(citing a paper from this *Magazine*[4]), and the multiverse. The first and last of those topics are admittedly more speculative; my guess is that at least the last will become a standard part of cosmology and not just of its history. (For the long history of the multiverse idea, see an excellent book[5] reviewed[6] in these pages.)

So, is there nothing to complain about? I do have a few small quibbles. Some references (which refer to endnotes) are "quoted in Kragh. . . ". While 'quoted in. . . ' is actually preferable to a direct citation if the information comes solely from the cited source rather than the original, that is obviously not the case if the cited source is one of Kragh's own works. Although one can refer to the Hubble constant as the Hubble parameter, the fact that, in general, it is not constant in time is not a reason to do so. There are eight pages of colour plates at the centre of the book; some of the black-and-white figures scattered throughout the book could also benefit from colour reproduction. While the description of Olbers's paradox is correct, it might not be clear to readers less familiar with it that most of the proposed solutions — in particular, two which are mentioned — don't actually work. The de Sitter universe (empty of matter but with a cosmological constant; expanding exponentially) is described as static and spatially closed. That was indeed the way it was seen at the time, though the description is coordinate-dependent; today, it is usually described as spatially flat, of infinite extent, and of course expanding. That is difficult to make clear in such a book; for details see ref. 7.*

Both the reference list and the 26 items in the 'Select Bibliography' (I've read exactly half and reviewed five in these pages) are excellent jumping-off points for those interested in more details — often entire books correspond to just a few paragraphs in this book. (Although I appreciate the full-information references, somewhat strangely all journal volumes are in roman numerals, although the journals themselves in most cases use arabic.) A five-page index ends the book.

Everyone with even a slight interest in the history of cosmology should read this book, and even those who have devoted their careers to the topic will benefit. — Phillip Helbig.

References

(1) P. Helbig, *The Observatory*, **139**, 219, 2019.
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(5) T. Siegfried, *The Number of the Heavens: A History of the Multiverse and the Quest to Understand the Cosmos* (Harvard University Press), 2019.
(6) J. Overduin, *The Observatory*, **140**, 107, 2020.
(7) S. Röhle, 'Mathematische Probleme in der Einstein – de Sitter Kontroverse', https://www.mpiwg-berlin.mpg.de/de/publikationen-ressourcen/publikationen/preprints-zum-download, 2002, no. 210.
(8) S. Röhle, *Willem de Sitter in Leiden – Ein Kapitel in der Rezeptionsgeschichte der Relativitätstheorien*, Ph.D. thesis, University of Mainz, 2007.

Astronomical Hazards for Life on Earth, edited by Gonzalo Tancredi (Cambridge University Press), 2025. Pp. 105, 25 × 18 cm. Price £98 (hardbound; ISBN 978 1 009 35308 3).

This slim volume, the proceedings of IAU Symposium No. 374, held in Busan (Republic of Korea) 2022 August 9–11, presents a partial summary of what was — or had the potential to be — a fascinating interdisciplinary symposium. According to the preface, the meeting included discussions of diverse astronomical risks and potential threats to life on Earth,

*Readers of German might want to consult a doctoral thesis by the same author[8] for more background on that as well as de Sitter's role in the early days of relativity and relativistic cosmology in general. The bulk of ref. 7 is also in German, but contains a foreword in English of more than 11 pages by David E. Rowe.

including those associated with solar variability and its long-term evolution, the effects of a supernova or gamma-ray burst close to the Solar System, a rare stellar passage through the Oort cloud, and even the ultimate fate of the Universe. Life's end poses questions as deep as those of its origin, and it would have been interesting to have seen a summary of key points arising from the contributions missing from these proceedings and the round-table discussions.

The book, conceived before the COVID health emergency but occurring (perhaps ironically) during health restrictions associated with the pandemic, unfortunately does not achieve its promise. Instead, most sections focus on different aspects of the near-Earth asteroid (NEA) impact hazard. While that might be a significant long-term threat to life on Earth (the threat to humanity is much greater), it is only one of many possible astronomical influences facing the evolution of life, whether on Earth or elsewhere.

Still, there are interesting papers. The editor's introduction gives a useful summary of various astronomical hazards that might occasionally affect life on Earth; several contributions show how different aspects of the impact hazard are now part of the corpus of 'normal' astronomical research, demonstrating how far the modern subject has advanced from its origin forty years ago in the weeds of the 'giggle' factor. There is a nice discussion of lunar impact events, and of possible fireballs that might be linked to the *c.* 370-m-diameter Apophis, which will pass within an astronomical whisker of Earth on 2029 April 13. Other papers discuss the relatively short (several Myr) time-scale for overturn of the observed NEA population, and how all-sky observational surveys will soon revolutionize our knowledge especially of small members of the population, presumably fragments of larger bodies.

In summary, this book will appeal to NEA specialists but probably not to the wider community of researchers suggested by its broad title. The cost, at nearly a pound a page, is disappointing. — Mark E. Bailey.

Astronomy and Satellite Constellations: Pathways Forward (IAUS 385), edited by Peter Grimley, John Barentine, David Galadi-Enriquez & Constance Walker (Cambridge University Press), 2026. Pp. 264, 25 × 18 cm. Price £98 (hardbound; ISBN 978 1 009 39922 7).

This is a review of the printed proceedings of IAU Symposium 385 (IAUS 385) held on 2023 October 2 in La Palma, Canary Islands, Spain.

This is only the second IAU symposium I've attended in-person; the first was IAUS 90[1*]. Curiously, CUP's on-line portal, Cambridge **Core**, has an information panel showing a date of 2024 December but published on 2026 January 19.

Given the rapidly moving subject of satellite launches and megaconstellations, the publication delay relegates the excellent papers published here to being an historical collection rather than a timely, useful work feeding promptly back into the community[†] — a point equally bemoaned by Helbig in his review[2] of the proceedings of IAUS 368.

The symposium was organized by the IAU Centre for the Protection of the Dark and Quiet Sky (IAU CPS) and partitioned according to the four 'hubs' within CPS: Community Engagement Hub, SatHub, Policy Hub, and Industry & Technology Hub. The total of forty-five papers in these proceedings are organized mostly in the order of the presentations in the programme, with about ten of those being separately contributed and poster-related papers following the others.

*For context, there was no 'on-line version' in 1979 as the internet really didn't take off until about four years later and the world wide web came about six years after that!

†The rapid growth of satellite megaconstellations is an *existential* problem for terrestrial astronomical observations and a growing challenge for orbiting observatories; astronomical research is under threat from fast-moving, politically unconstrained commercial interests and academic publication timescales are too slow!