# The meaning of porous dinosaur eggs laid on flat bedding planes

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Most reptiles bury their eggs in the ground or place vegetation on top. In this way the eggs stay in an environment of controlled high humidity, high $CO_2$, and low $O_2$. Most birds, on the other hand, lay and nurture their eggs in the open air. These differences exist because reptile eggs are porous while bird eggs are only slightly porous. The eggs of those few reptiles that do not bury their eggs are more similar to those of birds; they have low gas conductance through the egg shell.

Hundreds of thousands of dinosaur eggs are now found in the rocks from all over the world.[1] Sometimes they come in clutches of a dozen or more. The pores and gas conductance can be determined by a microscopic examination of the egg shells, and an examination of dinosaur eggs has shown that the egg shells are very porous,[2] generally like those of reptiles. This means dinosaur nests had to be in high humidity, high $CO_2$, and low $O_2$ environments, so they should have been buried or covered by vegetation.

## A recent analysis of eggs from Argentina reinforces the need for burial

A recent analysis of gas conductance in dinosaur eggs from Argentina reinforced the conclusion that the eggs are very porous and need to be protected from the air. Conductance was about 24 times that of bird eggs. Jackson *et al.* previously demonstrated low conductance for the same eggs at Auca Mahueva, Argentina, but the new conductance analysis shows Jackson *et al.* grossly underestimated the pore density and conductance. Grellet-Tinner *et al.* conclude:

> "As such this internal pore network and its geometry would enhance a greater GH20, GO2, and GCO2 [G is the symbol for gas conductance] through the shell to facilitate embryonic development in completely or semi-buried nests with high moisture content, as hypothesized by Deeming (2006). Considering our hypothesis and reexamination of the values expressed in Table 4, our interpretation is that the Auca Mahuevo clutches were incubated in substantially higher moisture conditions (Garrido, 2010b) than previously indicated. … Deeming (2006) concluded that dinosaur eggs were incubated in buried nests."

Deeming reinforces this conclusion:

> "The physics of gas diffusion are irrefutable and so the morphology of eggshells provides a valuable insight into part of the reproductive biology of dinosaurs. High-porosity eggshells indicate that the incubation environment is low in oxygen and high in carbon dioxide and that these shells need to be incubated in an environment saturated with humidity."

## Nest structures and evidence for vegetation are rare

Some researchers define a nest as the existence of egg shells or a clutch. However, this is a gross extrapolation; nest structures with raised rims surrounding a pit are rare. Chiappe *et al.* admit this:

> "Despite the relative abundance of dinosaur eggs in the fossil record (Carpenter *et al*., 2004: Carpenter, 1999), *trace-fossil evidence of dinosaur nest construction is extremely rare.* The existence of nests is typically *inferred* by the presence of an egg clutch and usually it is not accompanied by physical evidence of nest architecture [emphasis added]."

They believed they had found six nest structures at Auca Mahuevo, but these bowl shaped structures have turned out to be dinosaur tracks and the eggs probably floated into the tracks.[10] That reduces the number of nest structures in the rock record to probably less than a dozen.

In rare instances, the eggs in clutches are stacked, and this has been interpreted as evidence for burial, although there is no evidence of a dug out hole or a raised rim. However, these situations can also be explained by the dinosaurs laying their eggs during a sedimentation event.

If the eggs were not buried, then surely there should be evidence of vegetation associated with the nests, but this evidence is also rare. Researchers have found carbon remains, presumably of plants, associated with some of the depressions at Auca Mahuevo, but since these depressions are now interpreted as dinosaur tracks, these carbon remains cannot be associated with egg clutches. Kenneth Carpenter admits:

> "The suggestion that some dinosaurs may have nested in vegetation or vegetation-mud mounds similar to those of megapode birds or alligators seems to be a popular idea … but how can this be proven when all traces of vegetation have rotted away? Or how can we determine if vegetation was even used at all?"

The idea that the vegetation simply rotted away makes no sense since the preservation of dinosaur eggs, egg shells, and rare embryos requires rapid burial and fossilization. Besides, traces of organic carbon, pollen, or fossilized imprints of leaves and branches should be preserved with the eggs. The evidence stacks up that the dinosaurs did not add vegetation to the eggs.

## Dinosaur eggs hastily laid on BEDS early in the Genesis Flood

Very rare nest structures and almost complete lack of evidence for vegetation means that dinosaur eggs have been

**Figure 1.** Lambeosaurine duckbill dinosaur egg clutch from north-central Montana displayed in the Museum of the Rockies, Bozeman, Montana, USA.

laid on flat bedding planes. The embryo inside the egg would quickly dry out. This situation contradicts the environmental deduction of the porous eggs.

The only viable conclusion is that the dinosaurs laid their eggs in haste. They did not have time to dig a hole or add vegetation, possibly because there was no vegetation to be found. This means the eggs were laid in an unnatural environment and on flat sediment surfaces with subsequent rapid burial by watery flows—worldwide. In fact, the Argentina eggs are interpreted as resulting from multiple and successive flooding events.[10]

Dinosaur eggs thus provide strong evidence for the BEDS (Briefly Exposed Diluvial Sediments) hypothesis—in which Flood sediments are briefly exposed during a local drop in the Flood water.[2] This had to happen in the first part of the Flood since eggs and tracks indicate the actions of live dinosaurs, whereas by Day 150 all the dinosaurs would have been dead. Dinosaurs either swimming, clinging to log mats, or on higher land nearby could have embarked on the exposed sediments. They could make tracks, quickly lay eggs, and scavenge dead dinosaurs. A subsequent rapid rise in the muddy water of the Flood would then have covered up the dinosaur material and preserved it to this day.

## Further creationist considerations

Creationists have lots of challenges in the earth sciences, but there are still many unknowns, and I believe we lack an enormous amount of knowledge about the Flood. Often uniformitarian interpretations are made without enough data. We need to be careful of such interpretations.

In regard to the existence of dinosaur eggs and tracks, some earlier interpretations were not correct, such as: egg shells or clutches automatically define a nest; the eggs at Auca Mahuevo were not all that porous; six depressions were dinosaur nests (which turned out to be dinosaur tracks); and the evidence for carbon associated with those tracks was a sign of vegetation piled on the 'nest'. Although there are still challenges, the data on eggs and tracks is adding up to the BEDS hypothesis early in the Flood.[2]

The challenge of dinosaur eggs, tracks, and scavenged bone beds is an example of how we can approach these other earth science challenges. We must first gather the raw data and watch out for uniformitarian interpretations, realizing that these interpretations come from a naturalistic worldview. That does not automatically mean they are wrong, but they should be examined closely, holding tight to Scripture (1 Thessalonians 5:21). Moreover, we must read the literature or go out into the field in order to find newer data and interpretations that result in a different view of the data. With time, we should be able to construct an alternative explanation within Flood geology.

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