REVIEW

Book Review of Earth: Evolution of a Habitable World, 2nd Edition, by Jonathan I. Lunine

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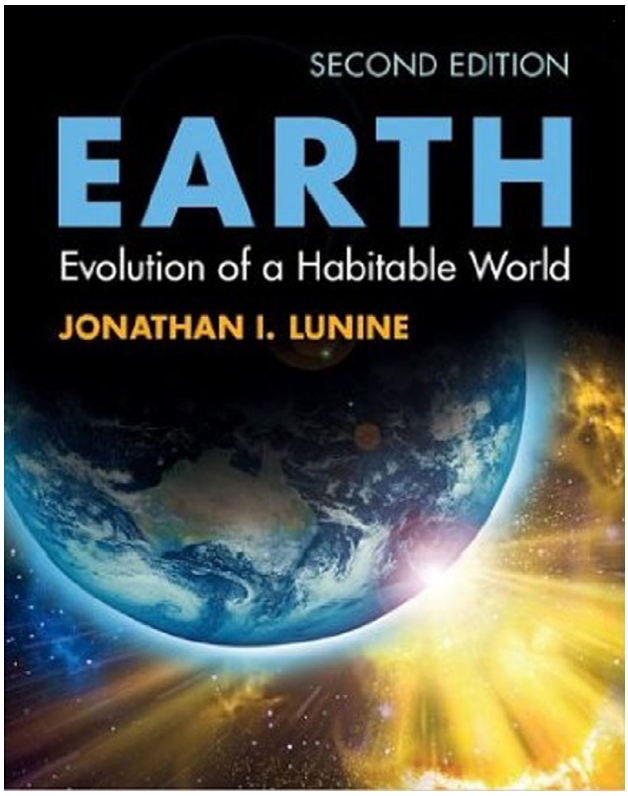

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This is an ambitious book. It attempts to integrate all branches of natural science to provide a complete overview of how the Earth has developed, from the Big Bang through to the present day, within the confines of about 300 pages. That it manages to do so at all is admirable, and that it manages to do so while also be thorough, engaging and thought provoking is all the more remarkable. There has clearly been a lot of loving attention put into the development of this text and as such it stands out as one of the best undergraduate-level textbooks on planetary science I have seen.

The order in which the book is written is expertly instructive and well thought out. The first section highlights where the Earth lies within the Universe, both spatially and temporally, and provides an outline of the essential physics and chemistry that governs the development of planets. Having provided this background the second section is split into five chapters demonstrating the tools we have at our disposal to determine the history and development of our planet through observation and analysis of data. This section really highlights one of the books main strengths – as well as providing a factual account of our planet's history, Lunine always shows us the exact nature of the evidence that leads scientists to be able to piece together the jigsaw puzzle they are trying to solve. He does this with careful referencing and good use of figures, so that the interested reader

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will always know where to look up more information, or investigate the data more deeply themselves. The third section of the book forms the bulk of the text, with an equally thorough history of the Earth from the formation of the Solar System, to the formation of the early Earth and the development of life, through the Phanerozoic, to the evolution of *Homo sapiens*. The final section then analyses climate change over human history up to the human-induced global warming of the present day and the problem of resources we are currently faced with, presenting the issues, with options for possible solutions.

There are no flaws in the book, although there are certain parts that might not be to all tastes. It is almost necessary in a book of this stature to provide lightning-quick explanations of subjects that really require a longer time for serious study, and so any attempt to do so is going to be difficult and met with criticism. The chapter on force and energy for example covers swathes of physics that aren't really needed for the rest of the book and could put a reader off early on if they weren't already well versed in the discipline. And though extremely thorough, no book can cover **everything** so any reader will have favourite concepts that they think might merit more discussion. I myself felt that chaos and complexity and their relation to life and its development were given short shrift and could have strengthened the narrative. I also wondered whether a look at anthropic principles could have added something towards the end, and possibly whether the Gaia hypothesis could have been given a little more attention.

All in all though, this is a super text. The question is, who is the best audience for it? It's not really written as a coffee table book (though it could have been if attempted in a different style), and so firmly belongs on academic bookshelves. I'd say it would be perfect for any introductory earth science course, pretty much essential for anyone interested in astrobiology, and, because it contains open discussion questions at the end of each chapter, would be ideal for use in earth science tutorials. Having made a transition from physics to geophysics myself I can say that it would also be very useful for PhD students making a shift across disciplines towards earth science. I currently run planetary science projects for undergraduate physics students and I will certainly be recommending they read chapters of this book in preparation for their work.

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