many of these dinosaurs. Between 1973 and the late 1980s, Dong named 19 different types of dinosaur, including *Tuojiangosaurus* (right).



Tuojiangosaurus

1977

GIANTS OF THE PAST



1977

A detailed illustration of a Lotosaurus dinosaur in a prehistoric setting. The dinosaur is shown from the chest up, facing left, with its large, tortoise-like beak open, eating a green plant. Its skin is dark grey with reddish-brown patches. The background features a rocky cliff, palm trees, and a body of water. The word 'LOTOSAURUS' is written in large, bold, yellow letters in the upper right corner.

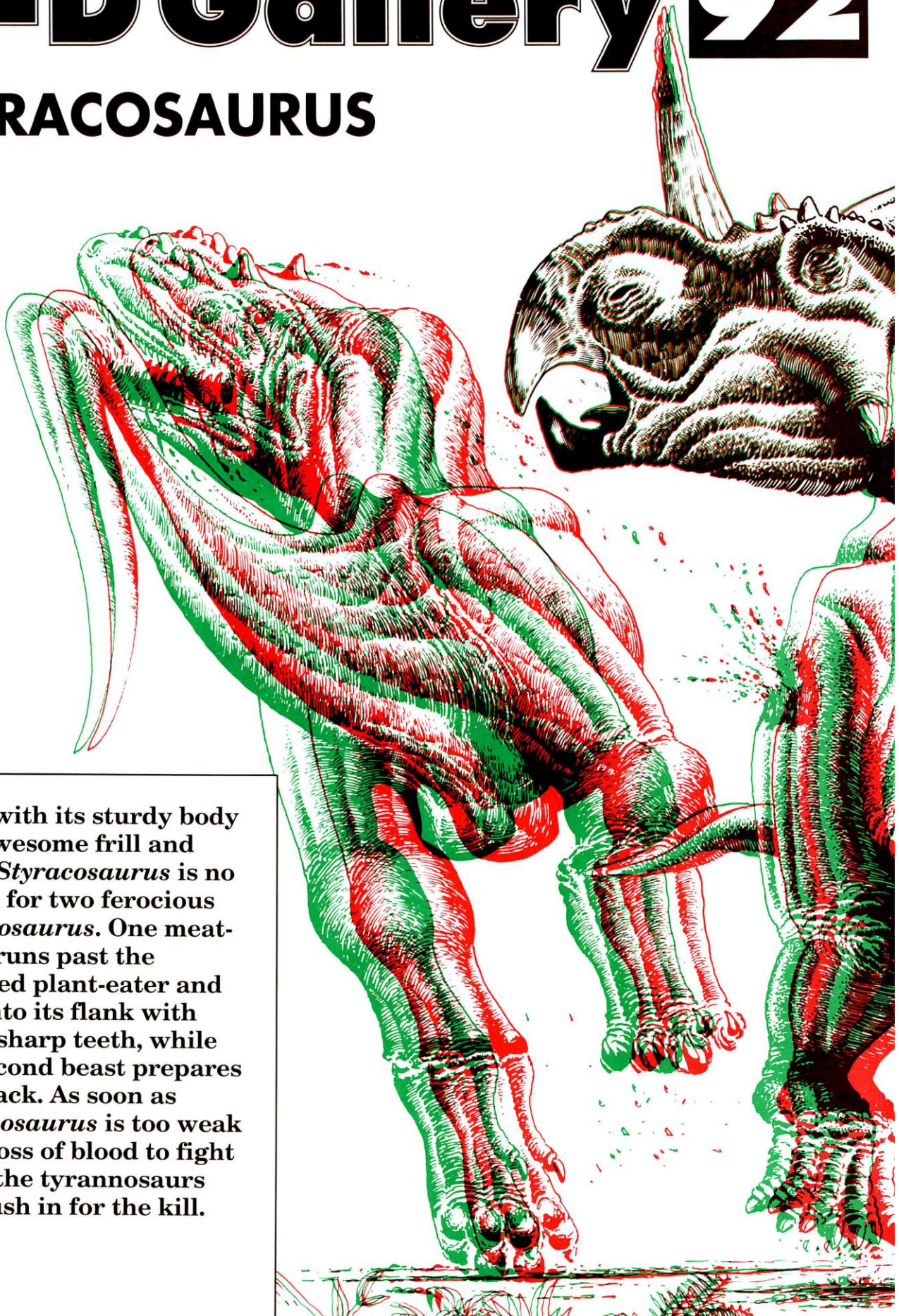
LOTOSAURUS

More than 220 million years ago, in Mid Triassic China, a herd of *Lotosaurus* is feeding by a lake. With its tortoise-like beak, *Lotosaurus* snips off stems and pulls leaves from the low-growing ferns and horsetails. *Lotosaurus* needs to eat a huge amount of food to fuel its large, heavy body, so the herd spends most of the day browsing and munching. All the time, the herd members keep an eye out for fierce predators like the speedy, wolf-sized *Cynognathus*.

1979

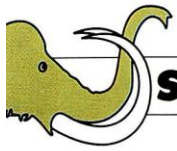
3-D Gallery 92

STYRACOSAURUS



Even with its sturdy body and awesome frill and horn, *Styracosaurus* is no match for two ferocious *Albertosaurus*. One meat-eater runs past the terrified plant-eater and rips into its flank with razor-sharp teeth, while the second beast prepares its attack. As soon as *Styracosaurus* is too weak from loss of blood to fight back, the tyrannosaurs will rush in for the kill.





Ruling reptiles

Crocodiles were fearless hunting machines in the days of the dinosaurs and are still top carnivores today.



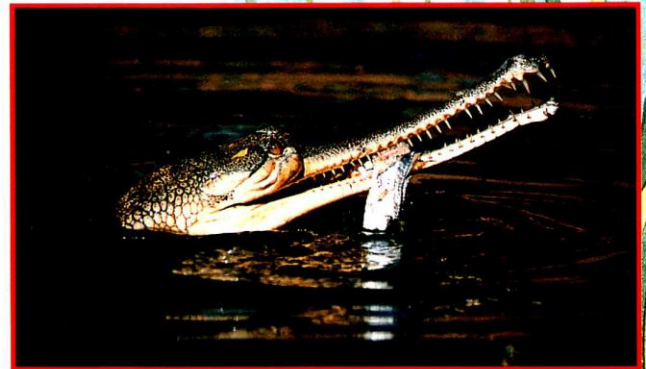
Crocodiles have changed little since their ancestors first appeared about 160 million years ago. Today, they are ferocious hunters with little to fear except old age or being hunted by people! Prehistoric crocodiles were just as fierce.

CROCODILES OR NOT?

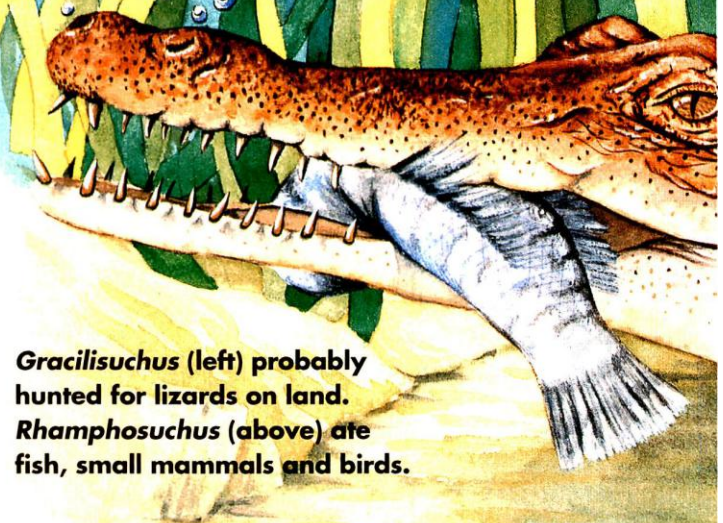
The earliest known crocodiles did not look much like today's crocodiles and they were not even recognised as crocodiles until 1980. *Gracilisuchus* from the Mid Triassic was well adapted for life on land. It was only 30cm long and ran upright on its slim hind legs, balanced by its large tail.



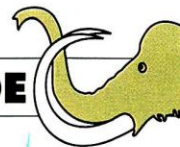
1982



Today's crocodiles, such as the Saltwater Crocodile of North Australia (top left) and the gavia (above), are very like their prehistoric ancestors.

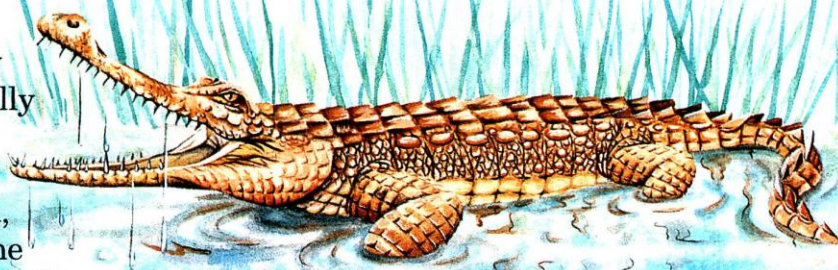


Gracilisuchus (left) probably hunted for lizards on land. *Rhamphosuchus* (above) ate fish, small mammals and birds.



A SMALL START

Today's crocodiles are probably descended from a family of really small crocodiles, the *Atoposauridae*. Their fossils have been found in Asia, Europe and North America. The largest, *Alligatorium*, was only 40cm long. These little Jurassic reptiles were more at home on land than in the water.



Phosphatosaurus looked like today's gavial but with a big, heavy jaw.

PAST GIANTS

At the end of the Cretaceous Period, a wave of extinction swept the world. The dinosaurs completely died out, but the prehistoric crocodylians lived on! Huge reptiles such as *Phosphatosaurus*, a 9m-long crocodile from the Early Cenozoic, continued to flourish when all the dinosaurs were extinct.

Phosphatosaurus did not feed on fish.

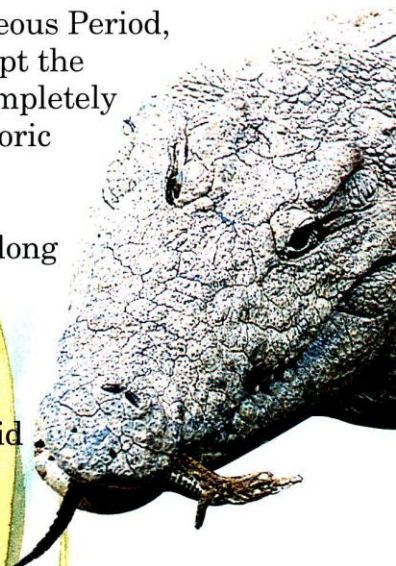
Instead its blunt back teeth were just the job for cracking turtle shells. One of the biggest ever crocodiles was *Rhamphosuchus*.

This giant lived about 6 million years ago, and was an impressive 15-18m long!

CARING PARENTS?

Scientists have only recently realised that crocodiles care for their young.

They guard their eggs and look after the small babies. If danger threatens, they will even carry their young to safety in their mouths (above). Perhaps prehistoric crocodiles did the same and this may be one reason they survived when the dinosaurs did not.



Fossils in the coal

At Messel in Germany, fossils in a coal mine give a complete picture of prehistoric life in Tertiary times.

Between 66 million and about two million years ago, Europe had a tropical climate. Swamps, like the Everglades in Florida today, spread over much of what is now Germany and Poland. In some areas the waters formed very still and stagnant lakes. These lakes did not contain enough oxygen to break down the plants and animals that fell into them.

HAPLESS ANIMALS

Any insect that buzzed across the surface and became trapped in the water, any bird or bat falling in, any dead animal washed in by the surrounding streams, was buried in the deep layers of mud and peat that built up in the bottom of these lakes.

COAL AND OIL

Slowly, over thousands of years, the peat turned into seams of brown coal, called lignite. In some of the Tertiary lakes, the bottom muds became so filled with plant and animal remains that they turned into rock.



Eomanis

Lophiodon

Pholidocercus

1984

Bat

A FAMOUS SITE

When the coal and oil have been extracted, amazing fossils have been found. The most famous of these fossil sites is that of Messel, near Darmstadt in Germany. There lie the skeletons of all sorts of animals. Most have a dark shadow around them, which is the remains of their flesh and skin. Some even have their last meals preserved in their stomachs! Oddly enough, no fish or other water creatures have been found. The Tertiary water was so poisonous very little could actually live in it.

Messelobunodon

Miacis

Eurotamandua

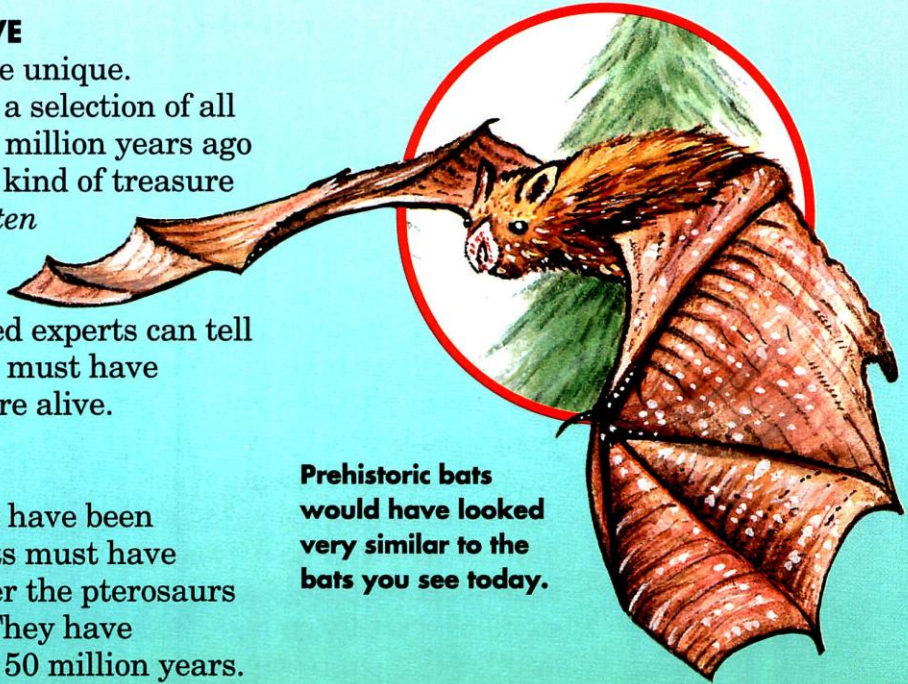
Leptictidium

UNIQUE TREASURE TROVE

The rocks from Messel are unique. Trapped within them are a selection of all the animals that lived 50 million years ago in northern Europe. This kind of treasure trove is called a *lagerstätten* (lar-ga-shta-ten). This is the name for a deposit of fossils that is so detailed experts can tell exactly what the animals must have looked like when they were alive.

BATS LIKE TODAY'S

More than 150 fossil bats have been discovered at Messel. Bats must have evolved quite quickly after the pterosaurs and dinosaurs died out. They have changed little in the past 50 million years.



Prehistoric bats would have looked very similar to the bats you see today.

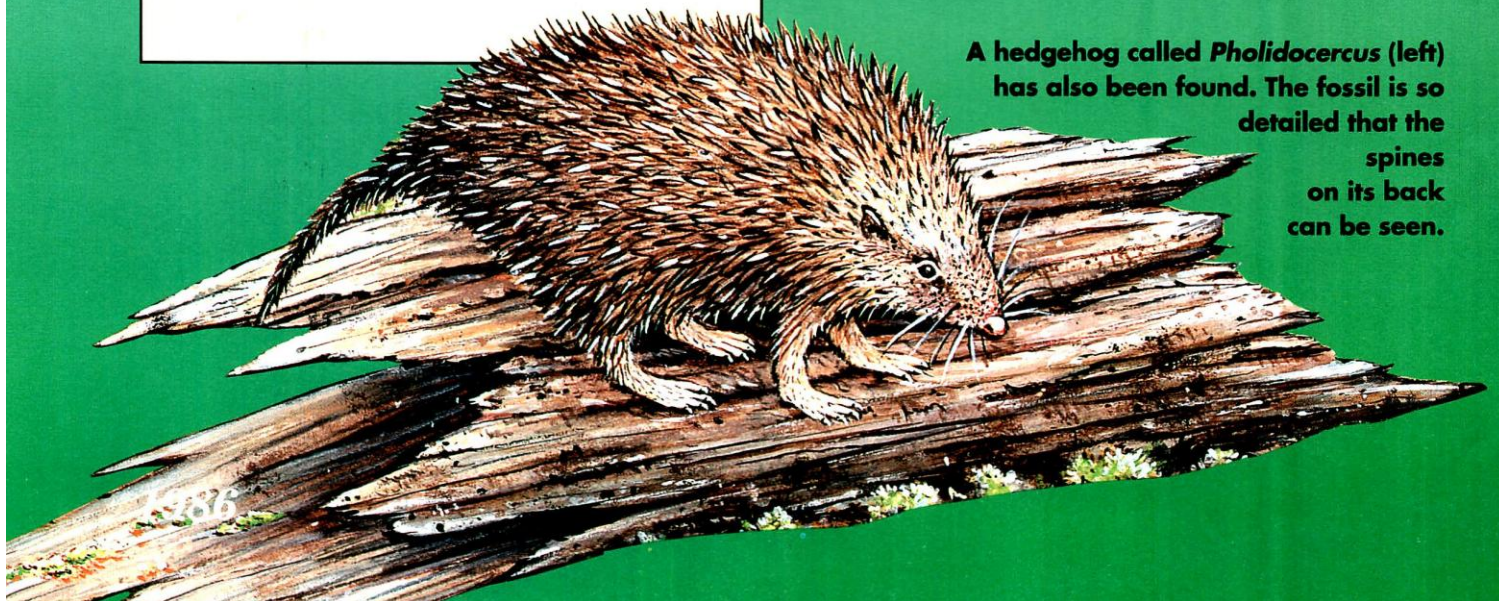
What is? LIGNITE

When dead plants are buried without having a chance to rot away, they form a substance called peat. Peat is made up of three basic elements: carbon, hydrogen and oxygen. As time goes on, this peat can very gradually change to lignite (or brown coal), then to bituminous coal (black coal) and then to anthracite (hard coal). At each stage the amount of carbon increases, and the fuel is of a better quality than the one before.

FOSSIL PUZZLE

Some of the finds are animals that are very different from today's creatures. A little shrew-like animal called *Leptictidium* (right) had long hind legs and a long balancing tail. Scientists once thought that it must have run on its hind legs because of the arrangement of the hip bones. But when they looked at the hip bones again, they had second thoughts. The hips were so well preserved that they could tell that the legs were built not for running, but for jumping.

A hedgehog called *Pholidocercus* (left) has also been found. The fossil is so detailed that the spines on its back can be seen.



SURPRISING ANTEATERS

An anteater called *Eurotamandua* has also been found. This is very surprising because today anteaters live only in South America. Anteaters probably evolved in Europe about 50 million years ago, then migrated to South America, where they still survive. But for some reason they became extinct in Europe and only fossils remain. The *Lophiodon* tells a similar story. It is an early form of tapir. But today, tapirs live only in parts of South America and Malaysia.



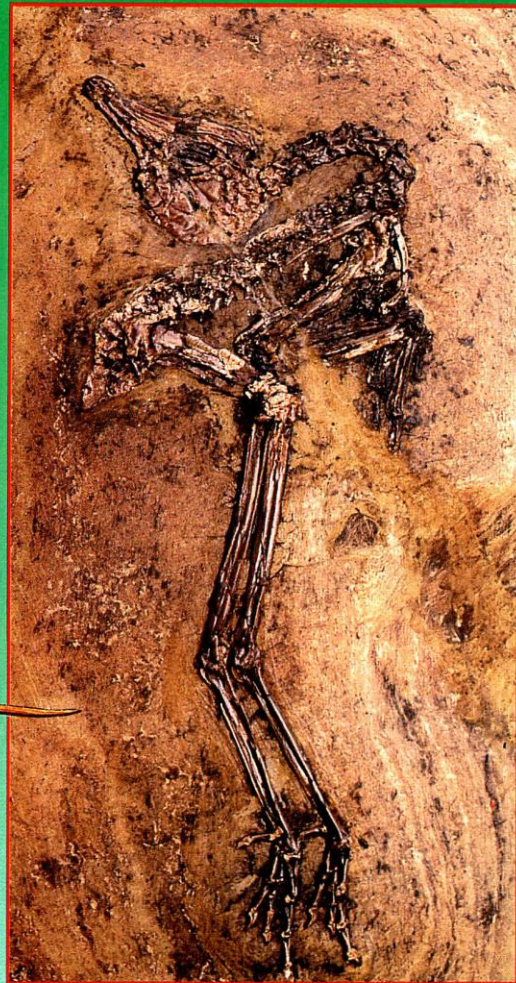
Leptictidium

FOSSIL DETAILS

A fossil pangolin, *Eomanis*, has also been discovered at Messel. Pangolins are related to anteaters. The Messel pangolins are very similar to today's African anteater except they are covered with scales. The *Eomanis* fossil is so detailed that these scales can be clearly seen. And what did the anteaters and pangolins eat? Ants, of course. Yes, even fossil ants have been found at Messel!

CAUGHT IN THE COAL

Many of these animals were in turn hunted and eaten by other creatures. A complete skeleton of *Miacis*, a distant relative of the cat, has been found. It looked very similar to a modern cat, with short legs and a long tail. It probably hunted in the same way. There were larger animals too. *Messelobunodon* was like an early antelope with long running legs and hoofs. It was about the size of a large dog.



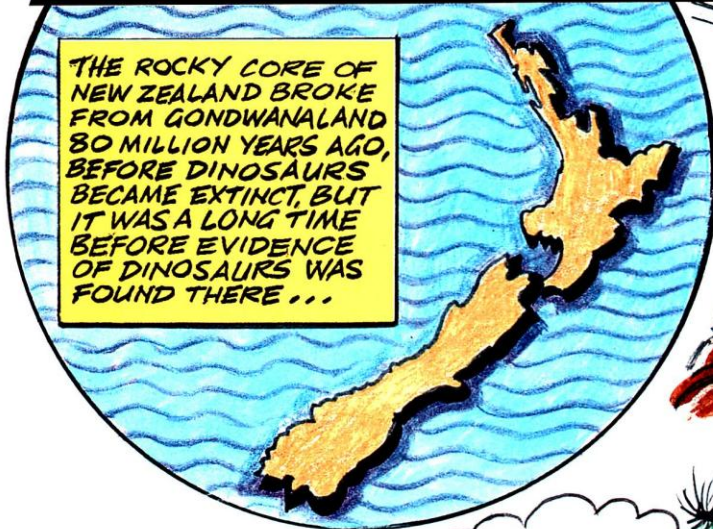
A CLOSE THING

All these amazing, detailed fossils, including the bird above, were almost lost to us forever. It is many years since the mine at Messel was worked to extract its oil shale, and a great hole in the ground was all that remained. Local councils wanted to use this pit as a handy rubbish tip for nearby towns. For 10 years there was a fierce battle between the politicians and the scientists about whether the site should be preserved or filled in with refuse. At last, in 1988, they finally reached an agreement. The Messel pit, with all its wonderful fossils, was to be saved for scientific research.

1987



NEW ZEALAND'S FIRST DINOSAUR!



THE ROCKY CORE OF NEW ZEALAND BROKE FROM GONDWANALAND 80 MILLION YEARS AGO, BEFORE DINOSAURS BECAME EXTINCT, BUT IT WAS A LONG TIME BEFORE EVIDENCE OF DINOSAURS WAS FOUND THERE...

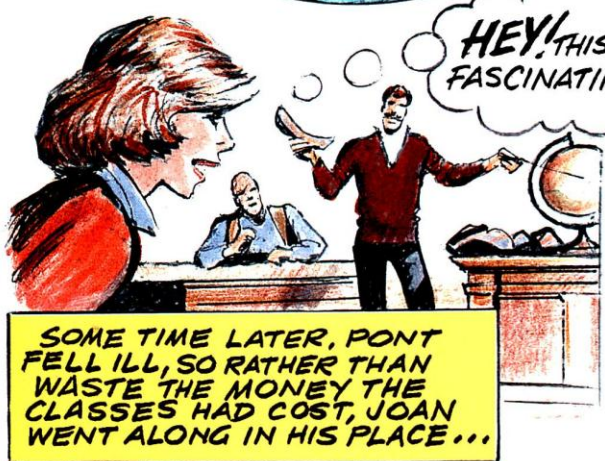
IN 1871, JULIUS VON HAAST, SUPERINTENDENT OF NEW ZEALAND'S CANTERBURY MUSEUM, TOOK ALEX MCKAY ONTO HIS STAFF.



I WANT YOU TO LOOK FOR DINOSAUR BONES, MCKAY!

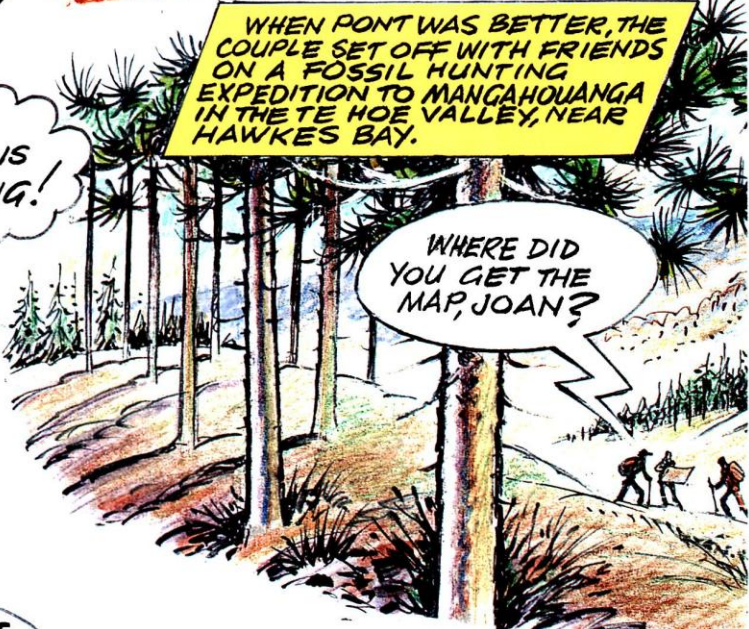
YES SIR!

MCKAY DID AS HE WAS BID, BUT, SADLY, FOUND NOTHING.



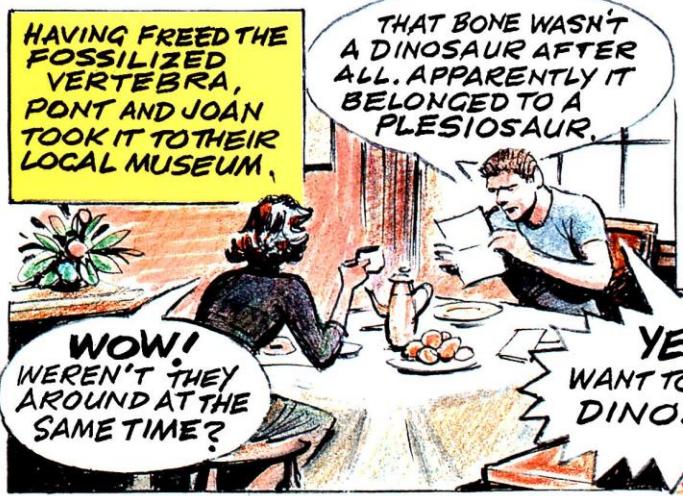
HEY! THIS IS FASCINATING!

SOME TIME LATER, PONT FELL ILL, SO RATHER THAN WASTE THE MONEY THE CLASSES HAD COST, JOAN WENT ALONG IN HIS PLACE...



WHEN PONT WAS BETTER, THE COUPLE SET OFF WITH FRIENDS ON A FOSSIL HUNTING EXPEDITION TO MANGAHOUANGA IN THE TE HOE VALLEY, NEAR HAWKES BAY.

WHERE DID YOU GET THE MAP, JOAN?



HAVING FREED THE FOSSILIZED VERTEBRA, PONT AND JOAN TOOK IT TO THEIR LOCAL MUSEUM.

THAT BONE WASN'T A DINOSAUR AFTER ALL. APPARENTLY IT BELONGED TO A PLESIOSAUR.

WOW! WEREN'T THEY AROUND AT THE SAME TIME?

YES! BUT I WANT TO FIND A DINOSAUR!

THE WIFFENS AND THEIR FRIENDS WENT BACK TO THE SITE AND SET UP A CAMP IN AN OLD SHACK. THEN, ONE DAY IN 1975...

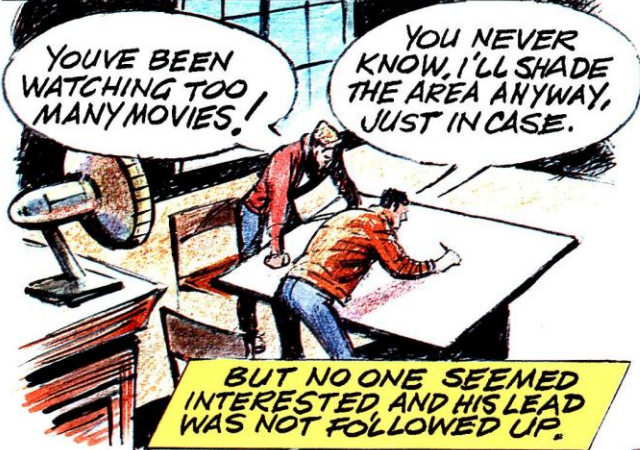
WHAT IS IT?



CAREFUL! IT'S BRITTLE!



BUT IN THE 1950S AN OILMAN SPOTTED SOME REPTILE BONES WHILE PROSPECTING. HE MARKED THE AREA ON HIS MAP...



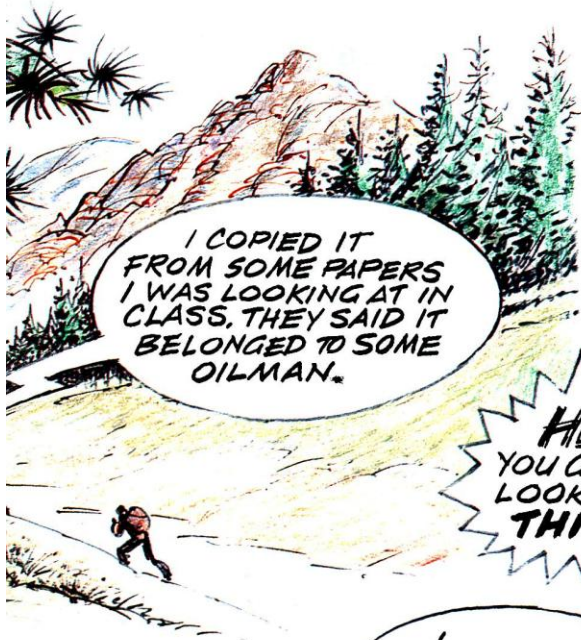
BUT NO ONE SEEMED INTERESTED AND HIS LEAD WAS NOT FOLLOWED UP.

ONE DAY IN THE 1970S, PONT WIFFEN, A RADIO TECHNICIAN AND SMALL-TIME FARMER, WAS TALKING TO HIS WIFE, JOAN.



I'LL MAKE TIME. BESIDES, I'VE ALWAYS BEEN INTERESTED IN GEOLOGY.

WHEN THEY BEGAN DIGGING, PONT AND JOAN FIRST FOUND THE REMAINS OF SOME MARINE INVERTEBRATES, BUT ONE DAY IN 1973...



I COPIED IT FROM SOME PAPERS I WAS LOOKING AT IN CLASS. THEY SAID IT BELONGED TO SOME OILMAN.



HEY—YOU GUYS! LOOK AT THIS!

A WEEK AFTER THEY RETURNED FROM AUSTRALIA, THE TELEPHONE RANG...

YES! IT IS A DINOSAUR!



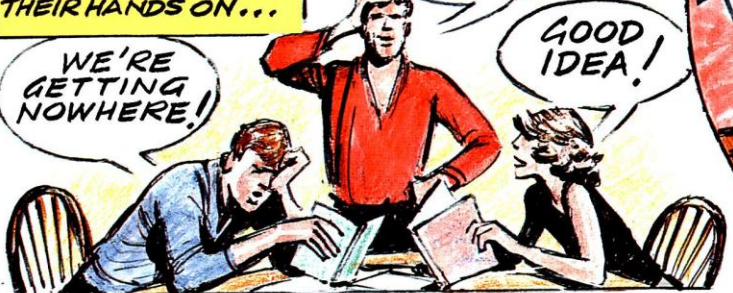
HOORAY!

SO, JUST BECAUSE JOAN AND PONT WIFFEN DIDN'T WANT TO WASTE THE FEES FOR PONT'S NIGHT CLASSES, NEW ZEALAND'S FIRST DINOSAUR REMAINS HAD BEEN FOUND.

EVERYONE TRIED TO IDENTIFY THE FIND FROM THE BOOKS THEY HAD MANAGED TO GET THEIR HANDS ON...

WE'RE VISITING AUSTRALIA SOON. WHY DON'T WE TAKE A CAST OF IT WITH US?

WE'RE GETTING NOWHERE!



GOOD IDEA!

Improve and test your knowledge with... **FACT FILE**

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

Bones by numbers

All theropods had the same number of vertebrae in their necks (10), their backs (13) and their hips (5). Reptiles, birds and even the plant-eating dinosaurs are much more variable in the number of vertebrae they have.

Live birth?

The bone-headed dinosaurs, such as *Pachycephalosaurus*, had very wide hips. Some experts think that this means they gave birth to live young, rather than laying eggs!

- 1** A *lagerstätten* is the scientific name for:
- a) a German coal mine
 - b) a deposit of fossils
 - c) a kind of coal

- 4** Sail-backed *Lotosaurus* was a:
- a) thecodont
 - b) tortoise
 - c) dinosaur

- 7** The creature with the longest neck of any known animal is:
- a) *Deinocheirus*
 - b) *Yangchuanosaurus*
 - c) *Mamenchisaurus*

- 2** The first time the remains of a dinosaur nest and eggs were discovered was:
- a) in 1923
 - b) in 1844
 - c) in 1980

- 5** Which prehistoric creature was named after a Hindu god?
- a) *Dravidosaurus*
 - b) *Sivatherium*
 - c) *Mononykus*

- 8** *Alioramus'* head had:
- a) a ridge of horns
 - b) a pair of antlers
 - c) a coloured crest

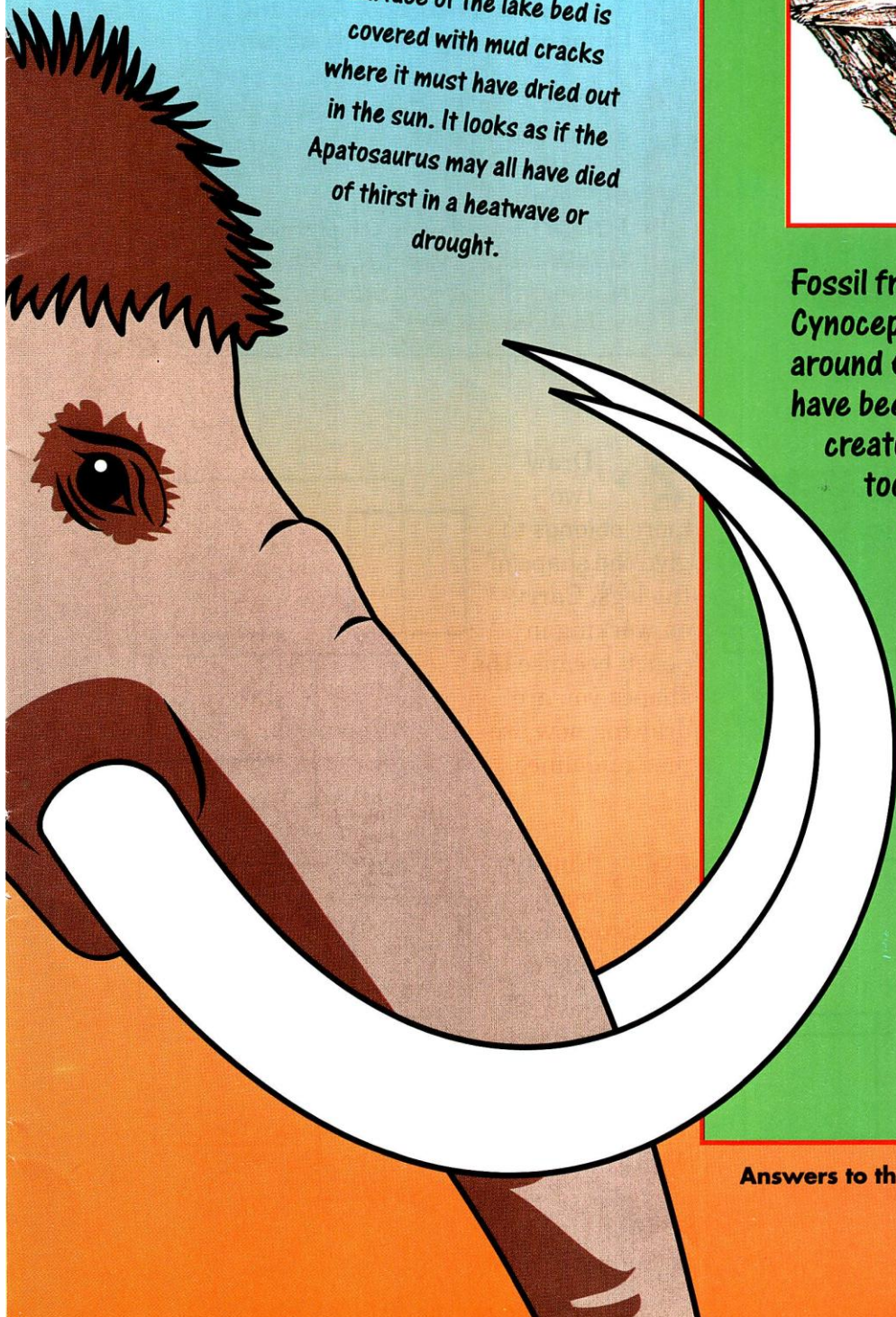
- 3** The crocodile *Phosphatosaurus* used its blunt back teeth to:
- a) catch fish
 - b) grind up plants
 - c) crack open turtle shells

- 6** *Gracilisuchus* ran on two legs, ate lizards and was a:
- a) dinosaur
 - b) crocodile
 - c) pterosaur

- 9** *Deinocheirus'* arms measured about:
- a) 1m long
 - b) 7.2m long
 - c) 2.6m long

- 10** Roy Chapman Andrews began his career by:
- a) digging up dinosaurs
 - b) scrubbing floors
 - c) fighting bandits

1990



Dying for a drink
At Sheep Creek in Wyoming, USA, many Apatosaurus skeletons have been found grouped together. They are all on a dry lake bed. The surface of the lake bed is covered with mud cracks where it must have dried out in the sun. It looks as if the Apatosaurus may all have died of thirst in a heatwave or drought.

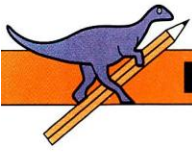
Early glider



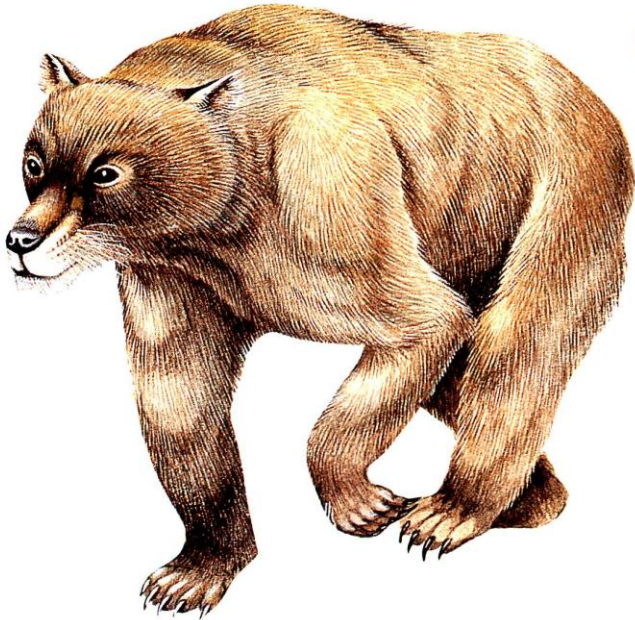
Fossil fragments of *Cynocephalus*, dating from around 60 million years ago, have been found. This creature can still be seen today in South East Asia. It is often mistakenly called the flying lemur. In fact, it is not a lemur, and while it can glide using the folds of skin between the front and back legs, it certainly cannot fly. It is a skilful climber, holding on to branches with its long claws.

Answers to the questions on inside back cover

1991



AGRIOTHERIUM

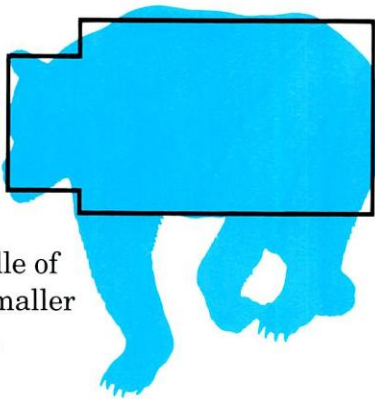


Fact box

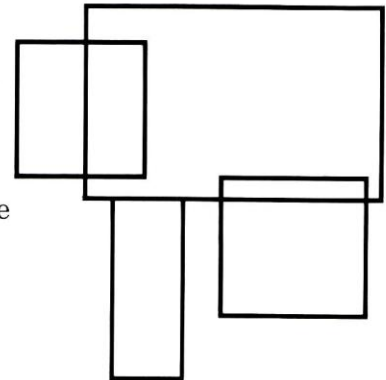
Agriotherium was a kind of primitive bear. Remains of **Agriotherium** have been found in Europe, Asia and in Langebaanweg in South Africa.

- **NAME:** *Agriotherium* (a-gree-o-theeri-um) means 'wild beast'
- **GROUP:** mammal
- **SIZE:** 2m long
- **FOOD:** berries, insects, fish and meat
- **LIVED:** over 20 million years ago in the Miocene in Europe and Asia and survived in South Africa until the Pliocene.

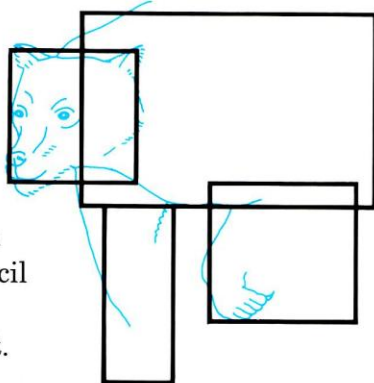
1 Add to your collection of prehistoric creatures with *Agriotherium*. Pencil in a large oblong in the middle of the paper. Put a smaller oblong on one end.



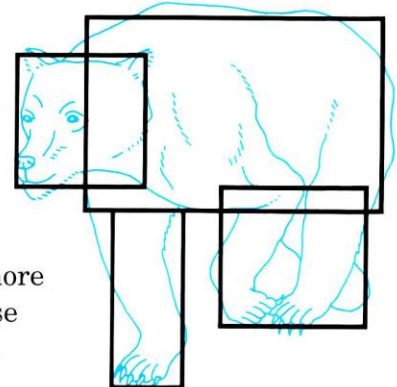
2 Draw two more oblongs to give the shape of the legs. Carry on working in pencil because the shapes you are drawing now are just guidelines.



3 Begin to sketch in the details of the face and claws. You can start working in colour now, or you may prefer to pencil in the whole bear before colouring it.



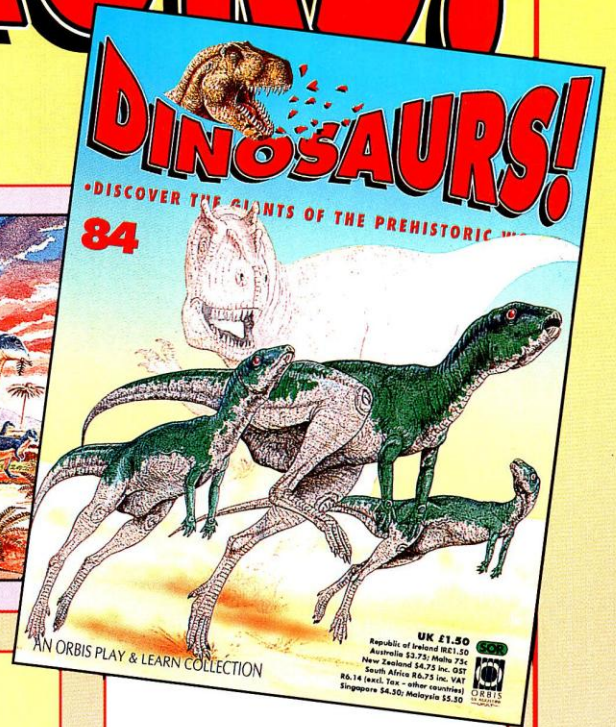
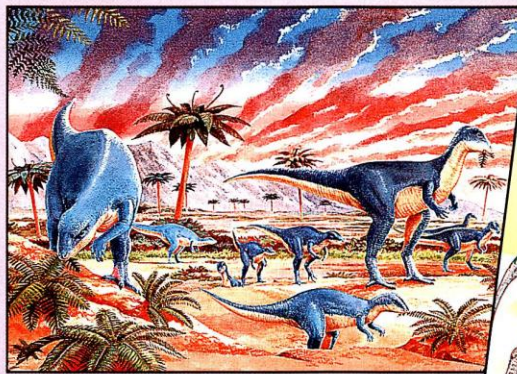
4 Finish your prehistoric bear by painting or colouring in the fur. Don't make the fur one solid colour. It looks more realistic if you use white highlights.



COMING IN PART 84 OF

DINOSAURS!

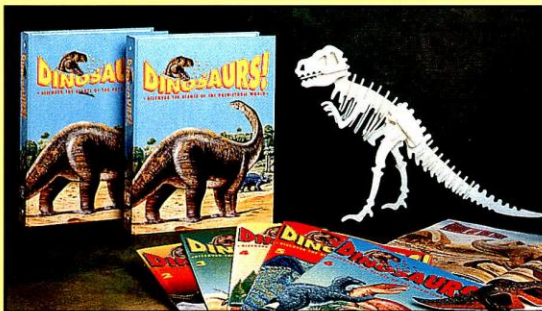
Take a walk in the Triassic in PREHISTORIC WORLD. See photos of famous dino hunter Barnum Brown at work in TIME DETECTIVE.



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PLUS

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

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Artwork: Robin Bouttell/WLAA 1978-79; Mike Dorey 1988-89; John Francis 1974TR; Tony Gibbons 1975TL, 1976 BR; Angela Hargreaves/WLAA 1984-85, 1986T, B, 1987L; Kingfisher 1975BC; James Marffy 1974-75; Bob Malhais 1992B; Deirdre McHale BC; Graham Rosewarne 1969, 1970-71, 1972, 1973, 1974B, 1975TR, BL, BR, 1977T, 1992T; Mark Stewart/WLAA 1982BL, 1982-83C, 1983TR; Chris West/Black Hat 1977C; Steve White 1980-81.

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



Dr David Norman of Cambridge University answers your dinosaur questions

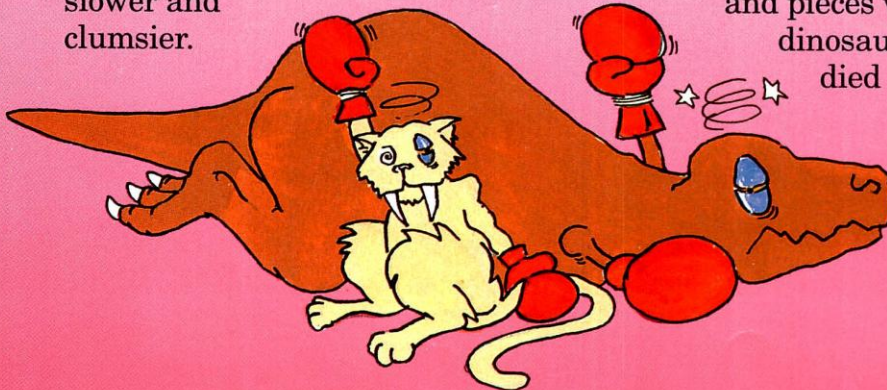
ASK THE EXPERT

Were dinosaur egg shells like the shells of hens' eggs?

Most dinosaur eggs were larger than hens' eggs, but they had a very similar construction and shape. Perhaps a better comparison would be with an ostrich egg. Ostrich eggs are larger than hens' eggs, and they have quite thick shells. They are very similar to some dinosaur eggs.

If T rex and Smilodon had lived at the same time, who would have won in a fight?

I don't think *Smilodon* and *T rex* would have fought even if they had lived at the same time. Carnivores do not tend to fight one another – they prey mainly on plant-eaters and sometimes squabble over the carcasses of dead animals. However, in a fight, *Smilodon* would have been faster and more agile and it may have been able to fight for longer. *T rex* was larger and stronger, but slower and clumsier.



Did dinosaurs eat pine cones?

The answer is 'probably'.

There is no direct evidence that they did eat pine cones. I do not know of any fossilized pine cones showing bite marks made by dinosaurs. However, there is one piece of intriguing evidence.

A mummified hadrosaur skeleton was examined many years ago, and it was reported that the stomach area was packed with twigs and pieces of pine cone. This could be evidence that these dinosaurs ate pine cones. But it is possible that all the bits and pieces were washed into the dinosaur's carcass after the creature died and the body dried out.

