

A cacophony of causes

Extinction: How Life on Earth Nearly Ended 250 Million Years Ago by Douglas H. Erwin, Princeton University Press, 2006, £15.95 hbk (306 pages) ISBN: 0-691-00524-9

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How do you sell a mass extinction without dinosaurs? How about giving it a catchy title, such as the ‘mother of all extinctions’ or ‘the great dying.’ Better yet, find a rock that came from space and identify it as the one that fell to Earth 65 million years at the end of the age of dinosaurs. Too often, the press (and, unfortunately, too many scientists) like neat little stories to explain complex events that transpired eons ago,

such as mass extinctions.

This aspersion certainly cannot be cast on Doug Erwin’s latest contribution (his first book was in 1993) to our current knowledge of the ‘the great dying’ that occurred some 250 million years ago, both slightly before and at the Permian–Triassic boundary, when a staggering 90% of all species might have disappeared. As he phrases it, ‘Life would be much easier if complex events had single causes, but the lessons of history are otherwise’. As an analogy, the author notes how we try too often to find single causes for why civilizations fall.

Erwin leads us through the morass of hypotheses for these extinctions. For the most part, he does a good job presenting and weighting data from the more plausible scenarios. To his credit, he is quite dispassionate and evenhanded, but never boring, when dealing with his own pet ideas as well as those of others. Certainly, some readers will be unhappy that he does not single out anoxia, volcanism, impacts and so on, as the cause. But where some might see this as a weakness in *Extinction*, I see it as strength. As a skeptical contributor to the study of the much younger and better-known Cretaceous–Tertiary (K–T) mass extinctions, I can forgive the sometimes simpleminded view that a rock hit the Earth and everything died. I should note that, in his short treatment of the K–T mass extinction, along with the other mass extinctions, Erwin does fall into this ‘single cause’ trap. His factual data on this extinction are somewhat out of date. For example, he cites an old figure of 79% for plant species extinction when it, probably by one of the same authors (Kirk Johnson), is now thought to be a maximum of 57%.

These are rather minor lapses, which can be overlooked. I do have two more serious organizational criticisms about what is otherwise a well-done book. First, citations do not appear in the text (e.g. is the 79% plant extinction from one

Kirk Johnson’s papers as I surmise?), which greatly reduces the utility for anyone searching for the source of Erwin’s information. Second, no index exists, which has a similar effect. I should note that I was given an advance copy for review so if either of these shortcomings was changed in the published version, so much the better. For those simply reading this volume as a well-documented scientific narrative, these issues do not pertain.

Quite appropriately, seven out of ten chapters deal in large part with matters marine, which in reality is the way it should be. As I have told more than one student, if you wish to study extinction, do not study dinosaurs but study the much more complete marine fossil record. This is not to say that these chapters do not touch on other topics, such as geochronologic dating, carbon cycles and so on, but as an invertebrate paleontologist, Erwin presents his strong side. In the process, he admirably highlights the human side of doing field paleontology. His good global perspective of his and his colleagues’ science is very readable.

As a vertebrate paleontologist, I hope that I can be forgiven in singling out his only chapter from the terrestrial realm on the Karoo Desert (‘South African Eden’). In comparison to some of the bandwagoners that spent relatively short stints there, Erwin provides balanced coverage of the long history of vertebrate paleontology that has given us the early inklings of our own mammalian line. Collectively known as synapsids, these small to very large, sometimes grotesque creatures are every bit as sexy as dinosaurs; they simply need a better press agent. I shared in his awe on first seeing the Karoo when he wrote ‘There is nothing like a good desert to make me happy’.

In the end, do not be put off by Erwin’s lack of finality on what might have caused the Permian–Triassic mass extinctions. We have not yet heard his last word on the topic, only his latest. Although acknowledging that mass extinction is not a good thing within the balance of human sensitivities, Erwin rightly states that, within the broadest and deepest expanse of what we Earth scientists call deep time, mass extinction is an unquestioned force that reshapes the face of evolution. Without it, as the late Steven J. Gould opined, we would not be here. I am a true believer.

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doi:10.1016/j.tree.2006.02.010