

Dinosaur, any member of a great series of reptiles that were the dominant land animals during most of the Mesozoic Era (from 245 to 66.4 million years ago) but became extinct at its close. A brief treatment of dinosaurs follows. For full treatment, see MACROPAEDIA: Dinosaurs. The term, derived from the Greek, meaning "terrible lizard," refers to the gigantic proportions of some of these beasts. Dinosaurs belonged to two distinct but related orders: the Saurischia and the Ornithischia that were distinguished from each other chiefly by differences in the structure of their pelvic girdles. The dinosaurs belonged to the Archosauromorpha infraclass of reptiles. Among the other archosaurs (Greek: "ruling reptiles") were the early crocodilians, extinct flying reptiles, and the ancestors of the modern birds. A considerable number of dinosaurs were flesh eaters, but many others abandoned this primitive reptilian mode of life for a plant diet. The early dinosaurs may have descended from archosaurs that were bipeds; many dinosaurs remained bipedal throughout the group's history. In both dinosaur orders, however, many of the herbivore types developed a four-footed mode of locomotion. It is believed that the saurischian dinosaurs evolved from small, bipedal archosaurs called thecodonts. All of the early saurischians were similarly bipedal, as were the majority of the later members of the order. Of the three known suborders of Saurischia that evolved, the two main types were the theropods and the sauropods. The theropod coelurosaurs were slender-limbed, lightly built, fast-running carnivores that probably preyed upon smaller reptiles. They ranged from 2 to 8 feet (0.7 to 2.4 m) in length and had birdlike feet. The theropod carnosaurs were flesh eaters; they tended to reach a large size. Among the best-known types was Tyrannosaurus, which had tiny front limbs and a huge skull with many sharp teeth that were highly effective biting and tearing instruments. It reached a height of about 16 to 18 feet (5 m) and a length of about 50 feet (15 m). Such an animal was powerful enough to attack any of its dinosaur contemporaries, including the great sauropod plant eaters. Although the prosauropods, such as Plateosaurus, were generally smaller than the carnosaurs and were herbivorous in diet, they evolved into the largest of all dinosaurs, the sauropods. Among these huge, four-footed plant eaters were Diplodocus, which reached a length of 87 feet (26 m), and the heavier Brachiosaurus, which weighed as much as 80 tons. Sauropods had massive bodies, powerful limbs (to support their great weight), a long tail, a long neck, and a small head. The ornithischian dinosaurs, like the saurischians, evolved from thecodonts. The ornithischians did not grow as large as some of the saurischians but were notable for their armour and other strange adaptations. They comprised four main groups. One group, the ornithopods, included the hadrosaurs, or duck-billed dinosaurs. These odd-looking creatures had ducklike mouths and several hundred teeth that they used to grind hard vegetable matter. The hadrosaurs were bipeds, but the other three ornithischian groups were mostly composed of quadrupeds. The stegosaurs had high-arched bodies and a row of large vertical bony plates running along their backs. The ankylosaurs were heavily armoured dinosaurs with extra bone plating over most of their bodies for defensive purposes. The ceratopsids, such as Triceratops, had a broad frill of bone protecting the head and neck and some type of long horn or horns projecting from the skull. Most dinosaurs had long tails, but they held these tails straight out and off the ground for help in maintaining their balance, rather than dragging them along the ground as had been previously thought. Dinosaurs were also long thought to be cold-blooded, like all other reptiles, but recent consideration of their postures, rates of predation, and certain anatomical details has led many paleontologists to conclude that at least some dinosaurs were warm-blooded. This is a point of continuing controversy, but it is clear that, contrary to the traditional image of dinosaurs as sluggish, slow-moving beasts, many of them were swift-moving creatures with relatively high metabolic rates. Most types of dinosaurs continued to flourish until the very latest phases of the Cretaceous Period. Then, within the next million years, they disappeared completely from the geologic record, and succeeding rock strata show not the slightest trace of a dinosaur. The cause of this sudden demise is not at all clear. One widely accepted explanation for their mass extinction has been that a major geologic cycle of mountain building at the end of the Cretaceous Period reduced the lowland areas in which dinosaurs flourished and also changed the world's climate, thus stimulating evolutionary changes in the plant life upon which dinosaurs fed. A more recent theory postulates an astronomical catastrophe as the cause: a collision between an asteroid and the Earth generated a huge dust cloud that caused a period of darkness lasting as long as three years. This blockage of sunlight made photosynthesis virtually impossible, and the resulting collapse of the food chain led to the worldwide extinction of the dinosaurs and many other life forms. Although this hypothesis has been

partially substantiated by geologic evidence, the apparent survival of some types of dinosaurs for as long as 1 million years after the presumed asteroid impact raises doubts that this catastrophe was the primary cause of the dinosaurs' eventual disappearance. It is possible that both climatic change and an asteroid impact played a part in the extinction of dinosaurs.