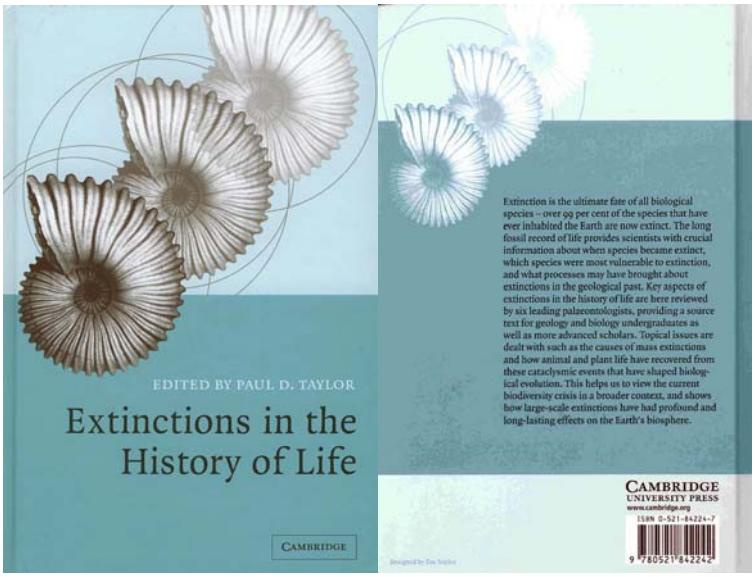
Taylor, P. Ed. 2004. Extinctions in the history of life. - Cambridge, Cambridge University Press.

Book review by L. van den Hoek Ostende



As a palaeontologist, I study species that are no longer there; at a certain point in time they went extinct. Frankly, I never gave the matter much thought, unless the disappearance may be linked to some ecological change. In a way, this is strange. Death is part of life, extinction is part of evolution. But sometimes the simplest of truths need to be pointed out to you. Reading "Extinctions in the history of life" certainly worked as an eye-opener.

The book is an offshoot of a symposium on extinctions held at the University of California, Los Angeles. It is aimed at the undergraduate student to point out the current debates on extinctions and their importance for the development of life on earth. At the same time, it provides an overview for anybody interested in the subject. In order to fulfill these objectives, a book needs to be written in an accessible style, and at the same time provide ample background information. Particularly readability is a challenge if you take six different scientists, each of which contributes a chapter on their own specialty. I was pleasantly surprised to find that each chapter provided light and yet highly informative reading. At the end of each chapter, a short list for further reading was given, next to the usual reference list. It is the type of book you would recommend to any student, wishing you had had more of those in your own student days.

Part of the appeal of the book is that none of the specialists loses himself in details. It is well and truly an overview, looking at the process rather than at the extinctions themselves. The six chapters cover the field well. The scene is set in the first chapter, written by Paul Taylor, who is also the editor of the book. The chapter gives a brief overview of the history of extinction research. It continues explaining how extinctions can be detected and measured. Databases with the stratigraphic distribution of genera and species, such as the epic work done by the late Jack Sepkoski, give insight in the Phanerozoic diversity and extinction pattern. Here we make acquaintance with 'the big five', the mass extinctions at the end of the Ordovician, Devonian, Permian, Triassic, and Cretaceous, respectively. We also see how diversity increased during the Phanerozoic, and how extinction rates declined.

Having established the patterns in extinctions, the second chapter comes with a surprise. In this chapter J. William Schopf discusses the extinctions, or rather the lack of them, in life's earliest history. As more and more becomes known about the fossil record of the Proterozoic, it becomes evident that the simple organisms from that period showed remarkably little change. Some cyanobacteria of over a billion years ago are incredibly similar to recent forms. How do such organisms fit in a book on extinctions? Schopf's chapter shows extinctions and evolution go hand in hand. Extinctions only became a regular phenomenon in the history of life on Earth after the development of sexual reproduction set the stage for organisms to evolve.

'Do plants suffer mass extinctions?' is the title of the chapter written by Scott Wing. That seems a legitimate question. Unlike animals, in which many large clades have disappeared, most higher taxa of plants survive in the present flora. And the diversity curve of plants in the Phanerozoic does not show any major dips. More detailed research, however, shows that there were indeed deep crises in the history of plant life. The chapter ends with four generalisations about the way the flora responded to the various periods of mass extinctions.

The chapter by David Bottjer stands out in that it is the only one that does not cover a prolonged period of time. Bottjer focuses on the Triassic, "70 million years of environmental stress and extinction". The Triassic is a logical choice if one wants to give a more detailed view of extinction research. After all it is the only period that starts and ends with one of the five big mass extinctions. Not exactly a case study, looking in just a bit more detail than the other contributors is a useful side road. It gives the reader an even better understanding on how the study of extinctions works.

In chapter five we get back to the big picture again, as Paul Wignall examines the possible causes of mass extinctions. The study of mass extinctions got a big boost when the impact theory was formulated to explain the K/T extinction, and with it the demise of the dinosaurs. Although the impact of terrestrial bodies has been used as a possible explanation for extinction events, circumstantial evidence suggests that massive volcanism usually provides a better cause. At least, huge eruptions occurred during each of the mass extinctions. Another common feature is the presence of marine anoxia in the oceans. The breakdown of primary production the world sees resulted in the so-called Strangelove oceans. Wignall also discusses other possible causes, such as transgressions, regressions, and global warming. Thus he presents a good overview of the ongoing debate of possible causes of mass extinctions.

The evolutionary role of extinctions is discussed in the final chapter by David Jablonski. We tend to think that surviving mass extinctions is key to evolutionary success. This is perhaps partly the heritage of Stephan Jay Gould, who in his "Wonderful life" pointed out that our own success is the result of our ancestors being lucky enough to survive the various crises in life's history. Jablonski, however, shows that not every survivor is a winner. In the aftermath of mass extinctions anything can happen, and some groups decimated in the event dwindle to extinction million years later.

It is not entirely fair to pick out some of the main conclusions of the various chapters. The strength of the book lies in the discussions and presenting the overall picture. What I meant to indicate here is that I learned a lot from reading the booklet. The content is well-suited for its primary goal, giving undergraduate students insight in the state of affairs concerning extinction research. The price of the book seems to be less directed at the student. The book is small and pleasantly thin, with clear diagrams. But it is nothing fancy, and considering that, it is quite an investment for the average student. Those willing to pay the price will get a nice hardcover book. A book that I wholeheartedly recommend to anyone interested in the history of life. For that story can only be understood, once we realise the importance of extinctions.

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