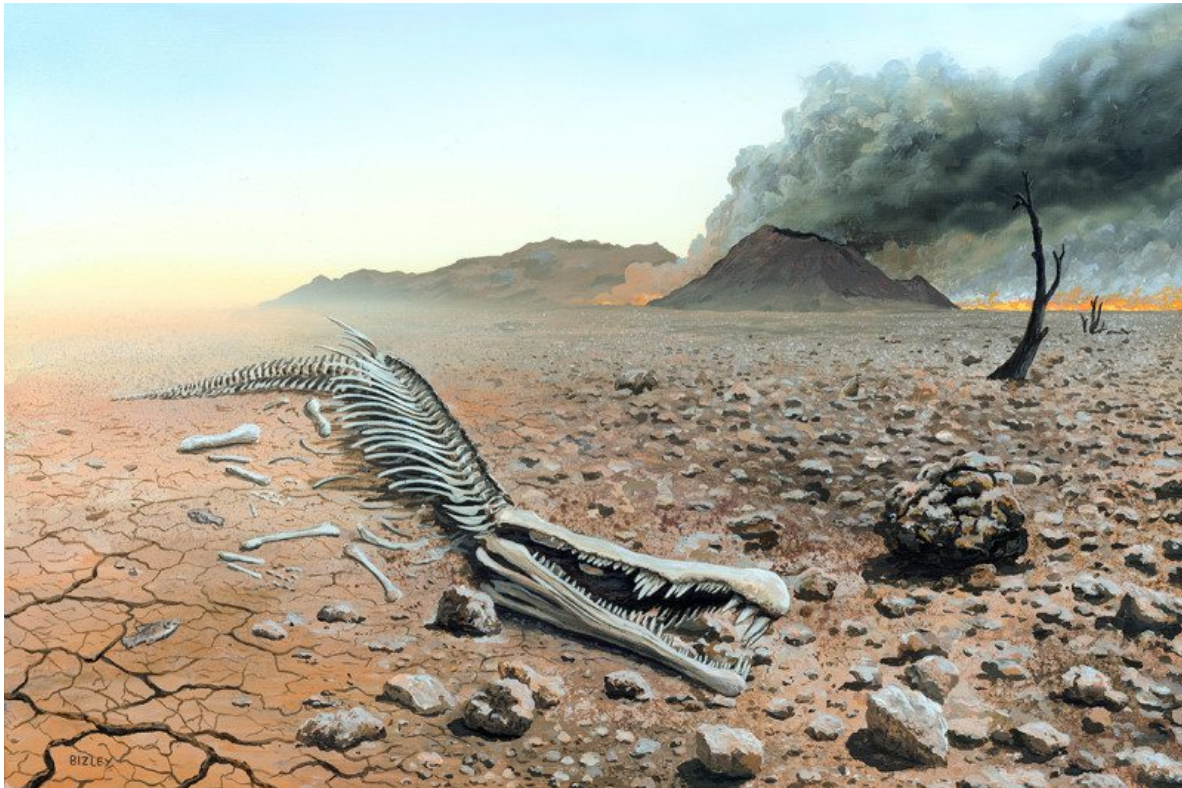


NEWS & TECHNOLOGY 19 October 2017

The mass extinction that might never have happened



Richard Bizley/Science Photo Library

By Colin Barras

Should the “big five” really be the “big four”? For decades, we have recognised five devastating mass extinctions that punctuate the last half-billion years of evolution. But now two geologists are controversially arguing that the end-Triassic extinction – often described as the third largest – has no place on that list.

“Certainly there was an environmental crisis, but it’s not a mass extinction per se,” says Lawrence Tanner at Le Moyne College at Syracuse, New York. “It’s misleading to continue to call it one.” If he is correct, our understanding of the early evolution of dinosaurs will need rewriting.

after. The end-Permian “mother of all mass extinctions” 252 million years ago nearly obliterated all complex life, while the extinction at the close of the Cretaceous 66 million years ago is famous because it wiped out all dinosaurs, apart from birds.

The end-Triassic extinction has been linked to a spate of volcanic eruptions around the birth of the central Atlantic Ocean. This “central Atlantic magmatic province” (CAMP) released carbon dioxide and sulphurous compounds into the atmosphere – supposedly triggering global warming, acid rain and widespread extinctions on land and at sea.

Rewriting the story

“If you look closely you see there’s more subtlety to it,” says Tanner. He and his colleague Spencer Lucas at the New Mexico Museum of Natural History and Science in Albuquerque agree there was ecological upheaval. But they say it took tens of millions of years, so can’t all be linked to the CAMP eruptions.

“There is no single extinction at the end of the Triassic,” says Lucas. “There’s a series of extinctions.”

In other words it was all a bit fuzzy. In the sea, shelled animals like bivalves and ammonites suffered. “But those bivalve extinctions are really spread out, and the big extinctions in ammonites occur 4 to 5 million years before CAMP,” says Lucas. “Something else is at work there.”

On land, the cataclysm is thought to have wiped out many early reptiles, leaving space for the rise of gigantic dinosaurs in the next geological period, the Jurassic. Many of the most famous species, like *Stegosaurus* and *Diplodocus*, only appeared in the Jurassic.

“Nonsense,” says Lucas. “The dinosaurs were already diversifying. There are big meat-eating dinosaurs in the late Triassic. We know them from their footprints and from their bones.”

The researchers will argue their case at the annual meeting of the Geological Society of America in Seattle, Washington later this month. However, they may find it tough to convince other geologists.

“There are few advocates of this viewpoint,” says Paul Wignall at the University of Leeds, UK. “In the sea the mass extinction is clear-cut and substantial. There were precursor losses around 5 million years earlier, but the [end-Triassic] marine extinction is huge.”

While there were several extinctions in the Triassic, “the end-Triassic extinction is still the biggest thing around,” agrees Paul Olsen at Columbia University in Palisades, New York. “It sees the complete or near-complete elimination of groups that were dominant beforehand.”

But Olsen also says Tanner and Lucas have valid points. For instance, Lucas has argued that the way geologists process data can give a false impression of large, catastrophic extinctions. If species disappear during a geological stage – which can last several million years – geologists often lump those extinctions together as occurring at the end. This “magnifies the apparent severity of extinction,” says Olsen.

A matter of timing

Olsen thinks the precise timing of the extinction is the key issue.

Recent studies suggest the extinction actually happened slightly before the end of the Triassic, not right at the end as previously thought. Olsen concedes Lucas and Tanner’s point that large dinosaurs made an appearance in the Triassic, but he says they only did so in the time between the mass extinction and the Triassic’s actual end. This implies that the existing story – that the mass extinction “unleashed” the evolution of dinosaurs – still holds.

However, Lucas rejects this, saying large dinosaur-like footprints are known from before the extinction.

Other researchers are open to downgrading the extinction.

“Clearly something happened to vegetation at the end of the Triassic period,” particularly near the CAMP eruptions, says Chris Cleal at the National Museum Wales in Cardiff, UK, who has studied late Triassic plants. “However, it certainly didn’t have a fundamental effect on the overall trajectory of vegetation history. Very few plant families became extinct at this time. For me a true mass extinction should be a mass extinction for all groups, not just a few selected groups.”
