find the epagomenal decan of the Senenmut list called sh-t-w-i, the Two Turtles. And as this is a family publication, I am probably not allowed to tell you what Nut and Geb are doing in Figure 1.13. There are also many illustrations of constellations and related patterns of stars in the sky, many clearly distorted from what was actually seen. The question most often asked is whether, and if so how, the Egyptian constellations are related to the ones we learned from the Babylonians, the Greeks, and the International Astronomical Union. The standard answer has been that Orion is recognizable as a striding man and the hippopotamus includes Sirius. The authors, however, have evolved a "working hypothesis" that identifies many more of the patterns shown in the Dendara astronomical ceiling (which you must now travel to Paris to see), including a Zodiac with Gemini, Taurus, Leo, Pisces, Cancer, and so forth, with the planets scattered among them. Their Sirius lives in the head of a recumbent cow, though the hippo is there (page 305) and seems to be carrying a folded umbrella.

Let us end with one item that lets us feel at home. The standard symbol for a celestial body (pronounced, roughly, seba) is a "five pointed star formed by an internal dot and five rays. The universal five-pointed star symbol presumably originated in Egypt in pre-Dynastic times" (page 540). — Virginia Trimble.

The ALMA Telescope. The Story of a Science Mega-Project, by Paul A. Vanden Bout, Robert L. Dickman & Adele L. Plunkett (Cambridge University Press), 2023. Pp. 264, 24·5 × 17 cm. Price £39·99/$49·99 (paperback; ISBN 978 1 009 27968 0).

ALMA took over 30 years to gestate, during which a great many committees, working groups, boards, and similar organizational bodies came and went. Each involved the dedicated services of numerous scientists, administrators, technicians, and financiers, and won the support and gratitude of innumerable (if understandably a little impatient) would-be users worldwide. This book is in many senses a corporate journal of the multitude of events, tasks, decisions, and recollections of how *ALMA* finally emerged in all its unique and transformational glory. An inevitable consequence is that the story moves painstakingly slowly, at times a little too much so, but the authors were present officially at, or not far removed from, the action during much of the period in question, thereby endowing the book with the status of a reference manual as well as a finely-interrelated collection of facts and figures.

This story of *ALMA* commences right at the start when a project of such magnitude could not be more than a pipe-dream, but that first distant whisper was sufficiently fertile to tickle the imagination of the more powerful activists among communities of millimetre and infrared astronomers, building on projects like the USA's *Millimeter Array* (*MMA*) already advanced in planning. And although it is freely admitted that this account of *ALMA* has been told from the perspective of the USA, in the end *ALMA* became a world project, not just an enhanced one owned and operated by that country alone. Indeed, as the concept slowly morphed into *ALMA* it became clear that one country alone simply could not manufacture, staff, or (most importantly) fund the entire project in all its complicated and detailed magnificence. A consequence of that somewhat myopic view is that no mention is made of the fact that it was British and Canadian radio astronomers who made breakthroughs in interstellar molecular physics, or that the all-important success with such a fundamental procedure as 'very long baseline interferometry' (VLBI) was initially a Canadian achievement.

The story is charmingly illustrated with cameos involving key players, some revealing things said *sotto voce*, even best left unsaid, that serve to brighten up the reams of details. Despite the eventually unchecked progress of the telescope from early idea to full completion, not everything was plain sailing, and the cliff-hanging description of the USA's very hesitant agreement at a late stage to accept the grossly enlarged budget for the telescope adds a welcome seasoning of excitement that brings its journalistic style alive. One aspect that could have been thought through differently was the wisdom to include specific costs in all their rather gory details. While indeed part of the journal, writing the exact figures with so many noughts might appear a bit vulgar to the general public (and to astronomers routinely strapped for cash), when descriptive words like 'several thousand million' would be more appropriate for a 'story'.

The book is generally well written, though the USA's habit of ignoring conventional grammar (including vital hyphens and commas) caused me some exasperation. Very few typos or other mistakes are apparent — until the final chapter, where the margins of several pages proved inadequate for me to pencil in all the corrections that I itched to make. The book includes a brief Appendix that explains the rudiments of radio astronomy and its attendant equipment, and (fortunately) it sports a 4-page 'Glossary' of the many acronyms that pepper the book freely, and (as with the costs) several could with advantage have been replaced by simple descriptive words. It will make interesting reading for the inquisitive public and for astronomers not directly involved, while primarily offering a fine set of reminiscences for the many who were so involved. It is a remarkable product of industrious archival research, and deserves a place on both science and departmental bookshelves. — Elizabeth Griffin.

Annual Review of Astronomy and Astrophysics, Volume 61, 2023, edited by E. van Dishoeck & Robert C. Kennicutt (Annual Reviews), 2023. Pp. 616, 24 × 19·5 cm. Price from $444 (print and on-line for institutions; about £365), $122 (print and on-line for individuals; about £100) (hardbound; ISBN 978 0 8243 0961 9).

The 2023 *Annual Review* begins with a remarkable story of a lady, raised in a Christian family in China, who rose to international prominence in the field of geodesy *via* long-baseline radio astronomy. Shuhua Ye overcame the turbulent history of her homeland in the latter half of the 20th Century to join the top ranks of the IAU and make a significant contribution to studies of Earth rotation and the establishment of accurate time services.

Starting at the beginning of time we find a tantalizing account by Klessen & Glover of the first stars to be formed — the so-called massive Population III stars (with masses up to $10^5 M_\odot$) — which will be hard to observe but particularly interesting because of their metal-free composition. Also at the 'Cosmic Dawn' we have a discussion of the earliest quasars by Fan *et al.*

A review I found particularly interesting was by Jewitt & Seligman on 'Interstellar Interlopers', a couple of which have been found wandering through the Solar System; it is thought that they may be planetesimals ejected from protoplanetary discs. The chemistry of volatile elements in such discs is examined by Öberg *et al.*

On the grand scale, we find a study of galaxy-cluster dynamics using hydrodynamical simulations by Crain & van de Voort, while swirling around those assemblies will be the circumgalactic medium whose processes are covered by Faucher-Giguère & Peng Oh.