

BOOK REVIEWS

Reading the Mind of God: Johannes Kepler and the Reform of Astronomy, edited by A.E.L. Davis, J.V. Field, and T.J. Mahoney. (Dordrecht, Springer, 2024). Pp. xxix + 405. ISBN 978-94-024-2248-1 (hardback), 160 × 240 mm, US\$99.

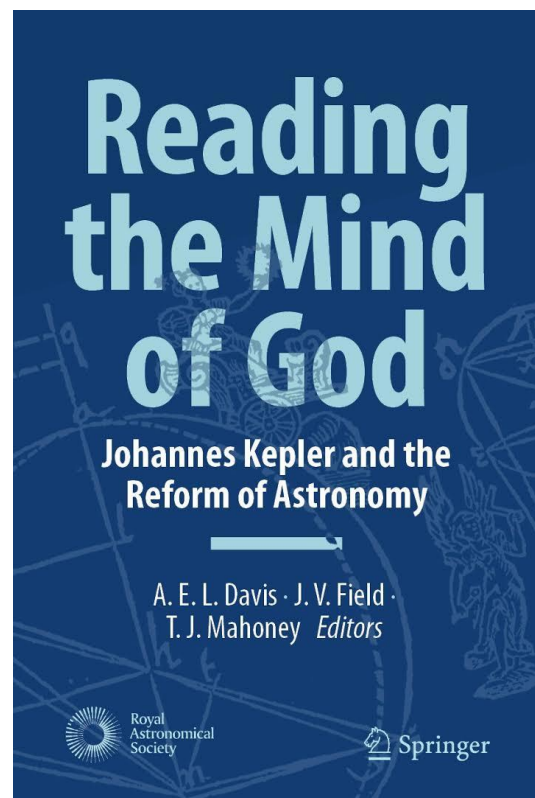
Even though this book on Kepler is virtually flawless, I must take issue with the title. People who noticed me with it thought I was reading a religious text. Instead of a titillating title, worthy of an evangelical tract, the publisher should have chosen one worthy of an academic book. While Kepler had a deep belief in God (he “... set out to describe a [cosmological] model according to which God created the Universe ...” page 27), that belief must have been sorely tested when his own mother was accused of witchcraft, and even his own Lutheran church excommunicated him.

The first editor of this book, Dr. Davis, died in 2020. I found it curious that virtually no mention of her death is posted online; she is listed by Wikipedia as missing a biography. In this book, a page of biography is devoted to her, noting she was Co-Vice Chair of the IAU Kepler Working Group, established in 2009. She received her doctorate at University of London (UOL) in 1981, but no academic affiliation is attached to her subsequent career. Kepler scholars will be quite familiar with the other two editors. Judith Field is associated with the UOL, and is author of the landmark 1988 book *Kepler’s Geometrical Cosmology*. T.J. Mahoney was Chair of the Kepler Working Group and is currently at the Instituto de Astrofísica de Canarias. He is the author of the gazetteer and atlas *Mercury*, published by Springer in 2014.

The book consists of 13 chapters. Field wrote three of them, with one each by Davis and Mahoney. W.H. Donahue (St. John’s College, New Mexico) contributed two chapters. Other contributors are Charlotte Methuen (University of Glasgow), Andrew Gregory (University College London), Eberhard Knobloch (Berlin Academy of Sciences and Humanities), Sheila Rabin (Saint Peter’s University, New Jersey) and our late beloved colleague Jay Pasachoff. The gestation period for this book was very long (15 years), with its impetus being the 2009 IAU meeting at which a special session on Kepler was held to mark the 400th Anniversary of the publication of *Astronomia Nova*. According to the preface by Field and Mahoney, this “... conspectus of research on Kepler ...” (page

vii) is geared not just to astronomers but students of astronomy at the undergraduate and postgraduate level. Pitched this way, it succeeds admirably.

Field highlights “... two obvious difficulties ...” for a modern reader of Kepler’s works on cosmology (page 26). The first is that he explains what we no longer regard as in need of explanation (such as the number of the planets). The second is what I mentioned in the opening paragraph. In his book *Harmonice Mundi*, Kepler says “... not that God is a geometer, but simply that God is geometry ...” (page 27), a premise that finds no traction



in the twenty-first century. Kepler’s belief also had an effect on the topic most historians of astronomy prefer to ignore: astrology. “For Kepler,” writes Rabin, “the geometrical configuration of the heavens was imprinted on the human soul at birth.” (page 173).

Field also makes an observation of great interest to scholars of both Kepler and Newton:

Isaac Newton ... was to apply Kepler’s third law to check that Jupiter’s satellites were moving under the influence of a force obeying an inverse square law, in their case attracting them to Jupiter. The orbits were too nearly circular for him to use the first two laws. (page 61).

An entirely different aspect of Kepler's work involves planetary transits. Even though Pasachoff does not mention the first recorded transit of Venus, made by Avicenna on 24 May 1032 (Nikfahm-Khubravan, 2025: 7; Özel and Budding, 2024), he does note that "Kepler did not predict the transit of Venus of 1639." (page 294). That one, predicted and observed by Jeremiah Horrocks in England, is typically given as the first Venusian transit seen by a human. In 1607 Kepler claimed to have seen a transit of Mercury, but he had to retract that when it became obvious that he merely saw a sunspot. Strangely, this is not mentioned in the Transits chapter by Pasachoff, but it is included in a chapter by Field. The Index is also silent on this important issue: there is no entry under Mercury for transits, and this instance on page 289 is merely Index-listed as 'Transits: observations of'.

A chapter by Donohue, on the perils of translating Kepler's original words and intent into English, is most valuable:

In translating Kepler, one needs above all to be aware that Kepler was attempting something nearly unprecedented: the use of mathematics (geometry in particular) as a metaphoric representation of dynamic actions and entities that can at the same time match the best astronomical observations. (page 361).

Finally, I take a longer look at the chapter by Davis on Kepler's discovery of planetary orbits. She advances the startling conclusion that Kepler used "... values recorded over many centuries ..." in his reduction of Tycho's observations, and

It has not been previously remarked that this procedure would have enormously increased the size of the database available to him. (page 127).

In very closely examining Kepler's study of elliptical orbits for the planets, Davis develops what I consider to be the most incisive insight in this book. She states that

... it is necessary to repudiate a well-entrenched error ... that Kepler relied, explicitly or implicitly, on the work of Apollonius. (page 137).

Davis refers here to the ancient Greek geometer and astronomer Apollonius of Perga (240–190 BCE), who favoured a "... panoply of tangents and oblique axes ..." in contrast to Archimedes who "... for central conics, depended on double-axis symmetry and orthogonal treatment." (page 140).

We emphasize that Kepler, trained in the geometry of Euclid, viewed orthogonality as associated with perfection and would therefore initially have regarded the Apollonian treatment as inappropriate for the purpose of astronomy ... Here it can be argued that it was Kepler who successfully merged the Archimedean tradition with the Apollonian tradition – indeed, so effectively that nowadays nobody is aware that a dichotomy ever existed. (*ibid.*).

Davis also tells us that by selecting one degree as his small interval, any results based his calculations were exact in Kepler's terms:

Kepler took a great leap forward by introducing the idea of small angles to lead to an alternative theoretical representation ... Thus it happened (and it is one of several unexplained but fortunate coincidences that crop up throughout this account) that Kepler satisfied this requirement in practice, simply as a result of his *stipulated level of exactitude*. (page 141, ital. by Davis).

Just as important as angles was the measurement of time. Davis states the Latin word *mora*

... has frequently been translated as 'elapsed time,' regardless of whether it was micro or macro. This is not helpful. (page 142).

By this distinction, Davis was able to mark the moment in *Astronomia Nova* "... when his astronomy became entirely new." (page 143). That critical point was reached by Kepler in Chapter 33.

Davis concludes her study of how Kepler discovered "... the pair of mathematical laws which together gave the position of the planet (distance and time coordinates) ..." (page 153) by making another important assertion:

Neither Kepler's contemporaries nor most of the astronomers who followed him were aware that these laws were exact ... Hence it is rare to encounter the two laws interpreted geometrically, and even rarer to find them in combination, expressed with precision in algebraic notation, their relationship established by the presence of a common variable. (page 153).

Davis finishes off this *tour de force* analysis by giving us those two algebraic equations. This chapter alone establishes this as an important book.

While Kepler scholars will find little new or

groundbreaking here (except in the chapter by Davis), this is the finest synthesis of modern Kepler studies, and as such a very worthy addition to the substantial existing literature on that key figure in the history of astronomy.

I noticed 5 typos. “that is it is seen” should be “that is seen” page 45; “if” should be “I” page 49; “seem” should be “seen” page 52; “in” should be “In” page 281; “note” should be “noted” page 343.

References

- Nikfahm-Khubravan, S., 2025. *Avicenna's Addendum to His Recension of Ptolemy's 'Almagest'*. Berlin, De Gruyter.
- Özel, M.E., and Budding, E., 2024. Ibn Sina's observation of a transit of Venus in 1032. *Journal of Astronomical History and Heritage*, 27(1), 46–52.

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Writing the Heavens: Celestial Observations in Medieval and Early Modern Literature. Book 10 in the ELINAS series *Literatur-und Naturwissenschaften*. Heydenreich, A., Klaeger, F., Mecke, K., Vanderbeke, D. and Wilms, J. (eds.). (Berlin, De Gruyter, 2024) Pp. 422. ISBN 978-3111597355 (hardback), 155 × 240, US\$125.00. Also available Open Access.

The Erlangen Centre for Literature and Science (ELINAS) is an interdisciplinary forum that holds workshops and conferences in Erlangen, Germany. The Centre provides a platform for the exchange of knowledge concerning the intersection of many different academic fields, mainly physics, natural sciences and literature, along with the study of rhetoric and the ethics of research and reasoning. Their recently-published book, *Writing the Heavens*, holds twelve scholarly papers; each examines the cultural significance and impact of scientific and literary research. The astronomical material studied in these essays appears in societal forms other than stated as purely numerical or geometrical data.

Writing the Heavens is divided into four sections ranging from 1. The Middle Ages, (literature from the twelfth to the fifteenth century), 2. The Sixteenth and Seventeenth Centuries (concerns connections between Earth and the Heavens), 3. The Long Eighteenth Century (focuses on the huge scientific changes of that period) and finally, 4. Early Modern China (examines the intersections of European and Chinese cultures). Each chap-

ter examines specific texts to provide a broader understanding of its historical, cultural and scientific relevance. Because of the length and variety of the subject matter, this review will address only two of the twelve academic papers.

Throughout history, astronomy has continued to be a fascinating topic until the modern period when the stars of the sky have mostly been washed out by light pollution. Today the sky's relevance in popular culture has been mostly unnoticed except for unusual events. Scholars have coined a new word to describe the great loss associated with missing the beauty of the night sky, ‘*noctalgia*’. Fortunately, during the last few decades a revitalized interest in astronomy has developed among historians with the advance of research into cultural astronomy and archaeoastronomy. Literary scholars as well have expanded their studies into the relevance of astronomy and its long appearance in literature; their newly-coined term for this field is ‘astroculture’. *Writing the Heavens* introduces the term and showcases the potential of ‘astroculture’ in future literary studies. This book presents samples of the direction of research by many literary historians at this time. Their studies include the practices of observing, interpreting and recording celestial phenomena through textual and symbolic methods in different cultures and time periods.

“Astronomical (In)accuracy in Heinrich Von Mügeln, *Der Meide Kranz*” by Walker Horsfal (pp. 51–67)

The Third Chapter in *Writing the Heavens* is titled “Astronomical (In)accuracy in Heinrich Von Mügeln, *Der Meide Kranz*”, or (*The Garland of the Virgin*), and was written by literary historian Walter Horsfal. Composed around the mid-fourteenth century, the Middle High German poem *Der Meide Kranz* is lengthy and complicated, designed to praise the Virgin Mary. The essay by Horsfal translates it into English and attempts to explain a possible cause for the inaccuracies of the poem. In addition, he presents a comparative analysis that examines and contrasts the motifs and symbols of that era. Horsfal also expects that the translation into English will attract more interest and further studies of this outstanding Medieval poem.

Horsfal is an Assistant Professor at the University of Illinois Urbana Champaign; his research area centers on the intersection of Medieval literature and natural philosophy. Horsfal focuses on Middle High German re-