



# THE ILLUSTRATED STORY OF PREHISTORIC ANIMALS 25¢

THE  
WORLD  
AROUND  
US

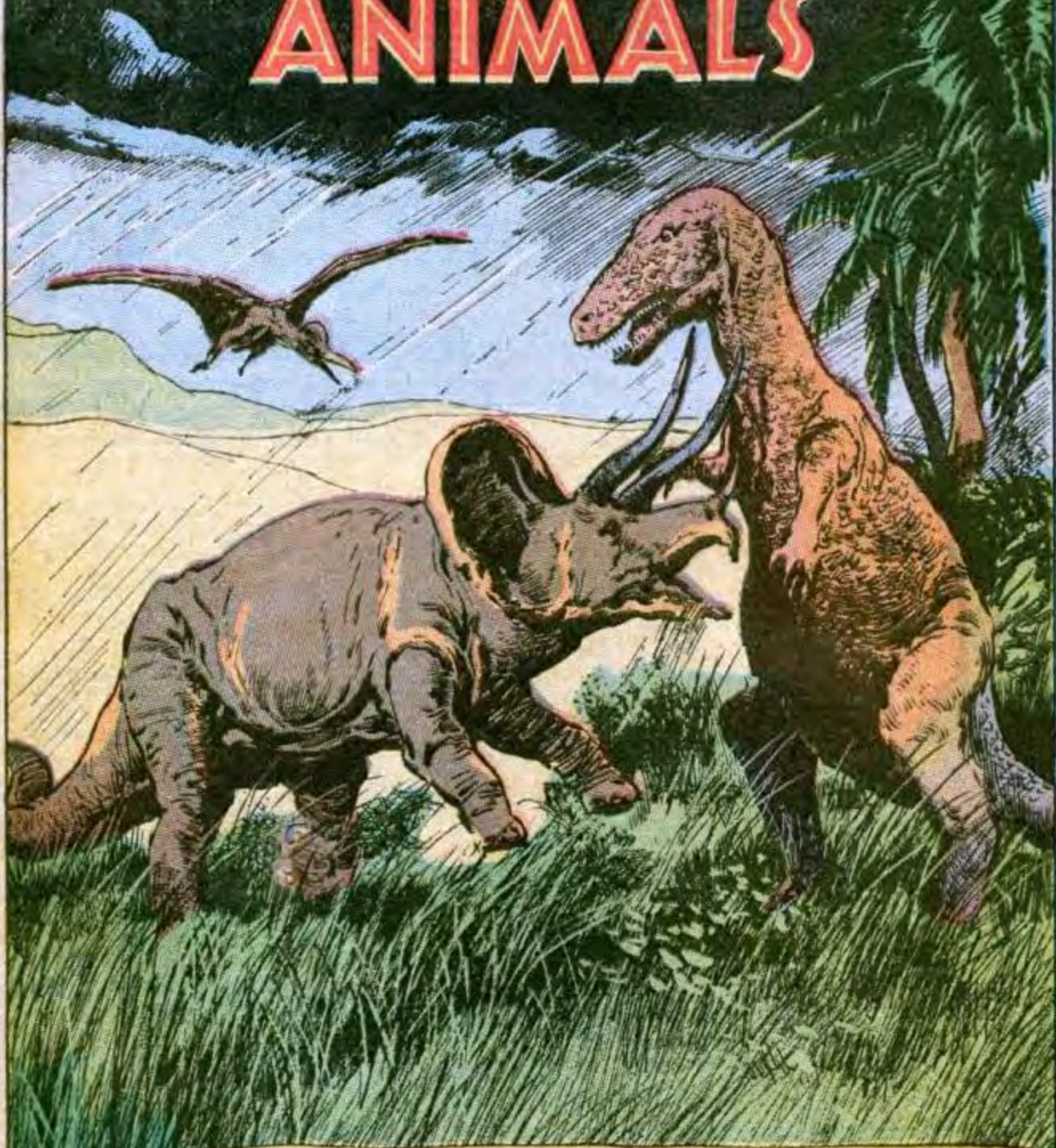


Jeffrey B. 1992

- FORGOTTEN LAND
- THE SMALLEST CONTINENT
- THE SCHOOLBOY AND THE SCIENTISTS
- "FOR THE HONOR OF OUR COUNTRY"

CLASSICS  
*Illustrated*  
PUBLICATION

# PREHISTORIC ANIMALS



**M**ONSTERS TALLER THAN TWO STORY BUILDINGS HAVE ROAMED OUR LANDS. STRANGE REPTILES HAVE FLOWN IN OUR SKIES. UNBELIEVABLE CREATURES HAVE LIVED IN OUR SEAS.

THESE WERE THE DAYS BEFORE MAN AND BEFORE RECORDED HISTORY. THESE WERE THE DAYS WHEN THE EARTH BELONGED TO PREHISTORIC ANIMALS.

# THE FISH THAT NEVER DIED

ON DECEMBER 22, 1938, OFF THE SOUTHERN TIP OF AFRICA

WHAT A STRANGE FISH!

I HAVE NEVER SEEN ONE LIKE IT.



LET US THROW IT BACK. IT WILL NOT BE GOOD TO EAT.



NO, LET US TAKE IT TO THE LADY AT THE MUSEUM.

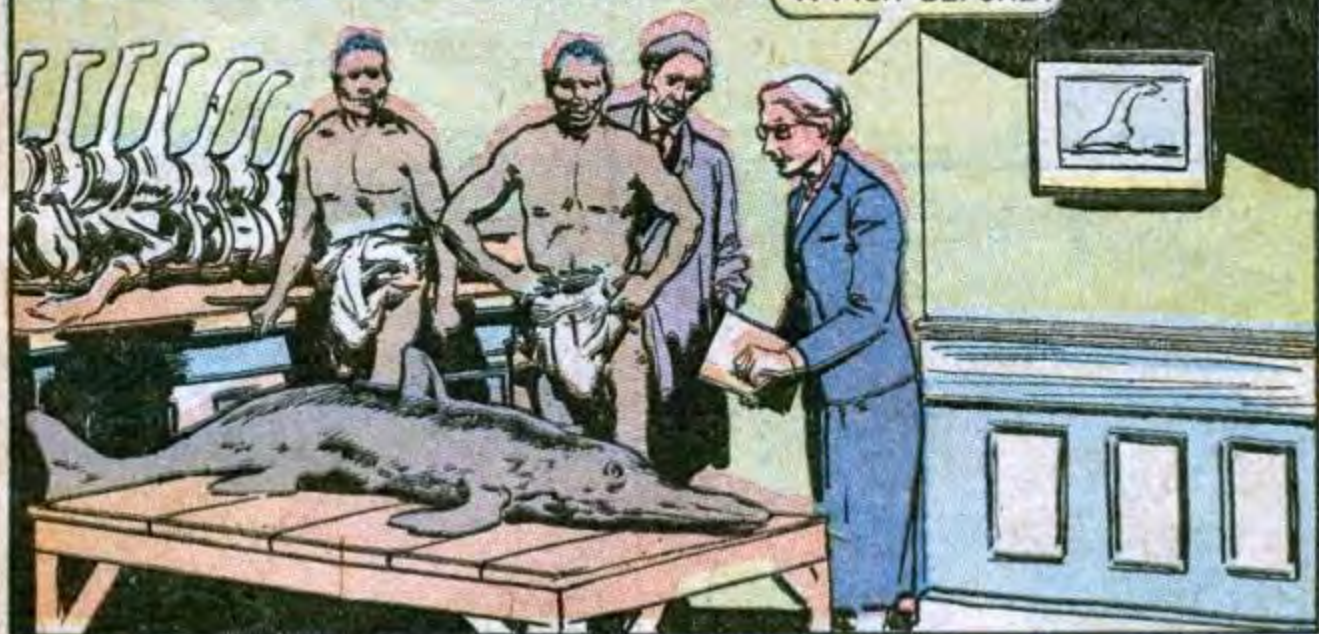


YES. SHE WILL WANT TO SEE IT BECAUSE IT IS NOT LIKE OTHER FISH.



THEY TOOK THE FISH TO THE CURATOR OF THE LOCAL MUSEUM.

WHAT A WONDERFUL FIND! I HAVE NEVER SEEN SUCH A FISH BEFORE.



BUT IT IS ALREADY BEGINNING TO DECAY. I MUST HAVE IT MOUNTED IMMEDIATELY.



WHILE THE FISH WAS BEING STUFFED AND MOUNTED, THE CURATOR WROTE LETTERS TO MANY SCIENTISTS.



A YOUNG ICHTHYOLOGIST\* FROM RHODES UNIVERSITY, GRAHAMSTOWN, SOUTH AFRICA, CAME TO SEE IT.

GOOD HEAVENS! IT LOOKS LIKE A... NO, IT COULDN'T BE!



\*A scientist who studies fish. Pronounced ik-thee-ah-lo-jist.



\* see-ia-kanth



I HAD THE SOFT ANATOMY THROWN AWAY AFTER THE FISH WAS MOUNTED.

OH, NO! WE MAY NEVER HAVE THE OPPORTUNITY TO STUDY THIS KIND OF FISH AGAIN!



**P**ROFESSOR JAMES LEONARD BRIERLY SMITH RETURNED TO HIS DESK AT RHODES UNIVERSITY. HIS WIFE UNDERSTOOD HIS DISAPPOINTMENT.

I KNOW HOW YOU FEEL, JIM. BUT MAYBE YOU'LL FIND ANOTHER COELACANTH.

HOW?



IF THERE WAS ONE COELACANTH, THERE MUST BE OTHERS.

YOU'RE RIGHT! IF WE LET ALL THE NATIVE FISHERMEN KNOW WHAT TO LOOK FOR...



**P**ROFESSOR SMITH PRINTED HANDBILLS DESCRIBING THE FISH. THEN HE AND HIS WIFE WENT FROM VILLAGE TO VILLAGE.

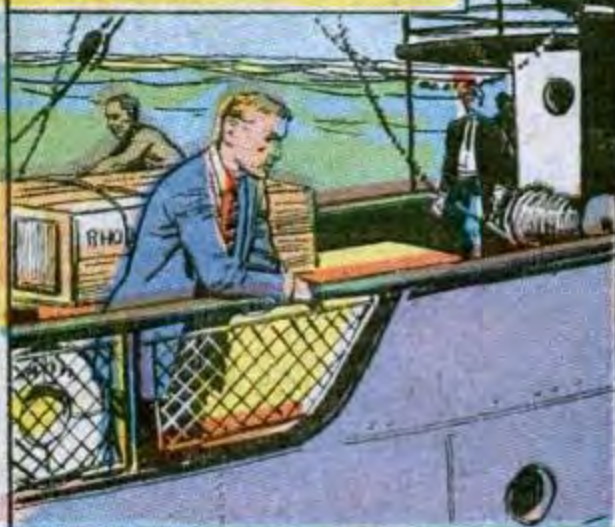
IF YOU FIND A FISH LIKE THE ONE IN THE PICTURE, I WILL GIVE YOU MONEY FOR IT.



**T**OGETHER PROFESSOR SMITH AND HIS WIFE WALKED THOUSANDS OF MILES ALONG THE SOUTHEASTERN COAST OF AFRICA, HANDING OUT PAMPHLETS DESCRIBING THE COELACANTH.



**F**OURTEEN YEARS PASSED. PROFESSOR SMITH SAILED ABOUT COLLECTING FISH SPECIMENS FOR RHODES UNIVERSITY, BUT HE COULD NOT FIND A COELACANTH.



**T**HEN ONE DAY, OFF THE NORTHWESTERN TIP OF MADAGASCAR IN THE COMORO ISLAND GROUP.



**T**HE NEXT MORNING, THE FISHERMEN TOOK THE BIG FISH TO MARKET.



**A**S PROFESSOR SMITH'S SHIP PULLED INTO THE HARBOR OF DURBAN, SOUTH AFRICA, THE RADIOMAN RECEIVED AN URGENT MESSAGE.

PROFESSOR SMITH! HERE'S A RADIO CALL FROM CAPTAIN ERIC HUNT ON HIS SCHOONER. HE SAYS SOME NATIVES CAUGHT A COELACANTH IN THE COMORO ISLANDS!

I MUST GET A PLANE AND FLY THERE AT ONCE!



**H**E WAS GIVEN A MILITARY PLANE BY THE PRIME MINISTER OF SOUTH AFRICA. WITHIN HOURS HE WAS BOARDING THE SCHOONER.

THE NATIVES BANGED UP THE FISH'S HEAD WHEN THEY CAUGHT IT, JIM, BUT I BELIEVE IT'S A COELACANTH.

YOU UNWRAP IT, ERIC. I'M TOO EXCITED TO TOUCH IT!



**A**FTER A FOURTEEN YEAR SEARCH FOR A FISH SCIENTISTS BELIEVED DID NOT EXIST, ANOTHER ONE LAY BEFORE HIM.

NOW I HAVE A WHOLE COELACANTH TO STUDY!



SCIENTISTS THOUGHT COELACANTHS DIED OUT OVER SEVENTY-FIVE MILLION YEARS AGO.

BUT THEY'VE KEPT ON REPRODUCING SOMEWHERE IN THE DEPTHS OF THE SEA. ERIC, THIS IS THE MOST IMPORTANT ZOOLOGICAL \* DISCOVERY OF THE CENTURY!



\* the science of all animal life

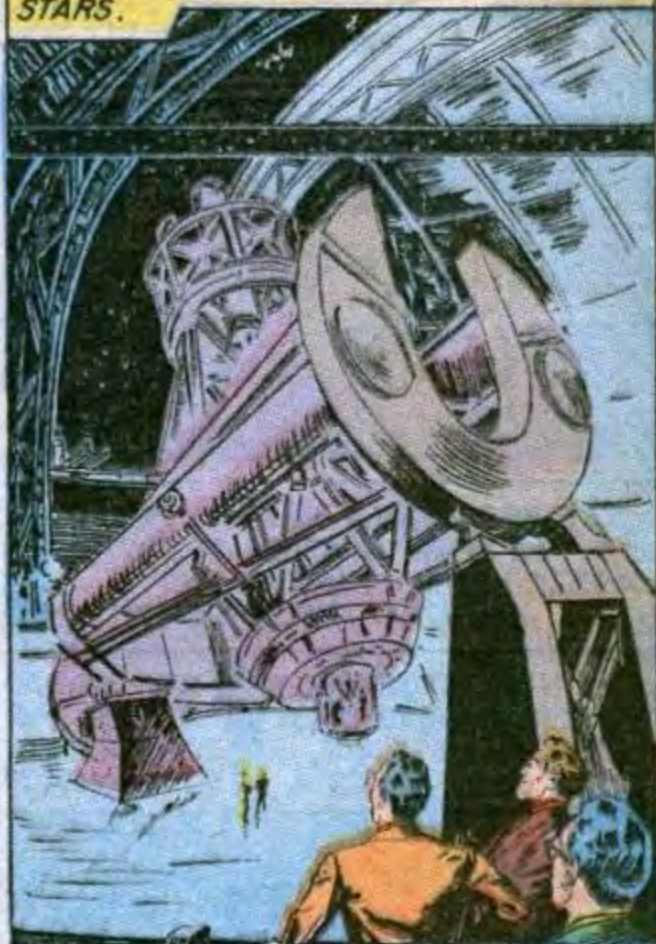


# BIRTH OF A PLANET

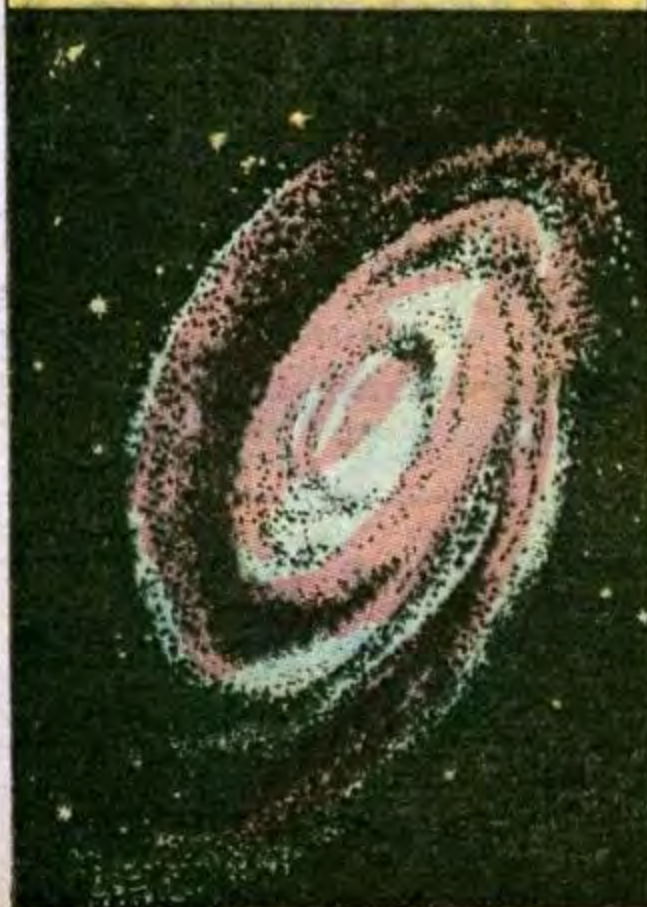
**T**HE ANCESTORS OF THE COELACANTH LIVED OVER SEVENTY-FIVE MILLION YEARS AGO. THAT'S LONGER THAN YOU CAN POSSIBLY IMAGINE. BUT OUR EARTH IS MUCH, MUCH OLDER THAN THAT. HOW DID LIFE BEGIN ON EARTH? HOW DID THE EARTH BEGIN?



**T**O FIND OUT HOW THE EARTH WAS FORMED, SCIENTISTS CALLED ASTRONOMERS HAVE LOOKED TO THE STARS.



**I**T IS BELIEVED THAT STARS WERE FORMED FROM SPINNING, GASEOUS MATTER. EACH CLOUD OF SPINNING GAS IS CALLED A NEBULA.



**T**HE SAME NEBULA SEEN FROM ITS SIDE SHOWS A RING OF SOLID MATTER FORMING AROUND THE OUTER EDGE.



**T**HIS RING OF MATTER IS MADE OF BILLIONS OF BURNING BALLS OF GAS WHICH WHIRL FURTHER AND FURTHER APART. THESE ARE STARS.



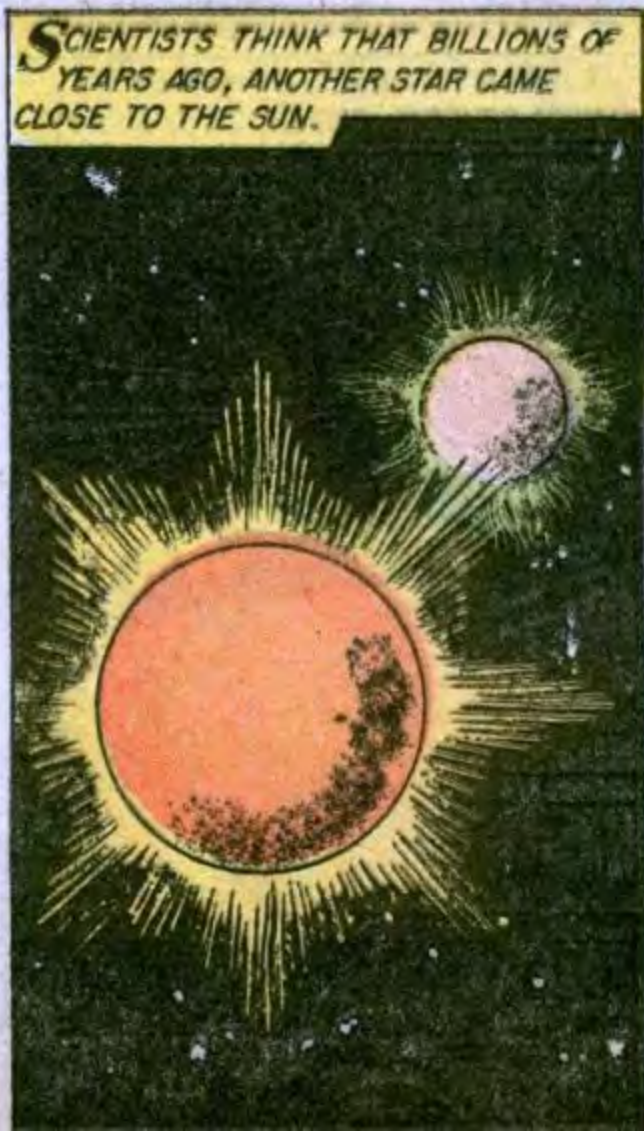
**W**HEN YOU LOOK AT THE MILKY WAY YOU ARE SEEING THE RING OF STARS OF OUR OWN NEBULA. OUR SUN IS ONE SMALL STAR AT THE OUTER EDGE OF THIS RING.



**L**IKE MOST STARS, THE SUN ONCE TRAVELLED ALONE.



**S**CIENTISTS THINK THAT BILLIONS OF YEARS AGO, ANOTHER STAR CAME CLOSE TO THE SUN.



**S**TARS ARE NOT SOLID. THEY ARE MADE OF BURNING LIQUID AND GAS. WHEN THE TWO STARS CAME CLOSE TOGETHER, IT CAUSED A GREAT DISTURBANCE. THE SUN SHOT OFF TWO GREAT ARMS OF BURNING GAS.



**T**Hese GREAT ARMS OF GAS BROKE UP INTO SEVERAL PIECES. THEY BEGAN TO COOL AND FINALLY BECAME PLANETS.



**T**HE SOLAR SYSTEM HAD BEEN FORMED.

## FORBIDDEN LAND

**T**HE HIGHEST MOUNTAIN in the world, Mount Everest, stands in the great Himalayan mountain range. The peaks of the Himalayas rise from 20,000 feet above sea level to Mount Everest's great height of 29,028 feet. This natural barrier of snow covered crags forms the northern border of India and the southern border of China.

Beyond the Himalayas, in southern China, is a high plateau which is bordered by other mountains called the Kunlan Shan. The region between these two mountain ranges is known as Tibet.

For three hundred years, explorers from Europe have tried to enter Tibet to learn what that strange land is like. But the rugged mountains and the harsh climate have made it difficult to reach. Even when foreigners could get there, the Tibetans have been unwilling to permit them to enter.

The capital city of Tibet is Lhasa. It lies in the southern part of the country, near the Himalayas. It was known as the Forbidden City, because no white man set foot in it until 1904.

In 1899, an adventurous Swedish explorer named Sven Hedin started a long journey to find out what Tibet was like. For three years he traveled across high mountains and over the vast desert-plateau of Tibet in an attempt to reach the Forbidden City of Lhasa. He disguised himself in the heavy clothing of the Tibetan

peasant and shaved his head, hoping to enter the city unnoticed. But he did not succeed. At the end of his three years of travel in this mysterious land, he was forced to return to the outside world.

Meanwhile, the British had been trying for hundreds of years to make treaties with Tibet in order to trade with its people. Finally, in 1904, Colonel Francis Younghusband led some British soldiers into the country. After a year of battling the harsh land and the hostile people, the British entered Lhasa. After all the fantastic stories they had heard about this strange city, they were disappointed. They saw only a dirty little town with narrow streets. But on a hill above the town rose the great palace of the ruling Lama. Its roofs of pure gold shone in the sun.

Though there are telephone and telegraph lines into Tibet now, it is still a country that is mysterious to foreigners. There are about 3,000,000 Tibetans, most of whom are farmers or monks. There are herdsmen, also. They care for the yak, an animal that provides Tibet with transportation, food and fuel.

The ruler of Tibet is a religious figure—the Lama. When he dies, the people believe his spirit is re-born in the body of a young boy. The priests search all of Tibet to find the boy who is to be the new Lama. Only the high priests know how to find him. When they do, they educate him until he is old enough to become the new ruler.

# LIFE BEGINS

SCIENTISTS THINK THE EARTH BEGAN TO COOL TWO BILLION YEARS AGO. A CRUST OF ROCK FORMED ON THE OUTSIDE. THERE WERE MANY VOLCANOS, FOR THE CENTER OF THE EARTH WAS STILL VERY HOT.



AS THE EARTH CONTINUED TO COOL, GREAT CLOUDS OF STEAM FROM THE VOLCANOS FORMED, WHICH TURNED INTO HEAVY RAINS. IT RAINED FOR THOUSANDS OF YEARS. THE OCEANS WERE FORMED.



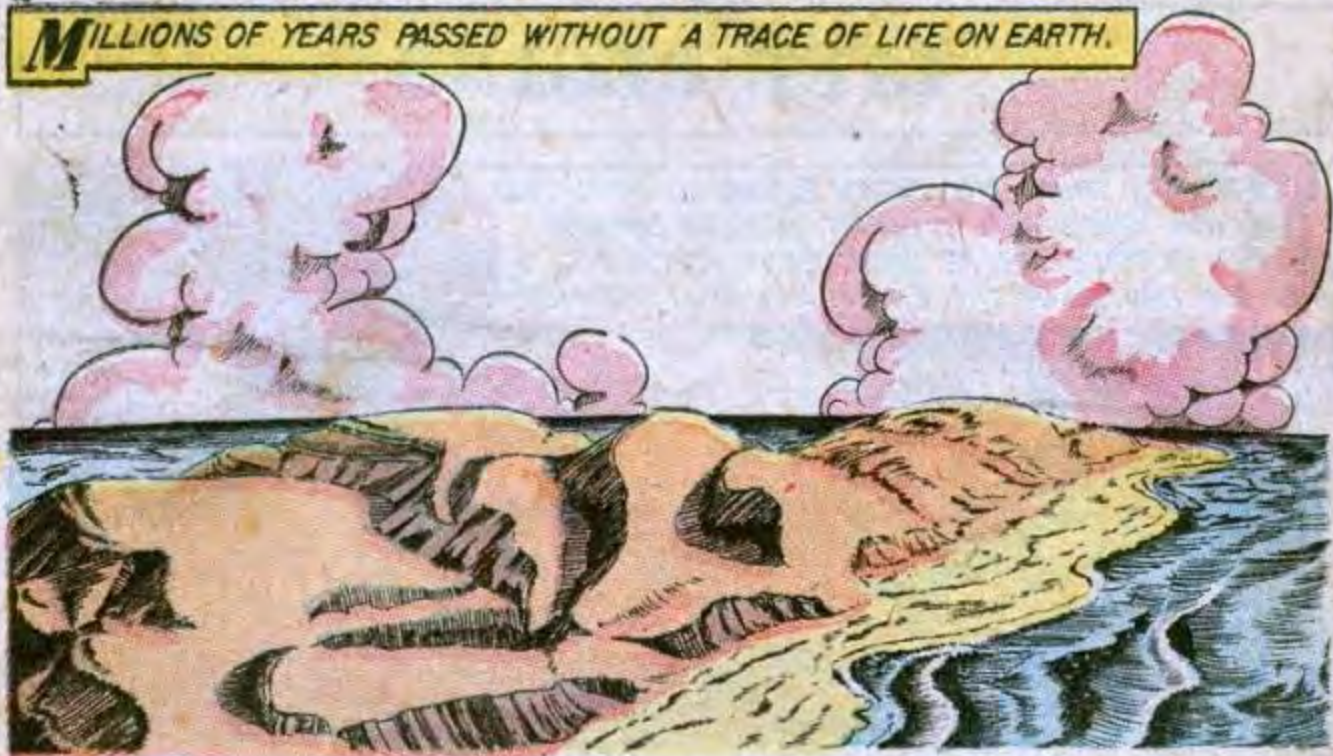
FOR MILLIONS OF YEARS, WATER AND WIND WORKED AWAY AT THE EARTH'S ROCKY CRUST, MAKING SAND AND DIRT. THIS PROCESS IS CALLED EROSION.



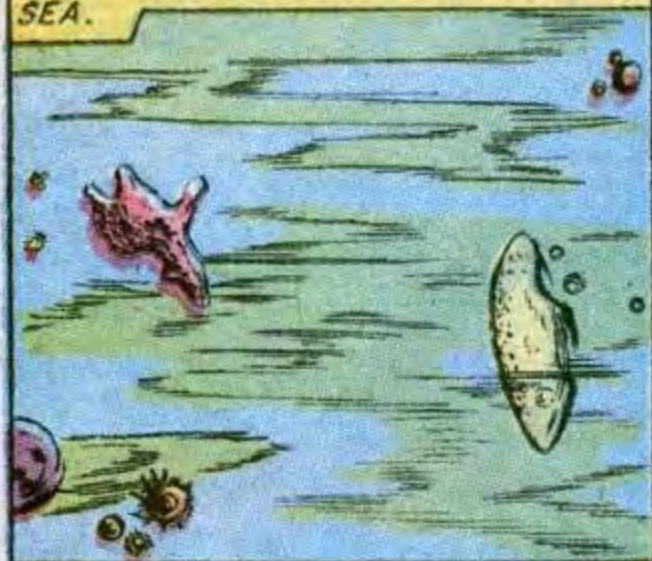
THERE WERE ALSO MANY EARTHQUAKES. THE GROUND HEAVED UP TO MAKE MOUNTAINS.



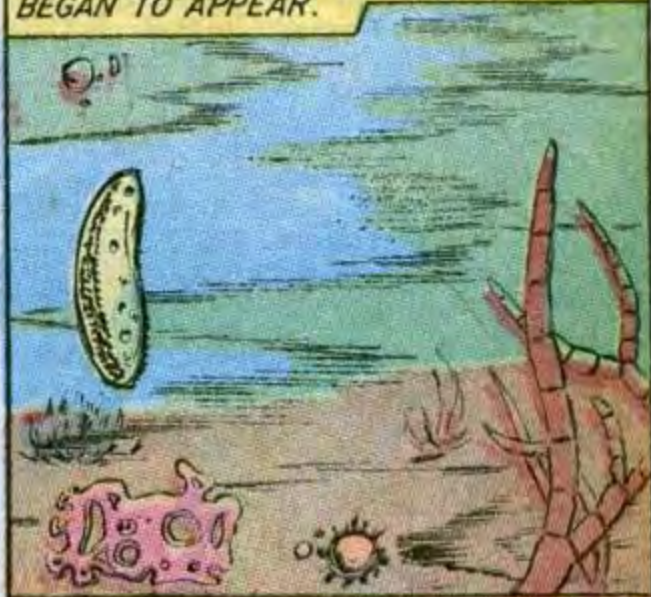
**M**ILLIONS OF YEARS PASSED WITHOUT A TRACE OF LIFE ON EARTH.



**N**O SCIENTIST CAN SAY FOR CERTAIN HOW LIFE BEGAN. BUT SOMETIME OVER FIVE HUNDRED MILLION YEARS AGO, LIVING THINGS APPEARED IN THE SEA.



**T**HEY WERE TINY ONE-CELLED PLANTS AND ANIMALS. THEN ANIMALS AND PLANTS WITH MORE THAN ONE CELL BEGAN TO APPEAR.



**T**HE FIRST ANIMALS WERE SOFT AS JELLY. THEY COULD NOT MOVE BY THEMSELVES, BUT ONLY FLOATED IN THE WATER.



**THEN SIMPLE KINDS OF SEAWEED  
BEGAN TO GROW.**



**SEA WORMS, TINY SNAILS AND  
STARFISH CREEPT SLOWLY OVER  
THE SANDY OCEAN FLOOR.**



**WATER SCORPIONS AND LARGER  
JELLYFISH SWAM AMONG  
CORAL AND SPONGES.**



**THE SOFT ANIMALS DRIFTED OR  
PADDLED SLOWLY TO FIND FOOD--  
OR WAITED PATIENTLY FOR FOOD  
TO COME TO THEM.**



**S**QUIDS LIVED IN SHELLS THAT SOMETIMES GREW TWELVE FEET LONG. LAMP SHELLS BURROWED IN THE SAND.

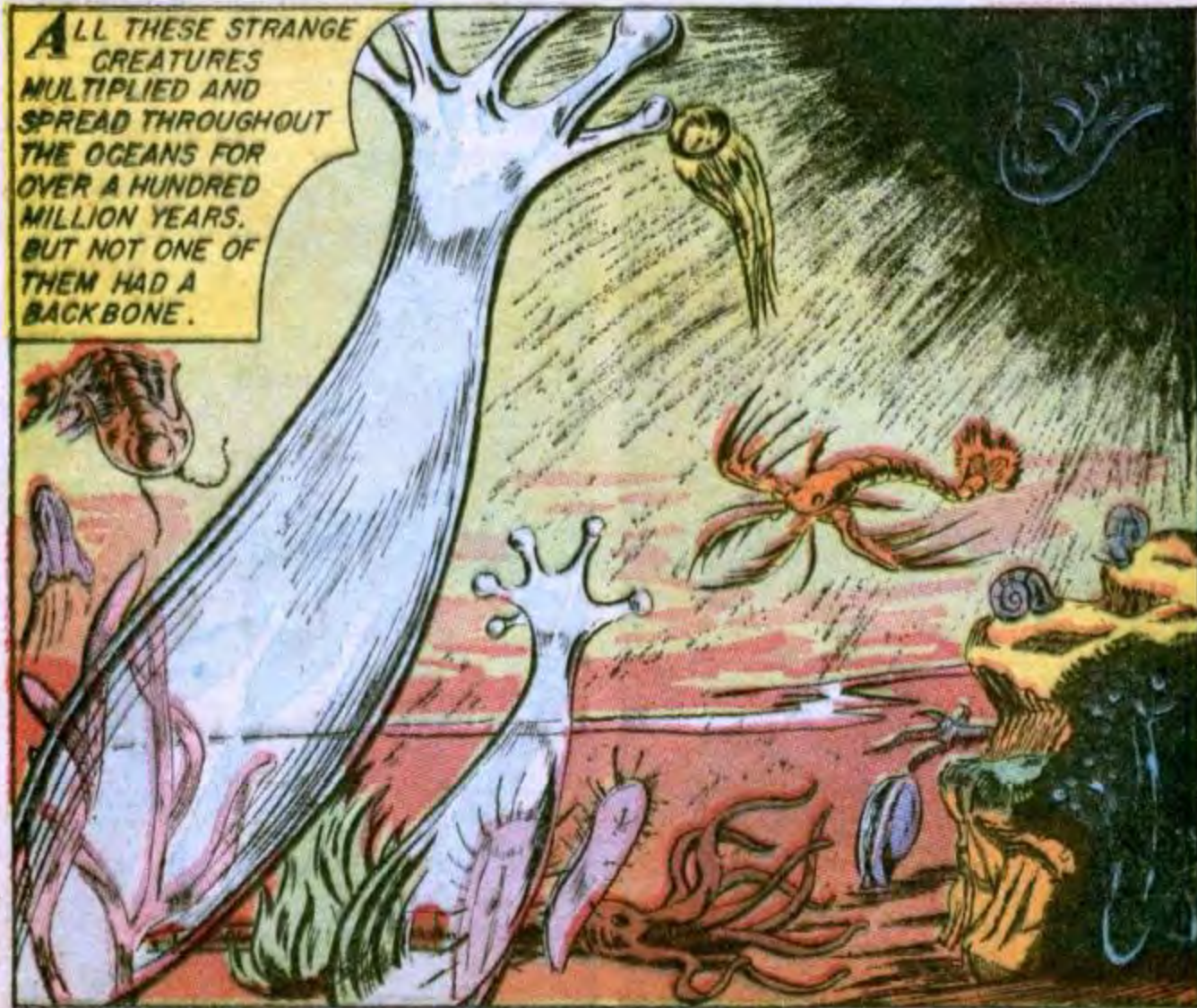


**O**NE OF THE MOST COMMON CREATURES IN THIS UNDER-WATER WORLD WAS THE TRILOBITE \*.



\* Try-lo-bite

**A**LL THESE STRANGE CREATURES MULTIPLIED AND SPREAD THROUGHOUT THE OCEANS FOR OVER A HUNDRED MILLION YEARS. BUT NOT ONE OF THEM HAD A BACKBONE.





# BACKBONES, LUNGS AND SHELLS

## FISH

**A**BOUT 375 MILLION YEARS AGO, FISH BEGAN TO APPEAR IN THE WARM SEAS. THEY WERE THE FIRST ANIMALS WITH BACKBONES.

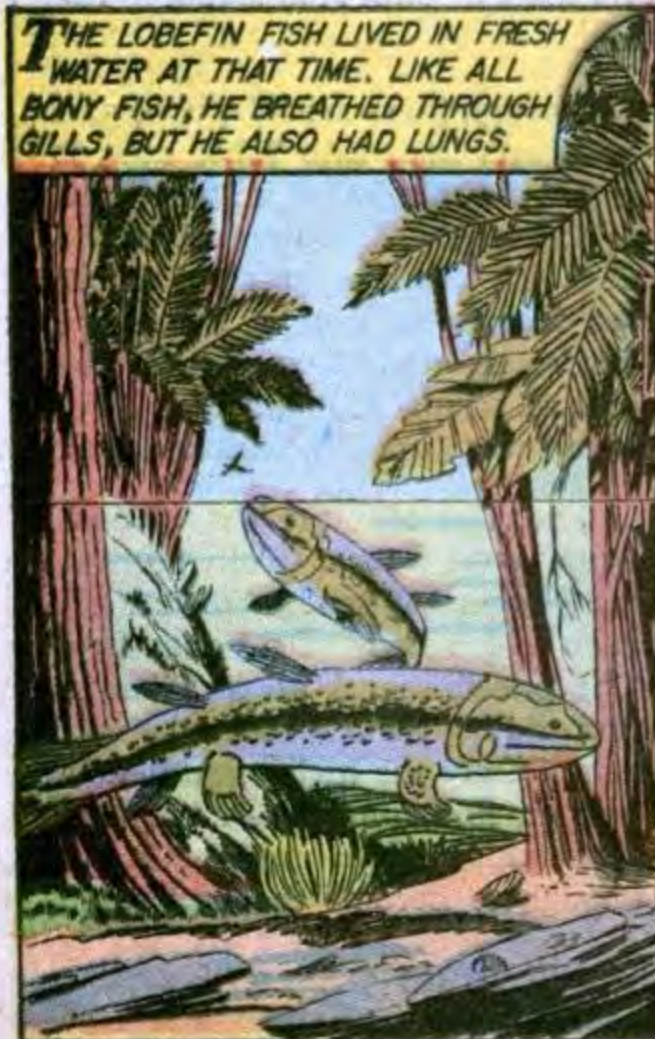


**T**HIS CLIMATUS\* HAD STRANGE, SHARP FINS. HE WAS AN ANCESTOR OF THE SHARK.



\* Cli-ma-tus

**T**HE LOBEFIN FISH LIVED IN FRESH WATER AT THAT TIME. LIKE ALL BONY FISH, HE BREATHED THROUGH GILLS, BUT HE ALSO HAD LUNGS.

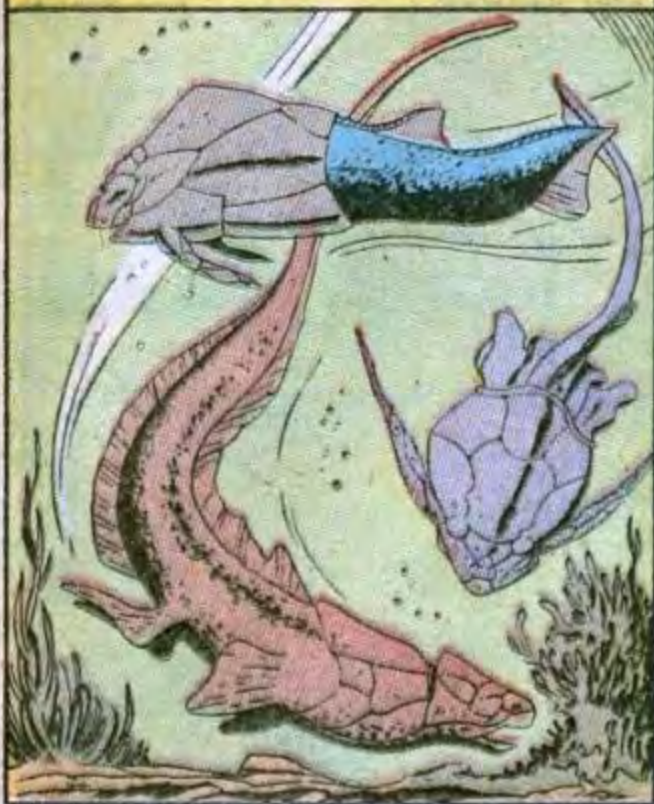


**T**HERE WAS ALSO AN ARMORED FISH CALLED A DINICHTHYS\*. THIS MEANS TERRIBLE FISH IN GREEK. HE WAS ABOUT TWENTY FEET LONG.



\* Din-ik-this

**T**HERE WERE SO MANY FISH, SCIENTISTS CALL THIS THE AGE OF FISHES.

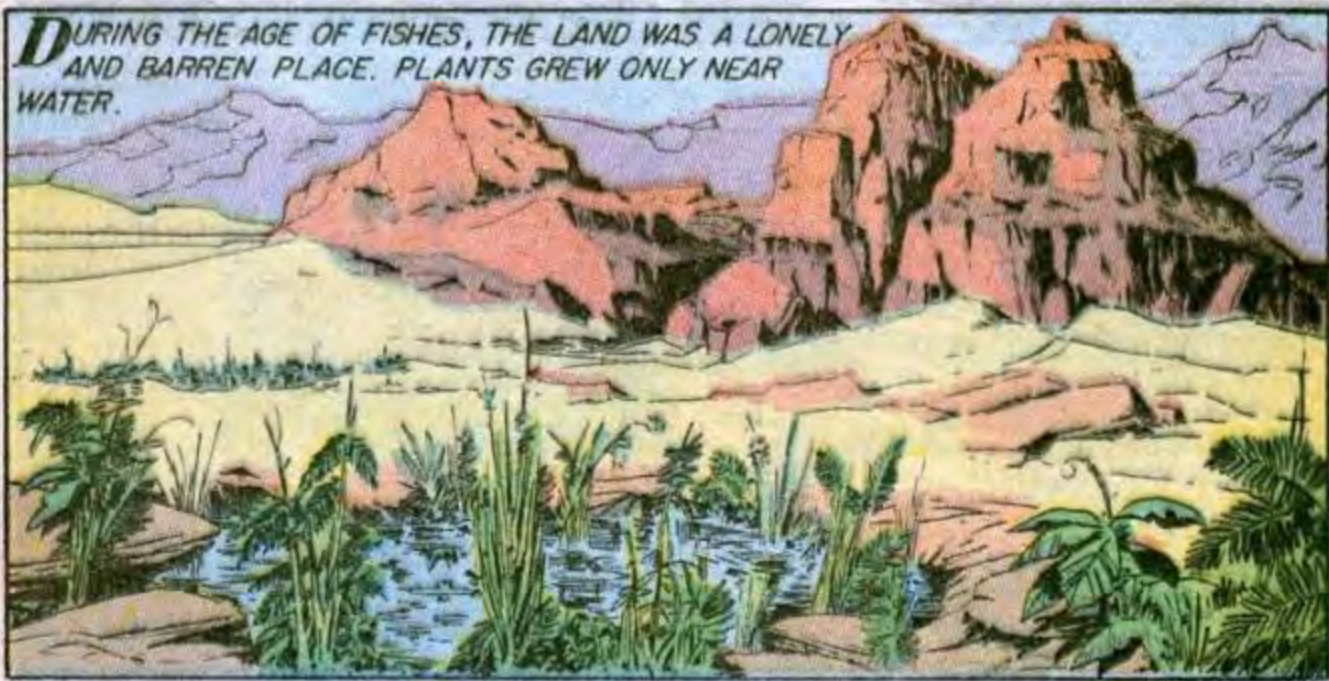


**S**OME WERE EVEN STRANGER THAN THE DINICHTHYS. THIS IS AN OSTRACODERM\*.



\*Ah-stray-ko-derm

**D**URING THE AGE OF FISHES, THE LAND WAS A LONELY AND BARREN PLACE. PLANTS GREW ONLY NEAR WATER.



**S**CORPIONS AND SNAILS LIVED ON LAND. BUT THEY COULDN'T GO FAR, FOR THEY HAD TO EAT FOOD WASHED UP BY THE SEA.



**I**N A FEW THOUSAND YEARS, IMPORTANT CHANGES TOOK PLACE. FORESTS BEGAN TO GROW.



**T**HE OCEAN FELL BACK IN MANY PLACES, LEAVING MARSHES AND SWAMPS.



**M**ANY FISH DIED WHEN THE SWAMPS BEGAN TO DRY UP.



**B**UT SOME KINDS OF FISH WERE ABLE TO BREATHE AIR AND SURVIVE ON LAND. AMONG THEM WERE THE LOBEFIN FISH.

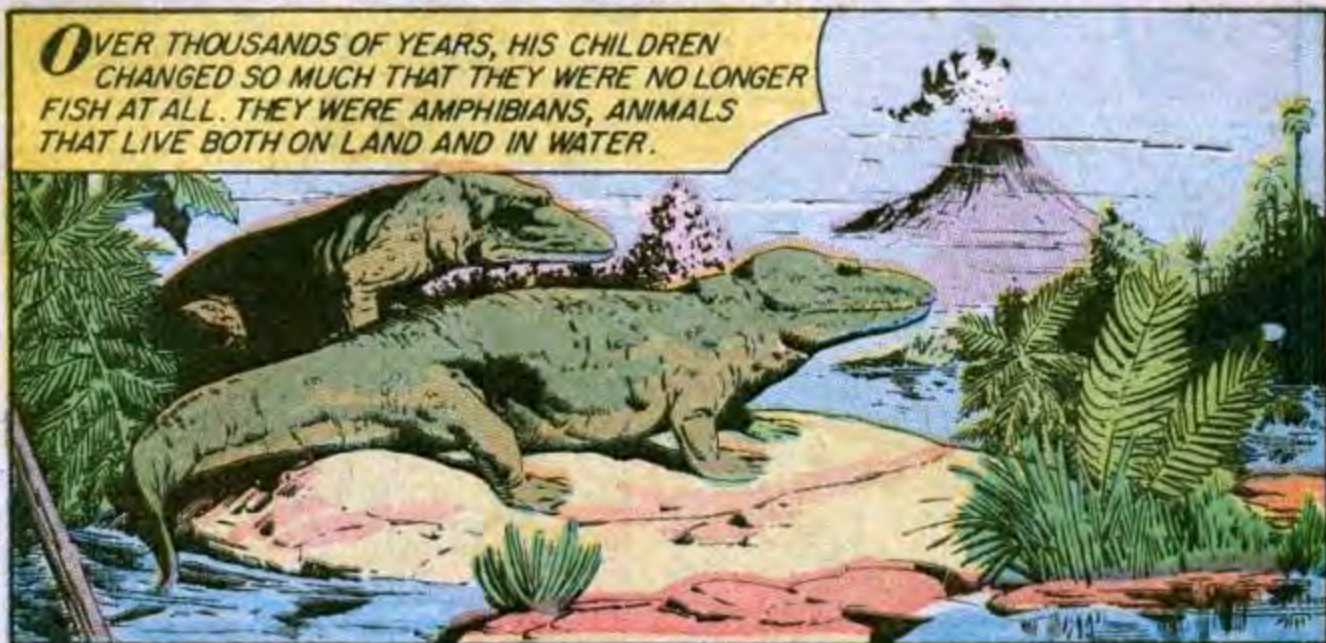


## AMPHIBIANS

**O**F COURSE, IN ORDER TO LIVE ON LAND, THE LOBEFIN FISH HAD TO CHANGE. HIS FINS WERE NO GOOD FOR WALKING, SO HE MADE LEGS OF THEM.



**O**VER THOUSANDS OF YEARS, HIS CHILDREN CHANGED SO MUCH THAT THEY WERE NO LONGER FISH AT ALL. THEY WERE AMPHIBIANS, ANIMALS THAT LIVE BOTH ON LAND AND IN WATER.



**A**FTER THIRTY MILLION YEARS, THERE WERE MANY KINDS OF AMPHIBIANS. FULL GROWN AMPHIBIANS BREATHED AIR THROUGH THEIR LUNGS, BUT SPENT A GREAT DEAL OF TIME IN THE WATER.



**M**OST OF THEM LAID THEIR EGGS IN PONDS AND STREAMS. THEN ONE WAS ABLE TO LAY EGGS WITH SHELLS, ON LAND. BECAUSE THESE ANIMALS NO LONGER LIVED IN THE SEA, OR LAID EGGS IN THE SEA, WE CALL THEM BY A NEW NAME--REPTILES.



REPTILES

REPTILES TOOK OVER THE WORLD. THEY CAME IN ALL SIZES AND SHAPES. THESE TWO LOOK ALIKE, BUT THE DIMETRODON<sup>®</sup> ATE MEAT, AND THE EDAPHOSAUR<sup>\*\*</sup> ATE PLANTS.



\*Die-met-ro-don

\*\*Ed-uh-foe-sawr

SOME OF THESE ANIMALS WENT BACK TO LIVE IN THE OCEAN, BUT THEY ALWAYS REMAINED REPTILES. THEY NEVER BECAME FISH AGAIN.

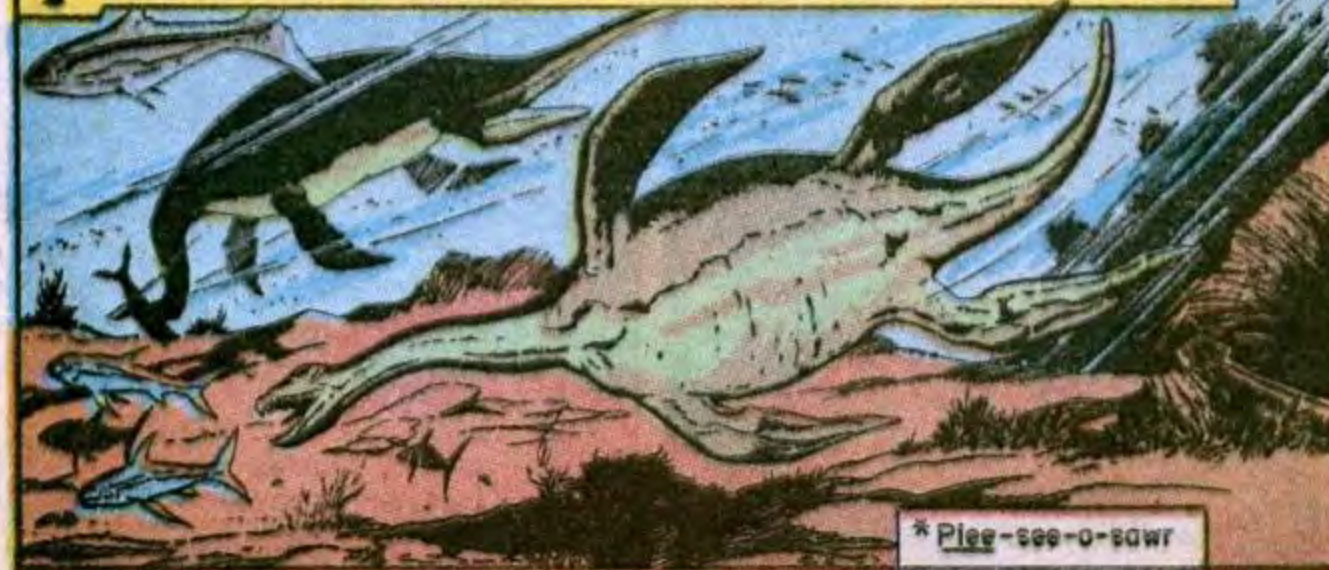


SOME, LIKE THE ICHTHYOSAURS<sup>\*</sup>, WERE SPEEDY SWIMMERS.



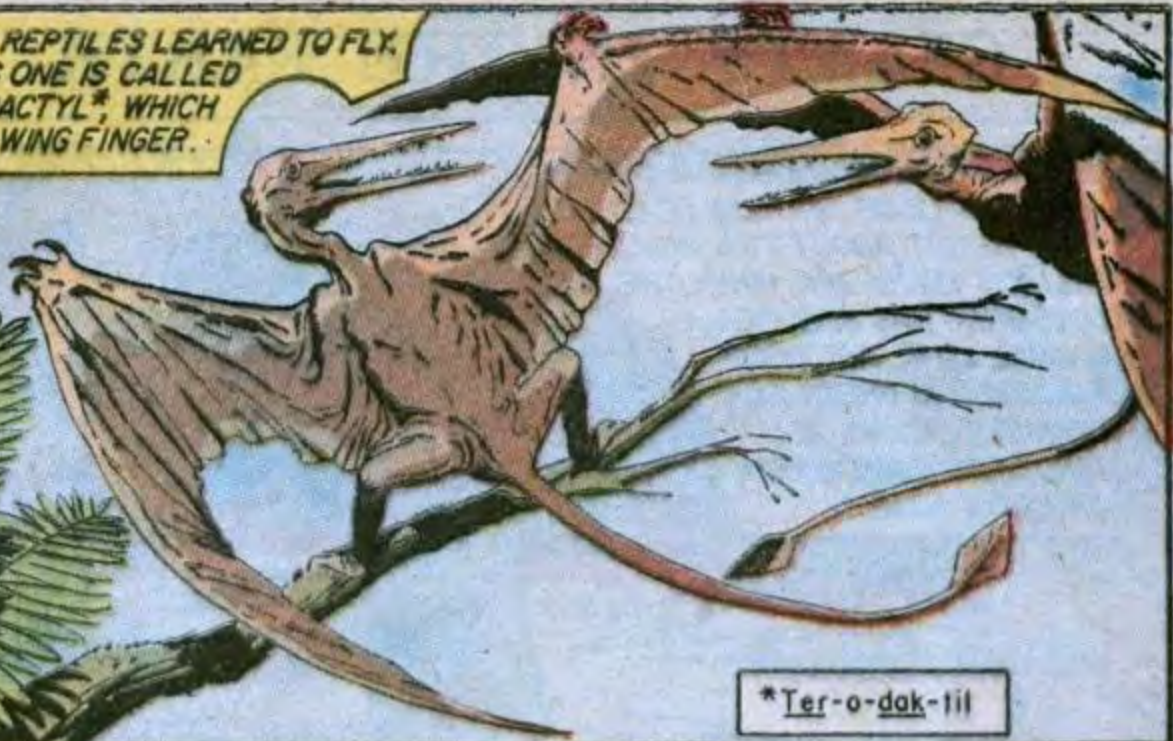
\*Ik-the-o-sawrs

THE PLESIOSAUR<sup>\*</sup> DEVELOPED A LONG NECK TO DART OUT AND CATCH FISH.



\*Plee-see-o-sawr

**SOME REPTILES LEARNED TO FLY. THIS ONE IS CALLED PTERODACTYL\*, WHICH MEANS WING FINGER.**



**\*Ter-o-dak-til**

**THIS IS A PTERANODON\*. FLYING REPTILES DID NOT FLAP THEIR WINGS LIKE BIRDS. THEY GLIDED ON AIR CURRENTS.**



**THE ARCHAEOPTERYX\* GREW FEATHERS AND LOOKED A LITTLE LIKE A BIRD OF TODAY. BUT HE HAD TEETH, CLAWS ON HIS WINGS, AND A LONG BONY TAIL.**



**\*Ark-ee-oo-ter-iks**

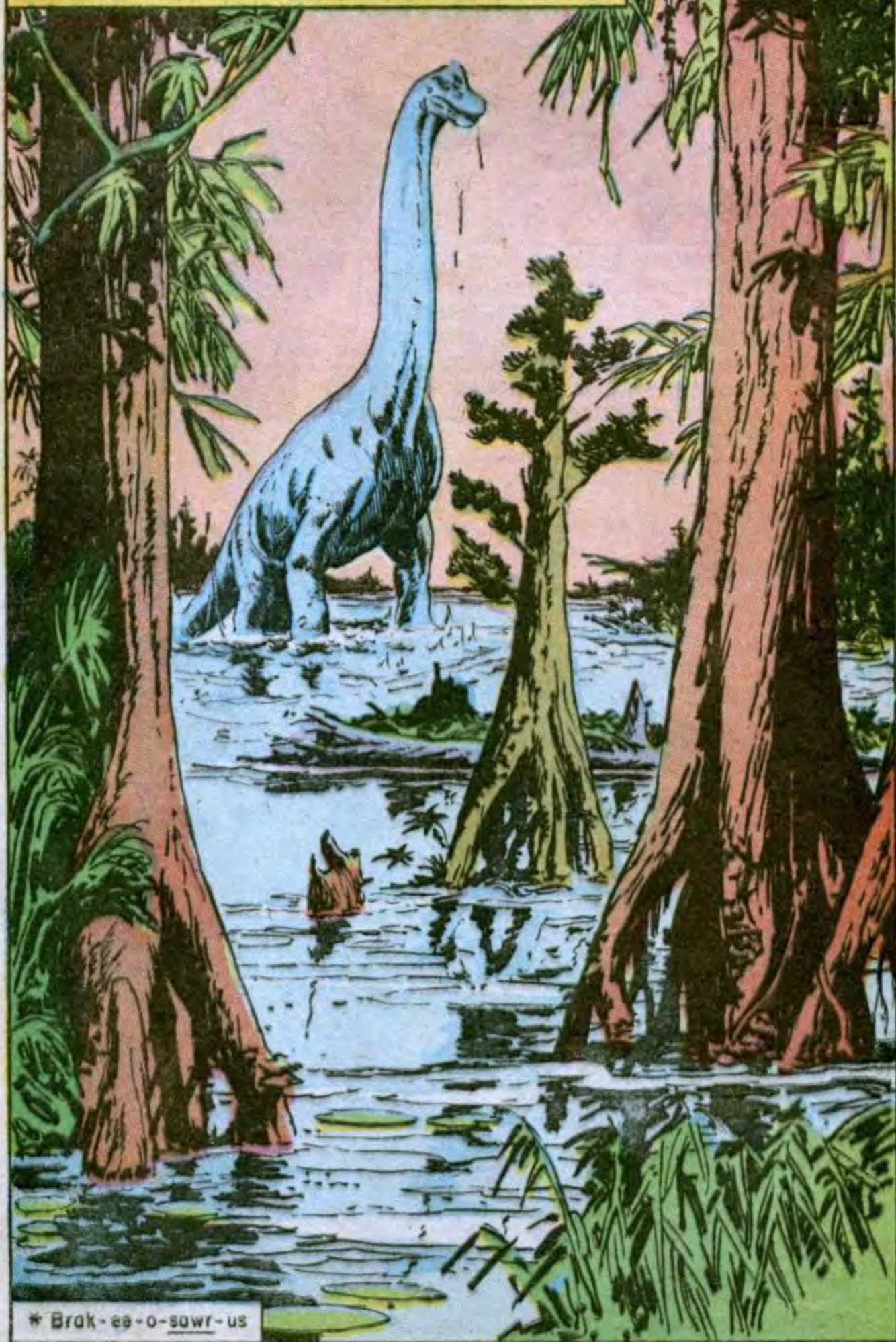
**\*Ter-an-a-don**

# GIANTS IN THE EARTH

**T**HE WORLD OF REPTILES REACHED ITS HEIGHT ABOUT TWO HUNDRED MILLION YEARS AGO, WHEN THE DINOSAUR WAS KING OF ALL ANIMAL LIFE. THE WORD DINOSAUR IS GREEK FOR TERRIBLE LIZARD. ALL DINOSAURS HAVE GREEK OR LATIN NAMES.

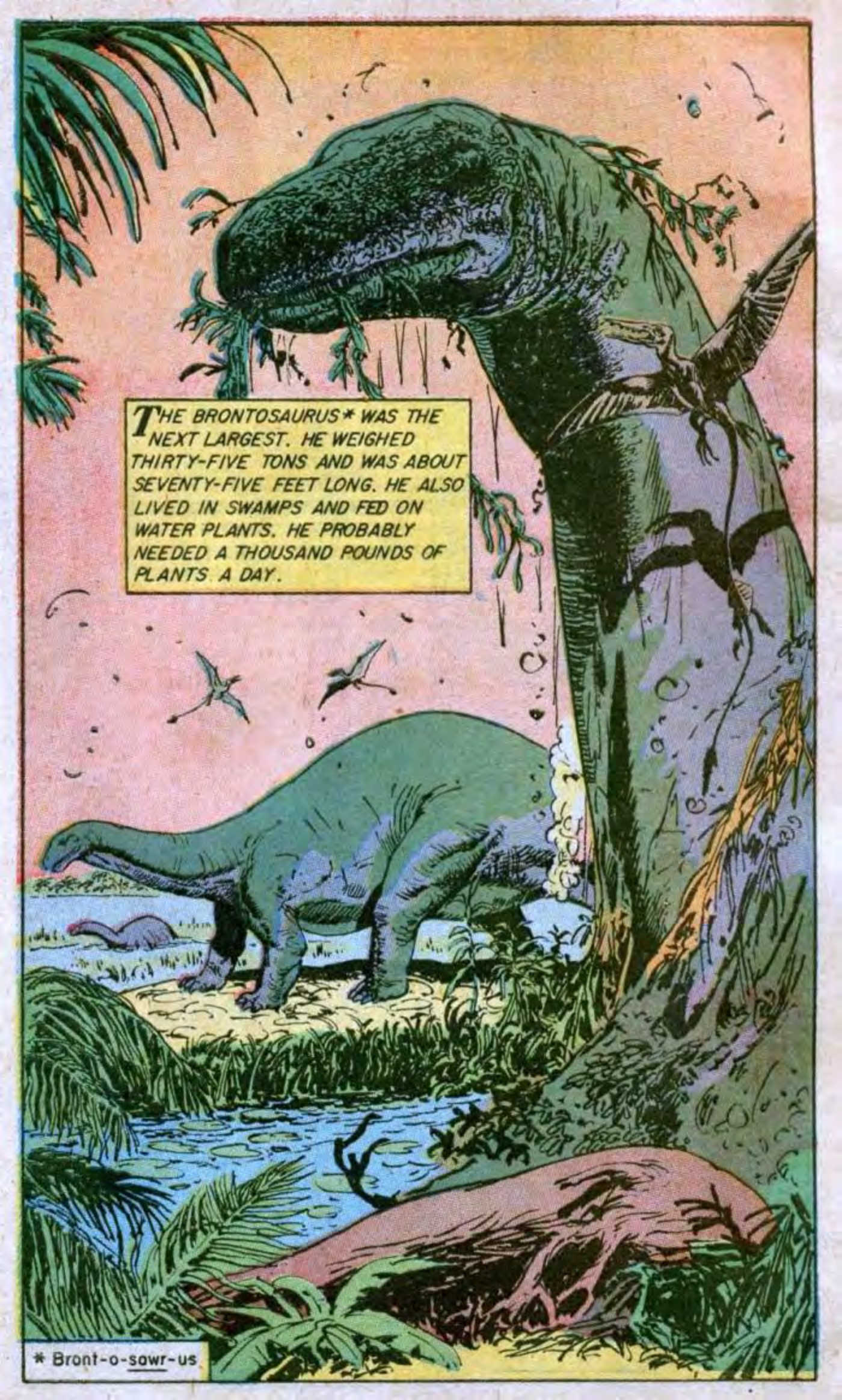


**T**HE BRACHIOSAURUS\* IS THE LARGEST ANIMAL THAT EVER WALKED THE EARTH. HE WAS ABOUT EIGHTY FEET LONG, AND WEIGHED ABOUT FIFTY TONS, WHICH IS AS MUCH AS TEN ELEPHANTS. HE SPENT MOST OF HIS TIME IN SWAMPS EATING PLANTS, FOR HE NEEDED A GREAT DEAL OF FOOD.



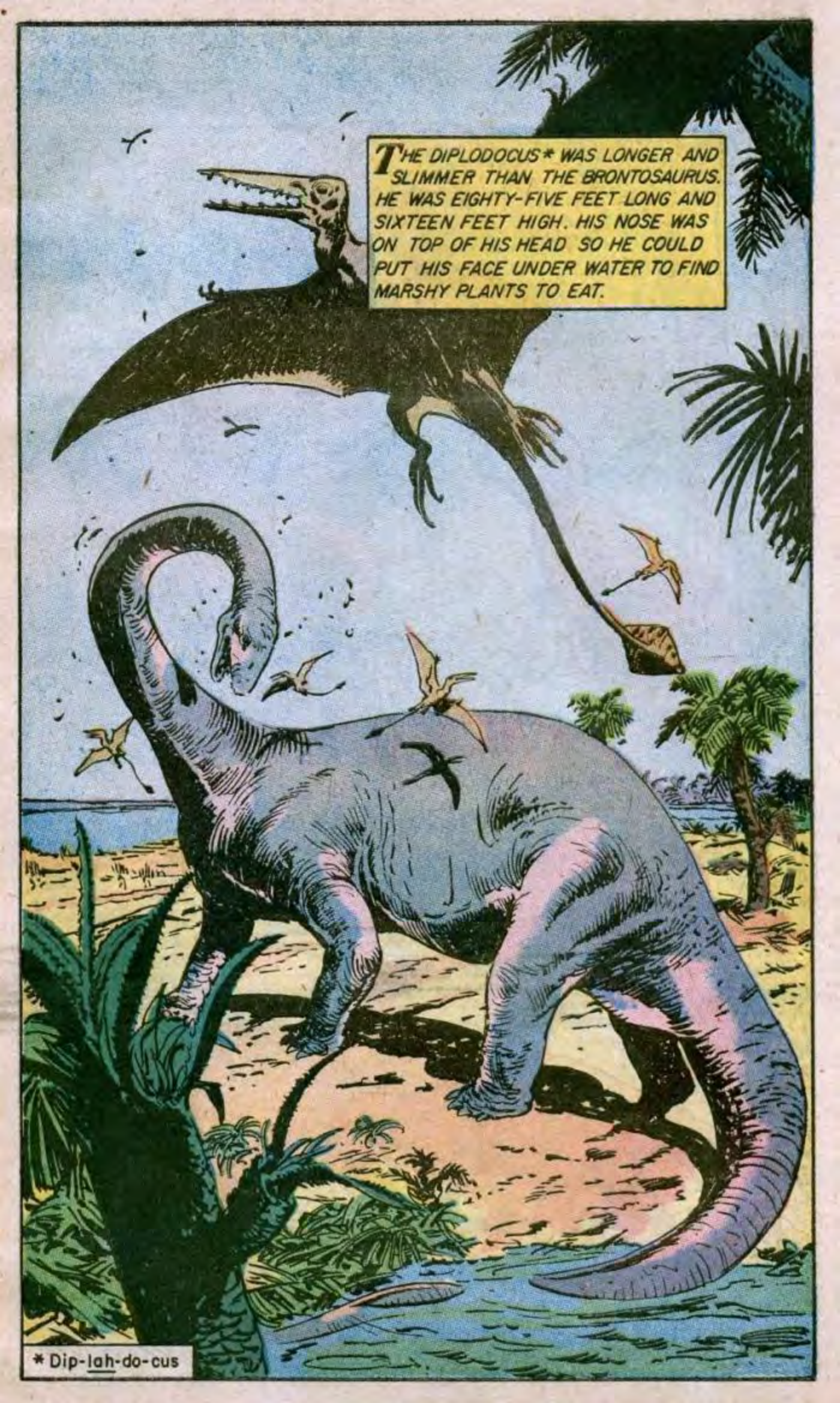
\* Brak - ee - o - sawr - us





**T**HE BRONTOSAURUS\* WAS THE NEXT LARGEST. HE WEIGHED THIRTY-FIVE TONS AND WAS ABOUT SEVENTY-FIVE FEET LONG. HE ALSO LIVED IN SWAMPS AND FED ON WATER PLANTS. HE PROBABLY NEEDED A THOUSAND POUNDS OF PLANTS A DAY.

\* Bront-o-sawr-us



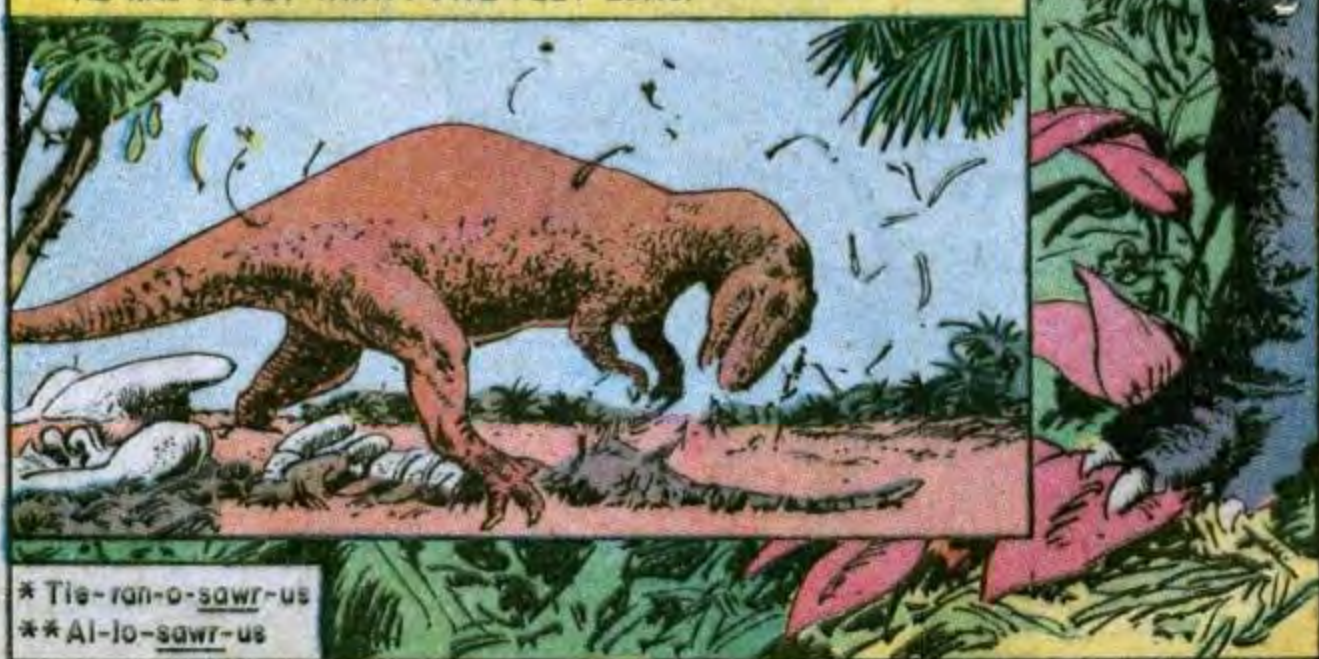
**T**HE DIPLODOCUS\* WAS LONGER AND SLIMMER THAN THE BRONTOSAURUS. HE WAS EIGHTY-FIVE FEET LONG AND SIXTEEN FEET HIGH. HIS NOSE WAS ON TOP OF HIS HEAD SO HE COULD PUT HIS FACE UNDER WATER TO FIND MARSHY PLANTS TO EAT.

\* Dip-lah-do-cus

**T**HE NAME OF THIS DINOSAUR IS TYRANNOSAURUS \*, THAT MEANS KING OF THE DINOSAURS. HE WAS ABOUT FIFTY FEET LONG, AND TWENTY FEET HIGH, AND HE WEIGHED TEN TONS. TYRANNOSAURUS WAS A MEAT EATER. THOUGH SMALLER THAN THE BIG PLANT EATERS, HE WAS THE MOST FEROCIOUS OF ALL THE DINOSAURS.



**A**NOTHER MEAT EATING DINOSAUR WAS ALLOSAAURUS \*\*, HE WAS ABOUT THIRTY-FIVE FEET LONG.



\* Tie-ran-o-sawr-us  
\*\* Al-lo-sawr-us

THESE DINOSAURS WERE ALSO MEAT EATERS. THE ORNITHOLESTES\* WERE ABOUT SIX FEET LONG. THE COMPSOGNATHUS\*\* WERE THE SMALLEST OF ALL DINOSAURS. THEY WERE ONLY ABOUT TWO FEET LONG. THEY PROBABLY ATE BIRDS AND VERY SMALL ANIMALS.



\* Orn-i-tho-less-teez  
\*\* Comp-sog-na-thus



THERE WERE MANY KINDS OF HORNED DINOSAURS. THE SMALLEST WERE THE PROTO-CERATOPS\*, WHO WERE ONLY SIX FEET LONG. THEIR HEADS WERE COVERED WITH HORNY ARMOR TO PROTECT THEM FROM ENEMIES. THEIR LARGER COUSINS, THE TRICERATOPS\*\*, HAD THREE HORNS.

\* Pro-to-ser-a-tops \*\* Try-ser-a-tops

**T**HERE WERE SEVERAL KINDS OF DUCKBILLED DINOSAURS. THEY USED THEIR BILLS TO SHOVEL THROUGH THE MUDDY SWAMPS IN SEARCH OF FOOD. THEY HAD AT LEAST TWO THOUSAND TEETH. TRACHODONS\* WERE THIRTY FEET LONG AND SIXTEEN FEET HIGH. SOME HAD FRILLS ON THE BACK OF THEIR NECKS.



\* Track-o-dons

## THE SMALLEST CONTINENT

**A**USTRALIA MIGHT be called the oldest piece of land on the globe. Many upheavals have occurred in the land masses of Europe, Asia, and America, where mountains were thrust up, or great sections dropped under the sea. But Australia has changed little during the years. No great high mountains thrust up their heads there. The highest mountain, Kosciusko, is only a little over seven thousand feet.

Australia is about the same size as the United States. This makes it the smallest continent in the world. It is also the only continent occupied entirely by one country. About one third of Australia has a tropical climate, but in its center is the third largest desert in the world.

The name Australia means southern land. It lies south of the equator, surrounded by the Pacific ocean. Scientists believe that very long ago, Australia was connected to southeastern Asia by a land bridge. This later disappeared and Australia has been cut off from the rest of the world by water ever since. The animals and people native to Australia are different from those in other lands. Because the natives are not exactly like other people, scientists have given them a name all their own—Australoid. Tribes of these natives still live in parts of the interior of Australia. They still use stone tools and weapons, like their stone-age ancestors.

The first white men set foot on the continent of Australia early in the seventeenth century. They were Dutch sailors who landed on the barren northern coast. They didn't like what

they saw and didn't bother to claim the land for Holland. But on the maps of that time, the strange, unexplored country was called New Holland. It remained for Captain James Cook, who landed on the more beautiful eastern coast, to claim the continent for England on August 23, 1770.

At that time there was a great amount of trouble and poverty in England. She had many criminals which were sent to the English colonies in North America. But the colonies won their independence and became the United States of America. England had to find another place to send her criminals, so they were shipped to Australia, because the land seemed good for nothing else.

By 1810, Governor Lachlan Macquarie began to improve the lives of the prisoners in Australia. He set many of them free, and they began to raise sheep. Soon large shipments of wool were being sent to England, and soon people all over the world saw that Australia was a place to be settled, much like the western part of America.

Today, Australia is part of the British Commonwealth of Nations. Modern cities and factories have been built. Cattle and sheep ranches dot the land.

The language of Australia is English, but the Australians have many words of their own. A tramp is a *swagman*. A sheep is a *jambuck*. *Dinkum* is a slang word like the American *okay*. When Australians like someone they might say, "He's a dinkum chap." That means he's *okay*.

# TRACKS, TEETH AND BONES

**N**O MAN HAS EVER SEEN A LIVING DINOSAUR. THEY DIED OUT ABOUT SEVENTY-FIVE MILLION YEARS BEFORE MEN CAME UPON THE EARTH. THEN HOW DO WE KNOW SO MUCH ABOUT THEM?



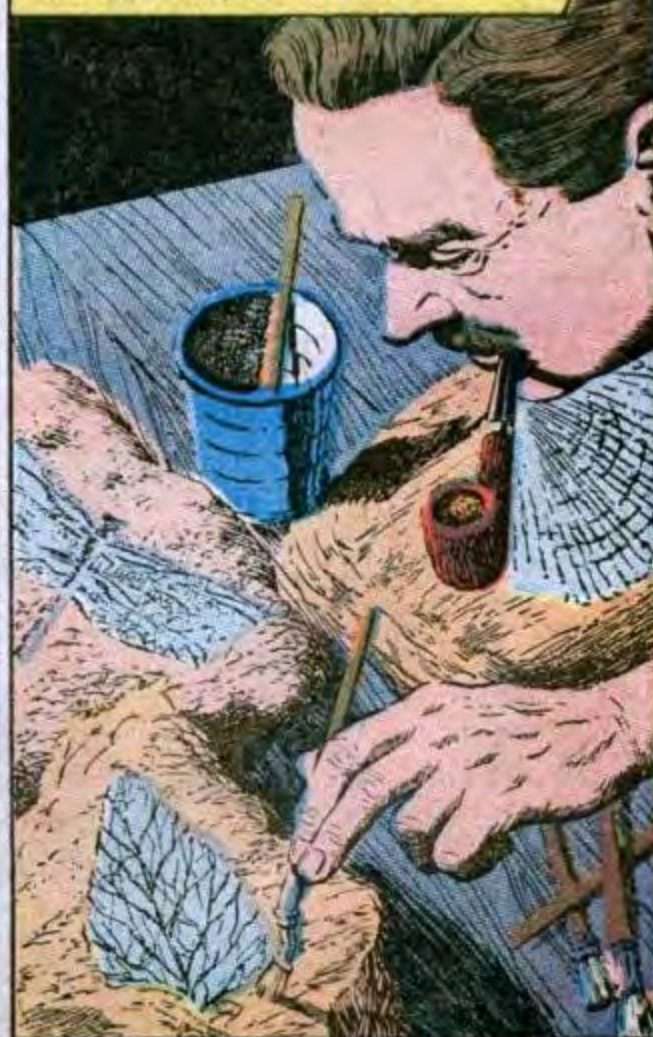
**W**E KNOW ABOUT THEM FROM FOSSILS. FOSSILS COMES FROM A LATIN WORD MEANING DUG UP. THE STUDY OF FOSSILS IS KNOWN AS PALEONTOLOGY \*.



**M**OST FOSSILS ARE BONES OF ANIMALS WHICH LIVED LONG AGO. BUT THEY CAN ALSO BE TRACKS OR FOOTPRINTS PRESERVED IN ROCK



... OR IMPRESSIONS OF PLANTS, OR INSECTS, OR SHELLS.

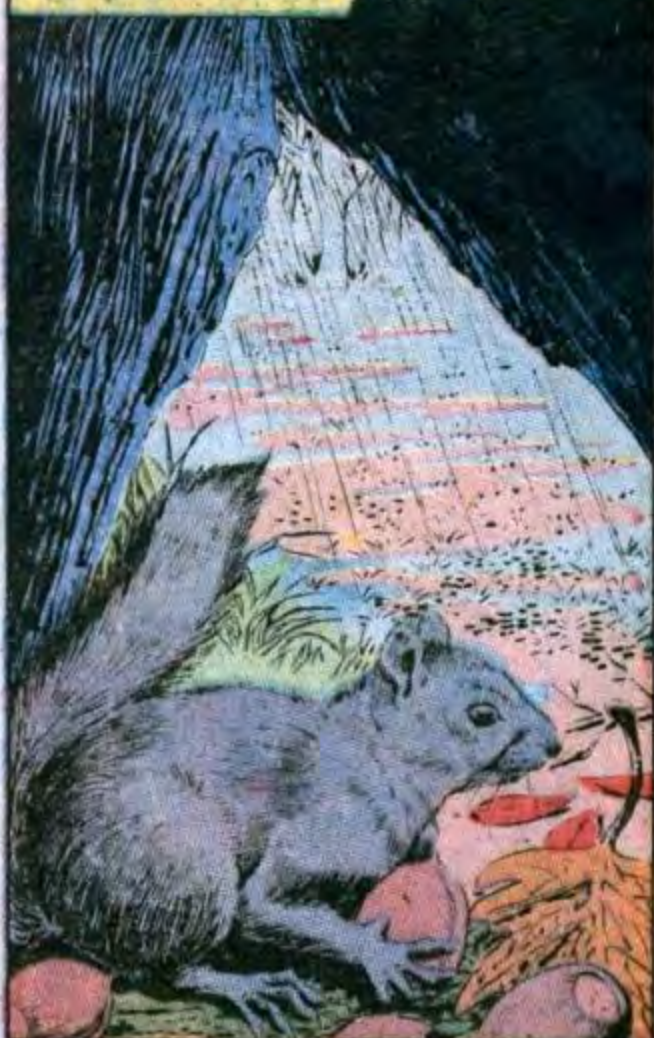




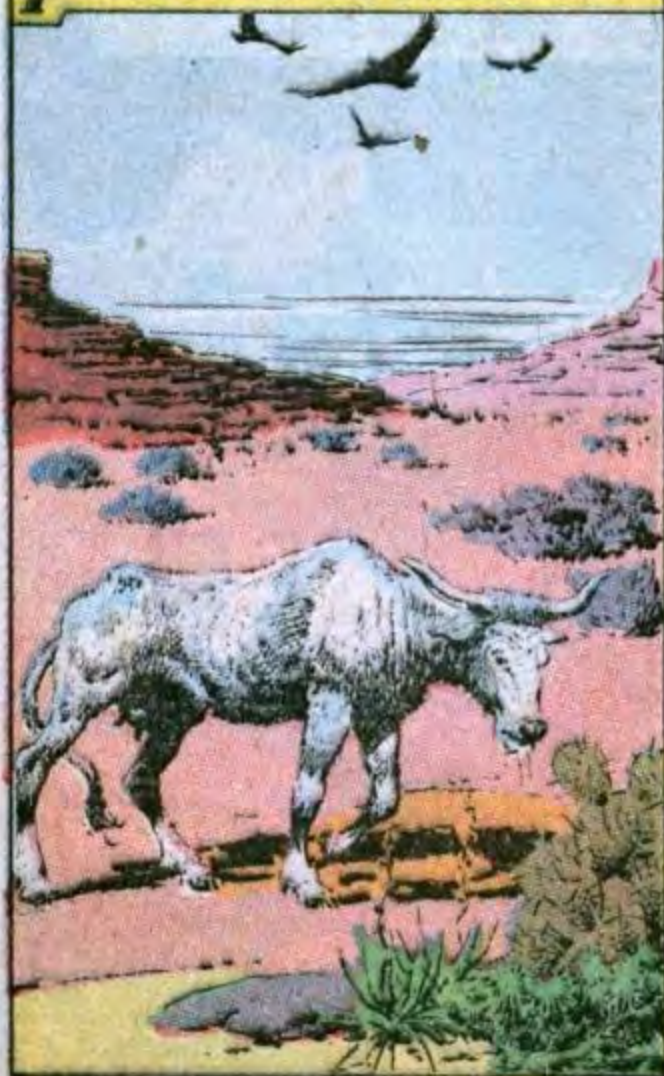
**H**OW CAN THIS BE? A DOG LEAVES TRACKS IN MUDDY GROUND.



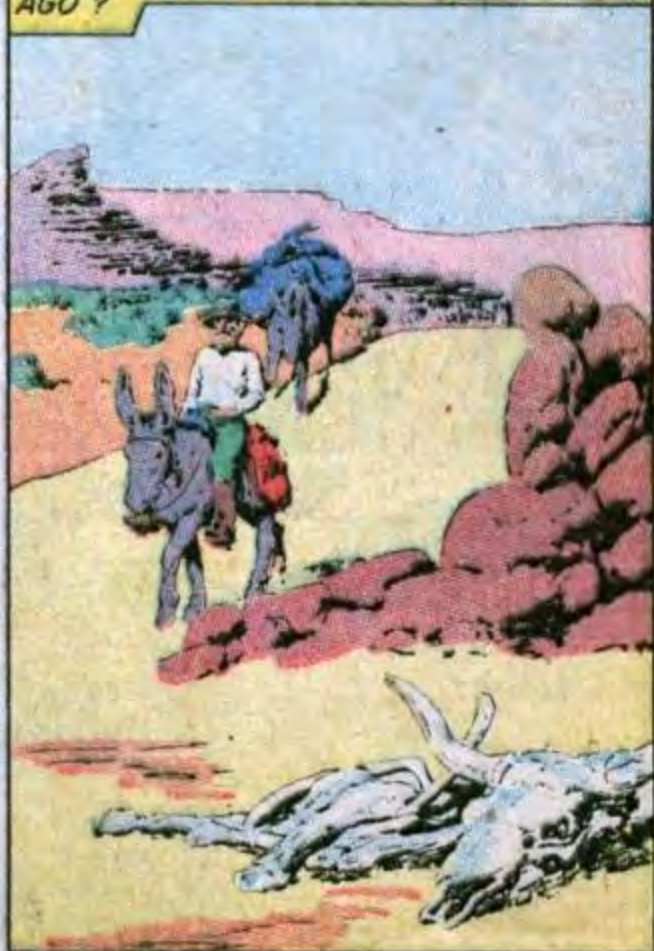
**B**UT THE FIRST RAIN WASHES THE TRACKS AWAY.



**I**F A COW DIES ON THE DESERT.



**T**HE WIND AND SUN SOON TURN ITS BONES TO DUST, WHICH BLOWS AWAY. HOW IS IT THAT WE FIND FOSSILS OF ANIMALS THAT DIED MILLIONS OF YEARS AGO?



**S**CIENTISTS HAVE SEVERAL EXPLANATIONS FOR THIS. SINCE AIR AND WATER DESTROY ANIMAL REMAINS, SOMETHING UNUSUAL MUST HAVE HAPPENED TO PRESERVE SOME OF THEM.



**S**OME ANIMALS PROBABLY FELL INTO QUICKSAND.



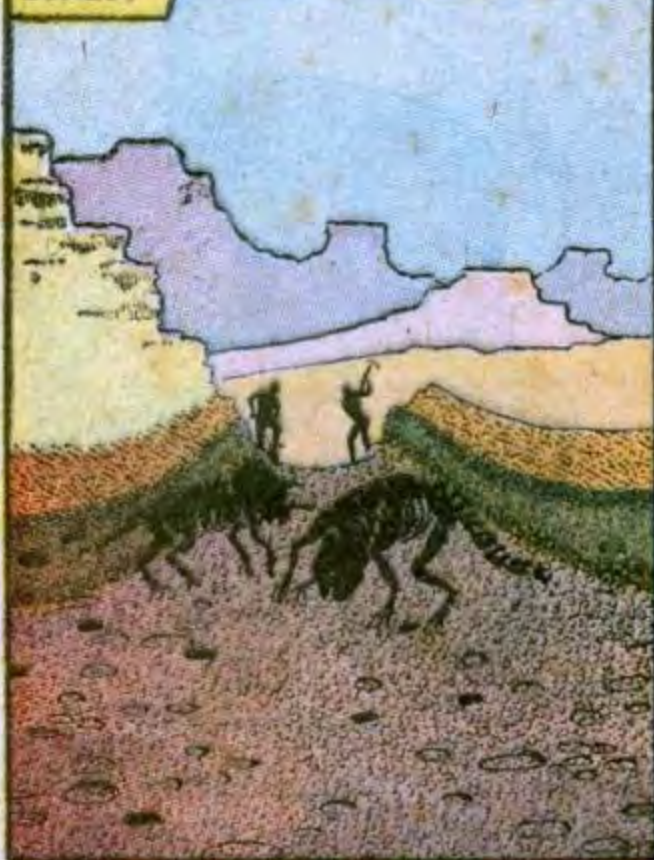
**L**AYERS OF FINE SAND AND MUD COVERED THEM. THESE LAYERS ARE KNOWN AS SEDIMENT.



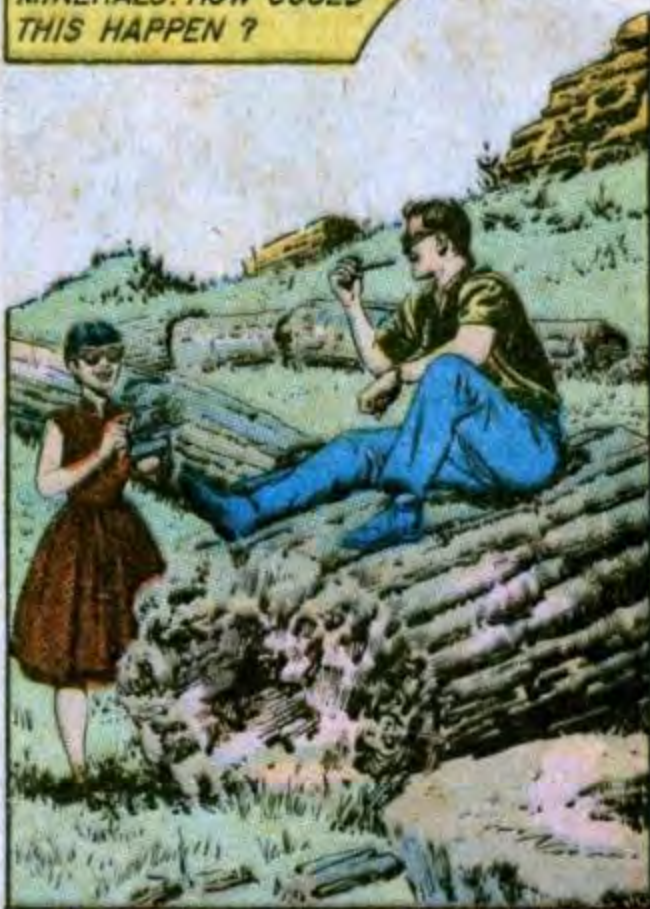
**T**HE HARD PARTS OF THE ANIMAL WERE PRESERVED BY THE SEDIMENT, EVEN THOUGH THE FLESH DISAPPEARED.



**D**URING MILLIONS OF YEARS, THE SHAPE OF THE EARTH WAS CHANGED BY EARTHQUAKES OR VOLCANIC ACTION. THE WIND, RAIN, AND ICE OF CENTURIES ERODED PARTS OF THE SOFTER EARTH, UNTIL MEN DISCOVERED THE FOSSIL BONES.



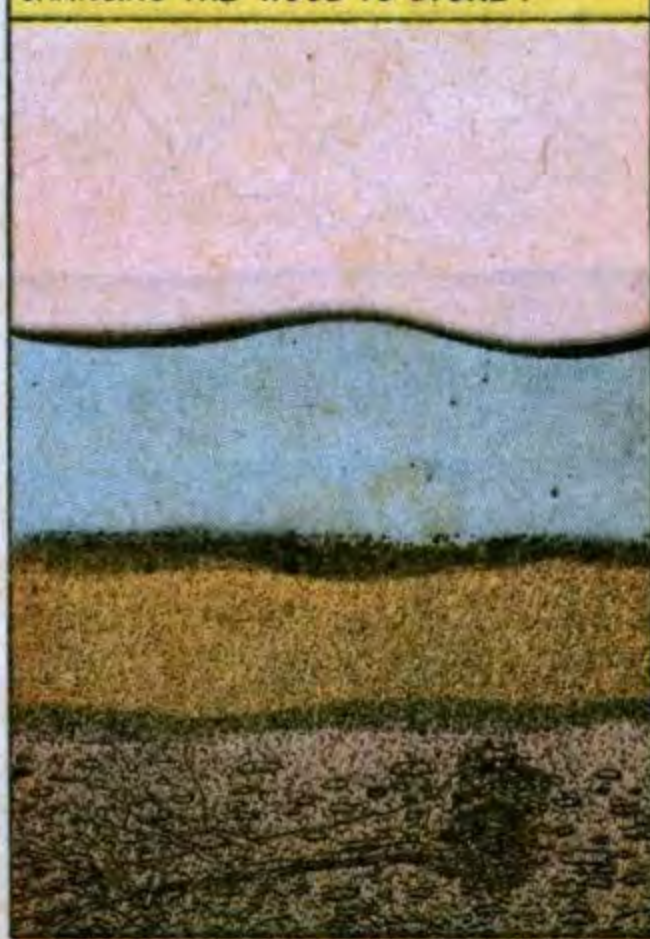
**T**HE PETRIFIED FOREST IN ARIZONA CONTAINS THOUSANDS OF FOSSIL TREES. THIS MEANS THE PLANT MATTER IN THE ORIGINAL WOOD HAS BEEN REPLACED BY MINERALS. HOW COULD THIS HAPPEN?



**S**OME SCIENTISTS THINK THERE MIGHT HAVE BEEN A VOLCANIC UPHEAVAL. THE TREES WERE THROWN DOWN.



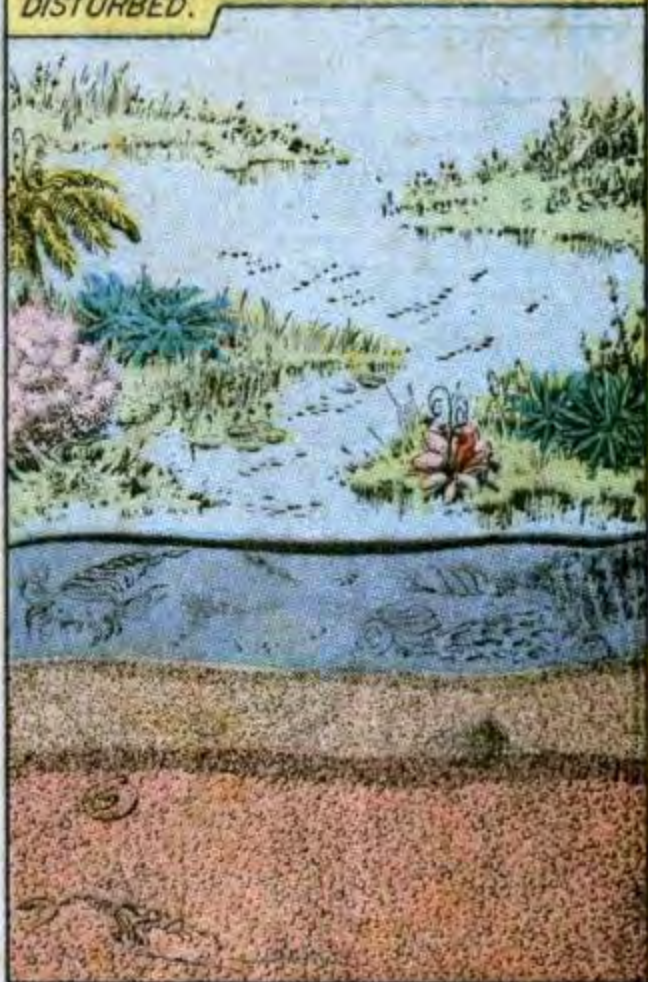
**T**HE UPHEAVAL THEN CAUSED SOME ANCIENT LAKE OR SEA TO COVER THE BROKEN TREES. CHEMICAL ACTION WORKED ON THE VEGETABLE MATTER, CHANGING THE WOOD TO STONE.



**M**OST OF THE FOSSILS WE FIND TODAY ARE FROM ANIMALS THAT LIVED IN OR NEAR WATER.



**W**ATER AND SEDIMENT COVERED THEM WHEN THEY DIED. THIS HAPPENED SO SLOWLY AND GENTLY THEY WERE NOT DISTURBED.



**T**HE BURIED FOOTPRINTS AND SHELLS AND LITTLE ANIMALS FORMED MOLDS AS THE MUD HARDENED AROUND THEM.



**T**HE MOLDS THEN FILLED WITH SAND OR MUD, WHICH MADE AN EXACT COPY OF THE SHELL, ANIMAL, OR FOOTPRINT.



**C**HEMICAL ACTION OR PRESSURE TURNED THIS COPY INTO STONE. EVEN THE TINIEST DETAIL WAS PETRIFIED THIS WAY.



**T**HE REAL SHELL, OR ANIMAL, OR FOOTPRINT WAS GONE. BUT WHAT REMAINED WAS A STONE CAST EXACTLY LIKE THE ORIGINAL.



**I**N 1802, A FARMER NAMED PLINY MOODY WAS PLOWING A FIELD IN CONNECTICUT WHEN . . .

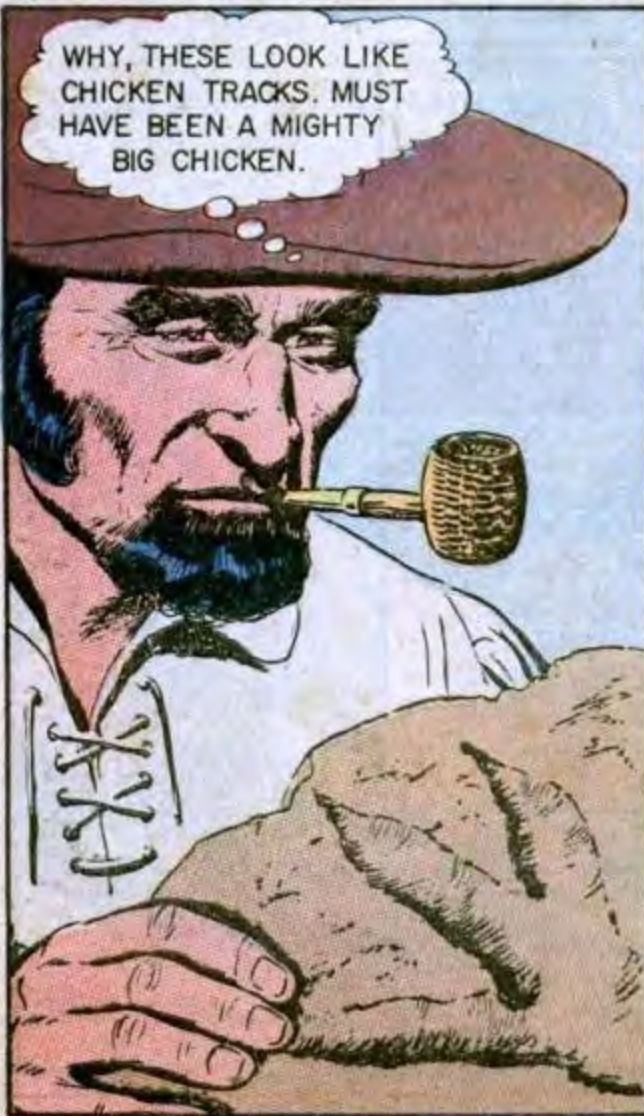
WHOA! DARN ROCKS IN THIS FIELD ARE ENOUGH TO BREAK A PLOW!



SAY, THERE ARE SOME MIGHTY STRANGE LOOKING MARKS ON THIS STONE.



WHY, THESE LOOK LIKE CHICKEN TRACKS. MUST HAVE BEEN A MIGHTY BIG CHICKEN.



**I**N THE NEXT FEW YEARS, MANY ROCKS WITH STRANGE TRACKS WERE FOUND BY OTHER FARMERS.

THOSE ARE JUST LIKE THE ONES I FOUND.

SOME OF THE TRACKS ARE SMALL AS HEN'S FEET. BUT I FOUND TRACKS TWELVE INCHES LONG!



**M**EN WORKING IN STONE QUARRIES IN THE CONNECTICUT RIVER VALLEY ALSO FOUND TRACKS.

THERE MUST HAVE BEEN SOME VERY STRANGE BIRDS AROUND HERE ONCE.



**B**Y THE YEAR 1835, SO MANY OF THESE TRACKS HAD BEEN SEEN THAT PROFESSOR EDWARD HITCHCOCK OF AMHERST COLLEGE, MASSACHUSETTS, BECAME INTERESTED IN THEM.

THESE MAY HAVE BEEN MADE BY BIRDS.

BUT WHAT HAPPENED TO THE BIRDS, PROFESSOR HITCHCOCK? WHERE ARE THEY NOW?



THEY MUST HAVE BECOME EXTINCT -- THAT IS, THEY ALL DIED OUT A LONG TIME AGO.



**M**EANWHILE, IN SUSSEX, ENGLAND, THE WIFE OF DR. GIDEON MANTELL HAD ALSO FOUND SOMETHING UNUSUAL.

I FOUND THESE TEETH OUT IN THE FIELD TODAY. WHAT ARE THEY?

I'VE NEVER SEEN ANYTHING LIKE THEM. I'LL SEND THEM TO SOME OF MY FELLOW SCIENTISTS.



**D**ISCOVERIES OF STRANGE ANIMAL REMAINS WERE MADE IN MANY DIFFERENT PLACES. IN 1811, A LITTLE GIRL NAMED MARY ANNING, WHO LIVED ON THE SOUTHERN COAST OF ENGLAND, FOUND AN UNUSUAL SKELETON.



**A**LL THESE DISCOVERIES OF TRACKS, TEETH AND BONES WERE STUDIED BY SIR RICHARD OWEN OF THE ROYAL COLLEGE OF SURGEONS IN LONDON. IN 1841

ENOUGH EVIDENCE HAS BEEN COLLECTED ABOUT THESE STRANGE EXTINCT ANIMALS TO GIVE THEM A NAME.



WHAT NAME WILL YOU GIVE THEM, SIR RICHARD?

THERE MUST HAVE BEEN THOUSANDS OF DIFFERENT KINDS. BUT THEY ALL HAVE ONE THING IN COMMON. THEY ARE LIKE OUR MODERN REPTILES OR LIZARDS. I AM GOING TO CALL THEM DINOSAURS.

DINOSAURS? WHY, THAT'S GREEK, ISN'T IT? IT MEANS TERRIBLE LIZARD.



**A**T LAST THE FARMERS IN CONNECTICUT KNEW WHAT MADE THE FOOTPRINTS THEY THOUGHT WERE BIRD TRACKS.

THIS SCIENTIST IN ENGLAND SAYS THEY WERE MADE BY A CREATURE HE CALLS A DINOSAUR.

SO THEY WEREN'T HEN TRACKS AFTER ALL! DINOSAURS! WHAT DO YOU KNOW ABOUT THAT!

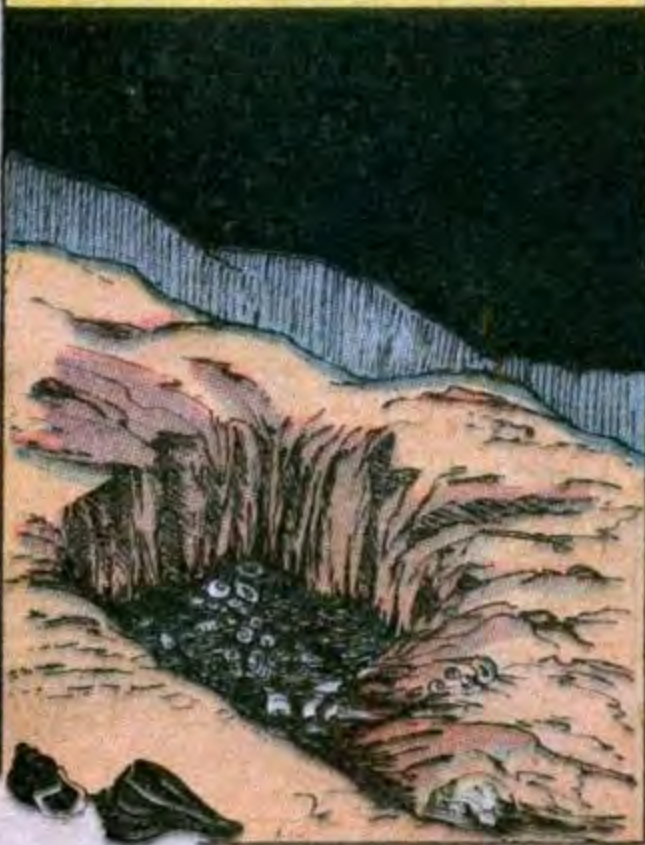


# FIXING FOSSILS

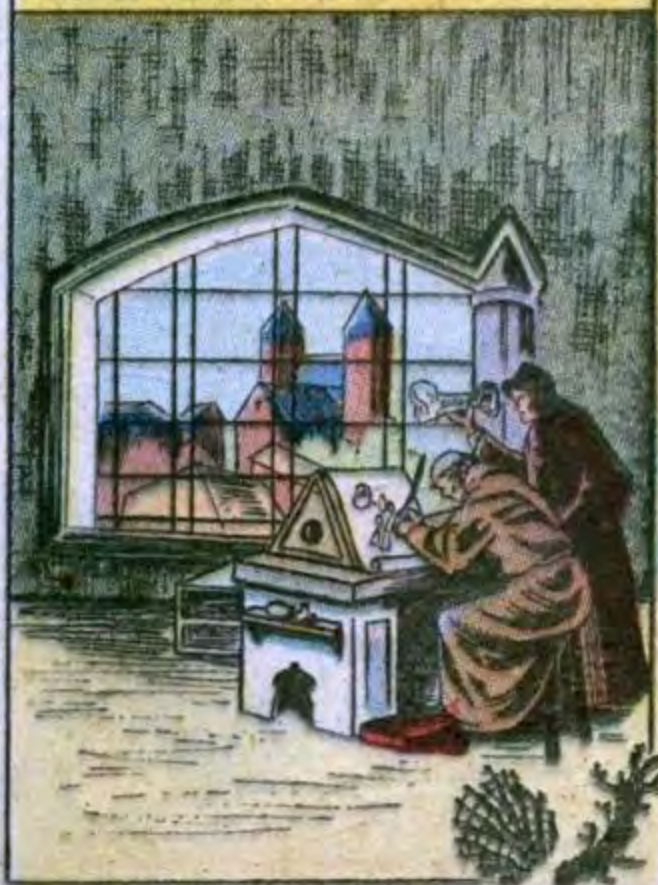
**F**OSSILS HAVE ALWAYS FASCINATED MEN. A FOSSILIZED TREE TRUNK WAS FOUND IN AN ANCIENT ETRUSCAN TOMB. PERHAPS THE ETRUSCANS THOUGHT IT HAD MAGIC POWER.



**P**EOPLE IN ANCIENT ENGLAND MAY HAVE BELIEVED IN THE MAGIC OF FOSSILS, TOO. FOSSILS WERE FOUND IN AN ENGLISH GRAVE THOUSANDS OF YEARS OLD.

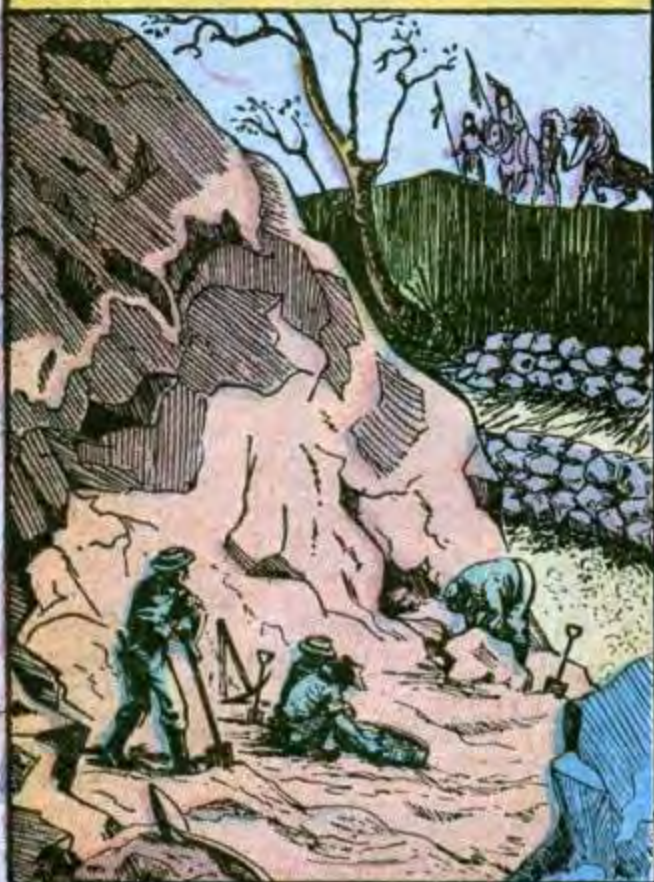


**D**URING THE MIDDLE AGES, MEN MADE BOOKS WITH PICTURES OF FOSSILS. THEY TRIED TO IMAGINE WHAT THESE FOSSILS REALLY WERE.





**I**T WAS NOT UNTIL AFTER THE CIVIL WAR THAT SCIENTISTS IN AMERICA BEGAN TO SYSTEMATICALLY SEARCH FOR FOSSILS. PROFESSOR OTHNIEL CHARLES MARSH OF YALE UNIVERSITY WAS ONE OF THE FIRST AMERICAN PALEONTOLOGISTS.



**P**ROFESSOR MARSH MADE MANY EXPEDITIONS OUT WEST. IN 1871, HE DISCOVERED THE BONES OF A PTERODACTYL.

PROFESSOR MARSH,  
THOSE INDIANS DON'T  
LOOK VERY FRIENDLY.

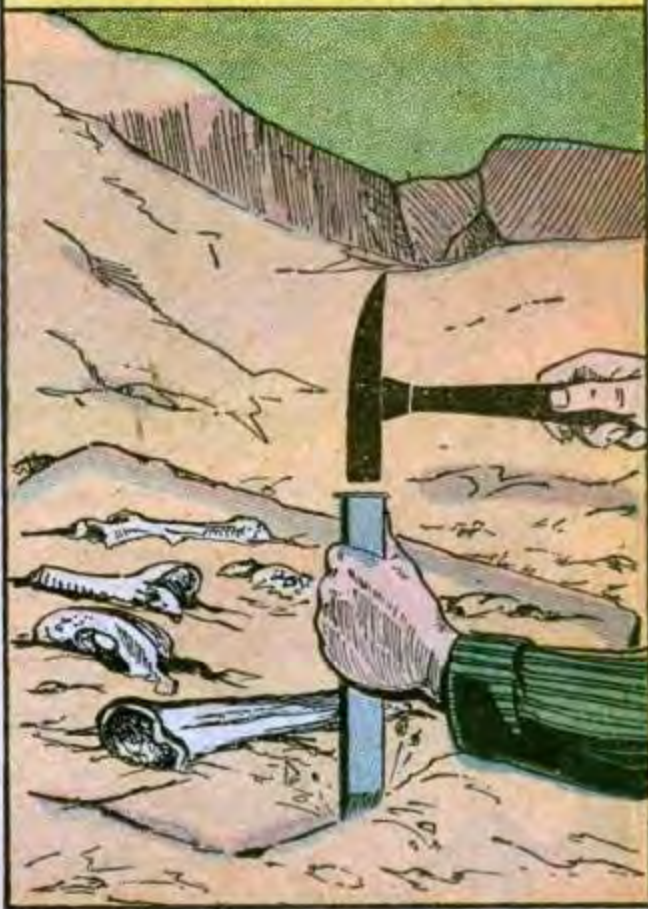
I CAN'T WORRY  
ABOUT INDIANS.  
I'VE JUST  
DISCOVERED A  
NEW FOSSIL.  
ANIMAL. LET'S  
GET TO WORK!



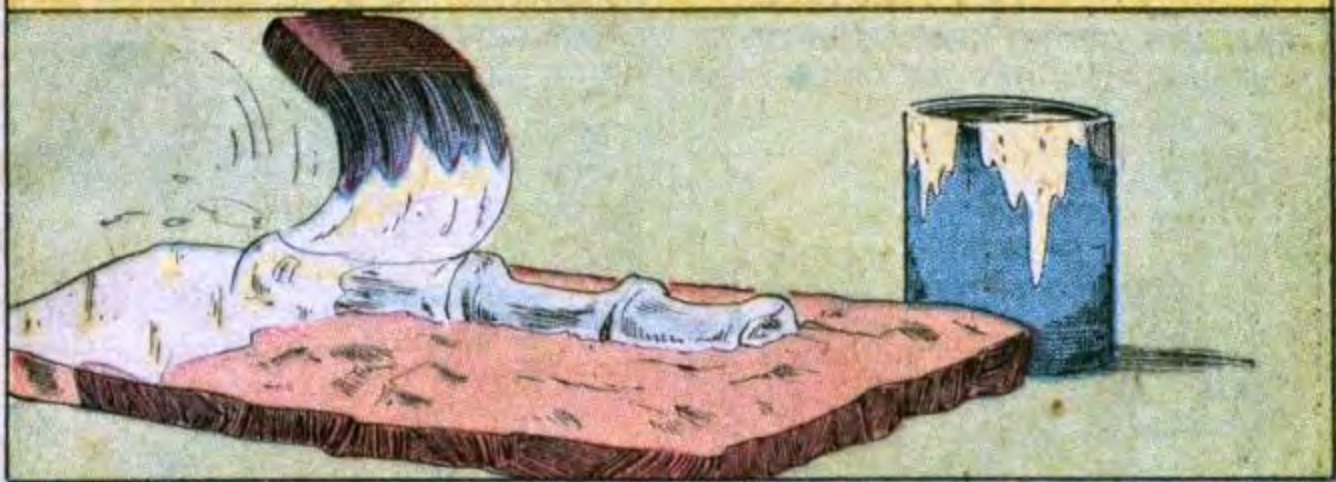
**F**IRST THEY UNCOVERED THE EARTH SURROUNDING THE FOSSIL. THEY USED SMALL SHOVELS, THEN WHISK BROOMS, TO DUST AWAY THE DIRT FROM THE BONES.



**P**ART OF THE BONES WERE LOCKED IN SOLID ROCK. THIS ROCK HAD TO BE CHIPPED AWAY WITH STEEL CHISELS AND HAMMERS. IT HAD TO BE DONE CAREFULLY, OR THE BONES WOULD BREAK.



**A**S THE FOSSIL WAS FREED FROM THE ROCK AND DIRT, IT WAS PAINTED WITH SHELLAC. THIS WAS TO HARDEN IT IN CASE IT WAS BRITTLE.



**A**FTER THE SHELLAC DRIED, THE MEN SOAKED STRIPS OF CLOTH IN FLOUR PASTE AND SPREAD IT OVER THE FOSSIL.



**W**HEN THE CLOTH AND PASTE WRAP- PINGS DRIED, THEY TURNED THE FOSSIL OVER CAREFULLY, AND WRAPPED IT THE SAME WAY ON THE OTHER SIDE.



**T**HE CLOTH AND PASTE FORMED A HARD SHELL TO PROTECT THE FOSSIL.

LOAD IT INTO THE CRATE. IT IS READY TO BE SHIPPED BACK TO YALE UNIVERSITY.



**A**FTER MANY MONTHS OF THIS CAREFUL WORK, PROFESSOR MARSH RETURNED TO YALE.

EASY WITH THOSE CRATES, MEN. THEY CONTAIN FOSSILS WHICH CAME ALL THE WAY FROM KANSAS. I WOULDN'T WANT ANYTHING TO HAPPEN TO THEM NOW.



**I**N HIS WORKSHOP IN THE PEABODY MUSEUM OF NATURAL HISTORY AT YALE UNIVERSITY, PROFESSOR MARSH UNWRAPPED THE FOSSILS.



**A**N IRON FRAME WAS BUILT TO SUPPORT THE SKELETON, AS THE BONES WERE CAREFULLY WIRED TOGETHER.



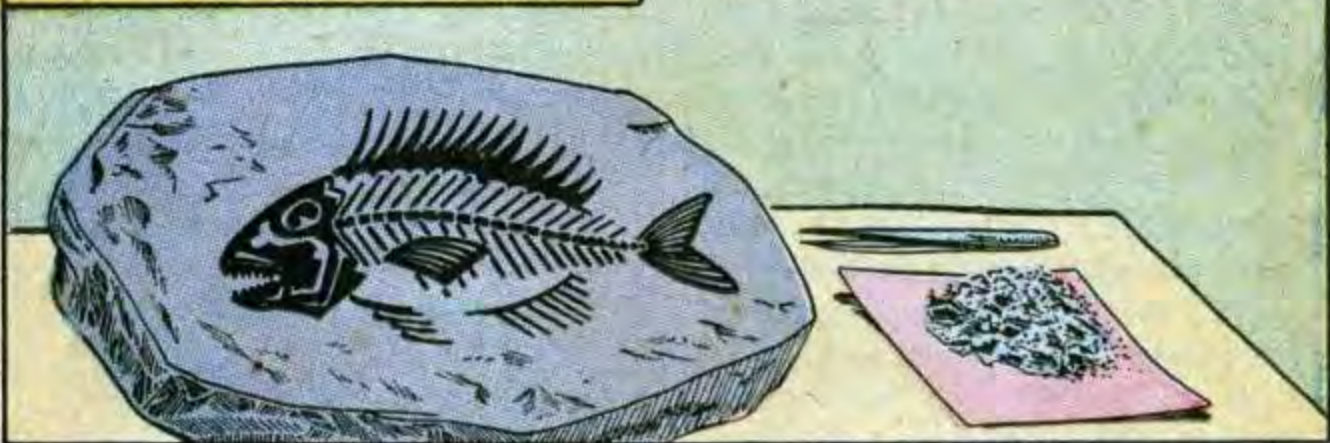
**T**HE WORK TOOK MONTHS, FROM THE DISCOVERY IN KANSAS TO THE SKELETON AT YALE.



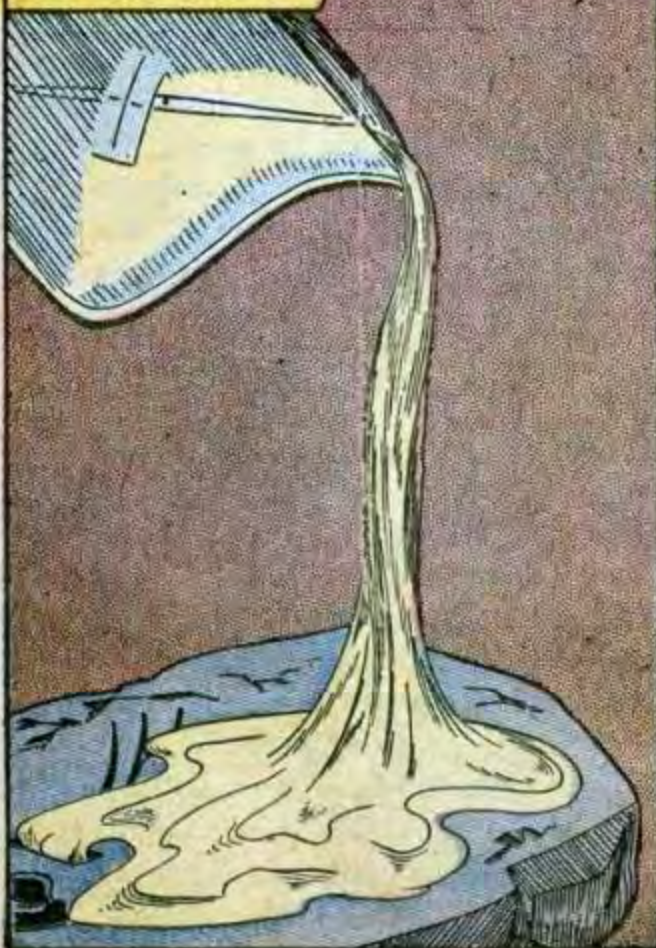
**P**ALEONTOLOGISTS TODAY WORK THE WAY PROFESSOR MARSH DID, BUT THEY HAVE SOME NEW METHODS. SOMETIMES A FOSSIL CRUMBLES TO DUST AS IT IS BEING SEPARATED FROM A ROCK.



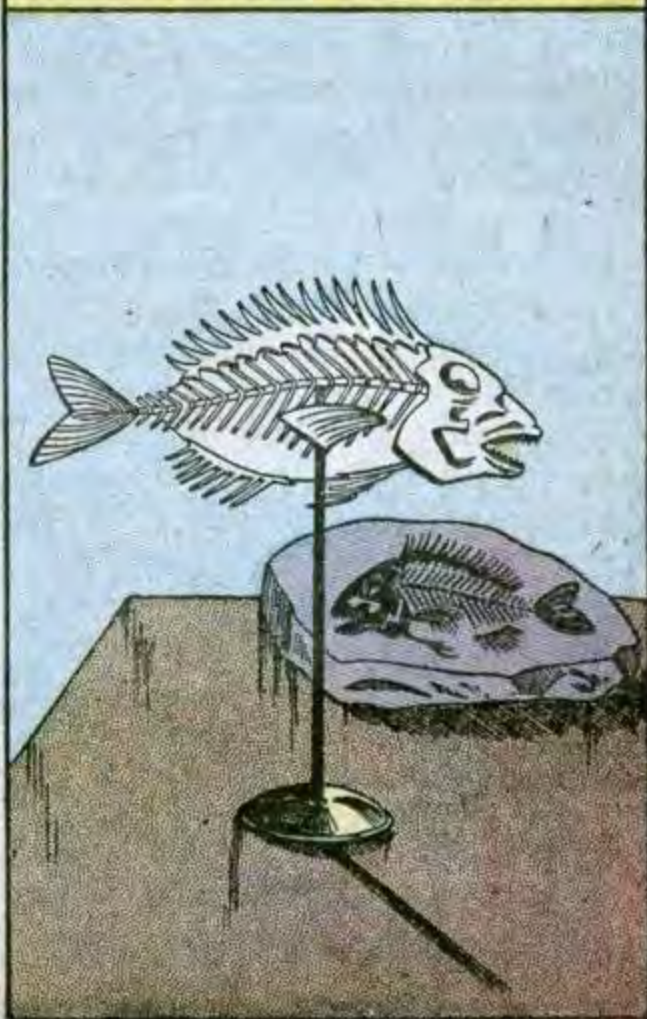
**O**FTEN THE ROCK IS HARD ENOUGH TO FORM A GOOD MOLD, EVEN THOUGH THE FOSSIL HAS BEEN DESTROYED.



**P**LASTER OF PARIS, WAX, SPECIAL GLUES, OR NEW TYPES OF PLASTICS ARE POURED INTO THE ROCK TO MAKE A CAST FROM THE ROCK MOLD.



**I**N THIS WAY, PALEONTOLOGISTS MAKE AN EXACT MODEL OF THE ORIGINAL FOSSIL.



## "FOR THE HONOR OF OUR COUNTRY"

ON NOVEMBER 29, 1910, an old whaling ship, the *Terra Nova*, weighed anchor in New Zealand. On board were a number of British scientists. They were led by Captain Robert Falcon Scott, who hoped to be the first man to reach the South Pole. Ever since Captain James Cook had sailed into the ice-choked waters of the Antarctic circle in 1774, men had been dreaming of conquering that vast, empty, snow-covered continent and discovering the South Pole. As yet, no one had succeeded.

The *Terra Nova* steered south from New Zealand, through icy storms, among towering icebergs. Finally, in January, 1911, Captain Scott and his men reached the Antarctic shore.

With the help of eskimo dog teams and sturdy ponies brought all the way from Siberia, the men began their journey inland. For almost an entire year, they set up camps and buried food and supplies at regular distances moving toward the Pole. They were to be dug up and used on the return journey. In July, which is the dead of winter in the southern part of the world, they worked in almost total darkness. In Antarctica, because of the tilt of the Earth's axis, the sun never rises during the winter.

In November, 1911, Antarctic summer began to warm the continent. Now there would be several months during which the sun would always be in the sky, never setting until the next winter. At certain points men were stationed with supplies to wait for Captain Scott's return. It had been decided that Captain Scott would make the last trek to the Pole with only four men.

On January 18, 1912, Captain Scott and the four men sighted a tent flying a Norwegian flag. After sixty-nine days of terrible hardships, they

had reached the South Pole—only to find that someone had reached it before them. The Norwegian explorer, Roald Amundsen, traveling by a different route, had arrived a month earlier.

Captain Scott and his four men turned back toward their base camp. They had come nearly two hundred terrible miles across snow covered mountains and glaciers. The way back would be even more terrible, for Scott and his men were heartsick because they had lost the race to Amundsen.

They could travel only six miles a day in that frozen land where the temperature dropped to sixty below zero. For weeks they struggled toward their camp. Their hands and feet turned black from frostbite. One of the men died.

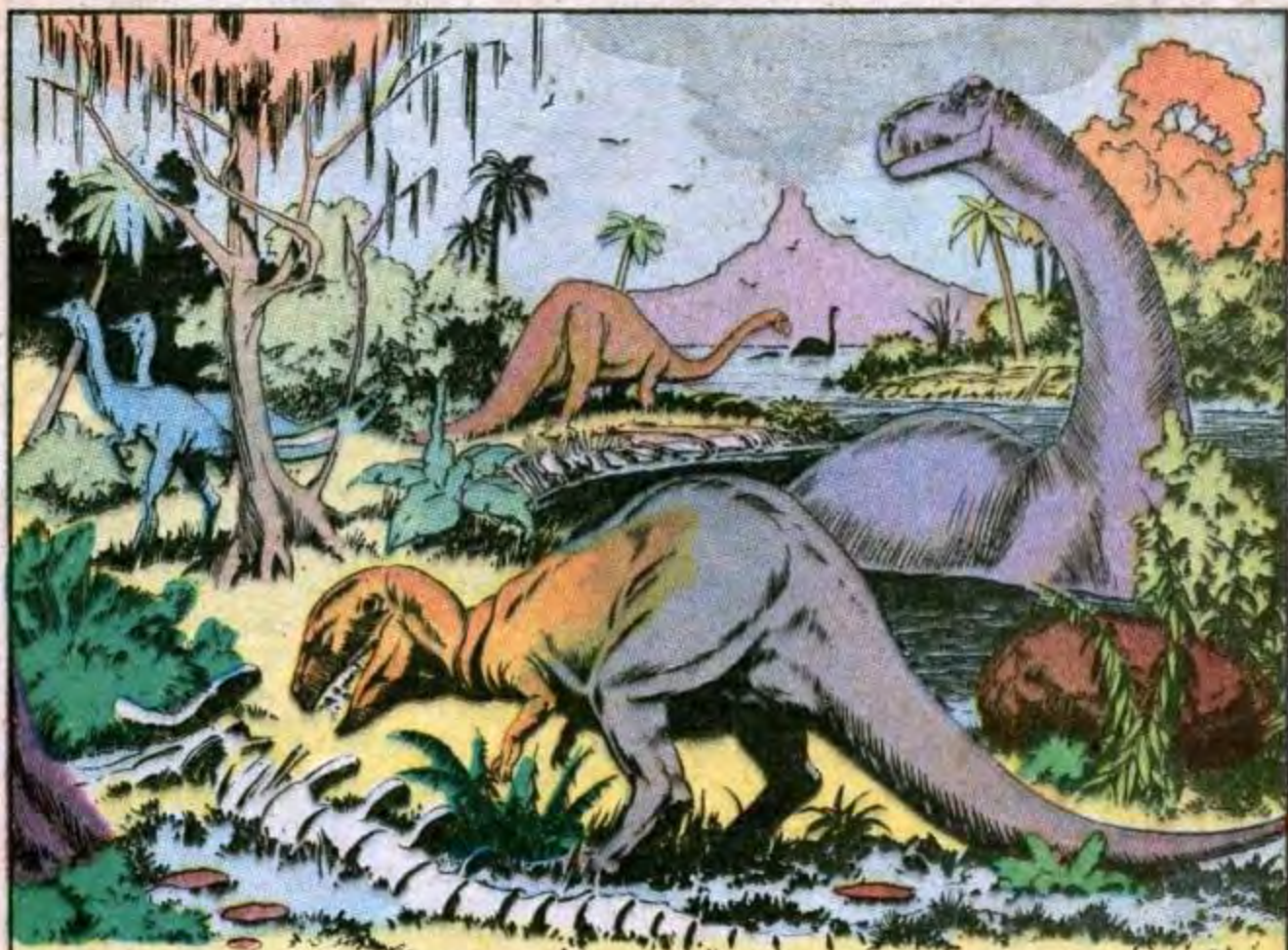
On March 2, they reached one of their supply camps buried in the snow. But all of the gasoline which they needed to cook their food and heat their tents had leaked away.

Finally they were stopped by a tremendous blizzard. One of the men was so crippled with frostbite that he walked off into the storm, deliberately sacrificing his life to permit Scott and the others to go on without him.

About March 29, Captain Scott and the two men still with him were camped in a howling blizzard. They had only eleven miles to go to reach safety, but the storm was too fierce.

Months later, the bodies of Scott and the two men were found frozen to death in that last camp. Before he died, Captain Scott had written, "I do not regret this journey, which has shown that Englishmen can endure hardships, help one another, and meet death with as great fortitude as ever in the past. We have been willing to give our lives for this enterprise, which is for the honor of our country."

# DEATH OF THE DINOSAUR

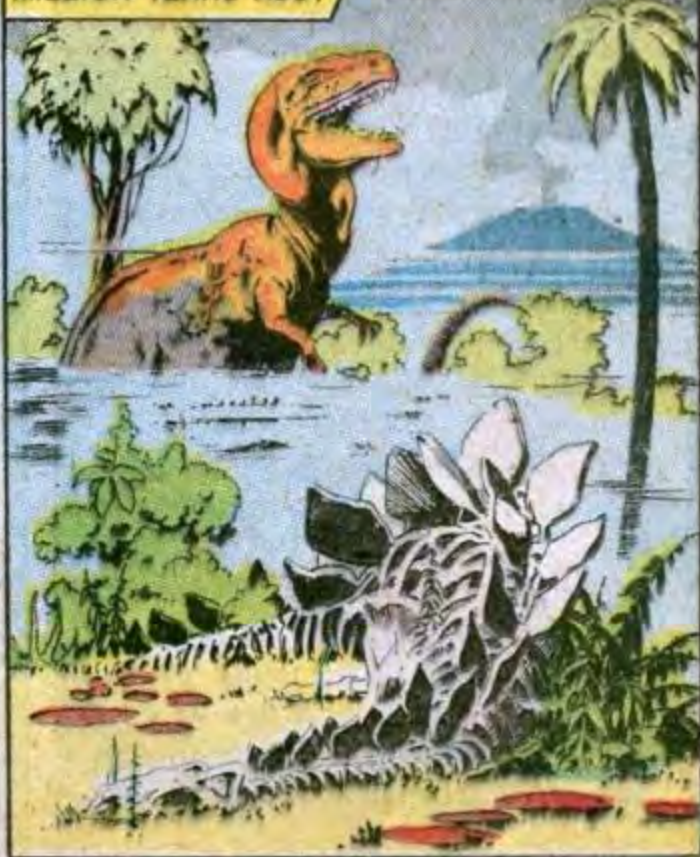


WHAT HAPPENED TO WIPE THE DINOSAUR FROM THE FACE OF THE EARTH?

IT WAS NO SUDDEN DISASTER. ALL DINOSAURS DIDN'T DIE IN ONE DAY.



DINOSAURS BEGAN DYING OUT ONE HUNDRED MILLION YEARS AGO. THE LAST OF THEM DISAPPEARED ABOUT SEVENTY-FIVE MILLION YEARS AGO.



**N**O ONE KNOWS EXACTLY WHAT DESTROYED ALL DINOSAURS. SOME SCIENTISTS THINK MAMMALS HAD SOMETHING TO DO WITH IT, EVEN THOUGH THEY WERE VERY TINY.



**A** MAMMAL COULDN'T ATTACK A GIANT DINOSAUR, BUT IT COULD EAT ITS EGGS.



**A**ND THE SMALLER DINOSAURS PROBABLY HAD TO COMPETE WITH MAMMALS FOR FOOD.



**P**ERHAPS SOME DINOSAURS DIED BECAUSE THEY COULD NOT GET THE FOOD THEY NEEDED. THE FERN-LIKE PLANTS THEY ATE GAVE WAY TO FLOWERING PLANTS. SOME DINOSAURS COULD NOT LIVE ON THE NEW DIET.



**I**N SOME AREAS, DINOSAURS DIED BECAUSE OF A CHANGE OF CLIMATE. OVER A PERIOD OF TIME, MOUNTAINS WERE FORMED, CAUSING PARTS OF THE LAND TO DRY OUT.



**D**INOSAURS WHO LIVED IN LAKES OR SWAMPS COULD NOT SURVIVE.





**E**ARLY DINOSAURS LIKE BRONTOSAURUS WERE REPLACED BY LATER DINOSAURS LIKE TRACHODON, WHO WERE BETTER FITTED TO SURVIVE.



**T**HE HORNED DINOSAURS WERE AMONG THE LAST TO DIE OUT. THEN ONE DAY THE DINOSAUR WAS GONE FOREVER. THE WORLD BELONGED TO THE MAMMALS.



# MAMMALS, MEN AND ICE

**M**AMMALS FIRST APPEARED ON EARTH DURING THE AGE OF THE DINOSAUR, BUT THEY WERE VERY SMALL.

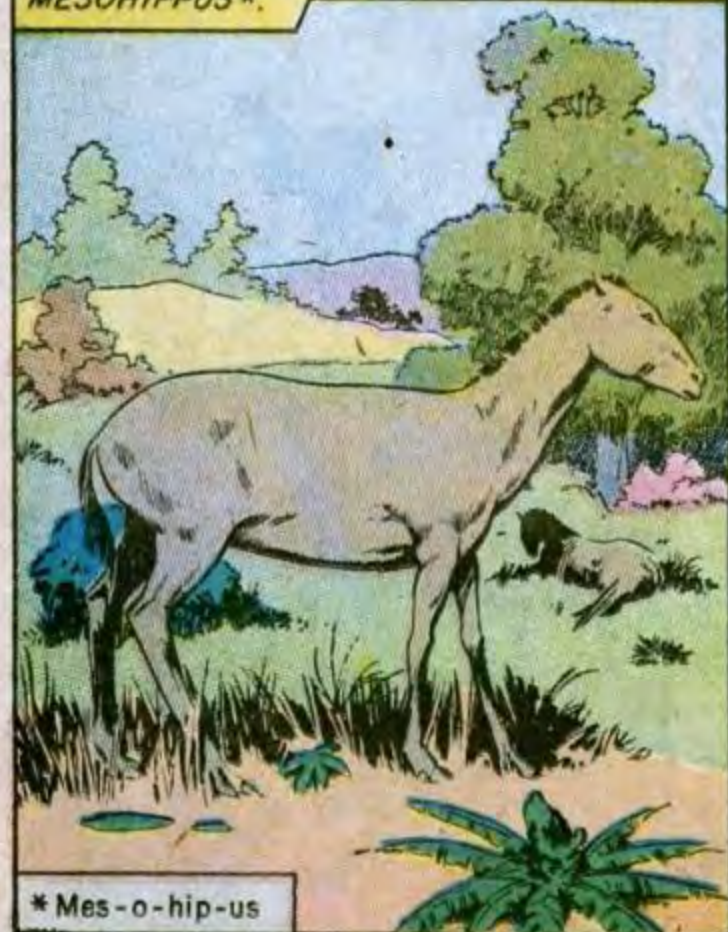


**T**HE FIRST HORSES WERE CALLED EOHIPPUS\*. THEY WERE NO BIGGER THAN PUPPIES, AND HAD TOES INSTEAD OF HOOFS.



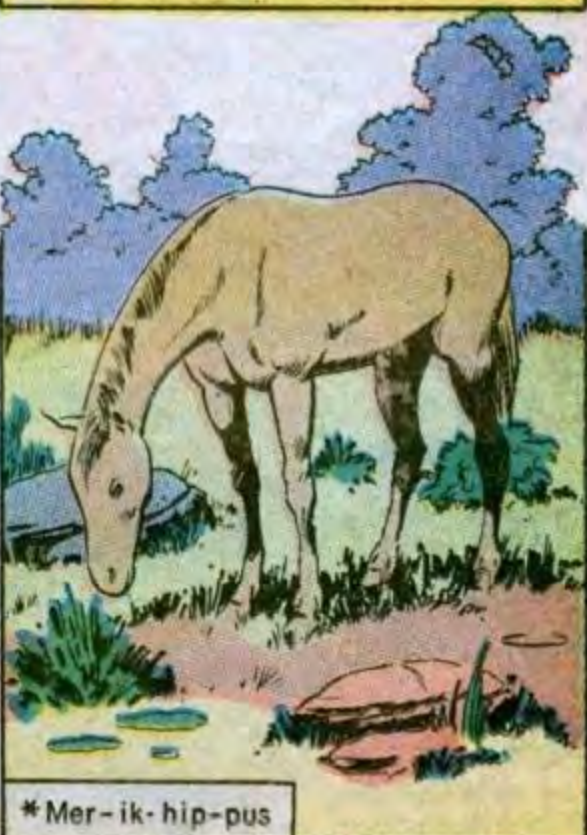
\*Ee-o-hip-us

**I**N TIME THE EOHIPPUS GREW TO THE SIZE OF A WOLF. IT WAS THEN CALLED MESOHIPPUS\*.



\*Mes-o-hip-us

**A**BOUT TWENTY MILLION YEARS AGO, IT GREW TO THE SIZE OF A MODERN PONY AND WAS CALLED MERYCHIPPUS\*. IT WAS BECOMING THE HORSE WE KNOW TODAY.



\*Mer-ik-hip-pus

**T**HERE WERE MANY OTHER PREHISTORIC MAMMALS. THE MOROPUS\* LOOKED A LITTLE LIKE A HORSE. HE HAD CLAWS ON HIS FEET.



\* Mor-o-pus

**T**HE ALTICAMELUS\* WAS A KIND OF CAMEL. HE WAS LARGER THAN MODERN CAMELS, AND HE PROBABLY DID NOT HAVE A HUMP.



\* Alt-ee-kam-ee-lus

**T**HE TRILOPHODON\* WAS A VERY EARLY KIND OF ELEPHANT. HE STOOD SIX FEET HIGH. HIS TUSKS AND TRUNK WERE SHORT.



\* Try-la-fo-don

**T**HE MACRAUCHENIA\* HAD THE NECK OF A CAMEL AND THE TRUNK OF AN ELEPHANT. HE COULD REACH LEAVES TEN FEET OFF THE GROUND.



\* Mac-raw-keen-ee-uh

**T**HE MEGATHERIUM\*, OR GIANT SLOTH, WAS A VERY LARGE MAMMAL. FROM THE TIP OF HIS TAIL TO THE TIP OF HIS NOSE, HE WAS TWENTY FEET LONG. HE STOOD TWELVE FEET HIGH.



\*Mega-ther-ee-um

**T**HE NORTHARCTUS\* WAS AN EARLY KIND OF MONKEY. HE LIVED IN TREES AND PROBABLY ATE INSECTS AND FRUIT. HE WAS THE ANCESTOR OF THE LEMURS OF MADAGASCAR.



\*North-ark-tus

**T**HE IRISH ELK LIVED THROUGHOUT EUROPE WITHIN THE LAST 100,000 YEARS. HE WAS COMPLETELY DESTROYED ABOUT SIX HUNDRED YEARS AGO. HIS ANTLERS WERE OFTEN NINE FEET ACROSS.



**T**HE GLYPTODON\* WAS LIKE A VERY LARGE ARMADILLO. HE WAS FIVE FEET HIGH AND TWELVE FEET LONG. LIKE A TURTLE, HE COULD DRAW HIS HEAD IN UNDER HIS ARMORED BACK TO PROTECT HIMSELF.

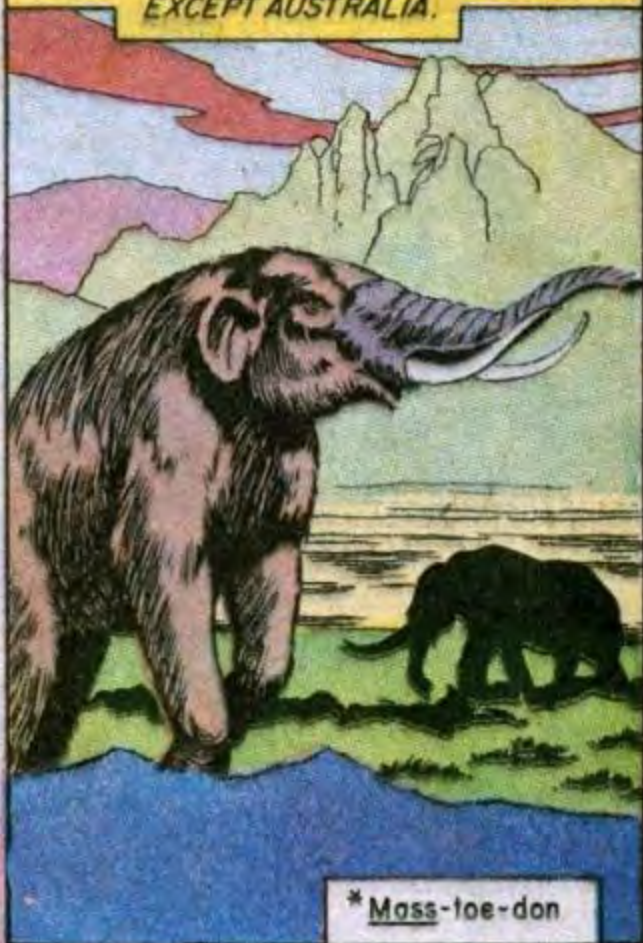


\*Glyp-to-don

**T**HE CAVE BEAR LOOKED LIKE HIS RELATIVE, THE BLACK BEAR, WHICH WE KNOW TODAY. LIKE MAN, THE BEAR EATS BOTH PLANTS AND MEAT.



**T**HE MASTODON\* WAS RELATED TO THE ELEPHANT. ABOUT NINE FEET HIGH AND COVERED WITH FUR, THE MASTODON LIVED ON EVERY CONTINENT EXCEPT AUSTRALIA.



\* Moss-toe-don

**T**HE SHOVEL-JAWED MASTODON WAS RELATED TO THE MASTODON. HE HAD A VERY LONG MOUTH.



**A**NOTHER RELATIVE OF THE MASTODON WAS THE MAMMOTH. HE WAS COVERED WITH LONG HAIR AND FUR, AND HAD A GREAT HUMP ON HIS BACK. HIS GREAT TUSKS GREW DOWN AND SOMETIMES CROSSED.



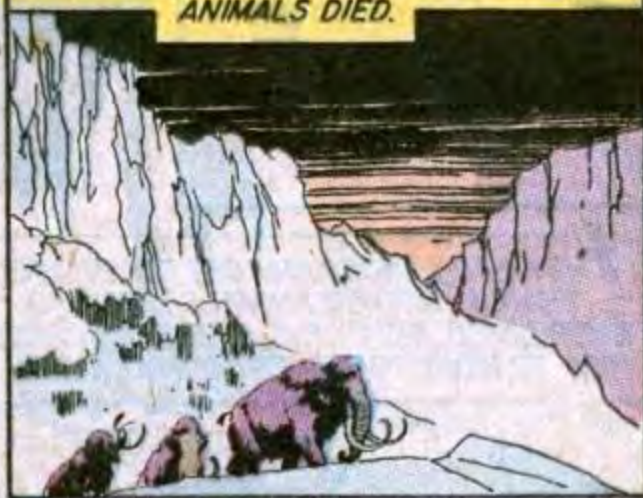
**I**N THE YEARS AFTER THE DINOSAURS DIED, MAMMALS GREW AND MULTIPLIED.



**T**HEN THE CLIMATE CHANGED. ABOUT EIGHT HUNDRED THOUSAND YEARS AGO, AN ICE AGE GRIPPED VAST AREAS OF THE WORLD.



**T**HE FIRST ICE AGE LASTED ABOUT ONE HUNDRED THOUSAND YEARS. THERE WAS NO SUMMER AT ALL--ONLY VERY COLD WINTER. MANY KINDS OF ANIMALS DIED.



**I**N TIME, FOUR LONG ICE AGES SWEEPED OVER THE WORLD. MAMMOTHS AND MASTODONS SURVIVED THEM ALL. THEY DISAPPEARED ONLY AFTER THE ICE AGES ENDED.



**A**T ABOUT THE TIME THE FIRST ICE AGE BEGAN, A WONDERFUL NEW ANIMAL APPEARED ON THE EARTH.



**T**HESSE NEW ANIMALS WALKED ON TWO FEET AND LIVED IN CAVES. THEY LEARNED HOW TO BUILD FIRES. THEY COULD EVEN DRAW PICTURES OF THE ANIMALS THEY HUNTED FOR FOOD.



**T**HEY HAD LARGER AND BETTER BRAINS THAN ANY OTHER ANIMALS THAT HAD EVER LIVED. BEST OF ALL, THEY LEARNED HOW TO WORK TOGETHER TO STAY ALIVE.



**T**HEY SURVIVED ALL OF THE ICE AGES. WHEN THE ICE WAS GONE, THE SUN ROSE ON THE AGE OF MAN.



# ICEBOX IN SIBERIA

SEVERAL THOUSAND YEARS AGO, A GREAT MAMMOTH WAS CALMLY MAKING ITS WAY ACROSS A TUNDRA, IN WHAT IS NOW A PART OF RUSSIA CALLED SIBERIA. A TUNDRA IS AN AREA OF FLAT LAND. IT IS PERMANENTLY FROZEN SIX INCHES BENEATH THE SURFACE.



WHILE CROSSING THE TUNDRA, THE MAMMOTH MAY HAVE HAD TO PASS OVER AN ICE-COVERED POND OR STREAM. SUDDENLY THE ICE CRUMBLER BENEATH ITS HUGE HULK. THE MAMMOTH FELL INTO THE WATER AND DROWNED.



FOR THOUSANDS OF YEARS, THE BODY OF THE MAMMOTH WAS PERFECTLY PRESERVED, FIRST IN ICE, THEN IN FROZEN SOIL. THEN THE STREAM ERODED.



A NEW STREAM CUT THROUGH THE FROZEN SOIL DEPOSIT. IT BEGAN TO WASH THE ANIMAL CLEAR.



**I**N 1900, A HUNTER LOOKING FOR REINDEER SAW THE HEAD AND TUSKS OF THE MAMMOTH. BUT HE DID NOT KNOW WHAT THE GREAT BEAST WAS. IT WAS NOT UNTIL APRIL, 1901, THAT THE DISCOVERY WAS REPORTED TO THE RUSSIAN ACADEMY OF SCIENCE.



**A** SCIENTIFIC EXPEDITION SET OUT FROM THE CITY OF ST. PETERSBURG, WHICH IS NOW CALLED LENINGRAD. IT WAS A 1,500 MILE JOURNEY. MUCH OF IT WAS BY SLED AND ON HORSEBACK. IT TOOK THREE MONTHS.



**T**HE EXPEDITION IMMEDIATELY SET TO WORK TO FREE THE MAMMOTH, FOR IT WAS DECAYING RAPIDLY. BUT MUCH OF THE MEAT WAS FRESH AFTER THOUSANDS OF YEARS IN ICE. THE DOGS ATE IT AND BARKED FOR MORE.

**T**HE SCIENTISTS FOUND THE MAMMOTH WAS COVERED WITH SOFT YELLOWISH FUR AND A COAT OF VERY LONG BROWN HAIR. IT WAS ABOUT TWELVE FEET TALL, WITH LONG CURVED TUSKS. IN ITS STOMACH WERE POUNDS OF UNDIGESTED FOOD. IT HAD EATEN PINECONES, FLOWERS, MOSS AND MOUTHFULS OF TREES AND HERBS.





**T**HE SCIENTISTS PACKED THE MAMMOTH'S BONES AND HIDE ONTO SLEDS, TO BE DRAGGED TO THE RAILROAD. FROM THERE IT WENT BY TRAIN TO ST. PETERSBURG.

**I**N ST. PETERSBURG, THE MAMMOTH WAS RECONSTRUCTED BY THE SCIENTISTS. FIRST THEY PUT ITS BONES TOGETHER.



**T**HEN THEY STUFFED AND MOUNTED IT. WHEN THEY WERE FINISHED, IT LOOKED EXACTLY AS IT HAD WHEN THEY FOUND IT.



**T**HE MAMMOTH CAN STILL BE SEEN IN THE LENINGRAD MUSEUM OF NATURAL HISTORY. IT WAS A VERY IMPORTANT DISCOVERY, FOR MEN HAD NEVER BEFORE SEEN A MAMMOTH SO WELL PRESERVED. SINCE THEN, OTHERS HAVE BEEN FOUND. MEN HAVE EVEN EATEN THE MEAT.



# SCIENCE, STRATA AND SPECIES

WILLIAM  
SMITH

**B**EFORE PALEONTOLOGY, THE STUDY OF FOSSILS, COULD BE A SCIENCE, OTHER SCIENCES HAD TO BE BORN. ONE OF THESE WAS GEOLOGY.



**I**N 1793, TWENTY-FOUR YEAR OLD WILLIAM SMITH WAS HELPING TO SURVEY A CANAL BEING DUG IN ENGLAND. WHILE THE MEN WERE AT WORK, SMITH MADE AN IMPORTANT DISCOVERY.

WHEN YOU DIG DOWN INTO THE EARTH, YOU FIND DIFFERENT COLORED LAYERS.



EACH LAYER GREW ON TOP OF THE ONE BEFORE IT. BUT THE LAYERS ALL TILT IN ONE DIRECTION.



THIS MEANS THEY SHOULD COME TO THE TOP OF THE GROUND IN THE SAME ORDER THEY ARE TILTING.



**S** MITH BEGAN TO DRAW MAPS OF ENGLAND. THEY WERE DIFFERENT FROM ANY OTHER MAPS. THEY SHOWED THE DIFFERENT LAYERS OF THE EARTH, AND WHERE THEY WERE.

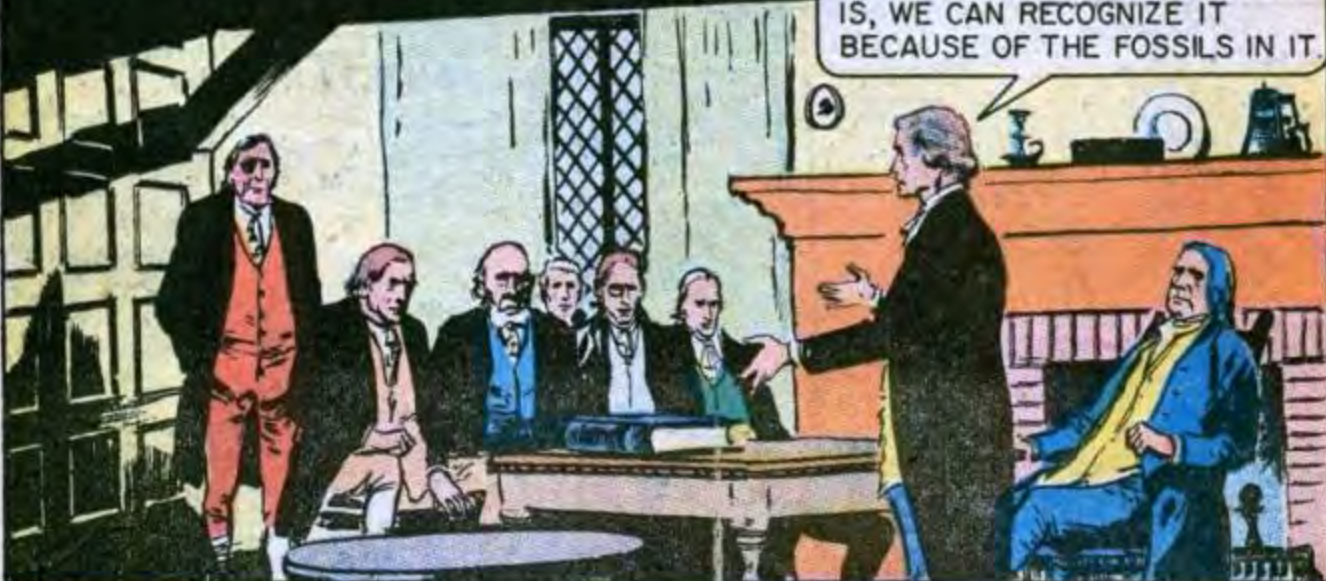


**H** E WORKED FOR MANY YEARS. HE BEGAN TO KNOW EXACTLY WHERE CERTAIN LAYERS WOULD APPEAR BECAUSE OF WHERE HE HAD FOUND THEM IN OTHER PARTS OF THE COUNTRY. HE CALLED THESE LAYERS STRATA. ONE LAYER IS A STRATUM. TWO OR MORE ARE STRATA.



**I** N 1799, SMITH ANNOUNCED HIS DISCOVERIES TO THE SCIENTIFIC WORLD.

YOU SEE, GENTLEMEN, EACH STRATUM CAN BE FOUND AT A DIFFERENT DEPTH IN THE EARTH. NO MATTER WHERE IT IS, WE CAN RECOGNIZE IT BECAUSE OF THE FOSSILS IN IT.



**W** ILLIAM SMITH IS REMEMBERED TODAY AS THE FATHER OF ENGLISH GEOLOGY. HIS MAPS LED MEN OF ALL COUNTRIES TO DISCOVER AND MAP THE STRATA OF THE WHOLE WORLD. HIS DISCOVERIES PAVED THE WAY FOR PALEONTOLOGY, WHICH IS A BRANCH OF GEOLOGY.



**BARON  
CUVIER**

**I**N 1769, IN FRANCE, GEORGES DAGOBERT WAS BORN.

I KNOW OUR SON WILL BE FAMOUS ONE DAY.

BUT, MY DEAR, I WANT HIM TO DEVOTE HIS LIFE TO THE CHURCH.



**A**S THE BOY GREW UP, HE BECAME INTERESTED IN ANIMALS.

GEORGES, WHY AREN'T YOU STUDYING YOUR LESSONS? I TOLD YOU NOT TO WASTE TIME DRAWING ANIMALS!

BUT, FATHER, I LIKE TO DO THIS!



**T**HE OLDER HE GREW, THE MORE GEORGES STUDIED EVERY ANIMAL HE COULD.

MY DEAR, HE SIMPLY DOES NOT WANT TO GO INTO THE CHURCH.

VERY WELL, IF HE WILL NOT FOLLOW MY WISHES, HE MUST GO TO WORK!



**G**EORGES BECAME A TEACHER.

TODAY, CHILDREN, WE ARE GOING TO LEARN ABOUT ELEPHANTS.



**A**T HIS NEW JOB, HE MET A MAN NAMED TESSIER.

GEORGES, I AM AMAZED AT HOW MUCH YOU KNOW ABOUT ANIMALS. I AM GOING TO RECOMMEND YOU TO THE NATIONAL MUSEUM OF NATURAL HISTORY IN PARIS.



**G**EORGES, NOW KNOWN AS THE BARON CUVIER, GOT A JOB AT THE MUSEUM.

THIS YOUNG BARON CUVIER BELIEVES HE CAN CATALOGUE ALL THE ANIMALS IN THE WORLD.

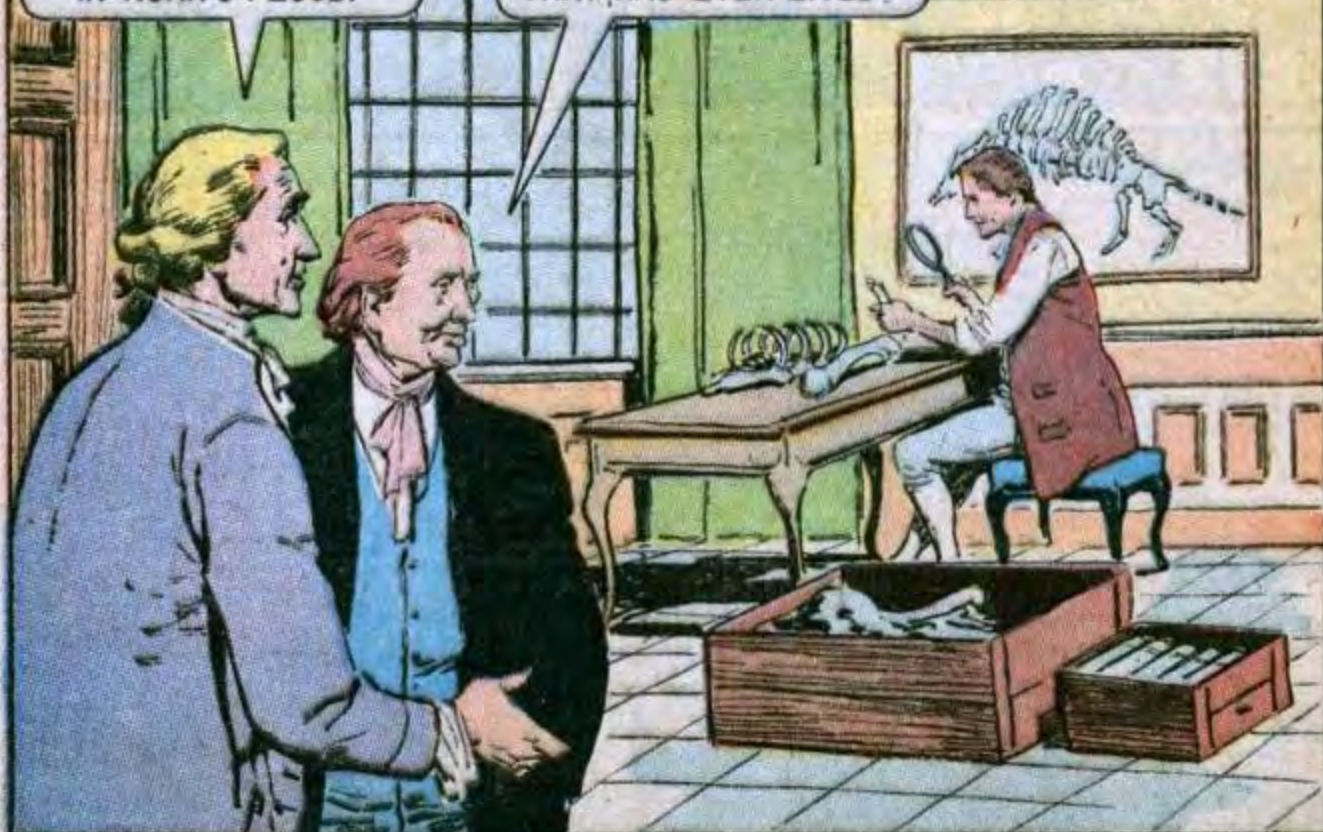
IMPOSSIBLE! CAN YOU IMAGINE HOW MANY THOUSANDS THERE ARE?



**A**S THE YEARS PASSED, BARON CUVIER BECAME INTERESTED IN THE FOSSILS OF ANIMALS NO LONGER LIVING.

CUVIER IS NOW STUDYING THE BONES OF ANIMALS WHICH WERE DROWNED IN NOAH'S FLOOD.

WHEN WILL HE REALIZE THAT NO ONE CAN CLASSIFY EVERY ANIMAL THAT HAS EVER LIVED?



**AFTER TWENTY-TWO YEARS OF STUDY, BARON CUVIER PUBLISHED A BOOK WHICH OPENED A WHOLE NEW SCIENCE TO THE WORLD.**

IN MY WRITINGS, GENTLEMEN, I HAVE TRIED TO SHOW THAT THERE WERE ONCE MANY KINDS OF ANIMALS, WHICH NO LONGER ARE ALIVE. CERTAIN ANIMALS, HOWEVER, CONTINUED TO LIVE.

WHAT DO YOU CALL YOUR SCIENCE, CUVIER?



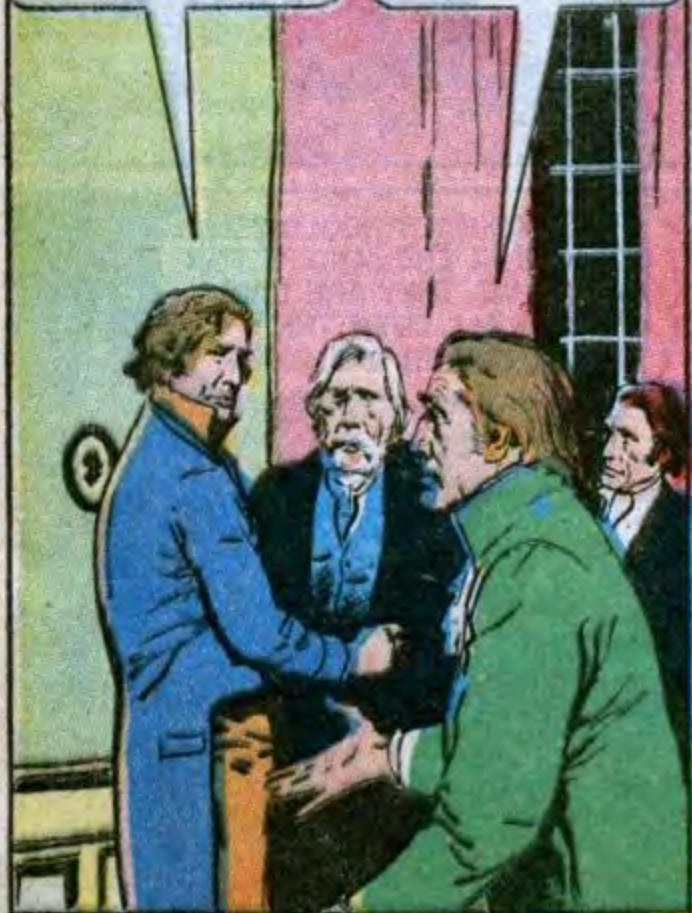
PALEONTOLOGY. IT MEANS THE STUDY OF ANCIENT AND EXISTING ANIMALS TO SHOW HOW THEY ARE RELATED.

RELATED? HOW CAN ALL ANIMALS BE RELATED? THEY LOOK SO DIFFERENT FROM EACH OTHER!



ONE WAY IS BY THEIR BACKBONES. ALL ANIMALS WITH BACKBONES I HAVE CALLED VERTEBRATES.

ELEPHANTS HAVE BACKBONES. SO DO GIRAFFES. SO DO MEN! HOW CAN THEY BE RELATED?



**CUVIER DID NOT KNOW THE ANSWER. BUT HE DID KNOW BACKBONES WERE IMPORTANT IN PROVING THE RELATION OF ALL LIVING THINGS. HE OPENED THE DOOR FOR MANY LATER DISCOVERIES.**



**CHARLES  
DARWIN**

**O**N DECEMBER 27, 1831, TWENTY-TWO YEAR OLD CHARLES DARWIN BOARDED THE H.M.S. BEAGLE IN PLYMOUTH, ENGLAND. HE WAS ABOUT TO BEGIN THE MOST FAMOUS VOYAGE OF SCIENTIFIC DISCOVERY EVER MADE.



**T**HE BEAGLE SAILED AROUND THE CONTINENT OF SOUTH AMERICA. THEN IT TURNED NORTH IN THE PACIFIC OCEAN AND HEADED FOR THE GALAPAGOS ISLANDS.



**T**HERE, DARWIN OBSERVED PLANTS AND ANIMALS. HE KEPT NOTES ON EVERYTHING HE SAW.



**D**ARWIN HAD READ THE BOOKS OF BARON CUVIER.

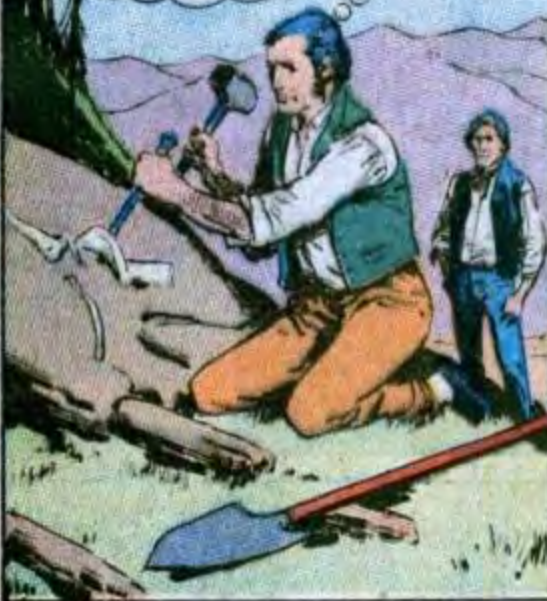
THESE ANIMALS WOULD SEEM STRANGE IN ENGLAND. YET IN MANY WAYS THEY ARE LIKE ANIMALS ALL OVER THE WORLD. CUVIER WAS RIGHT.





**T**HE BEAGLE TOOK DARWIN AND OTHER SCIENTISTS ACROSS THE PACIFIC TO OTHER ISLANDS. THERE HE DUG UP FOSSILS AND STUDIED THEM.

MANY ANIMALS DIED OUT MILLIONS OF YEARS AGO. YET THEY HAD FEATURES LIKE ANIMALS OF TODAY. THE NEW KINDS OF ANIMALS MUST HAVE DESCENDED FROM THE OLD KINDS.



**F**IVE YEARS LATER, THE BEAGLE RETURNED TO ENGLAND. DARWIN TALKED ABOUT HIS TRIP WITH A SCIENTIST NAMED SIR CHARLES LYELL.

IN SOUTH AMERICA, I FOUND THE BONES OF A GIANT SLOTH WHICH NO LONGER LIVES. THEY WERE MIXED WITH SHELLS OF SEA ANIMALS WHICH STILL LIVE TODAY.

WHY DO YOU THINK THE GIANT SLOTHS DIED OUT, WHILE CERTAIN SEA ANIMALS WENT ON LIVING?



THE ENVIRONMENT OF THE GIANT SLOTH CHANGED FASTER THAN THE ANIMAL COULD ADAPT HIMSELF TO IT. THE ENVIRONMENT OF THE SEA ANIMALS CHANGED SO LITTLE, OR SO SLOWLY, THAT THEY COULD CHANGE WITH IT.

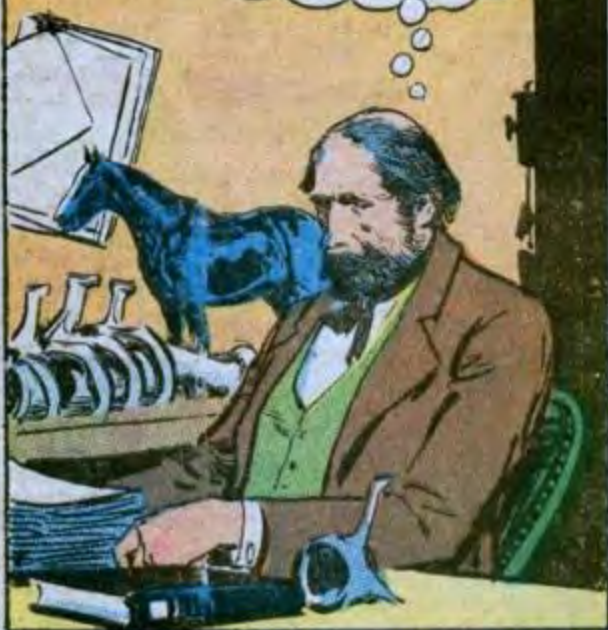
YOU MEAN SOME ANIMALS CHANGE TO NEW KINDS OF ANIMALS OVER MILLIONS OF YEARS?

I STILL HAVE MUCH STUDY TO DO BEFORE I CAN PROVE IT. BUT THERE IS NO DOUBT THAT THE WAY ANIMALS CHANGE IS CALLED EVOLUTION. IT IS THE DEVELOPMENT OF NEW PLANTS OR ANIMALS FROM OLDER ONES.



**D**ARWIN STUDIED FOR TWENTY-THREE YEARS. FINALLY, IN 1859, HE WAS READY TO PUBLISH HIS THEORIES.

THERE WILL BE MANY PEOPLE WHO WILL NOT UNDERSTAND.

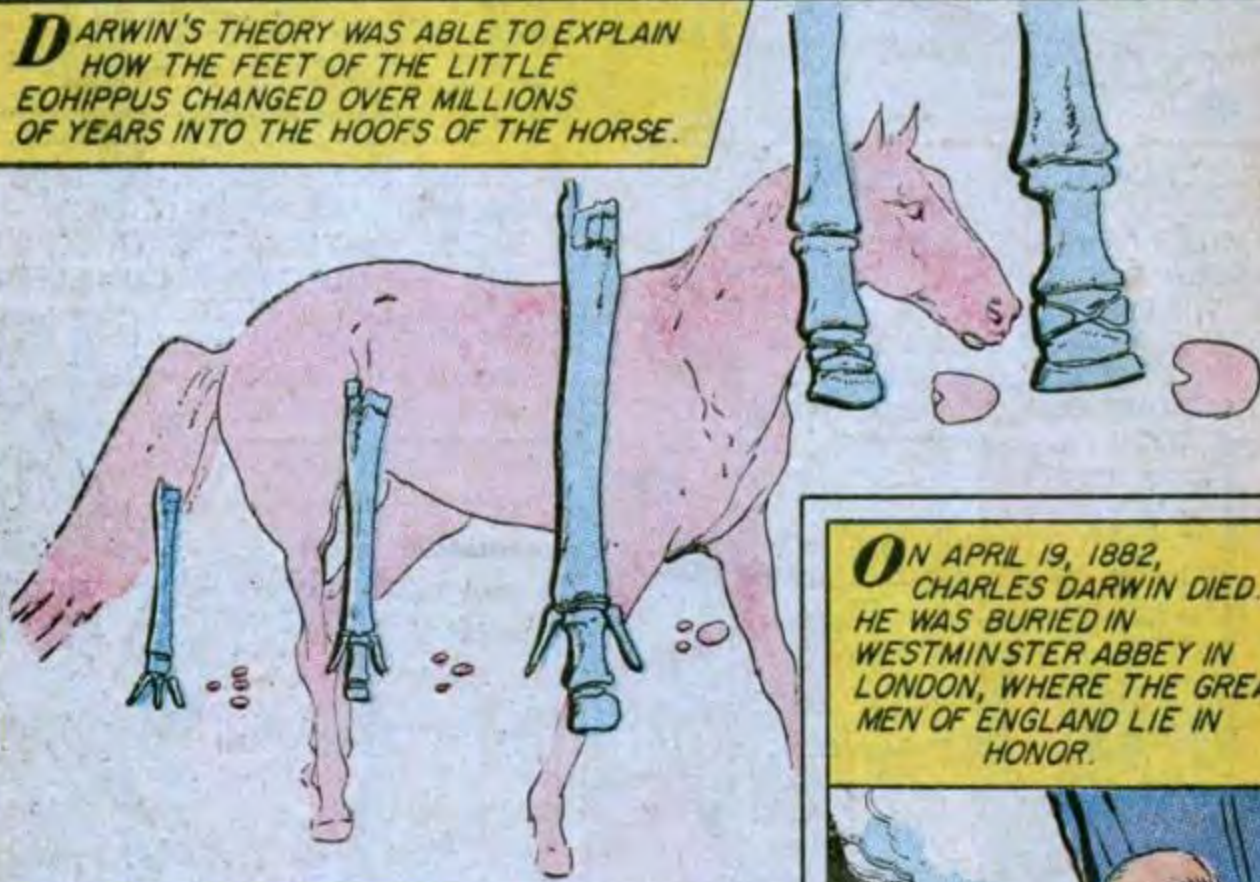


**H**IS BOOK, ORIGIN OF SPECIES, CONTAINED ONE OF THE MOST IMPORTANT SCIENTIFIC THEORIES IN THE WORLD.

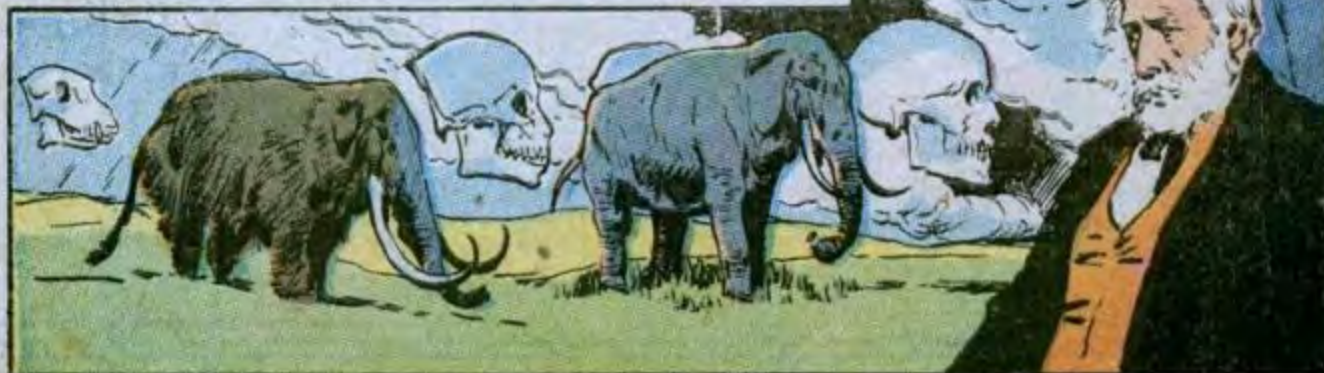
THE FIRST LIVING CREATURES STARTED IN THE SEA. LITTLE BY LITTLE, OVER MILLIONS OF YEARS, THEY CHANGED. EACH CHANGE WAS AN IMPROVEMENT TO MAKE THE ANIMAL BETTER ABLE TO LIVE.



**D**ARWIN'S THEORY WAS ABLE TO EXPLAIN HOW THE FEET OF THE LITTLE EOHIPPUS CHANGED OVER MILLIONS OF YEARS INTO THE HOOFS OF THE HORSE.



**O**N APRIL 19, 1882, CHARLES DARWIN DIED. HE WAS BURIED IN WESTMINSTER ABBEY IN LONDON, WHERE THE GREAT MEN OF ENGLAND LIE IN HONOR.



## THE SCHOOLBOY AND THE SCIENTISTS

**I**N 1955, Fred Schatzman of Highland Park, New Jersey, wrote a letter to Junius Bird, curator of archaeology at the American Museum of Natural History. The letter asked for a sample of some ancient bones. The museum gets many requests, but samples are seldom given out. This time, though, a sample was sent, because the letter was scientifically written. Officials of the museum were later amazed to learn that the writer was only fifteen years old.

Fred Schatzman needed a project for his high school science fair. He wanted to combine his three favorite subjects—mathematics, chemistry and electronics. He chose a project called radiocarbon dating—a very new process which had only recently been developed by highly-skilled scientists much older than Fred.

It wasn't long before Fred found he had chosen a project which was almost more than he could hope to complete. Several scientists had worked many years to discover a way to find out how long ago any living creature had lived. Dr. Willard F. Libby, working with Dr. F. C. Anderson and Dr. James R. Arnold, had developed a way to date the remains of living matter. It had taken them from 1948 to 1950 to complete their method. The process was very complicated and expensive. How could Fred Schatzman, a boy still in high school, hope to make such an experiment?

The theory of radiocarbon dating, which Dr. Libby and his fellow scientists had worked out, is simple. After cosmic rays were discovered in 1911 by Professor V. F. Hess, it was learned that beyond the upper atmosphere, high energy bombardment cre-

ates certain radioactive atoms. One of these is known as Carbon 14.

Carbon 14 seeps down through the atmosphere and is absorbed by every living thing on earth—plants, animals, even the smallest cell life. As long as anything is alive it absorbs Carbon 14. When it dies, the Carbon 14 begins to decay. The scientists discovered that even thousands of years after a thing is dead, they can find out how long ago it lived by measuring the amount of Carbon 14 left in its remains. In this way a bit of charcoal from a campfire built by cavemen centuries ago can be dated. The amount of Carbon 14 tells when the trees, which the cavemen used for fuel, were alive.

Fred Schatzman did not have the complicated equipment which scientists use for measuring Carbon 14. But he was not discouraged. He pleaded with a laboratory to loan him a scintillator, which is an electronic device for measuring radioactivity. Then he talked a man who manufactured toothpaste tubes into building the big shield of lead which Fred needed to protect his scintillator from outside interference. Fred saved more money by learning to be an amateur glass blower. He made his own tubes and containers for the chemical separation of the Carbon 14 from the ancient bones.

Several months after the museum sent the samples, the officials received an answer which they could hardly believe. Fifteen-year-old Fred Schatzman, working with equipment he borrowed or made himself, gave them the date the animal had lived from the bones the museum sent him. His date was almost exactly the same as Dr. Libby's date for that animal. The schoolboy had matched the scientists!

# LIVING FOSSILS

**M**OST ANIMALS OF TODAY ARE MUCH DIFFERENT FROM THEIR ANCESTORS.



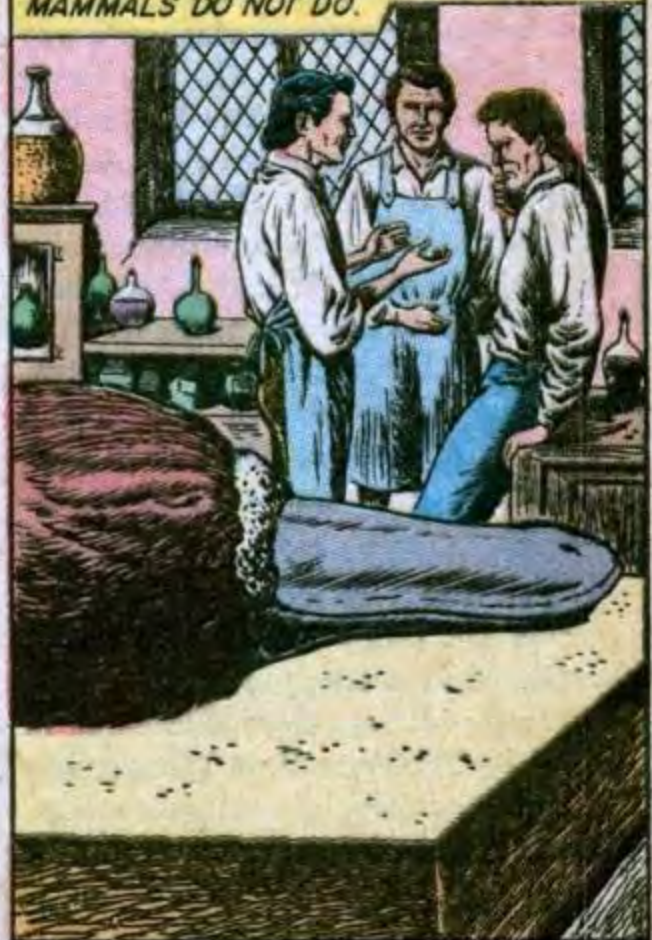
**B**UT THERE ARE A FEW ANIMALS THAT HAVE NOT CHANGED FOR MILLIONS OF YEARS. WE KNOW THIS BECAUSE THEIR BONES ARE THE SAME AS THE BONES OF THEIR ANCESTORS.



**T**HESE ANIMALS ARE OFTEN CALLED LIVING FOSSILS. IN 1797, A DUCKBILLED PLATYPUS WAS BROUGHT FROM AUSTRALIA TO ENGLAND. SCIENTISTS DIDN'T BELIEVE IT WAS REAL. THEY TRIED TO PRY ITS BILL OFF.



**T**HEY DIDN'T BELIEVE IT WAS REAL BECAUSE NO OTHER MAMMAL HAS SUCH A BILL. LATER THEY FOUND IT ALSO LAYS EGGS, WHICH OTHER MAMMALS DO NOT DO.



**T**HE AMERICAN OPOSSUM IS ALSO A LIVING FOSSIL. HIS ANCESTORS WERE JUST EXACTLY LIKE HE IS TODAY. THE OPOSSUM HAS NOT CHANGED FOR ABOUT SEVENTY MILLION YEARS.



**T**HE WATER OPOSSUM OF SOUTH AMERICA IS ANOTHER LIVING FOSSIL. LIKE THE AMERICAN OPOSSUM, THE FEMALE CARRIES HER YOUNG IN POUCHES UNTIL THEY ARE OLD ENOUGH TO TAKE CARE OF THEMSELVES.



**L**UNGFISHES ARE GROWING SCARCE TODAY, BUT THEY WERE ALIVE MORE THAN ONE HUNDRED MILLION YEARS BEFORE THE DINOSAUR. THEY SOMETIMES RISE TO THE TOP OF THE WATER AND BREATHE AIR. THEY CAN LIVE WITHOUT WATER FOR LONG PERIODS.



**T**HESE PLACODERMS\* ARE AS OLD AS THE LUNGFISHES.



\* Plak-o-derms

**T**HIS FROG BELONGS TO WHAT MAY BE THE OLDEST FROG FAMILY ALIVE TODAY. HE IS CALLED THE STEPHENS ISLAND FROG, AFTER AN ISLAND NEAR NEW ZEALAND.

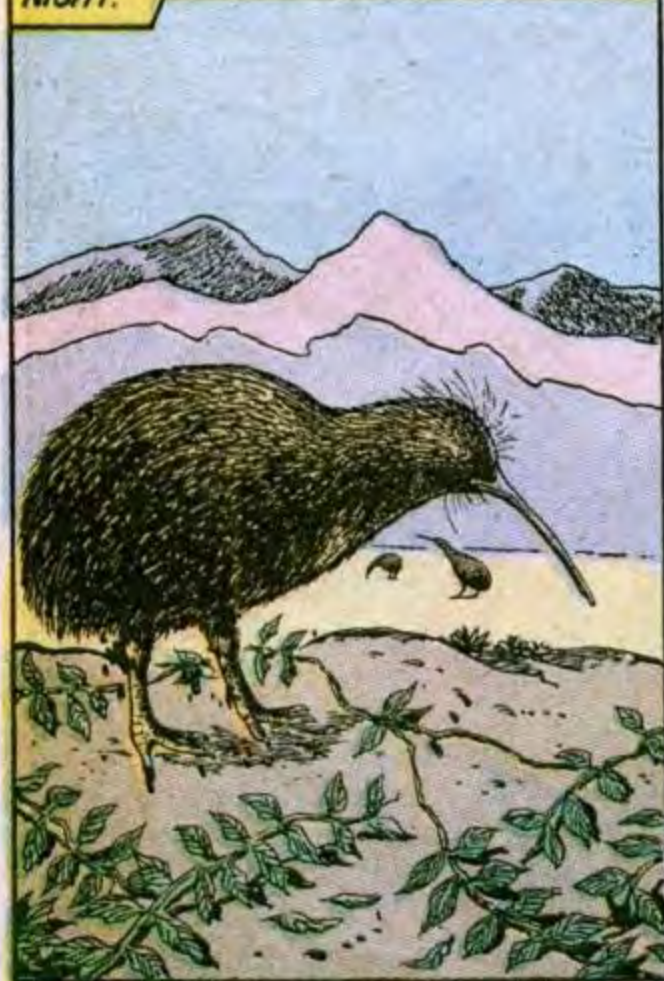


**T**HE TUATARA\* LIZARD OF NEW ZEALAND HAS NOT CHANGED FOR 180 MILLION YEARS.



\* Too-ah-tah-rah

**T**HE KIWI BIRD IS ANOTHER OF NEW ZEALAND'S LIVING FOSSILS. HE HAS POOR EYESIGHT BUT VERY GOOD HEARING. HE SEARCHES FOR HIS FOOD AT NIGHT.



**T**HE ANCESTORS OF THE KANGAROO WERE ALIVE SEVENTY MILLION YEARS AGO.

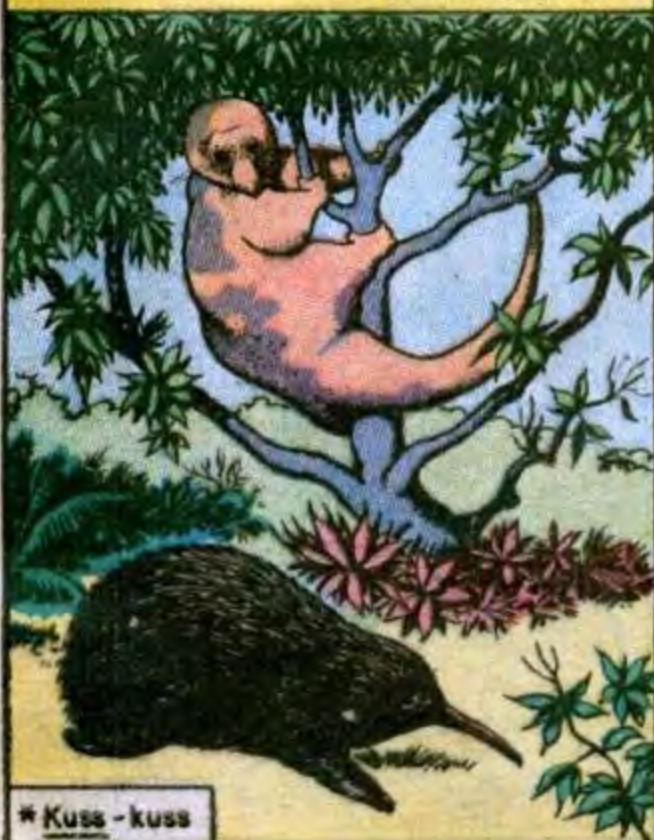


**T**HESE ANIMALS ARE ALSO AUSTRALIAN MARSUPIALS\*. MARSUPIALS ARE ANIMALS WHICH CARRY THEIR YOUNG IN POUCHES.



\* Mar-soop-ee-als

**T**HE SPINY ANTEATER AND THE SPOTTED CUSCUS\* ARE ALSO MARSUPIALS WHO LIVE IN AUSTRALIA. SCIENTISTS THINK THE REASON SO MANY FAMILIES IN AUSTRALIA HAVE NOT CHANGED FOR SO MANY MILLIONS OF YEARS IS THAT AUSTRALIA HAS BEEN CUT OFF BY THE OCEAN FROM THE REST OF THE WORLD.



\* Kuss - kuss

**T**HE KOALA BEAR IS THE MOST LOVABLE OF THE MARSUPIALS. HE LIVES IN AND EATS THE LEAVES OF THE EUCALYPTUS TREE, AND HE NEVER DRINKS WATER. HIS NAME MEANS NO DRINK IN AUSTRALIAN.



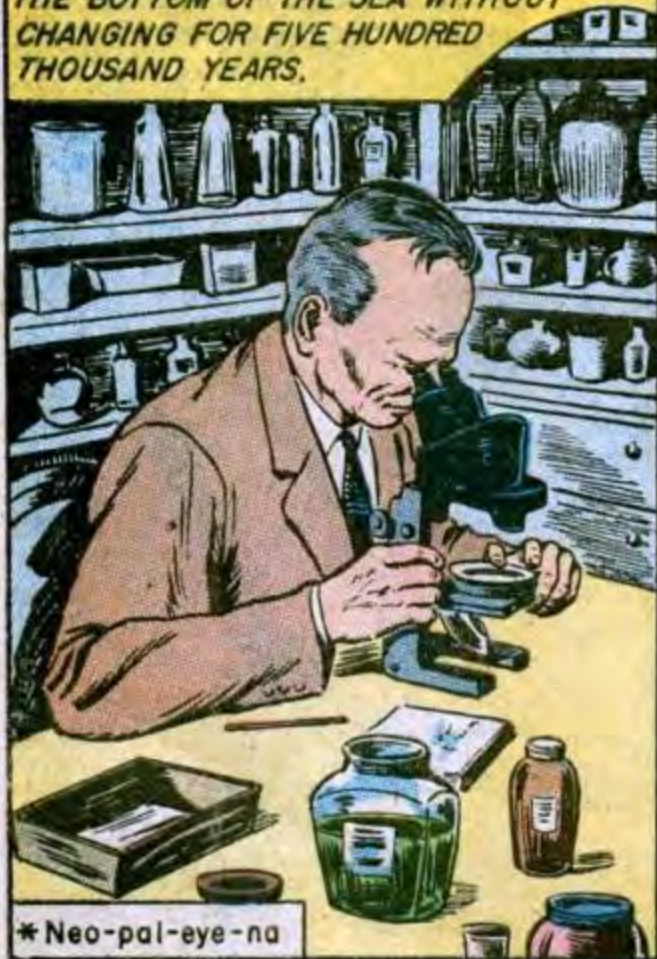
**T**HE SEARCH FOR LIVING LINKS WITH THE PAST CONTINUES TODAY. IN DECEMBER, 1958, SCIENTISTS SCRAPED THE BOTTOM OF THE PACIFIC OCEAN.



**T**HEIR NETS BROUGHT UP SMALL ANIMALS FROM THE FLOOR OF THE SEA.



**O**NE WAS A MOLLUSK SO SMALL IT COULD BE SEEN ONLY UNDER A MICROSCOPE. IT WAS NAMED NEOPILINA\*. IT HAD CONTINUED TO REPRODUCE AT THE BOTTOM OF THE SEA WITHOUT CHANGING FOR FIVE HUNDRED THOUSAND YEARS.



\*Neo-pal-eye-na

**L**IFE AT THE BOTTOM OF THE SEA GOES ON WITH LESS CHANGE THAN ON LAND. SCIENTISTS KEEP SEARCHING, BOTH ON LAND AND IN THE SEA, FOR NEW ANSWERS TO THE QUESTION OF HOW LIFE BEGAN AND DEVELOPED OVER BILLIONS OF YEARS.

