



200 million years ago Oregon is a very different place than today. It is mostly ocean instead of land, but collisions between continental and oceanic plates continue to make more land. Collisions scrape sediment and bits of oceanic crust into curved chains of volcanic islands. Over millions of years, ocean is replaced by land.

These collisions create great molten intrusions of granitic rock. Some of this granitic rock, uplifted and now exposed by erosion, forms Mount Ashland. The intense pressure of collision also creates metamorphic rock. This metamorphic rock forms much of the Klamath Mountains of Oregon and California.

Rhamphorhynchus is an early form of flying reptile. It eats insects it catches in flight. The broad flap at the tip of its tail stabilizes its flight. (160 million years ago)

The marine reptile *Liopleurodon* is over 20 feet long.

Leptolepis is prey for *Liopleurodon*.

27. 160 Ma panel

Liopleurodon

About the time that dinosaurs became dominant on land, and flying reptiles in the air, marine reptiles became the dominant predators in the sea. There were three main types of these large animals. Ichthyosaurs were built like a modern dolphin, with a short neck and built for speed. Plesiosaurs had long necks and small heads. Pliosaurus had short necks and large head and jaws. Their four flippers evolved from the four limbs of its land-living ancestors and probably gave them excellent maneuverability. *Liopleurodon ferox* ('fierce smooth-sided tooth') grew to 10 meters or more in length. It is probably fed on ammonites, fish and other marine reptiles. The bony fish *Leptolepis sp.* ('smooth scale') probably moved in schools. *Liopleurodon* probably got a meal by plowing into a school of *Leptolepis* with its mouth wide open.

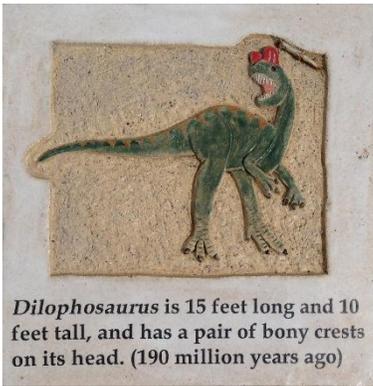
Rhamphorhynchus sp. ('beak snout') was a pterosaur, a flying reptile. Its long tail and head without a crest were the typical body plan for pterosaurs until the evolution of the *pterodactyls*, flying reptiles without a long tail and commonly with head crests and snout keels. Many very well preserved *Rhamphorhynchus* fossils are found in the Solnhofen Limestone in Germany. This rock was deposited in a series of warm, shallow lagoons. The bottom of these lagoons was often stagnant and oxygen starved ('anoxic'), and the sediment that deposited there was limy and very fine-grained. Creatures that died and quickly found their way to the bottom were fossilized in exquisite detail. Pterosaurs are so well preserved that we can see the tiny stiffening fibers in wing membranes, and the oval of skin at the tip of the tail that probably served as a flight rudder. Over 750 species of insect, pterosaur, early bird, dinosaur, fish, ammonite, crab, marine reptile, and plants have been found in the Solnhofen Limestone. It is one of the world's great repositories of ancient life.



Castorcauda is big for a mammal during the age of dinosaurs. It is over one foot long. It catches fish in fresh water lakes and uses its broad tail to swim (165 million years ago)

28. *Castorcauda*, M. Jurassic 11.4M

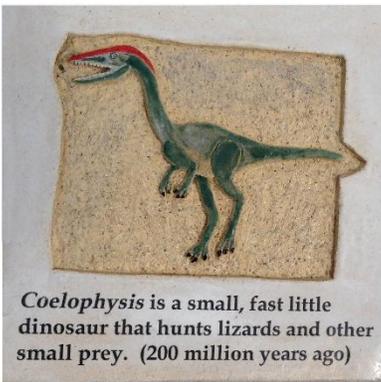
Castorcauda lutasimilis ('beaver tail, similar to an otter') was recently discovered in China and introduced to the scientific world in early 2006. This early mammal had a beaver-like tail, webbed feet, body hair, and teeth shaped to catch fish. It is much larger than the typical mammal fossils from the time; *Castorcauda* was up to 45 centimeters long. Before this key discovery the fossil evidence suggested that mammals in a world dominated by dinosaurs were small, shrew-like creatures that fed on insects, hunted by night and generally stayed as far from dinosaurs as they could. Only when the dinosaurs went extinct were mammals able to emerge from their second-class status and take center stage. But *Castorcauda* shows that it wasn't quite that simple. Mammals were able to attain a larger size and compete with reptiles as significant predators, at least in some environments. *Castorcauda* was discovered in China and shows how the expansion of paleontological expertise from a European center to the rest of the world has greatly expanded our knowledge of the past. It also confirms that our basic understanding of life's history on Earth is correct, and that an endless supply of fascinating detail awaits the paleontologist's hammer or a keen amateur's eye.



Dilophosaurus is 15 feet long and 10 feet tall, and has a pair of bony crests on its head. (190 million years ago)

29. *Dilophosaurus*, Early Jurassic 9m

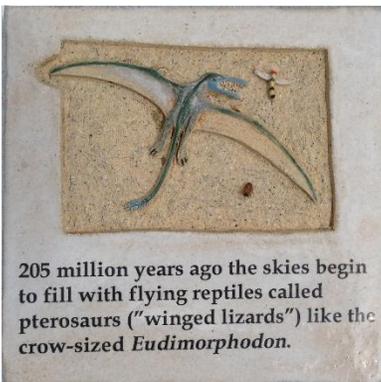
Dilophosaurus sp. was a good size dinosaur, up to 6 meters long from nose to tip of tail, and probably stood almost 3 meters tall. The long tail was held straight out behind to help balance the chest, head and neck on the fulcrum of the hips. Its jaws were not particularly strong, so it probably killed with the claws of its feet and hands, then plucked and nipped meat from the carcass. It is notable for having a double crest of bone on the top of its head, which gave rise to its name ('double-crested lizard'). We don't know the function of the double crest, but it may have been used in mating behavior. For this reason, the tile shows the crest brightly colored. *Dilophosaurus* was featured in the movie *Jurassic Park*, although they took some liberties with the facts: there is no evidence that *Dilophosaurus* could spit poison, and from what we can see of the neck anatomy on museum specimens, it was unlikely that it could erect a neck frill.



Coelophysis is a small, fast little dinosaur that hunts lizards and other small prey. (200 million years ago)

30. *Coelophysis*, U. Triassic 7.4 m

Coelophysis bauri (pronounced see-lo-fie-sis baw-rye) (the name means 'hollow form' for the hollow arm bones) is an early dinosaur that lived in the late Triassic and early Jurassic Periods. It was a small animal, 2 to 3 meters long and about one meter high at the hip. The skeleton of the animal was lightly built but included a strong jaw containing meat-cutting teeth. *Coelophysis* must have been a fast runner, hunting for lizards and other small prey wherever it could find them. Footprints of this animal or close relatives are common in rocks from around this time. Reproductions of these footprints are located on the Lifetime Walk at the start of the Jurassic Period. The footprint itself has its own name, separate from the animal that might have produced it. The track's name is *Grallator*. We can't know which species made the track unless the animal was found with a fossilized foot resting in the track.



205 million years ago the skies begin to fill with flying reptiles called pterosaurs ("winged lizards") like the crow-sized *Eudimorphodon*.

31. *Eudimorphodon*, U. Triassic 7m

Eudimorphodon sp. ('true two-form tooth') is the earliest flying reptile found in the fossil record. Flying reptiles are collectively known as pterosaurs ('winged lizard') and as pterodactyls ('wing finger'). *Eudimorphodon* and other early flying reptiles had long tails and no head crest. Later, flying reptiles typically had a very short tail and head crests. All pterosaurs, like birds and bats, flew using their arms. Pterosaurs did this by evolving a very long fourth finger with skin stretched between the finger and body. Bats did something similar, but all fingers are lengthened. Birds have greatly reduced or absent fingers and instead use feathers to form a wing. Insects also achieved flight but evolved a whole separate set of wings, instead of converting their arms to wings.