finish. These include mistakes in science, in mathematics, grammar, spelling, punctuation, and sentence structure, as well as the appallingly poor typesetting of mathematical symbols and equations to such an extent that I cannot honestly say that I recommend the book to anyone who is trying to learn from it.

To list all the mistakes would probably take up an entire issue of *The Observatory,* so I'll just choose a random few. Among the more amusing spelling mistakes are Harlow Shapely and discreet energy levels. As for punctuation, Lynne Truss (of *Eats, Shoots and Leaves* fame) would have a field day, with a vast mine of mistakes to choose from. Suffice it to say that the author seems to have no idea whatever of the use of apostrophes, commas, or hyphens. Among the many scientific mistakes, we are told that hadrons are mesons and muons, that a pion is the lightest of the muons, protons and neutrons are bosons, and electrons are baryons. We are also told that a black body absorbs no radiation. Cool objects don't emit any radiation below a threshold (a falsity obviously caused by a misinterpretation of the Planck curves illustrated just below it). In the Sun's spectrum, the atomic hydrogen emissions are a very distinct case and "shine-out" as bright lines against the backdrop of the continuum spectra. Type Ia supernovae emit silica lines. Faraday showed that magnets move within an electrical conductor. The pressure of a gas is not a scalar nor a vector, but a tensor. (Spectroscopy shows that) the coma of a comet consists predominately [*sic*] of (atomic) hydrogen. In neutron stars, electrons are accelerated by magnetic fields. You may remember from school physics that blue light is refracted less that red light. (Gosh — I'd forgotten. I thought my teacher said "more than" — did he get it wrong?). This is why our sky is blue. The atomic mass of helium is 2. (The author also confuses atomic weight with mass number, and tells us that the atomic weight must be written to the lower right of an element's symbol.) A globular cluster has lots of high-metallicity stars. Fe^{13+} is atomic iron with 13 of its 16 electrons missing. Methane, water, and carbon dioxide are diatomic elements. And so it goes on and on.

I'll give an example of just one mathematical derivation. We'll calculate the angular momentum of a solid rotating star. (I'm not sure what a solid star is.) The angular momentum of a closed system is *Smvr*. (We are not told what a closed system is or what the symbols stand for.) If we consider the scenario of a solid rotating star, we can integrate over the whole star and arrive at the angular momentum of the star as *MRv*, where *M* is the mass of the star, *R* its radius, and *v* the speed of rotation. Such is the quality of the mathematical derivation — and, of course, the wrong result. For a solid sphere of uniform density, the angular momentum would be only 40 percent of this. For a real, gaseous star, its angular momentum is nothing at all like this.

I think I have written enough. A brief summary, I'm afraid, is that I cannot recommend this one to those trying to learn mathematical astrophysics. — Jeremy B. Tatum.

The Enchantement of Urania: 25 Centuries of Exploration of the Sky, by Massimo Capaccioli (World Scientific), 2024. Pp. 573, 23·7 × 15·7 cm. Price £135 (hardbound; ISBN 978 981 124 777 4).

Massimo Capaccioli climbed five rungs of the academic ladder at the University of Padua from 1969 until 1990, becoming full professor, then moved to the University of Naples as full professor in 1995 (where he was also director of the observatory 1993–2005), becoming an emeritus towards the end of 2014. He was also a visiting professor at the University of Texas and counts Gérard

de Vaucouleurs as a mentor. He has (co-)authored more than a dozen books, mostly in Italian (some of which have been translated to other languages). This book is his own translation of the 2020 Italian version, the latter of which he had been working on since 2011.

This is a history of astronomy, but different from others which I have read, for several reasons. Although the topics covered in the 19 chapters are more or less what one might expect (with a slight preference for observation and instrumentation over theory), the fact that the chapters are the only division (no parts, sub-chapters, sections, *etc.*) reinforces the similarity of the narrative to myth (in a positive sense). Apart from the subject matter, the style reminds me of a bard recounting an oft-told tale, with a clear narrative peppered with asides and allusions which keep the narrative interesting without detracting from it. There are 1213 footnotes providing additional commentary, citations to the literature (including some to this *Magazine*), or both, and the main text often follows separate strands which are braided together.* (The citations, while accurate, are sometimes to surprising sources, perhaps reflecting the author's personal source of the corresponding information, rather than some standard citation.) While none of the main points were new to me, I encountered several details for the first time (some similar to the biographical details presented by Steven Phillipps in his recent historical series in these pages). While it is a history of (mostly Western) astronomy, political and other details of the corresponding times are also mentioned to provide context.

There are no equations, making the book accessible to a wide readership, though without too much simplifying of concepts. Perhaps unexpected for such a book, there are no illustrations whatsoever, apart from the cover featuring a painting of the muse Urania superimposed on a wide-field image containing stars and galaxies. Not surprisingly for an historical, as opposed to systematic, presentation, astronomers play as much a role as does astronomy. The nineteen-page index contains only names. One of those is Archbishop Isidore of Seville (560–636), quoted explaining the difference between astronomy ("the study of the stars") and astrology ("the superstitious line of thought"); many books on astronomy claim that there was essentially no difference between astronomy and astrology until much later (though to be sure some did both); a reference to the original Latin text is provided. Other titbits new to me were how Ptolemy measured the magnitudes of stars (based on their time of appearance at sunset) and that γ Draconis will be the brightest star in our sky in 1·5 million years (one of many interesting facts revealed in a long footnote when the star is mentioned in the main text because it culminates over Greenwich). The book is full of such delightful excursions. Although most topics one would expect are covered, the level of detail varies. Some are mentioned in only one sentence (perhaps with a footnote citing an entire book on the topic), others get a paragraph or two, and still others, such as the construction of the 200-inch *Hale* telescope, get several pages. (There is an entire chapter 'The Eighth Wonder', but it also includes many pages about Walter Baade and Bernhard Schmidt in Hamburg, Baade and Zwicky in California, and the history of the Schmidt cameras in Hamburg, at Palomar, and elsewhere, and the surveys made with them.)

*The range of knowledge of the author, indicated not just by the main text but especially by the footnotes, is vast. Both the main text and the footnotes refer to the main topic of the book, interesting additions, and broader historical and literary contexts, often in interesting superpositions, somewhat like adding a footnote about the Maxwell equations to Walt Whitman's "I sing the body electric".

Of course, in a book of this length, it would be a surprise if there were no mistakes at all, but they are mostly harmless: in addition to typos and linguistic errors typical of Italian speakers — though the translation is on the whole good — sometimes unimportant (for this narrative) details are wrong, *e.g.*, Max Born emigrated to the UK, not as stated to the USA, the ESO headquarters were first briefly in Hamburg before Geneva and then Garching (only the last two are mentioned), and sometimes relatively common myths are repeated, *e.g.*, that Einstein was led to Special Relativity *via* the Michelson–Morley experiment. Some matters of style and so on could have benefitted from better proof-reading, but other things, such as mis-spelled names, would need a proof reader familiar with the well-over-one-thousand names mentioned in the book (though different spellings of the same name should have been easy enough to spot). The author seems to be very well informed, so I was surprised that he thinks that there is more than just a shadow of a doubt on Eddington's interpretation of the famous 1919 eclipse-expedition results, as that long-standing myth has been convincingly debunked[1,2]. The back-cover description states that "[a] rich bibliography has also been added in the appendix", but there is no appendix at all. (The citations, though, contain full bibliographic information, including titles, issue numbers, and first and last page numbers.*)

However, in comparison to the treasure-trove of information contained in this tome, my complaints are minor. It is both a good introduction to the history of astronomy for someone who knows little or nothing about that field, but also an enjoyable read for those who know considerably more. Probably everyone would learn many new interesting things, and it is also valuable for its many citations to the primary literature, including the sources of quotations, of topics mentioned in the text. — Phillip Helbig.

References

(1) D. Kennefick, *No Shadow of a Doubt: The 1919 Eclipse that Confirmed Einstein's Theory of Relativity* (Princeton University Press), 2019.
(2) D. W. Hughes, *The Observatory*, **139**, 245, 2019.
(3) G. E. Christianson, *Edwin Hubble, Mariner of the Nebulae* (Farrar Straus & Giroux), 1995.
(4) D. J. Stickland, *The Observatory*, **117**, 325, 1997.

Here and There

DANGEROUSLY OUT OF FOCUS

The Cassegrain focus — effectively the lens — of the Subaru telescope atop the Mauna Kea volcano in Hawaii — *New Scientist*, 2023 January 23, p. 31.

*As a reference to Hubble's enormous ego, Capaccioli cites the definitive biography[3] (reviewed by our long-standing Editor[4]) and explicitly "pp. 1–420" (*i.e.*, the entire book).