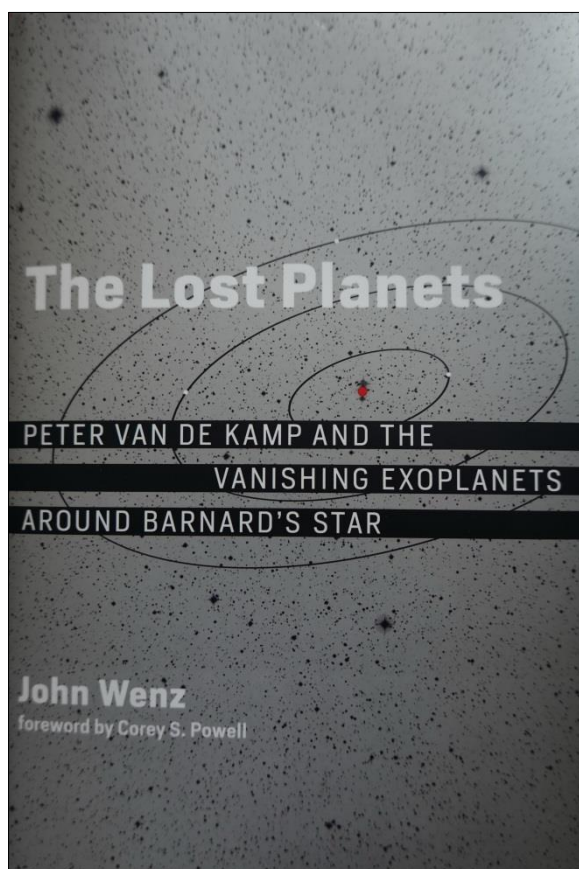


Astronomers at Sproul spent many years identifying exoplanet candidates, only to be followed by others there who debunked the earlier Sproul findings. Those astronomers, in turn, found sub-stellar objects that were also debunked.

An example of this latter work was done around 1988–1990 on the star Wolf 242. Sproul Director, Wulff-Dieter Heintz, a meticulous astronomer who had disproven exoplanet claims made earlier at Sproul, put forth the idea that the binary stars comprising Wolf 242 were no more than 5% of the Sun's mass, making them too weak for nuclear burning. "It was hailed as a 'victory for old fashioned astronomy' by the *New York Times* [in 1989]." The newspaper article



"... also noticed that Wolf 242 had been Heintz's 'career obsession'." (page 95). It took the Hubble Space Telescope to finally resolve the masses: it found the stars are well above 10% of the Sun's mass, "... meaning they both remained very small stars ..." not sub-stellar objects (page 95). The perils of following a career obsession are obvious. Heintz was using a 24-inch refractor, an extremely modest instrument by modern standards, and one that was pushed far beyond its limits to find what Heintz was looking for. The *New York Times* article was headlined "Life's Quest Rewarded". This book is indeed a sad tale of misbegotten careers.

The 'poster boy' for this is Peter van de Kamp, whose planetary work has "... largely been strick-

en from the annals of astronomy." (page 117). He began working at Sproul in 1938, and using 2,413 plates taken as far back to 1916, announced at an American Astronomical Society meeting in 1963 that he had discovered a planet orbiting Barnard's Star. He "... believed an object just 1.6 times the mass of Jupiter was lurching around the star every 24 years." (page 31). By 1970 what appeared to be a secondary tug on the motion of the star led van de Kamp to claim yet another planet, 80% the size of Jupiter, also orbited Barnard's Star! "The two-planet hypothesis was a capstone to his career," writes Wenz (page 52). His final publication, the 1986 book *Dark Companions of Stars*, saw van de Kamp launch yet another defence of his Barnard Star observations. In fact, neither of these planets exists, but it was revealed in 2018, based on 20 years of radial velocity data, that a planet three times Earth's mass does indeed revolve around Barnard's Star. So van de Kamp's belief in exoplanets was vindicated after his death (which occurred in 1995), but none of his own exoplanet claims has been verified. Just five months after his death, the first confirmed exoplanet was discovered.

Devoid of the mathematics that would be the hallmark of a text written by a professional, *The Lost Planets* is a well-written and finely researched book by a non-scientist that will have wide appeal. It is an excellent example of twentieth century astronomical history that is also relevant to the area of astronomy that most touches the public's awareness of our science in the twenty-first century. The book has many exciting elements, including personal rivalries at Swarthmore that became what Wenz characterises as "... caustic and combustible." (page 64). Wenz leaves the reader in no doubt about the very high stakes inherent in the search for (and premature claims for) exoplanets.

This book has two typos: on page 52 "... of bringing of ..." should read "... of bringing ..." and "face" on page 106 should be "fact". It would have benefited by having more illustrations (it has only three) but the 17 pages of footnotes provide up-to-date references.

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Time of Our Lives: Sundials of the Adler Planetarium, by Sara J. Schechner (Chicago, The Adler Planetarium, 2019). Pp.xiii + 474. ISBN 978-0-578-49710-5 (hardback), 255 × 287 mm, US\$40.

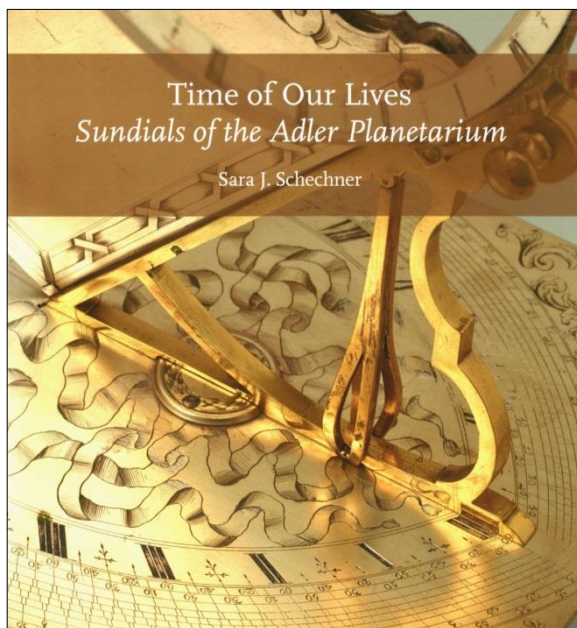
This fine book, weighing around 2.5kg, is basically a catalogue of the sundials in the Adler Planetarium in Chicago, USA. This volume is said to include about 60% of their collection, and I un-

derstand that a further edition, Volume 2, is planned for release in the next year or so. This first substantial book is well produced by Sara Schechner who has been working on it for many years.

This first volume, in full colour, covers mostly the portable pocket sundials in the Adler Planetarium collection. A separate chapter is devoted to each type.

The dust cover shows on its front the detail of a rather unusual 'Reclining Horizontal and Equatorial Dial Lectern' from the collection, with an impressive 'Cube Dial' on the back cover.

A section on "Cultural Introductions" has several short chapters giving details of many types of dials. It includes a 32-page section on "Time-Finding and Social Change" explaining time and its origins. This section describes several sorts of dials



and includes illustrations from dials in the Museum and many taken from old books on dialling. The following short chapter explains "Time-Finding versus Timekeeping".

Each section of the book has a page or two of introduction to describe its dial types. Every dial entry, in the catalogue, is given an individual number, the total being 268 dials. Also included are the dial's basic details, together with at least one, but usually more, colour photographs. The majority of these pictures are of excellent resolution and were taken by Steve Pitkin. Dr Schechner then goes on to describe the dial in detail. Entries for most dials include further details in the following sections:

PROVENANCE. A list of former owners of the dial or its auction details.

EXHIBITION. A list of exhibitions where the dial has been seen by the public.

REFERENCES. Details of sale or other catalogues.

BIBLIOGRAPHY. Any books or publications that have featured the dial.

DIVISIONS. The hour scale divisions and others like latitudes or compass marks.

A further section, but not for all dials, has a **GAZETTEER**, which shows the places marked on the dial, usually on its reverse, that may be used with the dial and their appropriate latitudes.

The entries for most dials take up at least one full page of the catalogue.

The terms used are generally good, but one that I would prefer not to read is that the direction marking on the dial compasses is referred to as a 'Wind Rose'. Admittedly, this may be the case in a few of the dials but not for the majority. It would have been better to have referred to it as a 'Compass Rose'. Another item that does not make for a clear understanding is that the images of the catalogued dials do not have titles or references under them and are sometimes over the page with respect to the associated text. Do they belong to the previous item or to the next one? A further problem with some of the illustrations is that some of the photographs are too small to see all of the details described in the text, and a few of the images are rather too dark to see the dial details. In one case a wrong image has been inserted. It is a Diptych Dial, number 239 on page 384. It is actually a photograph from an earlier dial that had been catalogued, Diptych Dial number 236 on page 378, so it is illustrated in two places.

A few less common types of dials from the collection are shown. One of particular interest is the Cannon Dial, these having a small cannon that may be filled with black powder, and as the Sun approaches mid-day its light is focussed through a lens onto the cannon which will then produce an audible bang, a good reminder of 'lunch time'. Five such dials are shown.

Another fine dial is the Cruciform Dial, shaped like Christ's cross with its top end pointing South to the ecliptic. The arms of the cross then act as gnomons and throw their shadows on both sides and the top arm of the cross making six hour scales in total. These dials also are sometimes engraved with Christ on the cross or other religious figures. Four of these attractive dials are shown.

The two commonest types of dial are Diptych and Tryptych Sundials, there being 51 shown, mostly carved from ivory, and Butterfield Dials, named after the Englishman Michael Butterfield who went to work in Paris in about 1663, of which a total of 34 is shown.

Near to the end of the book, on pages 59–61, is a section showing Saints Days for each day of the year. These have been taken from a Horizontal Dial in the collection, which was made by Franz Xaver Josef Bovius (1677–1725) of Eichstätt in 1719 (Catalogue Number 16).

As this book is basically a catalogue of the Adler's collection of sundials it does not necessarily give full technical details of each type of dial, so at the back is a Bibliography with about 444 entries listing books and other publications describing such sundials. Although many of the books are from the twentieth century there are some as early as the sixteenth century.

Apart from the few minor problems mentioned above, this is an excellent and attractive work, and I look forward to reading Volume 2 when it is published.

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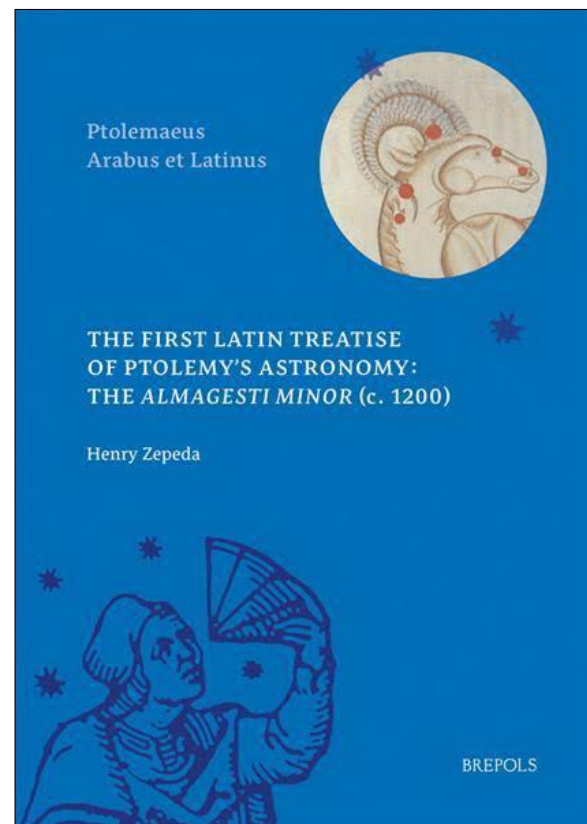
The First Latin Treatise of Ptolemy's Astronomy: The *Almagesti Minor* (c. 1200) [Ptolemaeus Arabus et Latinus, Texts: Volume 1], by Henry Zepeda. (Brepols, Turnhout, 2018). Pp. x + 662. ISBN: 978-2-503-58137-8 (hardback), 178 × 254 mm, Euros 155.

The *Almagesti minor* is the first volume of the "Ptolemaeus Arabus et Latinus" Text Series. With this book, Henry Zepeda offers us the critical edition, translation and commentary of this famous Latin abridgement of Ptolemy's *Almagest*, Books I to VI.

The book has three major parts: I. Introduction, II. Critical Edition and Translation, and III. Commentary on the Text and Figures.

I. Introduction. – The first section is about the title, date, origin, and author of the *Almagesti minor* (pp. 5–19). Although this work is known to modern scholars as *Almagestum parvum*, Zepeda retains *Almagesti minor*, which better reflects the manuscript tradition. This work would have been written ca. CE 1200, with CE 1220 as the *terminus ante quem*, because extracts of it appear in Guillelmus' *Astrologia*. This work cannot be attributed to Albategni (al-Battānī) or Geber (Jābir ibn Aflah) because the text follows Gerard of Cremona's Latin version of the *Almagest*, which is later. Zepeda finds little evidence of previous attributions, e.g. to Thomas Aquinas, Albert the Great, Hermann of Carinthia, Campanus of Novara, and Walter of Lille (according to Richard de Fournival's *Biblionomia*, ca. 1240), and only concludes that the text may have been written in northern France. The *Almagesti minor*'s most remarkable feature is that Ptolemy's text has been stripped down in elements, and reorganized—sometimes adapted—to fit into an "... axiomatic, deductive ..." structure in the Euclidean style (see pp. 21–27). This choice explains the disappearance of the many tables from the *Almagest* and the deletion of the first eight (non-mathematical) chapters of the

Almagest, summarized in a few sentences. As this is an essential feature of the text, an analysis of the axiomatic structure of the text would have provided a better understanding of the author's reflection on the structure of the text, his choices of materials from the *Almagest* and reorganization into a work of its own. A critical reflection on the limits of this reorganization would have been useful. The preliminary principles of each book are more often definitions than demands (postulates) or common notions (axioms). The definitional structure is not always consistent: some concepts are used covertly, without any connection to the apparent 'Euclidean' structure. For example, the concepts of parallax (II, 36), epicycle (III, 3), apogee and peri-



gee (III, 3-4), syzygy (V, 10) do not refer to any preliminary definition.

As regards the author's sources (pp. 29–39), textual parallels show that the *Almagesti minor* owes much to Gerard of Cremona's Latin translation of the *Almagest*. The author also very often borrows from al-Battānī's *Zīj* (translated by Plato de Tivoli as *De scientia astrorum*). Numerical values are not from Ptolemy or al-Battānī, but most often from the Toledan Tables. Hipparchus and Theon of Alexandria are known second-hand. The 23 MSS of *Almagesti minor* (pp. 47–70) fall into four groups which are 1A(P, F, R₁)–1B(Pr, Me, L₁, N), 2(P₇, B, Da, E, T, E₁, W₁), 3A(K, P₁₆, D, R, L, W₂)–3B(M, W), 4(Ba). In examining the relationships between the MSS, Zepeda concludes that no stemma codi-