

is that the massive population growth of the past century is a major factor in taking the negative aspects of our activities from a series of local problems to a global dilemma. The historical record can make the prospects for the future look gloomy, but the author remains hopeful and concludes each chapter with a “Where do we go from here” section. It is profusely and effectively illustrated with photographs, maps, statistical charts, and occasional schematic diagrams, all in color. The only weakness is a complete lack of external references. A great deal of useful statistical data is scattered through the text; a summary of data sources would be very useful to anyone wishing to dig deeper into the subject. Similarly, I would have liked to see a short list of further reading suggestions for each chapter. That caveat aside, this is a very impressive book on a broad-reaching and increasingly important topic. I would recommend it to anyone who wants a better understanding of the current environmental state of the planet and where it is going.

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**Waves and Rays in Seismology: Answers to Unasked Questions**, by M. A. Slawinski, ISBN 978-981-4644-80-8, 2016, World Scientific, 404 p., US\$115 (print).

The book *Waves and Rays in Seismology: Answers to Unasked Questions* by Michael Slawinski is a welcome addition to our library of books on seismology. The writing style of the author is unique in that he introduces each chapter with a brief history of the development of theory, including references to relevant areas of physics and mathematics. The title of the book raises our expectations in that detailed discussions of the content in Aki and Richards and Cerveny and Auld are contemplated. Unfortunately, the length of the book is inadequate to cover all of the topics in great detail. What one finds instead are very succinct summaries of different topics related to seismic wave propagation described in a concise mathematical framework. Yes, the author takes an applied mathematician’s approach to describing seismology (rightly so) and the book has numerous equations. The author deserves our kudos; I could not find any typographical errors.

The book starts with a description of the historical development of seismology including observations, physics, and the philosophy behind data analysis. Chapters 2–4 provide an excellent summary of continuum mechanics related to seismology. In particular, chapters 3 and 4 will prove useful to those interested in learning about material symmetry and anisotropic systems. Although details on this topic can be found in other books, these chapters provide readers with a strong background to delve into details. Chapters 5 and 6 cover fundamentals of body wave and surface wave propagation in an excellent manner. I liked the descriptions of the variational principle and related topics in chapter 7 the best, although the ray theory portion is too short. Chapter 8 describes gravitational and thermal effects — something that seismology students must be aware of. Finally, chapter 9 describes the author’s philosophy about seismology as science.

The book is self-contained; the appendices are very helpful. Anyone with some background in classical physics will be able to follow the developments in the book. Overall, I found the book

to be an excellent read and I would recommend it to students and researchers in seismology.

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**Introduction to Energy: Resources, Technology and Society**, by Edward S. Cassedy and Peter Z. Grossman, ISBN 978-110-7605-04-6, 2017, Cambridge University Press, 408 p., US\$59.99 (print), US\$48 (eBook).

A look at the authors’ descriptions explains a lot about this book. The late Edward S. Cassedy was an electrical engineering professor at Brooklyn Poly, while Peter Z. Grossman is a former science journalist and professor of economics at Butler University in Indiana. As one might expect then, the economic treatment of energy issues is the strength of the book. It is extremely well done and refreshingly free of bias. In fact, the book refrains from taking any positions at all throughout, leaving that exercise up to the reader. Societal factors affecting energy production and use, including environmental concerns and governmental action, are addressed independently of the economics sections, thus leading to a very readable, useful, and refreshingly honest treatment of energy issues. The book not only doesn’t take sides, but routinely points out internal contradictions and internal conflicts inherent in many energy positions, which are often ignored by the media.

The third section of the book includes an excellent treatment of future energy needs and possible developments. Of necessity, the section is speculative but well thought out, evenhanded, and honest. Economic, societal, and governmental issues are, as before, treated separately without resorting to advocacy. A technical strong point is, as expected, the treatment of electrical generation, transmission, electrical technologies, and uses of electricity. Again, it is free from bias and very well done.

This third edition has been brought up to date from the 1998 version but not, it seems, completely. For example, at the outset much is made of the failure of M. King Hubbert’s energy predictions, which by now are definitely DOA. Some of the chapter references cite books many decades out of print, and one might like to see these hard-to-find references replaced by more modern and accessible treatments.

It is when the book moves into technologies unfamiliar to either author that things get a bit rough. Then the reader finds misprints, incorrect diagrams, and confusing statements such as the claim that fracking opens up fissures in the earth, parallel to the surface, which horizontal drilling can follow for thousands of feet. These show evidence of a lack of editing, both factual and typographic. However, errors like this belong squarely on the doorstep of Cambridge University Press rather than with the authors. Some of the technology also seems to have been included to justify the title and the inclusion of integrals in the latter part of the book, which seems to argue against its adoption for any classes but those for college-level STEM students.

That is unfortunate because if the reader is willing to forgive the occasional error and ignore the higher math, the book may be one of the best on its subject, as well as one of the most