

DOTING LIZARDS

Elusive phenomena such as the parental care habits of prehistoric animals would seem to be forever inaccessible to paleontological research. However, new spectacular finds offer some deeper insight into such behavior

Łukasz Czepiński

Faculty of Biology, University of Warsaw

Reptiles are commonly perceived as cold, un-emotional creatures. The phrase “crocodile tears,” common in the languages of the European cultural circle, is used to describe a display of emotions that is not sincere. Biologists know that the saying actually refers to the secretion of fluid by the tear glands which crocodiles have near their eyes, a phenomenon physiologically unrelated to the emotional state of these animals.

However, there are times when otherwise dangerous animals demonstrate caring behavior, above all when they interact with their offspring. The young of most reptiles are self-sufficient as soon as they hatch. In crocodiles, however, the females of these “insincere” animals watch over their young after they first emerge, carrying them from the nest to the water in their mouth. A clear majority of today’s birds look after their hatchlings, and this caring behavior is often exhibited by both parents. Crocodylians and birds are the only living representatives of a group of animals referred to as archosaurs (“ruling reptiles”) – birds essentially being reptiles descended from a group of small predatory dinosaurs. So did crocodiles and birds start to care for their young independently, or was this trait found in their common ancestor? This is certainly not an easy question to answer. Nevertheless, paleontologists can try to search for clues in the fossil record, which documents the ancestors of today’s animals in prehistoric times.

Dino moms

It is hard to find absolute proof of parental care in prehistoric animals. Sometimes, however, certain unique fossils allow us to conclude that at least some

prehistoric reptiles did look after their offspring after they hatched. Dinosaur nest and egg fossils have been known since discoveries made in the Gobi Desert in Mongolia in the 1920s. However, it was not until 50 years later that scientists found evidence that some of those animals were in fact doting parents. In the 1970s, American paleontologist John Horner reported a fossilized colony of nests of large herbivorous duck-billed dinosaurs in Montana. In the nests, scientists

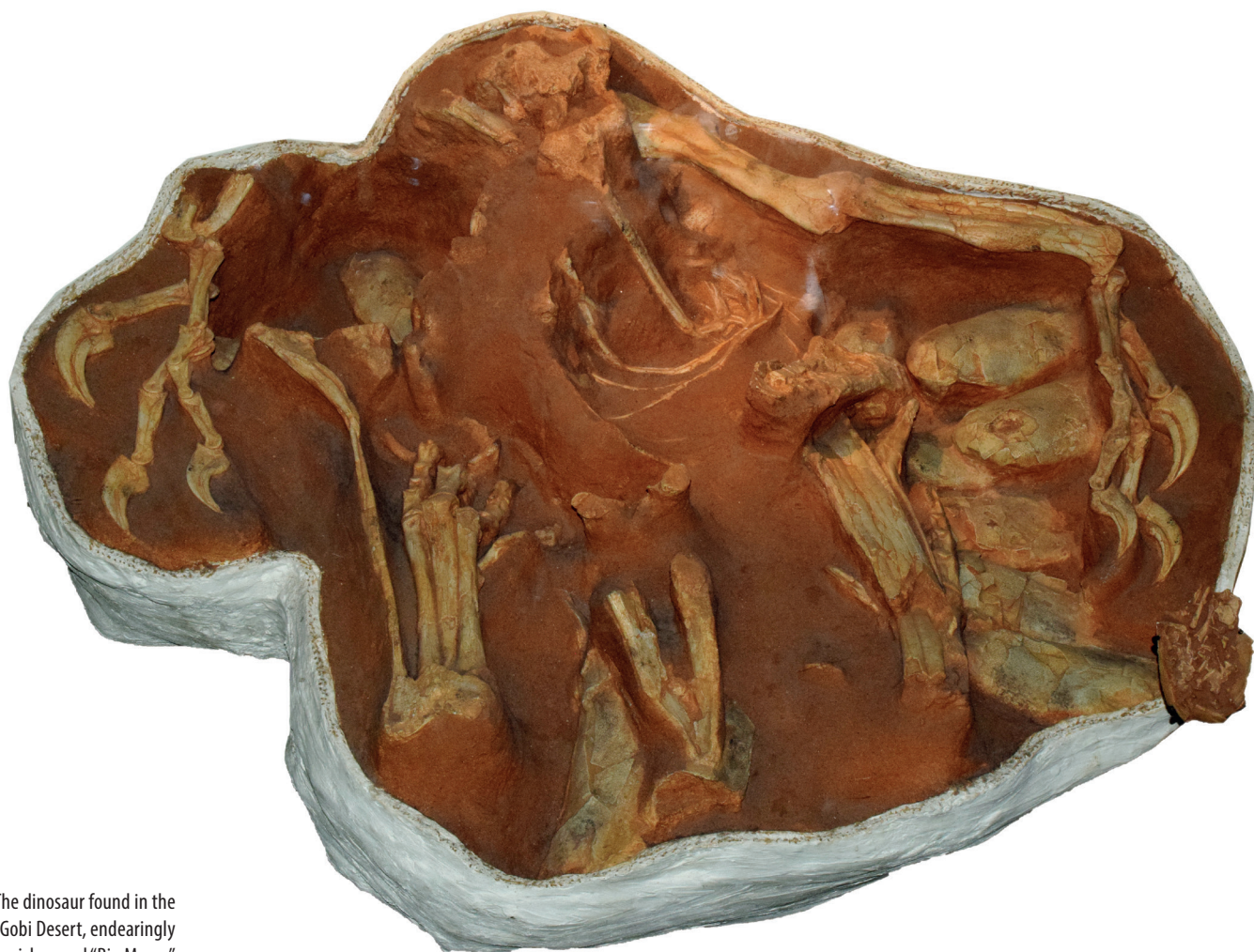


Łukasz Czepiński, MS

is a PhD student at the Faculty of Biology, University of Warsaw. He studies the evolution of archosaurs, chiefly the early forms from the Triassic in Europe, and dinosaurs from the Late Cretaceous in Asia. He is an editor with the popular-science website dinozaury.com. lczepinski@biol.uw.edu.pl



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The dinosaur found in the Gobi Desert, endearingly nicknamed "Big Mama"

found fossils of hatchlings and somewhat larger juvenile specimens. Eggshells found in the bottom of the nests were crushed, most probably by young that had stayed in the nest. Another discovery from the same site comprised the bones of adult dinosaurs of the same species that were nine meters in length. The animal was named *Maiasaura*, meaning "good mother lizard" in Greek. The presence of not only hatchlings but also juveniles still in the nest suggests that these animals stayed in their nests for a relatively long time after hatching. Most probably, they were fed and watched over by adults. The nests in the colony were separated by distances that allowed the parents to move freely and rest, while simultaneously caring for their offspring.

Like all reptiles, dinosaurs had to incubate their eggs by maintaining a constant temperature needed for the successful development of the embryos. Most likely, large animals such as *Maiasaura* did not put their entire bodyweight on the nests. Instead, they covered their eggs with dirt or vegetation. Thanks to the amazing remains discovered in the Gobi Desert in 1995, we know that some dinosaurs brooded their

eggs much like today's birds. An adult specimen of a small predator (oviraptorosaur) of the *Citipati* genus had been buried while nesting. Its front limbs, probably covered with feathers when the animal was alive, encircled the entire nest. The scientists who studied the specimen called it endearingly "Big Mama." The perception of oviraptorosaurs evolved in an interesting way: the name itself means "egg thief" in Latin, because the first specimens of this group were found in the Gobi Desert in the proximity of elongated eggs. Scientists assumed that those eggs had been laid by herbivorous dinosaurs called *Protoceratops*, because the remains of many of them were found at the site. This naturally led the scientists to believe that the predatory dinosaurs treated the eggs as an easy source of proteins. It was not until many years later that an oviraptorosaur embryo was found inside one such egg and researchers realized that these animals were in fact guarding their own nests. In line with the rules of taxonomy, however, the name, misleading as it is, has remained unchanged.

There is more evidence suggesting that dinosaurs cared for their young. In China, the remains of a small

herbivorous adult *Psittacosaurus* individual were found, surrounded by over 30 juvenile specimens. In Montana in the United States, several juvenile and one adult herbivorous *Oryctodromeus* individual were found preserved inside a burrow dug out by this animal. In both cases, the young were larger than new hatchlings, which suggests that they stayed close to their parents long after hatching, including outside the nest.

Numerous offspring

Consequently, the reproductive strategy of at least some dinosaurs resembled that of today's birds. But what about earlier reptiles? Recent finds have made it possible to identify several other crucial moments in the evolution of the reproductive strategy of tetrapods. The remains of an animal called *Dendromaia* found in modern-day Canada may be the oldest evidence of parental care in the fossil record. The adult specimen was found with its tail wrapped around a juvenile specimen of the same species. Both specimens were preserved inside a petrified tree stump. The remains are around 310 million years old.

Large yet proportionate eyes and heads are typical of most of the young of tetrapods. These features,

which are characteristic of pups and kittens as well as baby pigs and horses are so universal that they arouse parenting instincts even between species. We only need to recall how adorable we find the young of other groups of animals. This suggests how deeply such responses are hardwired in our brains. Parental care is common among mammals, which have fewer offspring than reptiles or amphibians yet put much greater effort into keeping their young alive and therefore boosting their chances of survival.

Recent finds include spectacular remains of an adult cynodont (pre-mammal) of the *Kayentatherium* genus from the Early Jurassic (around 190 million years ago) with 38 babies. The number is greater than in any of today's mammals. The young did not differ from the adult in terms of skull proportions and showed no anatomy typical of cubs. This suggests that amniotes (a group comprising reptiles, birds, and mammals) originally had numerous and probably self-sufficient offspring. The reproductive strategy of this group of animals only changed when the brains of mammals grew bigger in the course of evolution.

Although paleontology is associated mainly with the study of fossilized bones, such spectacular discoveries can still shed some light on the evolutionary history of more complex animal behaviors. ■

Further reading:

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