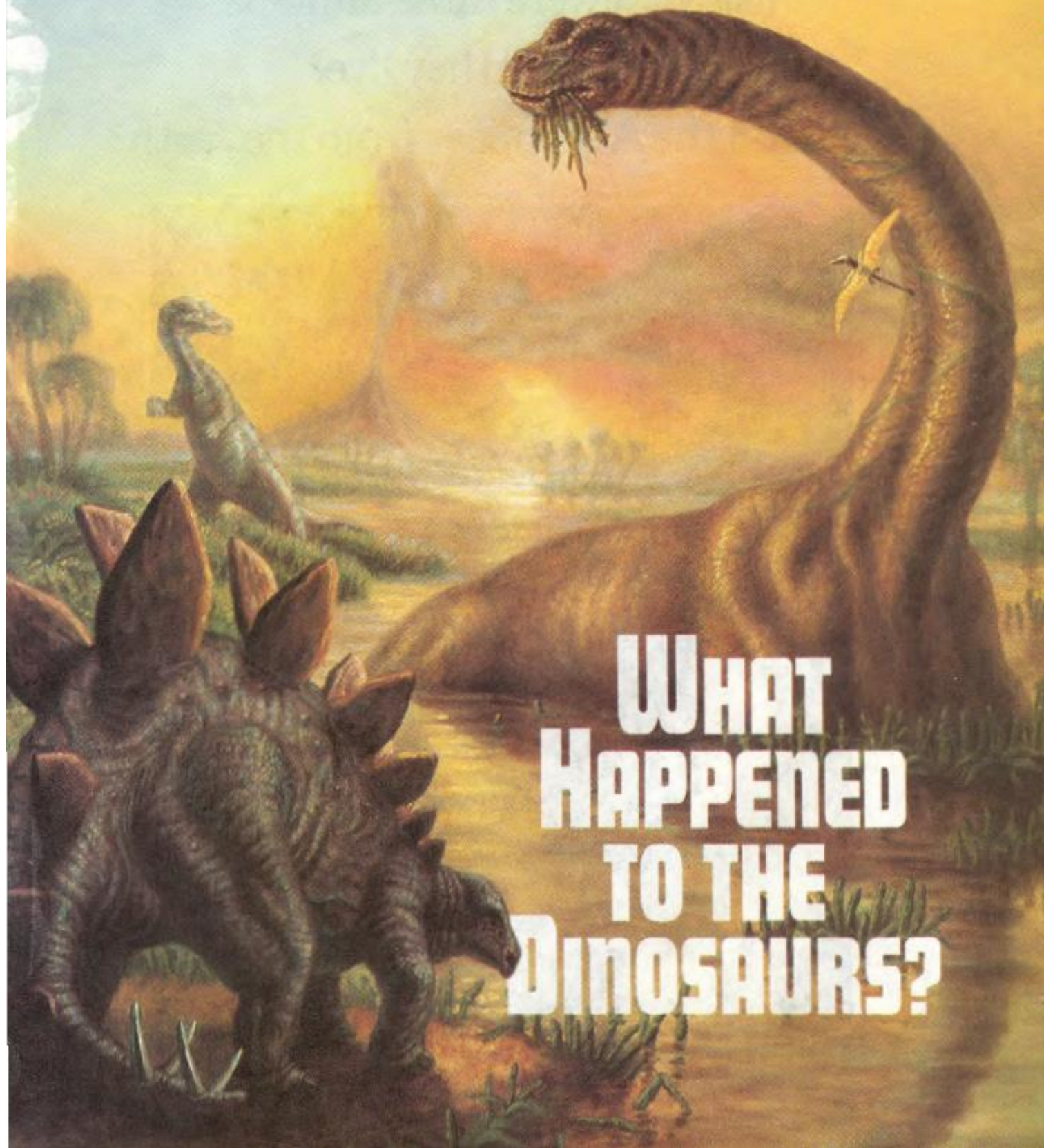


# Awake!

February 8, 1990



**WHAT  
HAPPENED  
TO THE  
DINOSAURS?**

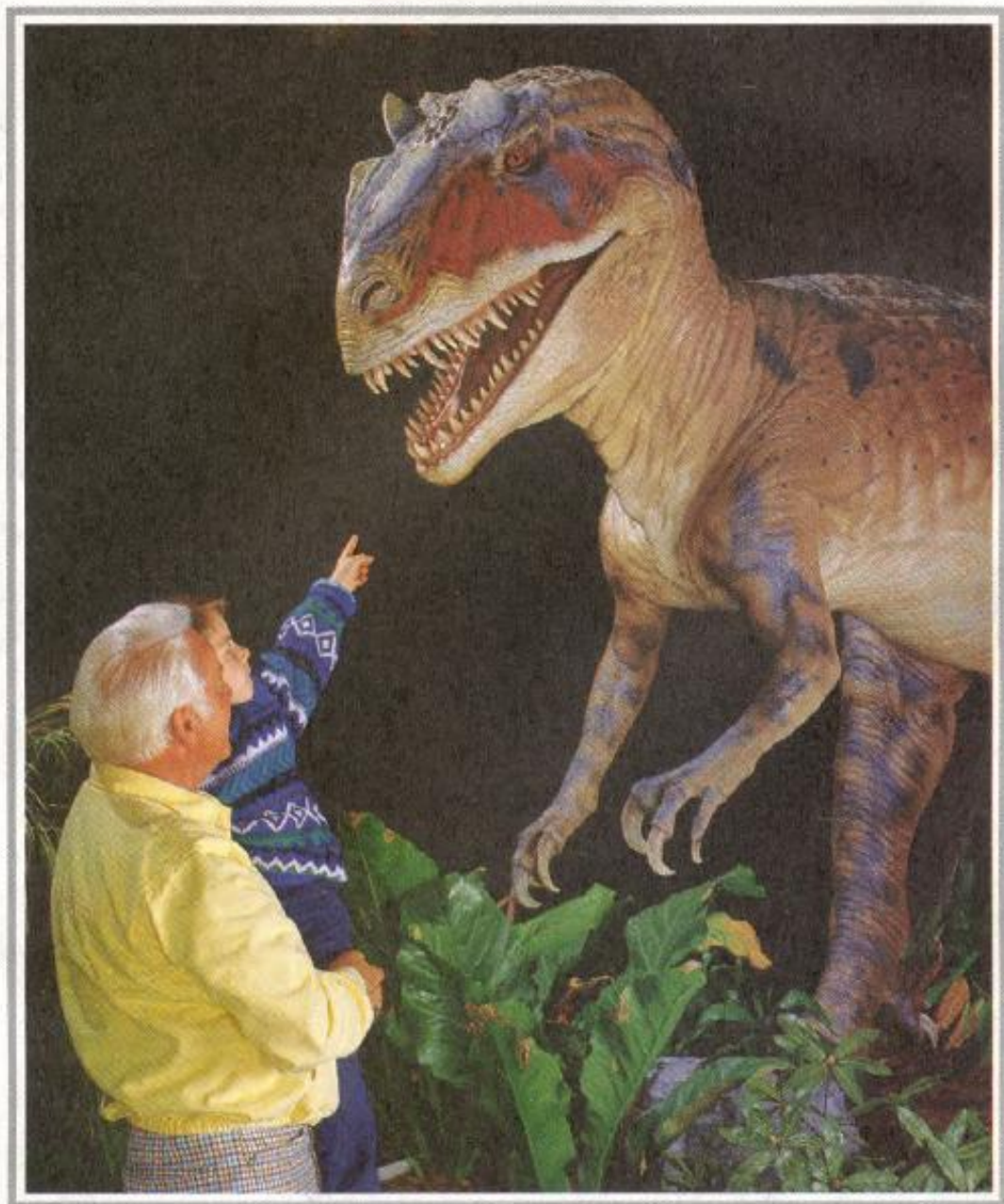


**Dinosaurs have long fascinated both  
young and old.**

**Just what were those animals?**

**When did they live?**

**Why did they disappear from the earth?**



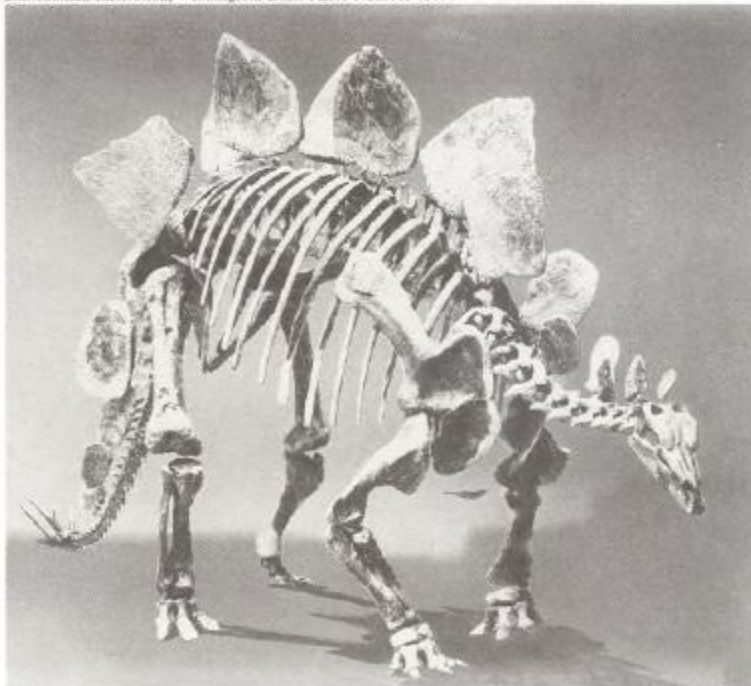
Dinamation International

# DISCOVERING 'THE GREAT REPTILES' OF THE PAST

**W**HEN you stand on the edge of the Red Deer River valley, just south of the town of Drumheller in Alberta, Canada, you stand on the edge of two different worlds. At eye level, in every direction, are the endless wheat fields of the Alberta prairies. But looking down the cliffs into the dry and barren valley, visitors can imagine another world far removed from their own—the world of the dinosaurs.

In this valley, with its steep canyons of multicolored sedimentary rock layers, hundreds of dinosaur bones have been unearthed. Some people in this area call the barren canyon "the badlands." But visitors, young and old alike, are filled with astonishment as they view the fossil legacy of some of the most amazing animals that ever lived on earth.

Smithsonian Institution, Washington, D.C.: Photo Number 43494





## Discovering Dinosaurs

Before 1824, dinosaurs were unknown to man. In that year the bones of several kinds of fossilized reptiles were unearthed in England. British paleontologist Richard Owen called these animals Dinosauria, from the two Greek words *deinos* and *sauros*, meaning "terrible lizard." The name remains in common use to this day, although while dinosaurs are reptiles, they are not lizards.

Since 1824, dinosaur fossils have been found on every continent. The fossil record, left in layers of sedimentary, or water-laid, rock, indicates that there was an extraordinary abundance and variety of dinosaur types at a time in earth's history called the Age of Dinosaurs. Some made their home on land, while others lived in swamps. Some perhaps even lived in water, much like the present-day hippopotamus.

Large quantities of dinosaur remains—including such nonskeletal evidence as tracks—have been unearthed in the Great Central Plain of North America. The prairies of central Alberta have yielded many dinosaur remains, including nearly 500 complete skeletons. In the 1920's, expeditions discovered dinosaur bones in the Gobi Desert of central Asia. In the 1940's a Soviet expedition in Mongolia discovered a dinosaur skeleton some 40 feet in length.

In 1986 Argentine scientists discovered the fossils of a plant-eating dinosaur in Antarctica. Until then, Antarctica had been the only major land area where dinosaur fossils had not been found. Just before that, an American researcher found dinosaur bones on the North Slope of Alaska. Throughout the last hundred years, deposits of dinosaur bones have been uncovered in so many places that it has become apparent that dinosaurs were widespread in the remote past.

## When Did They Live?

Dinosaurs played a dominant role in life on earth during their age. But then they came to an end. The rock layers containing human fossils consistently occur above those layers containing dinosaur fossils. Because of this, scientists generally conclude that humans came on the earthly scene later.

In this regard the book *Palaeontology*, by James Scott, states: "Even the earliest species of *Homo sapiens* (man) lived long after the disappearance of the dinosaurs . . . After tilting (through earth movement) has been allowed for, rocks containing fossil men consistently occur above those preserving the bones of the great dinosaur reptiles and it follows that the latter belong to an earlier age than the human remains."

In the Red Deer River valley, there is a layer of sedimentary rock that contains

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dinosaur bones. Just above this, there is a purplish-brown layer that follows the contour of the hillside. On top of the purplish-brown layer is a layer of brownish siltstone containing fossils of subtropical ferns, indicating a hot climate. Above this, there are several layers of coal. Farther up the hillside are coarser-grained layers of earth. There are no dinosaur bones in any of the higher layers.

The book *A Vanished World: The Dinosaurs of Western Canada* states that "all of the 11 major kinds of dinosaurs . . . ceased to exist in the western interior at about the same time." This, and the fact that human bones have not been found with dinosaur bones, is why most scientists conclude that the Age of Dinosaurs ended before humans came on the scene.

However, it should be noted that there are some who say that dinosaur bones and human bones are not found together because dinosaurs did not live in areas of human habitation. Such differing views demonstrate that the fossil record does not yield its secrets so easily and that no one on earth today really knows all the answers.

### Characteristics

Scientists have concluded that east of the North American Rocky Mountains, a great

shallow sea once existed. This sea was hundreds of miles wide, extending from the present Arctic Ocean to Mexico. Along the flat shoreline were lush, marshy forests. Fossils suggest that many types of dinosaurs flourished in this ecological setting. The edmontosaurus, a duck-billed dinosaur about 30 feet long, apparently browsed in herds in cow fashion through the swamp. Well-preserved three-toed footprints and the fossilized contents of the stomach led paleontologists to this conclusion.

Other evidence suggests that some dinosaurs displayed social habits. They likely herded together, perhaps in groups of hundreds or more. Discovery of successive layers of nests and eggs in the same place indicates that some dinosaurs returned to the same nesting sites year after year. Skeletal remains of infant dinosaurs near the nests, states *Scientific American*, 'strongly suggest sibling social behavior and also imply the possibility of parental attendance on the young after their hatching.'

The fossil evidence thus demonstrates that there were vast numbers and varieties of dinosaurs. But just what did they look like? Were they all fearsome, gigantic monsters—"terrible lizards"? Why did they seem to disappear so suddenly?

### WHY "AWAKE!" IS PUBLISHED

AWAKE! is for the enlightenment of the entire family. It shows how to cope with today's problems. It reports the news, tells about people in many lands, examines religion and science. But it does more. It probes beneath the surface and points to the real meaning behind current events, yet it always stays politically neutral and does not exalt one race above another.

Most importantly, this magazine builds confidence in the Creator's promise of a peaceful and secure new world before the generation that saw the events of 1914 passes away.

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# THE DIFFERENT SHAPES AND SIZES OF DINOSAURS

**O**F ALL the life-forms now extinct, dinosaurs have perhaps most stimulated the imagination of humans. Dinosaurs are often imagined as having been huge and terrifying. When the name was first coined from the Greek words meaning "terrible lizard," they were thought of as being fearfully large because the then known dinosaur fossils were large.

Some types of dinosaurs were gigantic and did look fearsome, likely weighing more than ten times as much as a large African elephant. However, over the decades, paleontologists have unearthed bones of many smaller dinosaurs. Some are the size of a donkey, and some are not much larger than a chicken! Let's take a look at some of these fascinating ancient reptiles.

## *Reptiles That Fly*

One intriguing type of ancient reptile was the pterosaur ("winged lizard"), which includes the pterodactyl ("winged finger"). But these were not dinosaurs, nor were they birds. They were flying reptiles and are classified with other reptiles such as dinosaurs and crocodiles. Some of them had wingspans of

25 feet. One discovered in Texas in 1975 indicates that some had wingspans of more than 50 feet. These were perhaps the largest animals ever to fly.

While pterosaurs had the teeth, skull, pelvis, and hind feet of a reptile, they in no way resembled the reptilian dinosaurs. And while they appeared to be a bird with stiff aerodynamic wings, they were much different. Like birds, the pterosaurs had hollow bones and few flexible joints in wings and ankles. However, a bird's wings use feathers rather than a membrane as was the case with the pterosaurs. And the fourth finger of the pterosaur forelimb extended to support the wing membrane. In the bird the second finger is the principal support of the wing.

## *The Ornithischians*

The ornithischians ("bird hipped") were one of two general classes of dinosaurs as determined by the structure of their hips. Those in this category had a hip structure similar to that of a bird but, of course, vastly larger. Some were small in overall size, others huge. The iguanodon reached lengths of 30 feet. Skeletons of several types of hadrosaurs indi-

cate a duckbill upper and lower jaw, with numerous teeth. Hadrosaurs were apparently bipedal, walking or running on two legs. Some of them reached lengths of 33 feet.

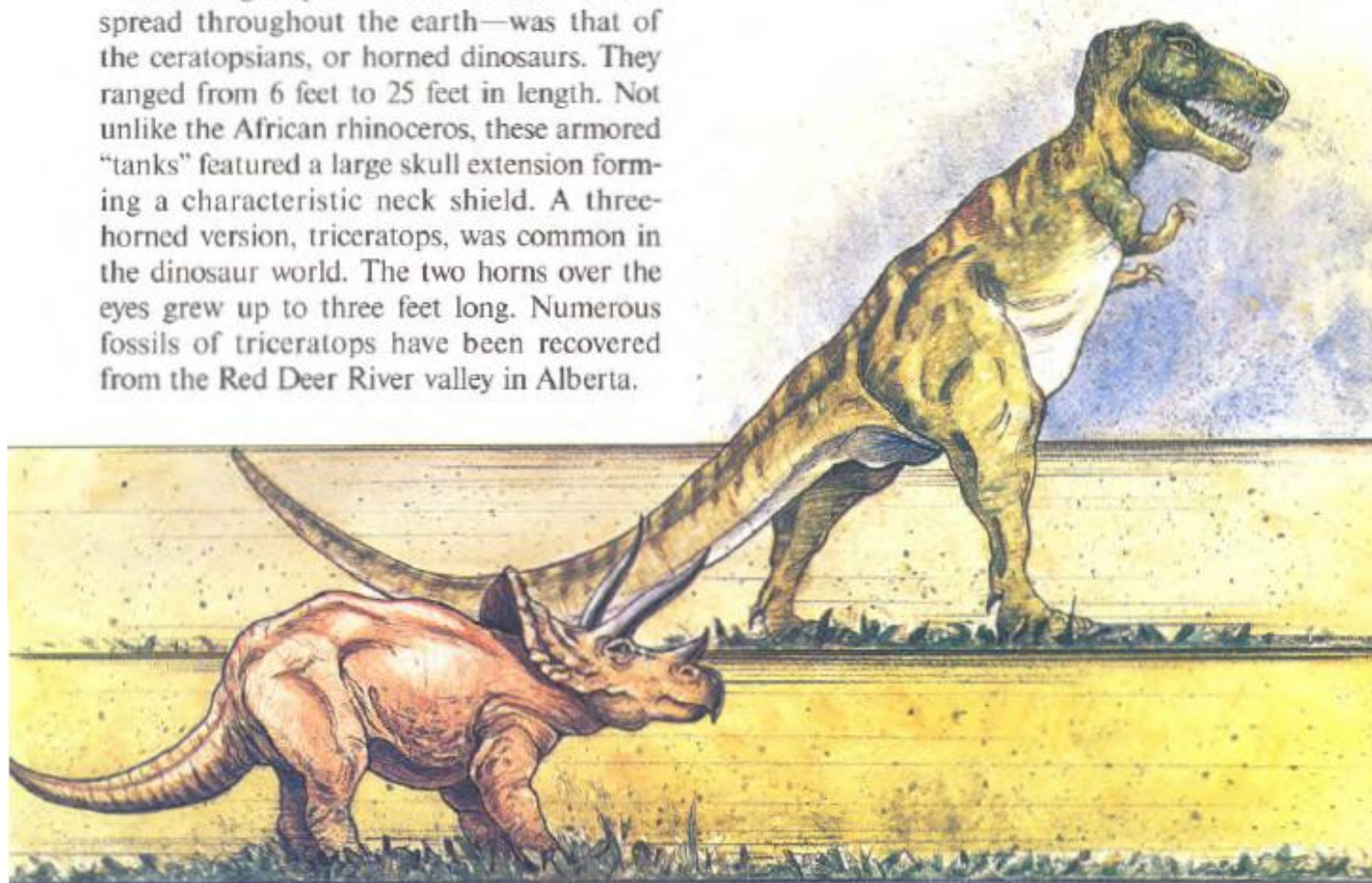
The stegosaurs were a group of the ornithischians that had large bony blades mounted in a pattern down their back. They walked on all four legs and were about 20 feet long, and 8 feet high at the hips. More recently, it has been thought that the bony back plates served not just as a protection but as part of a cooling system for their body. Hind legs were heavy and elephantine, while front legs were of smaller size, causing the small head to be low to the ground. The tail had long, bony spikes radiating from the end.

A final group of ornithischians—widespread throughout the earth—was that of the ceratopsians, or horned dinosaurs. They ranged from 6 feet to 25 feet in length. Not unlike the African rhinoceros, these armored “tanks” featured a large skull extension forming a characteristic neck shield. A three-horned version, triceratops, was common in the dinosaur world. The two horns over the eyes grew up to three feet long. Numerous fossils of triceratops have been recovered from the Red Deer River valley in Alberta.

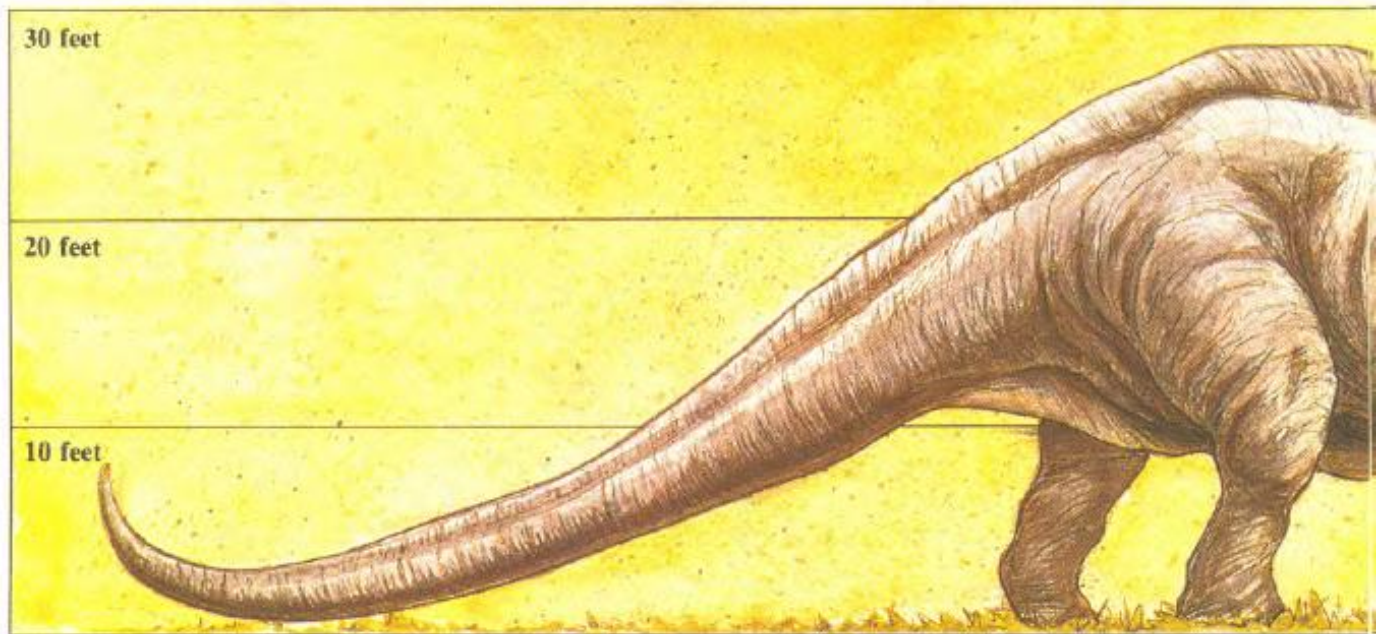
### *The Saurischians—Dinosaur Giants*

Another general class of dinosaurs is known as saurischians (“lizard hipped”), having hip structures like those of lizards, though, again, much larger. They fit the usual concept of dinosaurs: huge and fearsome. Among these were the apatosaurus (previously called brontosaurus), a plant-eating dinosaur that walked on all four legs. It reached lengths of 70 feet and weighed an estimated 30 tons. These dinosaurs have been unearthed in North America and Europe.

The equally gigantic diplodocus was more snakelike, with a long neck and tail but having legs. It is the longest dinosaur known,







stretching out some 90 feet, though weighing somewhat less than the apatosaurus. Uncovered in North America, the diplodocus had nostrils on top of its head, allowing it to submerge its head almost totally.

Then there is the brachiosaurus. A skeleton discovered in Tanzania reached a length of 70 feet. It is estimated that some weighed more than 85 tons. They stood 40 feet tall, with a body that sloped downward toward the tail, giraffelike.

In 1985 fossilized vertebrae of unusual size were unearthed in New Mexico, U.S.A. The curator of the New Mexico Museum of Natural History named it seismosaurus. The animal was estimated to be about a hundred feet in length and to tip the scales at perhaps a hundred tons!

The fierce-looking tyrannosaurus rex ("tyrant-lizard king") was about 10 feet high at the hips. When standing, it could measure some 20 feet tall. It was about 40 feet long. Its head was up to four feet in length, and its large mouth was equipped with many six-inch conelike teeth. The hind legs

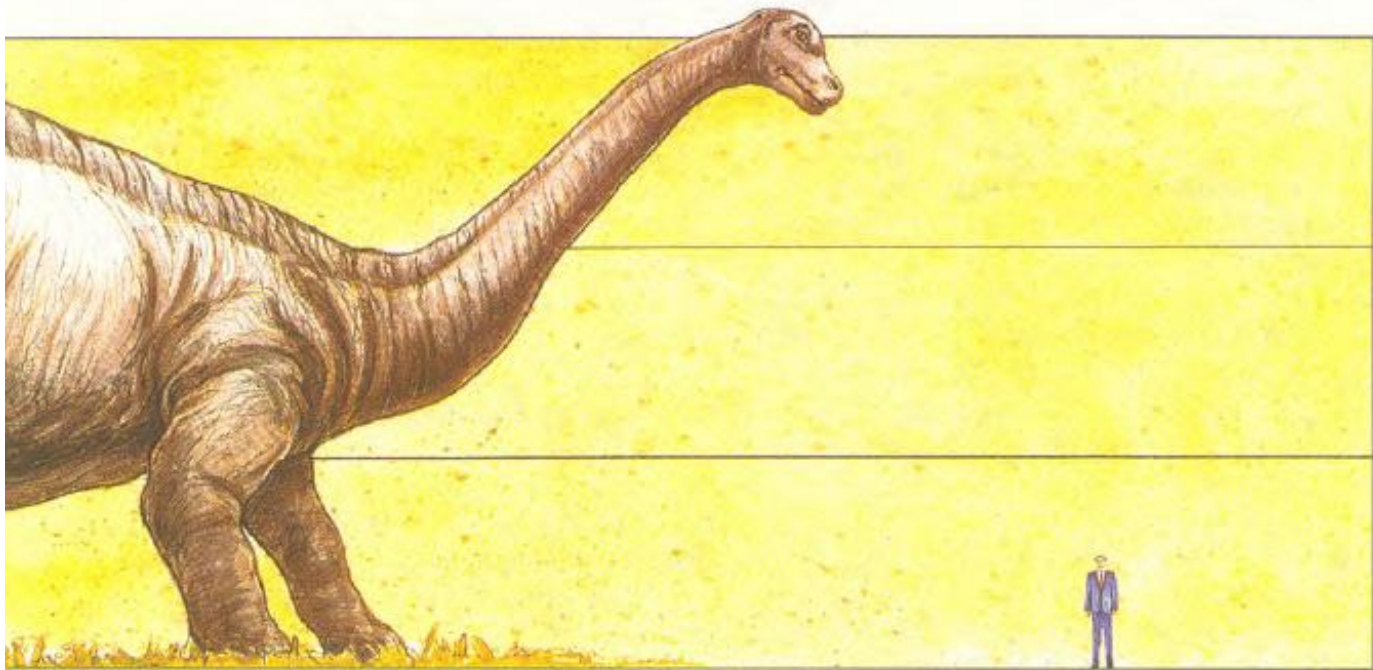
were elephantine, while the front legs were very small. A huge lizardlike tail brought up the rear. Rather than walking upright, it is now concluded that the tyrannosaurs held their bodies horizontal, balancing their body's weight with their long tail.

### *A Changing Scene*

That dinosaurs existed abundantly throughout the earth, in an ancient landscape long ago vanished, is obvious from the fossil record. But these amazing creatures, along with countless other animal and plant kinds, passed out of existence. As to just when these things took place, paleontologist D. A. Russell states: "Unfortunately, existing methods for measuring the duration of events that happened so long ago are relatively imprecise."

What happened to the dinosaurs? What does their sudden appearance and apparently sudden extinction mean? Do the dinosaurs bring into question some basic principles of Darwinian evolution? We will explore those questions in the following article.





# WHAT HAPPENED TO THE DINOSAURS?

**"P**ALAEONTOLOGY is the study of fossils, and fossils are the remains of life from past ages." But as one paleontologist said, it is "a highly speculative and opinionated science." This is evident regarding dinosaurs. Listing some speculations as to what happened to them, Princeton scientist G. L. Jepsen stated:

"Authors with varying competence have suggested that dinosaurs disappeared because the climate deteriorated . . . or that the diet did. . . . Other writers have put the blame

on disease, parasites, . . . changes in the pressure or composition of the atmosphere, poison gases, volcanic dust, excessive oxygen from plants, meteorites, comets, gene pool drainage by little mammalian egg-eaters, . . . cosmic radiation, shift of Earth's rotational poles, floods, continental drift, . . . drainage of swamp and lake environments, sunspots." —*The Riddle of the Dinosaur*.

It is apparent from such speculations that scientists are not able, with any certainty, to answer the question: What happened to the dinosaurs?

### ***Sudden Extinction Theory***

A more recent theory was put forth by a father-and-son team, Luis and Walter Alvarez. Walter Alvarez discovered, outside the town of Gubbio in central Italy, a curious thin, red layer of clay sandwiched between two limestone layers in the rock formation. The lower layer of limestone yielded an abundance of fossils. The top layer was almost devoid of fossils, leading the geologists to conclude that life suddenly disappeared and that the thin, red layer of clay had some connection with the extinction.

Analysis revealed that the clay was rich in iridium (a metal), 30 times richer than the concentration normally found in rocks. They knew that such high concentrations of this rare element could come only from the earth's core or from sources outside the earth. They concluded that the iridium was deposited by a huge asteroid that hit the earth, causing the sudden extinction of the dinosaurs.

After the discovery of the iridium-enriched clay at Gubbio, similar deposits were found in other parts of the world. Did this corroborate the asteroid hypothesis? Some scientists remain skeptical. But as the book *The Riddle of the Dinosaur* acknowledges, the Alvarez hypothesis added "fresh yeast to the study of extinction and evolution." And paleontologist

Stephen Jay Gould admits that it could diminish "the importance of competition between species."

Commenting on this new theory and the apparently sudden extinction of the dinosaurs, one science writer admits: "They could shake the foundations of evolutionary biology and call into question the current concept of natural selection."

University of Arizona scientist David Jablonski concludes that 'for many plants and animals, extinction was abrupt and somehow special. Mass extinctions are not merely the cumulative effects of gradual dyings. Something unusual happened.' That is also the case with dinosaurs. Their relatively sudden appearance and disappearance contradicts the commonly accepted view of slow evolution.

### ***The Dating of Dinosaurs***

Dinosaur bones are regularly found in lower earth layers than are human bones, leading

## **The fossil record of the dinosaurs supports not evolution but creation**

many to conclude that they belong to an earlier time period. Geologists call this time the Mesozoic period and subdivide it into the Cretaceous, Jurassic, and Triassic periods. The time frames used for these periods are on



the order of tens of millions of years. But has this been established with any certainty?

One method being used to measure the age of fossils is called radiocarbon dating. This dating system measures the rate of decay of radioactive carbon from the point of death of the organism. "Once an organism dies, it no longer absorbs new carbon dioxide from its environment, and the proportion of the isotope falls off over time as it undergoes radioactive decay," states *Science and Technology Illustrated*.

However, there are severe problems with the system. First, when the fossil is considered to be about 50,000 years old, its level of radioactivity has fallen so low that it can be detected only with great difficulty. Second, even in more recent specimens, this level has fallen so low that it is still extremely difficult to measure accurately. Third, scientists can measure the present-day rate of radioactive carbon formation but have no way of measuring carbon concentrations in the distant past.

So whether they use the radiocarbon method for dating fossils or other methods, such as employing radioactive potassium, uranium, or thorium, for dating rocks, scientists are unable to establish the original levels of those elements through ages of time. Thus, professor of metallurgy Melvin A. Cook observes: "One may only guess these concentrations [of radioactive materials], and the age results thus obtained can be no better than this guess." That would especially be so when we consider that the Flood of Noah's day over 4,300 years ago brought enormous changes in the atmosphere and on earth.

Dartmouth College geologists Charles Officer and Charles Drake further add doubt to the accuracy of radioactive dating. They state: "We conclude that iridium and other associated elements were not deposited instantaneously . . . but rather that there was an intense and variable influx of these constituents

during a relatively short geologic time interval on the order of 10,000 to 100,000 years." They argue that the breakup and movement of the continents disrupted the entire globe, causing volcanic eruptions, blocking sunlight and fouling the atmosphere. Certainly, such disruptive events could change radioactivity levels, thus distorting results from modern-day radioactive clocks.

### ***The Genesis Account and Dinosaurs***

While the radioactive dating method is innovative, it is still based on speculation and assumption. In contrast, the Bible account in the first chapter of Genesis simply states the general order of creation. It allows for possibly thousands of millions of years for the formation of the earth and many millennia in six creative eras, or "days," to prepare the earth for human habitation.

Some dinosaurs (and pterosaurs) may indeed have been created in the fifth era listed in Genesis, when the Bible says that God made "flying creatures" and "great sea monsters." Perhaps other types of dinosaurs were created in the sixth epoch. The vast array of dinosaurs with their huge appetites would have been appropriate considering the abundant vegetation that evidently existed in their time.—Genesis 1:20-24.

When the dinosaurs had fulfilled their purpose, God ended their life. But the Bible is silent on how he did that or when. We can be sure that dinosaurs were created by Jehovah for a purpose, even if we do not fully understand that purpose at this time. They were no mistake, no product of evolution. That they suddenly appear in the fossil record unconnected to any fossil ancestors, and also disappear without leaving connecting fossil links, is evidence against the view that such animals gradually evolved over millions of years of time. Thus, the fossil record does not support the evolution theory. Instead, it harmonizes with the Bible's view of creative acts of God.