

Secret of the Turtle Shell

How did turtles get their shell?

Most people know a turtle when they see one. Its shell gives it away. Ever wonder how turtles got it? The question intrigues scientists, and recent events have only added fuel to the flame.

Since the time of the dinosaurs turtles have had an intact carapace and plastron. How shells evolved before that time is debatable, and conclusive supporting evidence has been sparse -- until recently.

In 2007 scientists unearthed turtlelike fossils in southwestern China. Estimated to be 220 million years old, these turtle remains, the oldest on record, aren't typical turtles. This animal more than 15 inches long had teeth and an incomplete upper shell. Other fossils found nearby suggest the turtle might have been aquatic. Calling it *Odontochelys semitestacea*, scientists described it in *Nature* in late 2008.

To some, this fossil discovery supports one theory of turtle shell evolution: The plastron forms first followed by an outgrowth and broadening of the ribs and backbone to form the carapace. Modern turtle embryos undergo a similar process. If this theory were true, supporters say, perhaps turtles originated in water.

But others aren't convinced. All previous evidence suggests the oldest turtles were terrestrial, they say, so the incomplete shell could be a shell reduction, much like what's seen in modern freshwater soft-shell turtles. If this theory were true, supporters say, the creature's shell is an adaptation from a land-dwelling ancestor that lived even earlier.

No matter what scientists believe, most can agree that the new evidence has generated new ideas and new challenges.

(Canadian Museum of Nature press release, Nov. 27, 2008; University of Toronto press release, Nov. 26, 2008; nature.com)