

Impossible Extinction: Natural Catastrophes and the Supremacy of the Microbial World

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Book reviews

Book Review: Impossible Extinction – Natural catastrophes and the supremacy of the microbial world Charles S. Cockell

Cambridge University Press, Cambridge (2003)
181 pages · £18.95 (US\$28) · ISBN 0 521 81736 6
10.1017/S1473550403211630

Like all good books, *Impossible Extinction* is a journey – a cosmic journey as the Earth and the solar system travel around the centre of our Galaxy in a galactic year of 225 million years. During this epic journey, there are numerous hazards and dangers to be encountered. Rather than taking a human perspective, as in most books on natural or man-made catastrophes, the heroes of *Impossible Extinction* are the smallest of Earth's creatures – the microbes. The first and second chapters provide a delightful introduction to our Galactic environment to set the scene. The third chapter introduces the main characters of the story, the vast array of bacterial organisms that inhabit our planet. These microbes have adapted to survive within a huge range of different environments inaccessible to us more "evolved" creatures. They utilise a host of different methods of extracting energy from their environment for their survival. The following four chapters describe the most important, potentially destructive, cosmic events that may be encountered on this 225 million year voyage around the Galaxy. Earth's geological history provides testament to the vagaries of life on Earth with potentially catastrophic consequences on terrestrial life. Since the evolution of multi-cellular creatures some 600 million years ago, there have been at least five mass extinction events in which huge swathes of creatures were annihilated, never to be seen again. The most famous of these mass extinction events was the KT extinction 65 million years ago which wiped out the dinosaurs, believed to have been caused by an impacting asteroid or comet. Such bolide impacts are just one possible source of annihilation. A nearby supernova explosion is also a possibility during our cosmic traverse but so far there is no direct evidence of such having caused a mass extinction. There is also the possibility of super-volcanic eruptions on Earth, such as the eruption of the Deccan Traps some 65 million years ago, which appear to have occurred nine times during the last 225 million years of geological history. The final, potentially catastrophic event is that produced by humans – the degradation of our environment through pollution has added a further danger to the survival of our fellow creatures (and ourselves).

Yet, despite all these hazards with their devastating effects on animals and plants, microbes appear to survive, and perhaps even thrive. This is the linking thread throughout

the whole book – that microbial life is ubiquitous and this ubiquity, from the depths of the oceans to the bowels of the Earth's crust, provides the key to microbes' survival. Hence the title of the book – despite all the insults to which the Earth may be subjected, microbes survive and prosper. The versatility of their lifestyles ensures their continued survival under the most extreme conditions that would annihilate more "evolved" lifeforms. The final chapter suggests that perhaps microbes may even survive the Earth itself – indeed, it is conceivable that Mars or Europa may be home to microbes. Even when the Earth is swallowed up, some 5 billion years hence, as the Sun swells into a red giant, microbes may survive, encapsulated within pieces of rock ejected into space from the impacts that have occurred through geological history. Perhaps these rocks may be slung out of the solar system altogether, eventually to impact onto the surfaces of other planets around other stars to colonise a new home. If so, then microbes do truly represent life as an inextinguishable cosmic phenomenon.

I thoroughly enjoyed this book, and the author has an engaging style, uncluttered with jargon, lending it to a wide general readership. From a more scientific viewpoint, it was refreshing to see biology treated within a cosmological context – a readily accessible introduction to the science of astrobiology which brings alive the world of the microbe in its proper context, the cosmos as a whole.

Alex Ellery

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Alone?: A Discovery Sourcebook for Astrobiology

By students from the International Space University (ISU) Summer Session Programme, Pomona, California, 2002

International Space University, Strasbourg (2002)
225 pages · Free, postage is £15 or \$15 in Europe, £21 or \$20 elsewhere (see http://www.isu.net.edu/library/student_reports.htm)
10.1017/S1473550403211637

This book, designed by one of two International Space University (ISU) project teams for the 2002 summer school programme, tackles the broad topic of astrobiology with a particular focus on space mission issues. Before reviewing the content of the book, however, it is worth mentioning the book's context and authorship, as it would appear that this has had significant influence on its content. The ISU summer school is a 10-week structured postgraduate school in space studies (with an emphasis on space science and engineering) for young scientists, engineers, architects, lawyers and social scientists from across the globe. The structured programme is

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