

## CHAPTER 9

# EVIDENCE FOR PLANT AND ANIMAL EVOLUTION

## WHALES—LAND OR SEA CREATURES?

The theory of evolution predicts that the fossil record should show transition fossils. These are fossils that show gradual changes between species of the distant past and the species we see today. When fossils of an ancient species are found, they lead scientists to predict the types of transition fossils that might be found, and where they might be found, to connect the ancient species to the present. These predictions have been confirmed in many cases. One good example is the transition fossils of whales.

Whales are mammals, so they breathe air and give birth to live young. But unlike most other mammals, whales spend all of their time in the water.

The earliest mammal fossils are of land-dwelling animals. If God used evolution in order to create whales, we would expect to find a series of fossils transitioning from land-based animals long ago to the ocean-dwelling whales of today. Indeed, the fossil record does show just that.

Rocks about 60 million years old contain fossils of a creature called *Sinonyx*. It was about the size of a large dog, lived on land, and had a long muzzle suitable for hunting fish. Like other land-dwelling animals it had limbs suitable for walking and nostrils on the front of its face. Fossils of *Sinonyx* are found with fossils of other land-dwelling animals.

Rocks about 50 million years old contain fossils of several species intermediate between *Sinonyx* and modern whales. These animals had shapes well adapted to swimming but limbs that allowed them to move on land, like modern sea lions. Rocks with these fossils show signs of having been formed in low-lying wet areas such as you would find where rivers empty into gulfs and shallow seas.

Rocks about 46 million years old show fossils even more like modern whales—still capable of moving on land but with shorter limbs and other changes showing adaptation to spending most of their time in water. For example, nostrils had moved from the front of the skull toward the top of the head. These rocks and fossils show signs of having been formed in sea sediments, like the edge of a continental shelf—deep water but not yet open ocean.

Rocks about 40 million years old show fossils still closer to modern whales. The hind limbs are so small that the creatures could not have moved on land, and the hole in the skull that had been for nostrils is moved even more towards the top of the head for a blowhole. These fossils are found in both deep-water and shallow-water sediments.

In rocks younger than 40 million years fossils look increasingly like modern whales. Even some modern whales have tiny, vestigial hind-limb bones that are completely covered by their muscles and don't produce limbs.

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Interestingly, in rocks that are older than about 40 million years, the whale transitional fossils have been found only in one part of the globe, an area corresponding to central Asia and the Indian Ocean. But in rocks younger than 40 million years, the fossils are found all over the globe. This situation indicates that the land-based and shallow-water-based ancestors of whales, who lived more than 40 million years ago, lived in one particular region of the earth, but once early whales were capable of living in the open ocean, they spread out over the whole earth.