

Annual Review of Earth and Planetary Sciences, Vol. 51, 2023, edited by R. Jeanloz & K. H. Freeman (Annual Reviews), 2023. Pp. 695, 24 × 19.5 cm. Price \$511 (about £400) for institutions; \$122 (about £95) for individuals (hardbound; ISBN 978 0 8243 2051 5).

This year's volume of *Annual Review* opens with a remarkable autobiography of Estella Atekwana, biogeophysicist, to which the present writer can personally relate and recommend to all aspiring scientists who face challenges. I hope it is also read by those in positions to lighten the burdens of such colleagues.

The regular scientific-article section as usual covers a broad range of topics within Earth science including Solar System, climate change, the trendy new subject of machine learning (is this an oxymoron?), and the solid, liquid, and gaseous spheres of Earth. There is room herein to comment on only too few of these excellent papers. We are seeing increasing treatments of the interface between society and Earth science these days and I would particularly highlight a beautifully written chapter on 'Communication and Behavior Science' to improve the ability of society to make decisions regarding climate change, by authors Maibach and others. The recommendations, *e.g.*, simple, clear messages, have, however, clear application elsewhere in scientific writings! Another favourite I recommend is the chapter on 'Machine Learning in Earthquake Seismology' by Mousavi and Beroza. This short but to-the-point chapter provides a helpful primer and summary for those who might be wondering what this subject is and whether it is useful. Another of my pet favorites is the chapter 'The Mid-Pleistocene Climate Transition' by Herbert. It boldly states upfront and throughout that a complete explanation of the pattern of climate oscillations during the Pleistocene is still out of reach. Continued study of the interplay of multiple environmental processes, rather than focussing on Earth's orbital variations alone, is the present trend. I am glad scientists have not given up on this stubborn problem! I have room only to mention one more favourite and, after some hand-wringing, it has to be the chapter 'The Rock-Hosted Biosphere' by Templeton and Caro. There are 10 000 times more cells in Earth's crust than there are stars in the Universe, so this little-emphasized subject is not insignificant. In addition to summarizing the current state-of-play in the subject, the text emphasizes what we don't know, which is certainly enough for a fair few PhD projects, to say the least. A good read for aspiring students then. Abject apologies to the authors of the other excellent papers in this year's volume. Readers of this short report will just have to go out and purchase of a copy of their own (highly recommended)! — GILLIAN FOULGER.

Planetary Systems Now, edited by Luisa M. Lara & David Jewitt (World Scientific), 2023. Pp. 425, 23.5 × 16 cm. Price £130 (hardbound; ISBN 978 1 80061 313 3).

We are currently in the middle of a revolution in our understanding of planetary systems. There is now a dauntingly large amount of knowledge for the new student embarking on the study of planets. *Planetary Systems Now* attempts to provide a broad overview of the state of the field of planetary science as of early 2021. The book is based on an on-line school aimed at early-career researchers: 'Planets, Exoplanets and their Systems in a Broad and Multidisciplinary Context'.

The 14 chapters are reviews of their individual fields authored mostly by the lecturers at the on-line school. Unlike a typical textbook, the range of authors makes for a broad and diverse book and allows up-to-date results from a wide

range of topics to be presented by experts in those topics. Each chapter is self-contained and understandable without having to read those preceding it. On the other hand, the book lacks consistency in symbols used and style across the various chapters. There is also, on occasion, significant overlap between chapters, particularly Chapters 4 and 5, which explore the atmospheres of terrestrial planets. Each chapter is concluded by an “abbreviated” version of the question-and-answer sessions that followed the lectures during the school. These sections are a useful addition that would not be found in a standard textbook. In general, these are interesting and provide further helpful insight, though I am not sure why the question with the answer “I can’t remember” was included.

Planetary Systems Now is, in general, easy to read and contains many useful figures (often printed in beautiful full colour). It contains many examples of the latest thinking and results in each field in the pre-*JWST* era; for example, the lack of a significant spike in impact rate during the so-called ‘late heavy bombardment’, and a substantial chapter devoted to interstellar planetesimals — the first of which was only identified late in 2017. There are also, helpfully, many pointers to other published reviews for those looking to delve deeper. This book is probably of greatest interest to those beginning research in planetary or exoplanetary science, or existing research students seeking to broaden their background knowledge. If there is not a similar school that you can attend, I recommend this book as a good substitute. — PHILIP J. CARTER.

William Frederick Denning. *Grand Amateur and Doyen of British Meteor Astronomy*, by Martin Beech (Springer), 2023. Pp. 334, 24 × 16 cm. Price £34.99 (hardbound; ISBN 978 3 031 44442 5).

This is a very interesting and valuable biography of W. F. Denning, an individual who spent most of his life in Bristol, and whose work on meteor showers won him the Gold Medal of the RAS. I must take issue with ‘Grand Amateur’, a term invented by Allan Chapman in *The Victorian Amateur Astronomer* to describe those gentlemen who, upon retiring from business (if ever engaged upon it) devoted themselves to astronomy. They were wealthy, owned fine observatories, and had paid assistants. But Denning never fell into any of those categories, and it is not even certain that he ever enjoyed any systematic paid employment, other than as a journalist and writer. (As Beech shows, there is no proof that Denning was ever an accountant, like his father, as had once been thought.)

Beech writes very well, and gives us as comprehensive and lively a description of our subject’s life that the reclusive Denning allows us at this distance in time. He has researched Denning for decades, and gives us a really good history of the rise of meteor astronomy, a summary of meteor physics, and of Denning’s part in the field. Indeed, the young Denning was drawn into studying meteors by having witnessed the Leonid storm of 1866.

A lack of original Denning records is evident throughout this book. On display in its upper library, the RAS has Denning’s meteor globe, donated by his family in 1942. But we know of only a few letters and notebooks. Fortunately there is an abundance of Denning in print.

Much of Denning’s meteor work was conventional. His records of meteors were accurate, and his ability to sustain long watches was exceptional. In 1877 he was able to demonstrate the nightly motion of the Perseid radiant, as required by theory. But in deducing the coordinates of some meteor radiants, Denning tended to amalgamate observations over several nights instead