Sensational. Ancestors of the duck-billed platypus may have had the same electrosensory bill.

Jaw Shows Platypus Goes Way Back

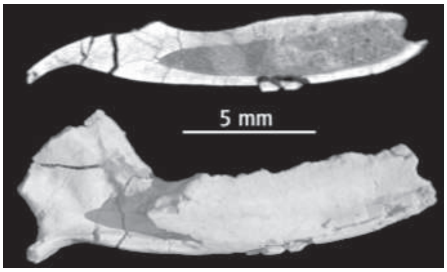
When scientists first laid eyes on the duck-billed platypus and the echidnas in the late 18th century, they were so baffled by these bizarre egg-laying mammals that some considered the specimens a hoax. Modern researchers have uncovered other implausible features, including 40,000 tiny glands in the broad bill that sense electric currents, which may help the platypus catch prey underwater. The ant-eating echidna has about 100 in its tiny snout. The platypus and echidna are so unusual that they were assigned an order—the Monotremata—separate from the more common marsupial and placental mammals.

The fossil record of monotremes is also sparse. The oldest known specimen is a single tooth from Patagonia, about 62 million years old, with a distinctive compressed shape like that of juvenile platypuses before they lose their teeth. A reanalysis of fossil jaws from Australia, reported at the meeting, suggests it belonged to a platypus that lived at least 112 million years ago. "It's really, really old for a monotreme," Timothy Rowe of the University of Texas (UT), Austin, told the audience.

Teinolophos trusleri was discovered near Inverloch, Australia, in 1997 and described by Thomas Rich of the Museum Victoria in Melbourne, Pat Vickers-Rich of Monash University, and colleagues. The specimens consist of jaws and teeth.

Looking for more anatomical clues to the evolution of mammals, Rich's team took fossil jaws to Rowe, a paleontologist who also runs a computed tomography–scanning facility at UT Austin. Scans of three specimens revealed a large internal canal along the entire length of the jaw, like the canal in a modern platypus that carries nerve fibers from the electrosensory glands in the bill to the brain. "There's no other mammal that has a canal this size," Rowe said. Even back in the early Cretaceous, it seems, the platypus was using electrosensation. "This is the most compelling evidence to us that *Teinolophos* is a platypus."

That would push back the fossil record of the platypus quite a bit; the next youngest fossil is *Obdurodon dicksoni* from 15-million-year-old rocks in Australia. It is also much older than current estimates from DNA of when platypuses and echidnas diverged from their most recent common ancestor. Molecular clocks put that date somewhere between 17 million and 80 million years ago. Rowe speculated that one reason for the underestimate may be that monotremes evolve at slower rates than other mammals do, an idea that fits with their lower diversity.



Grand canal. The dark gray area in the CT scan (*above*) of a jaw marks the path of nerve fibers.

Zhe-Xi Luo of the Carnegie Museum of Natural History in Pittsburgh, Pennsylvania, agrees that the canal in *Teinolophos* resembles that of a modern platypus: "I'm leaning toward accepting Rowe's idea." **–ERIK STOKSTAD**

Snapshots From the Meeting >>

Hopping toward frogs. About 340 million years ago, amphibians began to evolve into an amazing array of now-extinct forms. Some grew 3 meters long; others developed armor. One of the most diverse groups, called the Dissorophoidea, also concocted some more familiar shapes that resemble modern amphibians. Jason Anderson of the University of Calgary in Canada described an unnamed fossil that strengthens the case that dissorophoids gave rise to frogs and salamanders.

The 12-centimeter-long fossil was discovered in Texas in 1995. The nearly complete specimen is housed in the collections of the Smithsonian Institution's National Museum of Natural History. The skull looks froglike enough that the fossil was dubbed "Froggy," and the number of bones in the digits are also froglike. The short ribs and fused bones in the ankle are like those of salamanders. A classic dissorophoid called *Amphibamus* had 21 vertebrae, the oldest fossil frog had 14 vertebrae, and Froggy fits in between with 17. All told, Anderson says, Froggy is the closest fossil relative to frogs and salamanders. "It really neatly fills the gap," says Rainer Schoch of Staatliches Museum für Naturkunde in Stuttgart, Germany.

Flight first. A stunning new fossil unveiled at the meeting suggests that bats evolved flight before they began to echolocate. "We're all excited about it," says Nicholas Czaplewski of the Oklahoma Museum of Natural History in Norman. "There's a lot you can learn from a specimen that well preserved."

In her presentation, Nancy Simmons of the American Museum of Natural History in New York City described the 52-million-year-old bat, which came from Green River Formation in Wyoming and is now housed in the Royal Ontario Museum in Toronto, Canada. "When we first saw it, we knew it was special," she recalled. The bat has traits that make it the most primitive yet discovered. For example, there are claws on all five digits; modern bats have claws on at most two fingers of each hand. The claws could have made the bat a skilled climber.

Long fingers, a keeled sternum, and other features suggest that the bat could flutter under its own power. It probably couldn't fly as far or as fast as other fossil bats, because of the stubby wings, but it would have been able to maneuver well. The skull lacks the features of echolocation, such as an enlarged cochlea, found in modern bats. "It finally gives us an answer: Flying evolved first, echolocation second," Simmons said. **–E.S.**

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