Reviews

not on mechanical calculation. Common topics such as the difference between contravariant and covariant tensors and Christoffel symbols are *explained* rather than just presented. Although one learns only 'the theoretical minimum', this book is probably the best I have read so far for those who actually want to learn General Relativity. The book reads like a series of good lectures, on which of course it is based. (It "is adapted from a course...at Stanford in the Continuing Studies program to an audience of adults"; I'm not sure what Susskind wants to imply about normal students at Stanford.)

By now even Susskind should know that Wheeler didn't coin the term 'black hole', though he did popularize it. Other than that, I noticed no mistakes in the book. Somewhat unorthodox is the fact that equations are not punctuated, and equations, theorems, *etc.*, named after people are usually with neither the definite article nor the possessive form (*e.g.*, "given by Pythagoras theorem", "solving Einstein field equations"). I found it somewhat strange to discuss comparing the observations of someone falling into a black hole with those of someone watching that from afar without mentioning redshift, though the description is, of course, correct. Susskind is also somewhat dismissive of videos (by professional relativists) which purport to show what one would actually see if falling into a black hole and so on, though he doesn't say why. Those minor points don't distract from the main narrative, but might be interesting to follow up for those interested in Susskind's perspective.

There are several black-and-white diagrams scattered throughout the book, and of course, equations, though not a huge number of the latter. There are a few footnotes but neither endnotes nor references; apart from the chapters ('lectures') there is only a short preface by both authors and a six-page small-print index. The book is well written and I will probably read the others in the series, and hopefully review the upcoming one on cosmology in these pages. — PHILLIP HELBIG.

Cultural Astronomy in Latin America, edited by Steven R. Gullberg & César Augusto zen Vasconcellos (World Scientific), 2024. Pp. 398, 23.5 × 16 cm. Price £135 (hardbound; ISBN 978 981 12 8192 1).

Cultural Astronomy in Latin America is a book by and for experts. Its 14 chapters address (mostly) archaeological sites and artifacts associated with the Inca culture and Mayan written records. At the edges, as it were, are (i) Mark Raney looking at the star lore of the Hopi and Zuni Indians of the American Southwest and comparing it with the views of the Aztecs of what is now Mexico; (i) Armando Madrid on how astronomy brought by European immigrants to southern Argentina has blended with and survived alongside the myths of the local indigenes, and (iii) Walmir Thomazi Cardosa with a "long 20th century" look at a grab-bag of entities from the Brazilian northwest Amazon, including light beams, asterisms, and snake myths. The chapters are not ordered North to South (or South to North) nor early to late, nor even alphabetically by author. Perhaps the chapters are in the order the texts reached the editors. Many of the authors have affiliations in the countries that host(ed) the cultures they have written about. You won't be surprised to hear that these (mostly) pre-Columbian groups of people were interested strongly in what the Sun does (rising, setting, and in between), a bit less strongly in what the Moon does (and trying to fit the two sorts of cycles together), and often also in patterns of stars in the sky and perhaps the motions of Venus among them. These were also the interest of early (and contemporary!) peoples of the Old World. The specific myths are different, though water makes a frequent appearance, as from time to time do pyramids and various circles. And the hope of forecasting rain from the phases of the Moon (Kepler had similar hopes for his astrology). More realistic were uses of solar phenomena to keep track of times for planting and harvesting crops and thanking the Gods in festivals for successful agricultural years,

How do I know the book was meant for experts? Nearly every chapter uses indigenous words for concepts or phenomena without translation in a glossary. Only rarely does a map locate the site. And the asterisms (that is patterns of stars assigned names and significance different from those of our own Babylonian-to-Greek-to-Lacaille-to-IAU constellations) are mostly described rather than shown as dots on a skymap with coordinates, although the Pleiades are mentioned in several chapters.

Unquestionably there is something to be learned from every chapter, but I was particularly glad to encounter the one by editor Steven R. Gullberg on the Chankillo astronomical complex in north-central Peru. A watercolour of the site, by the editor's wife Jessica Gullberg, graces the cover of the volume. There are 13 towers (about as high as an Editor) along the crest of a ridge, separated by home-pool lengths. An observer situated at either an east or a west observation point will see the Sun rise or set in the gaps between the towers on days like the solstices and equinoxes. The Moon on this somewhat elevated horizon also peeks through from time to time. Dendrochronology and C-14 dating place use of the site around 250–200 BCE, and it is therefore clearly pre-Incan. The same site is identified as one of the most persuasive preliterate astronomical locations in a forthcoming book with very different origins^{*}. — VIRGINIA TRIMBLE.

Einstein in Time and Space: A Life in 99 Particles, by Samuel Graydon (John Murray), 2023. Pp. 317, 20 × 13 cm. Price €14 (about £12) (paperback; ISBN 978 1 529 37250 2).

The 'Particles' in the title are anecdotes. (They are preceded by a ninepage introduction which gives a more conventional but very good overview of Einstein's work, life, and times.) We've all heard anecdotes about Einstein: why he dropped out of high school, his childhood fascination with a compass, the fate of his daughter, his stolen brain, his time at the patent office, and so on. A few of those presented here were new to me: I knew about his newspaper advert offering tutoring, and his friendship with Maurice Solovine, but didn't know (or had forgotten) that they met through his ad. There is also some interesting background information: Einstein famously explained Brownian motion, Brown having found that it applied to all small particles, whether of biological origin or not (initially having observed pollen grains, Brown had at first thought that it was some sort of vital sign), by testing all sorts of materials, including, for some reason, filings from the Great Sphinx of Giza! (Perrin was awarded a Nobel Prize for confirming Einstein's predictions involving Brownian motion.) Also new to me were details of his romance with Marie Winteler, mostly unknown to the world until the corresponding letters were published in the fifteenth volume of Einstein's Collected Papers in 2018. (Einstein had boarded with the family of her parents, Jost and Rosa. Einstein's sister Maja married Marie's brother Paul, and Einstein's friend Michele Besso married Marie's sister Anna.)

Similarly to the autobiographical stories of Richard Feynman written up by his friend Ralph Leighton^{1,2†}, this book consists essentially of only such anecdotes, just briefly discussing Einstein's work or more banal details of his life. However,

*Noah Brosch, Of Stars and Stones: Diffusion versus Convergence in Archaeoastronomy, to be submitted shortly for publication, 2024.

[†]Depending on the edition, for both books Leighton is sometimes referred to as co-author or editor, and for the former Edward Hutchings is sometimes referred to as editor.