


Hidden underground
are pieces of the past.
There is much to discover,
from works of art made
by ancient cultures to
dinosaur fossils. Read about
how people dig for these
treasures and what
we can learn from
these finds.



Dig That!

by Frances Chan





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The Buried Past

How do we find out how people lived in the past? Go digging! Scientists who study remains left by ancient cultures are called archaeologists. They find buried buildings and dig for artifacts. Artifacts are objects made by people, such as tools, pottery, and coins.

Archaeologists also find plant or animal remains left by ancient cultures. These finds are called ecofacts. They include things such as bones, fruit pits, or seashells that were thrown away after a meal. They tell us what people used to eat.

Artifacts



Ecofacts

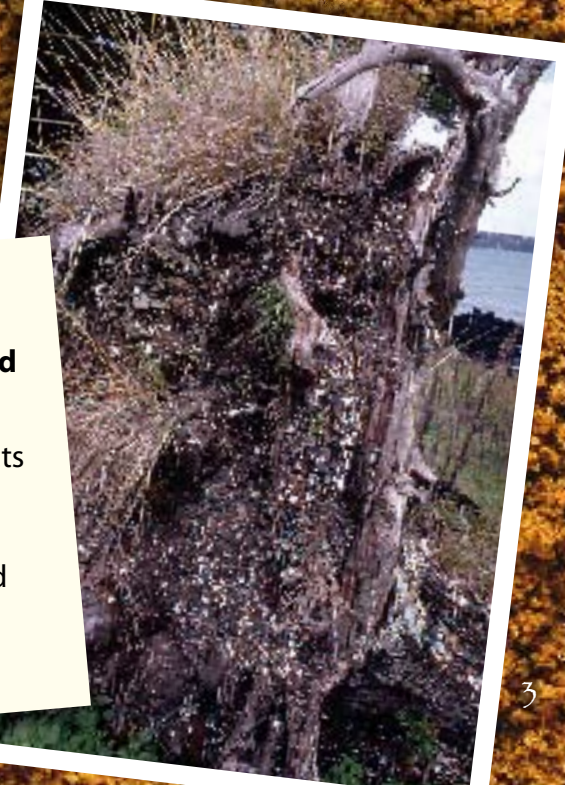


King Tutankhamen's tomb, Egypt

King Tutankhamen ruled ancient Egypt from 1347 B.C. –1339 B.C. His tomb was discovered in 1922. It contained more than 5,000 artifacts, including thrones, beds, jewelry, statues, and chests filled with ancient clothing. This mask made of gold and precious stones covered the mummy of the 18-year-old king.

Maori cooking pit, New Zealand

When this tree blew over, archaeologists discovered ecofacts left by Maori people hundreds of years ago. Empty shells and charred soil tell us about seafood meals that were cooked in an underground pit.



Digging for Clues

How do archaeologists find interesting areas to dig? Some places really stand out, such as the pyramids in Egypt. Others can be traced from historical records and ancient maps. Some discoveries have been found by accident.

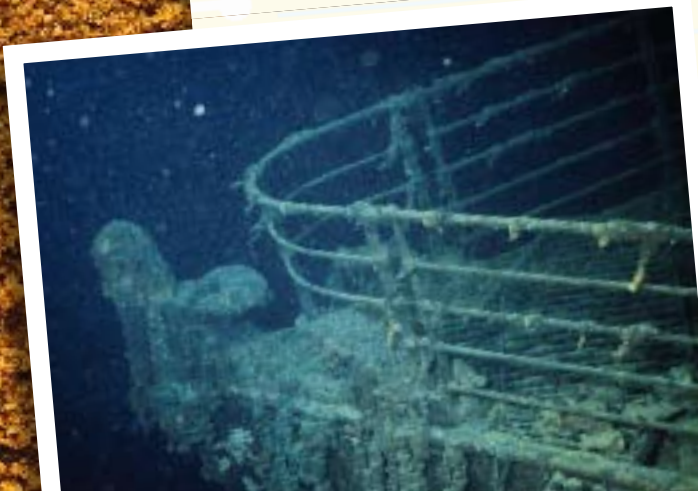
A place where archaeologists dig is called a site. Before digging starts, archaeologists must get permission from land owners and from local governments and cultural groups. The team must **excavate** the soil carefully to avoid breaking any artifacts that may lie underneath. It can take several months or years to excavate a whole site.



Some sites are underwater. Scientists dive to study ships that have sunk or whole towns that have been buried.



These divers are using a float to lift up an anchor from a 17th-century Spanish ship. The shipwreck was found near the Bahamas.



Titanic, Atlantic Ocean

The shipwreck of the *Titanic* was discovered 73 years after it sank. It lay more than two miles below the ocean's surface. About 6,000 artifacts have been recovered from the wreck. Some are now exhibited in museums.

City in the Clouds

For thousands of years, Sagalassos was a wealthy city in the mountains of Turkey. Then, in 518 A.D., an earthquake struck, and the city was abandoned.

Explorers found the ruins in the 1700s, but it wasn't until 1990 that a Belgian-British team started a large-scale excavation project. There are still many different buildings to be studied, including some Roman baths, a theater, a food market, and a shrine.



Piecing together broken statues is a bit like working on a giant jigsaw puzzle.



These archaeologists are cleaning a mosaic floor found in one of the houses.



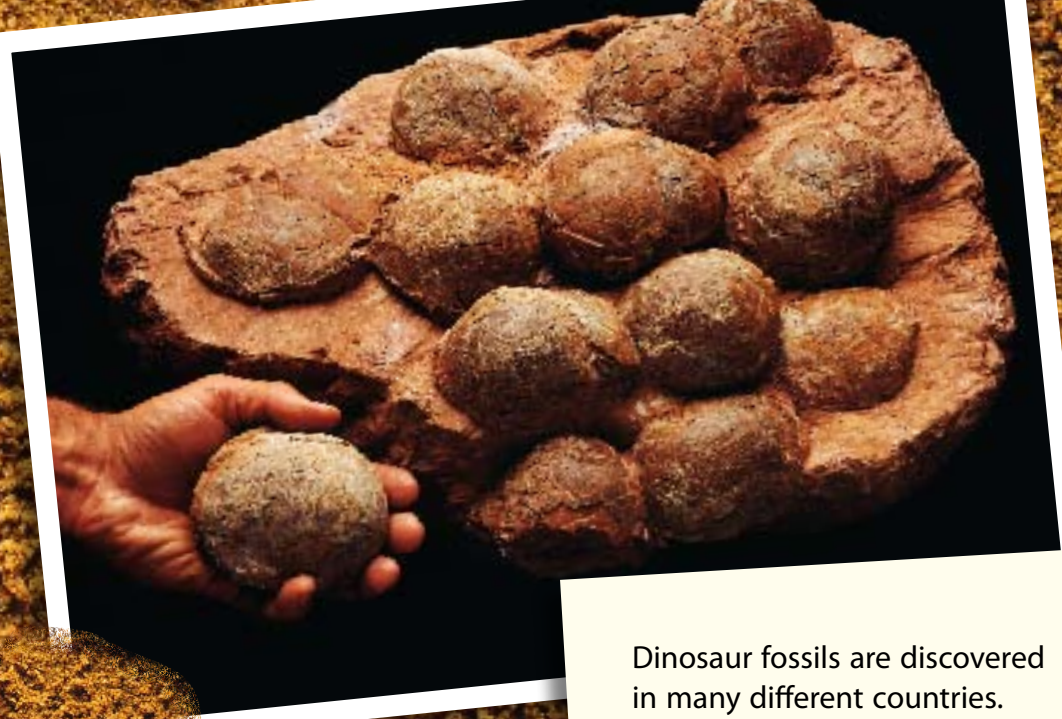
This oil lamp and coin were found in the marketplace.

Ancient Animals

Other kinds of scientists besides archaeologists also dig up ancient remains. Paleontologists are scientists who dig up the remains of dinosaurs. People have been finding dinosaur fossils for centuries, but for a long time they did not know what they were.

In 1841, British scientist Richard Owen created the term “dinosauria” to describe this group of **extinct** reptiles. He realized that dinosaurs were different from living reptiles.

Paleontologists gather their information on dinosaurs from their fossilized bones, eggs, and footprints.



Dinosaur fossils are discovered in many different countries. These fossilized eggs were found in China.

This paleontologist is excavating fossilized dinosaur bones in Africa.



Making Tracks

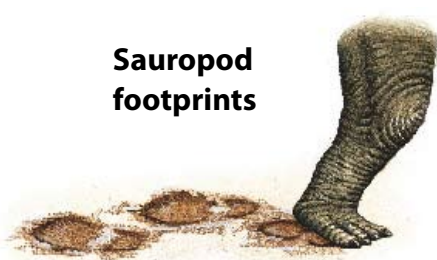
Dinosaur footprints, or trackways, have been found all over the world. Paleontologists study the size and shape of a dinosaur's footprints and measure the length of its stride. From this, they can figure out its height and speed and if the dinosaur walked on two or four legs.

Trackways show that some *Brontosaurus* traveled in large herds and others walked in single file. Coelurosaurs' footprints show that they were small, birdlike dinosaurs that could run fast on two legs. Sauropods had wide feet and walked on four legs. Their back feet made huge footprints.

Coelurosaur footprints



Sauropod footprints



Many dinosaur footprints have been found in the Arizona desert. Paleontologists expose them with a special liquid so that they can be seen easily.

These paleontologists are looking at *Brontosaurus* trackways in Colorado. When the dinosaurs were alive, the site was a huge lake.



At a Dig Site

Like archaeologists, paleontologists work slowly and carefully when digging. The first step at a dig site is to divide the site into squares and draw the area onto a grid map. Then the paleontologists excavate one square at a time. They record what they find on the map. It is important to know exactly where each fossil was located. Every site is photographed and filmed so all the information is recorded.

Paleontologists use chisels, picks, and brushes to excavate fossils.

Once the fossils are excavated, they are wrapped in aluminum foil and then cast in plaster. This will stop them breaking on their way to the **laboratory**.



In the Lab

People who clean and repair fossils are called preparators. They must be patient and skilled with their hands. Part of their job is to remove the layer of rock or hardened mud around the fossil bones. This layer is called the matrix. Preparators often use drills and air-powered tools to remove it all. Any broken bones are then repaired with special glues.

1

A cast-cutting saw is used to open the plaster jackets that were used to transport the fossils safely.



2

Cleaning begins. Preparators often use a magnifying glass to see a fossil in detail.



3

Small dental drills and picks are used to remove the matrix near the bone.



4

Preparators remove any last bits and pieces of the matrix with an air-powered tool. The machine pumps very fine baking soda and air through a tiny nozzle.



Museum Masterpieces

Many museums around the world have dinosaur exhibits. Some exhibits display real fossilized bones. However, most exhibits display models. This is because complete skeletons are rare, and real fossils are often too valuable to display. Preparators make the models using real dinosaur fossils.

**Natural History Museum,
London, England**



1

Preparators make molds using silicone rubber. Then the molds are filled with liquid fiberglass. The fiberglass hardens as it dries.



2

When the cast is ready, it is separated from the rubber mold.



3

The cast is cleaned and the seams are sanded smooth.



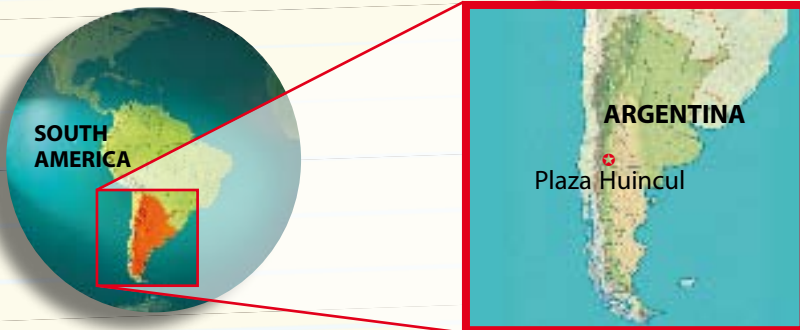
4

The cast is painted so it looks like the original fossil.

Meet a Paleontologist

Professor Rodolfo Coria, from Argentina, helped to excavate *Argentinosaurus*, possibly the world's largest dinosaur. The first piece to be discovered was a 6-foot-long shinbone. The rancher who found it in Plaza Huincul thought it was a fossilized tree trunk!

Professor Coria and his team found only 10 percent of the skeleton, but they figured out that *Argentinosaurus* was more than 120 feet long and weighed about 100 tons.



Interview With Professor Coria

- Q. How did you become a paleontologist?
A. I studied biology at college. Then I became a volunteer in the Vertebrate Paleontology Department at Argentina's National Museum.
- Q. How often do you go on fossil digs?
A. I usually spend two months a year in the field with a group of 8 to 10 people.
- Q. What is the best part of your job?
A. Traveling and discovering new dinosaurs. I want to know how many dinosaurs were out there and how they were related.
- Q. How long did it take to unearth *Argentinosaurus*?
A. It took about two and a half months. We had to deal with bad weather. Windy days were annoying, and we were stuck in our tents for weeks because of the rain.
- Q. What skills do you need to become a paleontologist?
A. Patience, not to be afraid of hard work, knowledge of **anatomy**, and a thirst to learn more.



Some pieces, or vertebrae, from the *Argentinosaurus* backbone are more than 5 feet high.

Discovered in Brazil

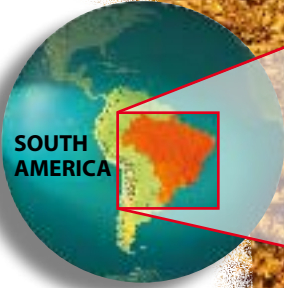
In 1998, a new species of dinosaur was discovered near Santa Maria, in Brazil.

A local farmer spotted a bone poking out of the ground when he was out for a walk.

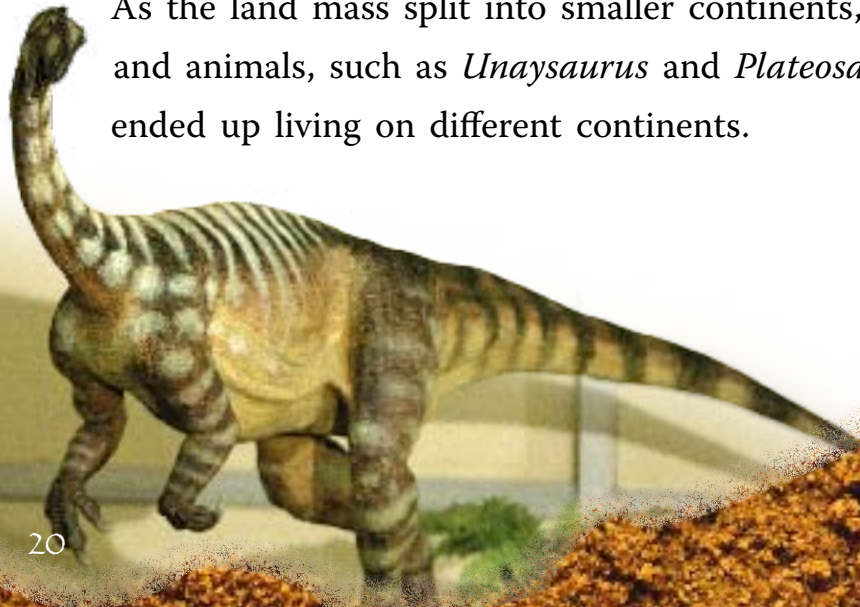
It was the skeleton of one of the oldest dinosaurs ever to walk on Earth. It was named *Unaysaurus*.

Paleontologists believe that *Unaysaurus* is closely related to *Plateosaurus* from Germany. Some scientists think that Earth's land started out as one huge island.

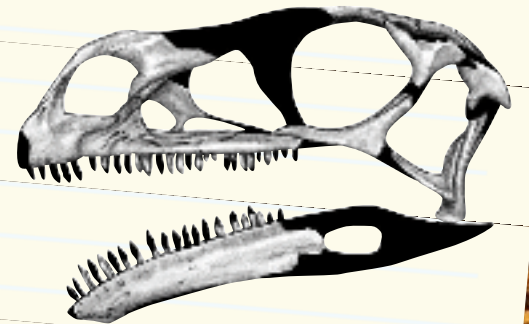
As the land mass split into smaller continents, plants and animals, such as *Unaysaurus* and *Plateosaurus*, ended up living on different continents.



Unaysaurus was a plant-eating dinosaur that walked on two legs. Scientists made this model to show how big it was and what it may have looked like.



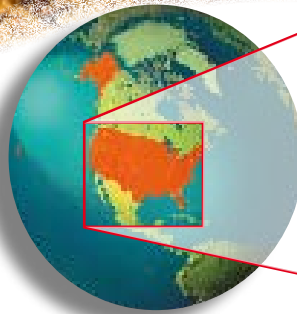
This drawing shows which skull-bone fossils were found. Even though some pieces were missing, paleontologists could figure out the whole structure of the skull.



■ Missing skull pieces

Say Hello to Sue

Sue is the largest and most complete *Tyrannosaurus rex* fossil ever found. The skeleton is on display at The Field Museum in Chicago. It was discovered in 1990 by Sue Hendrickson, while she was on a fossil hunt in South Dakota. Paleontologists named the dinosaur after Sue, but they don't know if it was actually male or female. Sue's skeleton is 90 percent complete. It contains about 200 fossilized bones.



All About Sue

Length:	42 feet
Height at hips:	13 feet
Weight:	about 7 tons
Number of teeth:	58
Length of teeth:	7½ to 12 inches
Diet:	meat




Here paleontologists are excavating Sue's bones at the dig site in Faith, South Dakota.



Sue's skull is 5 feet long and weighs 600 pounds. It is too heavy to be placed on the skeleton body. Instead, a lightweight model sits on the body, and the skull has its own display case.





Glossary

anatomy the bodily structure of a plant or an animal

excavate to dig out

extinct no longer existing

laboratory a place where scientists work



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