Fossilized dinosaur egg discovered to have fully-intact remains of oviraptor embryo

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20 February 2022

In paleontology, major discoveries are oftentimes made long after a fossil is physically acquired from the field. The recent finding of the headline-grabbing embryonic Oviraptor named Baby Yingliang last month in Ganzhou, China is one such example.

While the findings were published in *Cell* on December 21 of last year, the fossils themselves were originally discovered in a mine in 2000. Nearly 20 years later, the construction of a new natural history museum prompted Chinese paleontologists to examine many of the specimens they had collected, among them the eggs.

When reexamined, there were minute amounts of fossilized bone visible on cracks in the egg. The egg was opened, and the fossilized remains of a developed embryo were uncovered within.

Finding an intact fossilized dinosaur egg is rare, finding a dinosaur egg with an intact embryo is rarer. Before this discovery, only eight species of dinosaurs have yielded fossilized embryos. To put this in perspective, there are currently over 700 recognized species of dinosaurs.

A discovery of this nature can reveal much about the lives and evolution of dinosaurs and modern birds.

To understand the importance of this discovery, we need to look at the group this developing animal belonged to: the Oviraptorids. The most famous species of the group is Oviraptor. Present in Mongolia 75 million years ago, this dinosaur lived alongside the more renowned Velociraptor.

When initially discovered by an expedition to Asia by the American Museum of Natural History, Oviraptor was assumed to act like its Greek namesake, egg thief. Its remains were first discovered next to a nest that was presumed to belong to the Ceratopsian, Protoceratops.

It was impossible to determine at the time what species the egg belonged to, as the contents were simply not preserved in the fossilization process. However, many years later another expedition located a similar egg, this time with the developed embryo of an Oviraptor contained within.

There were also two small skulls belonging to a relative of Velociraptor. These skulls were either predators who had failed to raid the nest or were preyed upon by one of the parents and brought back to the nest like a modern eagle does with its prey. This demonstrated that the Oviraptor “was, it now turns out, simply trying to hatch its own offspring,” stated a 1994 report in the *New Scientist* .

This discovery further helped paleontologists realize the connection between dinosaurs and modern birds, as the discovery of the nest demonstrated that this animal was not a brainless, cold-blooded monster, but rather a creature that exhibited parental care much like a modern bird.

The largest member of the group was a species known as Gigantoraptor. While most Oviraptorids would rarely exceed proportions similar to that of an emu, Gigantoraptor was larger than any land-dwelling animal alive today, reaching lengths of over eight meters and weighing over two tons.

Much like Oviraptor, Gigantoraptor is known only from the late Cretaceous period in Mongolia. In fact, every single known species of the group is known from the late Cretaceous of Asia. The first representatives of the group appeared around 84 million years ago and the group disappeared along with the rest of the non-avian dinosaurs during the KT (Cretaceous/Tertiary) mass extinction 66 million years ago.

A popular misconception is that birds are descended from dinosaurs. This is analogous to saying bears are descended from mammals. Like bears in relation to

mammals, birds did not evolve into their own separate group of organisms but are rather one branch of a larger family tree we call dinosaurs.

To contextualize their relationship, we need to look at a group of dinosaurs called theropods. This group can be divided into two major subcategories: avian theropods and non-avian theropods. Non-avian theropods include animals such as Oviraptorids and more renowned creatures such as Tyrannosaurus rex and Velociraptor. Avian theropods contain such organisms as ostriches, pigeons and bald eagles.

This means that dinosaurs never truly went extinct; one lineage survived the KT mass extinction and became one of the most successful vertebrate groups of all time.

The newly discovered Oviraptorid eggs only reinforce this relation between non-avian and avian theropods.

Modern reptile and bird embryos maintain different postures during development in eggs. Baby Yingliang's embryo more closely resembles postures found in modern bird eggs. This embryonic position is known as "tucking" and is crucial for a young bird's survival during hatching as the embryo positions itself to break through its eggshell with the use of its mouth.

The Ganzhou findings also suggest that the movement of bird embryos within an eggshell was originally a behavior that developed in non-avian theropods and was likely present within this entire branch of the dinosaur family tree.

The discovery of a fully intact Oviraptorid embryo is just one of many findings from China that have helped dramatically further our understanding of our planet's past. The country has experienced a renaissance in the field of paleontology and there is no doubt that we have only scratched the surface of China's contributions.

This comes alongside more disturbing developments facing Chinese and global populations in the social realm. Among these are the expending commercialization of fossilized specimens and the attacks on funding for research across academia.

For thousands of years in China, the remains of extinct animals have been utilized in ineffective home health remedies. This practice has destroyed countless specimens and continues well into the present. Fossils have also become a valuable commodity internationally with the fossil trade booming, much to the detriment to the field of paleontology.

In addition, tensions between the United States and China have impeded research around the globe in countless fields. The United States has done everything from blocking Chinese grants to American scientists to preventing high-profile and accomplished Chinese scientists from attending conferences in the US by withholding short-term visas.