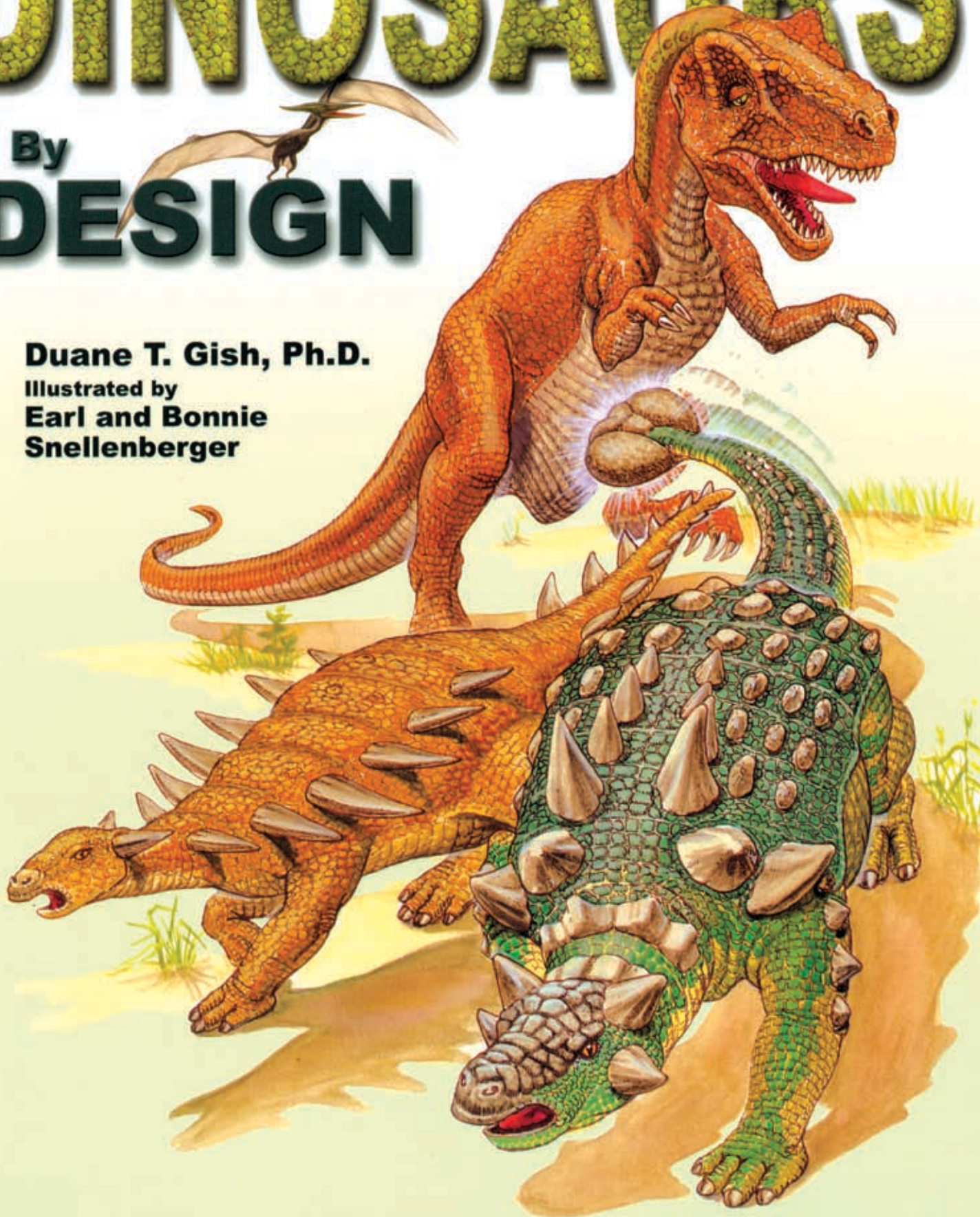


DINOSAURS

By
DESIGN

Duane T. Gish, Ph.D.

Illustrated by
**Earl and Bonnie
Snellenberger**



About the Author

Dr. Duane Gish is a man who, in addition to his accomplishments as a speaker and writer, is known by many as the foremost creationist debater in the world today. His travels have taken him to virtually every state in the continental U.S. and into 30 countries. Dr. Gish is listed in American Men of Science and Who's Who in the West. He is a member of the American Chemical Society, the American Association for the Advancement of Science, and is a Fellow of the American Institute of Chemists.



Dr. Gish received his Ph.D. in biochemistry in 1953 from the University of California, Berkeley. His interest in the creation/evolution issue grew until, in 1971, he left The Upjohn Company to join the faculty at the newly established (1970) Christian Heritage College and its research division. In 1972, the latter changed its name to the Institute for Creation Research, and Dr. Gish has served as Associate Director and Vice President since that time.

Dedication

This book is dedicated to Masami Usami, M.D., of Mito, Japan, President of the Creation Science Association of Japan, for his dedicated, selfless, and untiring efforts to make known the truth of God's creation to the people of Japan.

Acknowledgement

The author wishes to acknowledge that this book is the product of a major team effort. The artwork gives obvious testimony to the artistic abilities of the artists, Earl and Bonnie Snellenberger, but their work also involved many hours of researching each subject. Special thanks are due to the production manager, Gloria Clanin, who designed this book, and put in countless hours, not only as production manager, but also in research, editing, and other areas. Thanks are also due to Barrie Lyons for research and editing, to John Rajca, whose technical assistance and overview of the subject has been invaluable, and to Ron Hight, for production assistance and final layout.

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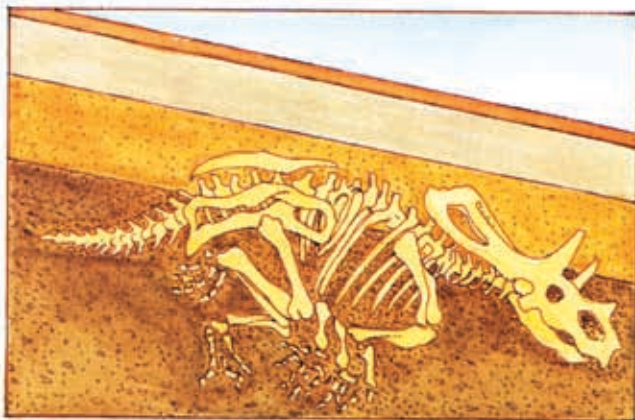
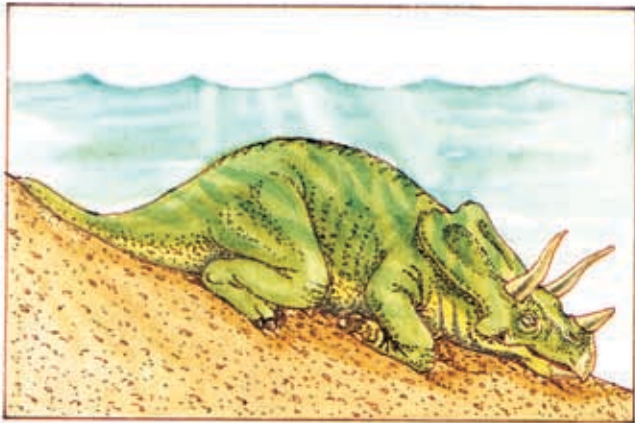
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How Fossils Are Formed



A fossil is a part of an animal or a plant that has been dead a long time—usually thousands of years. In order for a plant or an animal to become a fossil (except under very special circumstances), it must be buried almost immediately after it dies. If an animal dies, and then just lies around on the ground or floats around in the water, it never becomes a fossil.

1 First of all, dead plants and animals—especially animals—decompose very quickly due to bacteria and natural chemical processes. Second, there are a lot of insects, worms, and animals (called scavengers) that eat dead things. Third, oxidation by oxygen in the air causes animals and plants to decompose. Finally, there are chemicals in water and the ground—such as acids—which decompose and dissolve everything, including bones and teeth.

2 What happens to a bone, a tooth, or a plant when it becomes a fossil? What usually happens is everything in the bone or plant is replaced, a tiny bit at a time, by minerals dissolved in the water that is in the ground. As water moves through the ground, it carries various kinds of minerals—such as silica (silicon dioxide [SiO_2]), calcite (calcium carbonate [CaCO_3]), and pyrite (iron disulfide, [FeS_2])—along with it. When the bones and teeth of an animal, or parts of a plant buried in the ground, become wet with this water, the mineral in the water replaces all the material in the bone, tooth, or plant, and it

3

4

1. All dinosaurs not on Noah's Ark were drowned in the Flood.
2. Animal was buried rapidly as the Flood deposited soft layers of material that later turned to stone.
3. Fossilization occurred as the animal lay buried deeply beneath Flood sediment.
4. Fossils become exposed as the ground around animal erodes away.

becomes hard as a rock. In fact, it is now a rock, but it has almost the exact shape of the bone, tooth, or plant it replaces. It doesn't take millions or even thousands of years for something to become a fossil.

Someone found, down in an old abandoned mine shaft, a hat that a miner had lost 50 years earlier. The hat was as hard as rock. After lying at the bottom of the shaft in water with a lot of mineral, the hat had fossilized. The miner's soft hat was now a hard hat!

Once in awhile, very rarely, an animal is frozen quickly and stays frozen for several thousand years. For example, a few mammoths (huge woolly elephants) in Alaska and Siberia were somehow frozen very quickly thousands of years ago and have been found recently with their flesh still good enough to eat. The fossil bones of thousands of animals have been taken out of the La Brea tar pits in Los Angeles, California. The tar didn't keep the flesh of these animals from rotting away, but it did prevent the bones from decomposing or disappearing.

Fossil studies give us evidence of a worldwide catastrophe, such as a flood. We have already mentioned that a fossil is formed when a plant or animal is buried very quickly after it dies. If there is time for it to rot or decompose slowly, it will not retain its form or composition. A flood would cause sudden burial and provide a natural means of fossilizing their bones.

Fossils of dinosaurs and many other animals have been found in all parts of the world; many have been dug up in places where they could not survive the climate that exists there today. How could they have existed there? Apparently a drastic change in climate has occurred since that time.

Scientists agree that there was a drastic change of climate at one time in the earth's history, but they have many different reasons for it. Creationists believe that the Flood changed the earth's climate.



*Dinosaur
National
Monument,
Utah*



Fossils of dinosaurs have been found in just about every place in the world, from Alaska and Siberia to Antarctica. Many have been found in Canada, the U.S. (especially in some of the western states such as Colorado, Utah, Montana, and Wyoming), China, Mongolia, Europe, Africa, Mexico, South America, and Australia. Sometimes the fossils of many dinosaurs are found all jumbled together in a huge fossil graveyard, just as you would expect if they had been tossed around in a gigantic flood.

All we have left today to tell us about the creatures that roamed the entire earth long ago are the many fossil bones, fossil footprints, and fossil eggs. But finding them in areas where no dinosaurs could live today provides further evidence of the Flood as recorded in the Bible.

Digging Up Dinosaur Fossils

When you think of buried treasure do you picture a pirate's chest or prospecting for gold? Well, looking for fossils is also hunting for buried treasure.

Paleontologists and amateurs scour the world looking for new "treasures." The word "amateur" doesn't really apply here. It takes a great deal of time and practice to get your "eye in" (that means that you can recognize a fossil when you see it). This is not nearly as easy as you might think. Often the first thing searchers see may only be a small fossil bone or bone fragment sticking out of an eroded hillside or sea cliff. Who knows, perhaps that small bone is the tip of a *Triceratop's* tail, or the edge of a great fossil field.

When we think of fossils, we usually think of fossilized bones, but there are five kinds of animal fossils. The other types are: footprints, coprolites (animal droppings), skin impressions,

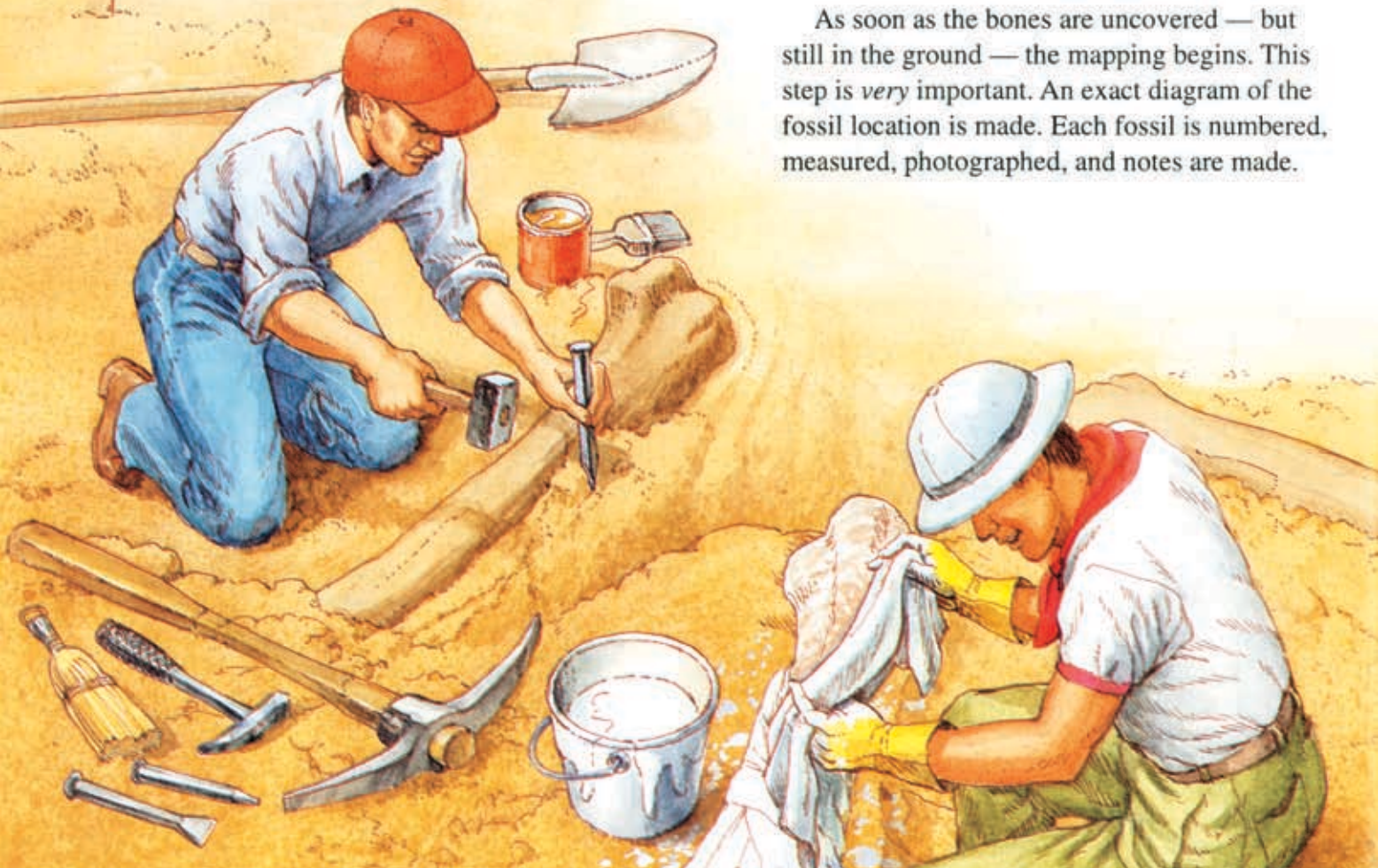
and dinosaur eggs. Each of these plays a part in learning more about dinosaurs and how they lived.

Sometimes discoveries are made by accident as new roads are built, railroad beds are cut out of mountains, mines dug, or perhaps by a farmer plowing a new field.

Locating fossils is only the beginning. Freeing a large dinosaur from the rock in which it's buried is a job for a team of experts. We think of large dinosaur bones as being heavy and durable. They were when the dinosaur was alive, but they're not bones anymore, they're fossils. Fossils need careful handling because they are fragile and can easily be destroyed.

Surprisingly, one of the first things the "experts" may do is bring in bulldozers to move tons of rock. If great amounts of rock need to be moved to uncover the fossils, they may even use dynamite. As the workers get closer to the brittle fossils, they work more carefully. Picks and shovels may be utilized in the next step.

As soon as the bones are uncovered — but still in the ground — the mapping begins. This step is *very* important. An exact diagram of the fossil location is made. Each fossil is numbered, measured, photographed, and notes are made.



All of this is vital for the people who will be assembling the dinosaur. The fossils may wait in a museum or warehouse for years until assembly can begin. If the information about the fossils isn't accurate and complete, it may be nearly impossible to put the dinosaur together correctly.

As work progresses on the dinosaur "dig," hand tools such as chisels, hammers, brushes, toothbrushes, etc. are used. A needle may be used to remove individual grains of sand. In the Sahara Desert you can simply brush the sand away from the fossil. Protective goggles may be worn to protect the workers' eyes, and hard hats are necessary near cliffs.

At times the bones are so small and delicate that they are left in a block of rock to be separated in the museum laboratory under more controlled conditions.

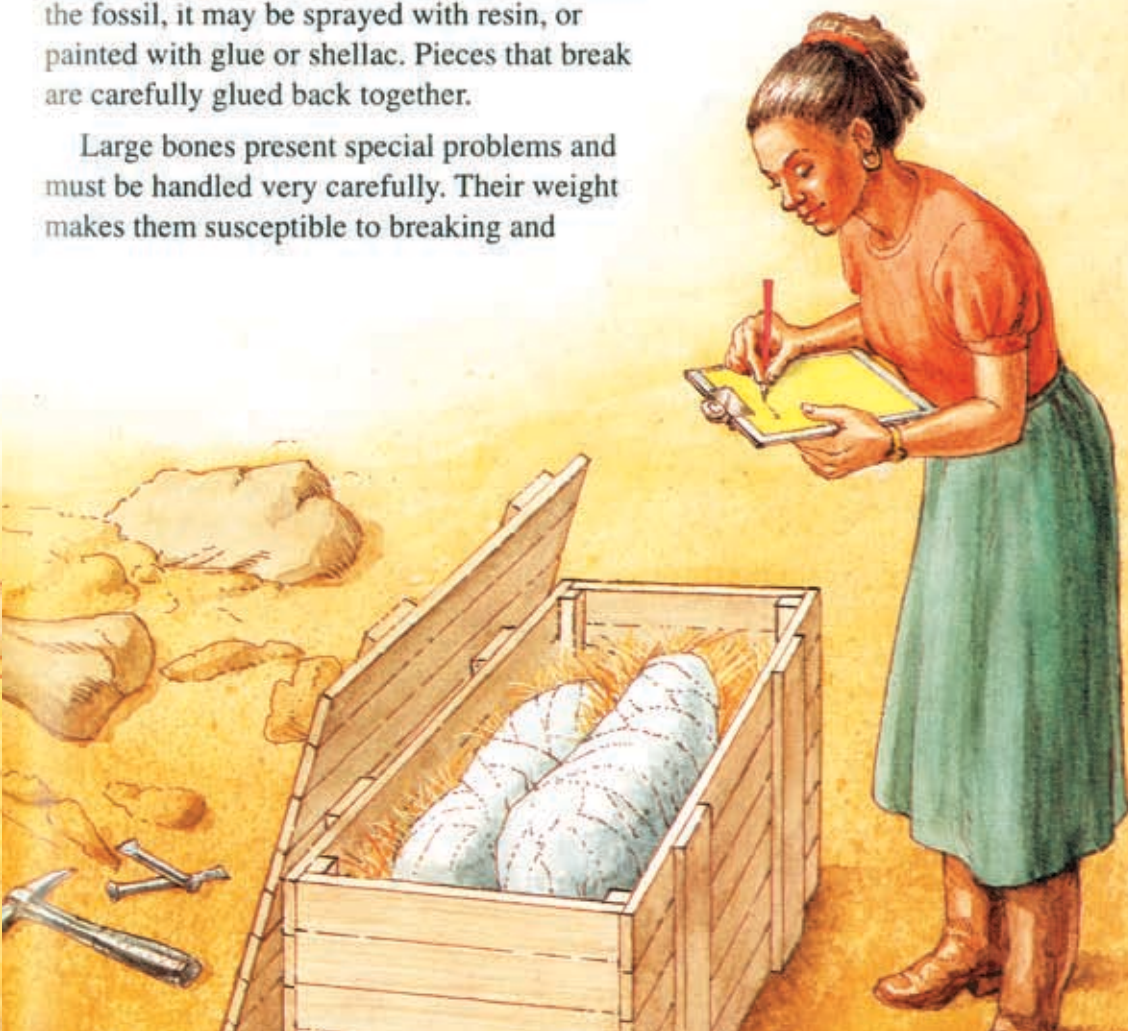
Once a fossil is exposed to the air and humidity, it will begin to deteriorate. To harden the fossil, it may be sprayed with resin, or painted with glue or shellac. Pieces that break are carefully glued back together.

Large bones present special problems and must be handled very carefully. Their weight makes them susceptible to breaking and

crumbling. First, a little more than half of the bone is freed from the rock. Next, wet tissue paper is spread over the exposed surface to protect it. Then, sackcloth bandages soaked in plaster of paris are used to cover the surface. When this has hardened, the rest of the fossil is freed and carefully turned over. The procedure is then repeated on the second side. When the plaster jacket has hardened it is ready to be transported.

Preparing the preserved fossils for the trip to the museum can be quite a job. The larger fossils, in their plaster jackets, may need to be lifted into a truck with a crane. Smaller fossils will be packed in crates. Again, careful note-taking is done. All the fossils must be accounted for, and the crates labeled.

Having been carefully prepared, these "treasures" are loaded on trucks for their often bumpy ride or flight to a museum.



OTHER KINDS OF FOSSIL REMAINS



Footprints



Coprolites



Skin Impressions



Eggs and Nests