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JOURNAL OF THE EUROPEAN SOCIETY FOR THE HISTORY OF SCIENCE

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Centaurus

64.2 (2022)

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The journal is available at BrepolsOnline: www.brepolsonline.net/loi/cnt

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D/2022/0095/10
ISBN 978-2-503-59853-6
DOI 10.1484/J.CNT.5.128416
ISSN 1780-3187
eISSN 2034-2101

Printed in the EU on acid-free paper.

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Josefina Rodríguez-Arribas, Charles Burnett, Silke Ackermann, Ryan Szpiech. *Astrolabes in Medieval Cultures*. Leiden, The Netherlands: Brill, 2019. viii + 508 pp. ISBN 9789004383807.

The astrolabe has been called the queen of medieval instruments and was of symbolic and practical importance in Jewish, Muslim, and Christian cultures. Associated with luxury, prestige, and power, it was an interdisciplinary and sophisticated tool for observing, calculating, teaching, and solving problems related to time-finding, astronomy, astrology, medicine, and surveying. Checklists of extant astrolabes were created in the 20th century by Robert T. Gunther and Derek de Solla Price and Sharon Gibbs, but even after 150 years of scholarship, we still do not know all there is to know about the astrolabe. There remains much uncharted territory to explore—or as Silke Ackermann writes in the book's introduction, “here be dragons” (p. 3). This volume cannot hope to fill in all the gaps, but only to move the margins of these beasts and start to chase them off the globe.

Most papers in this volume were first presented at a conference on “Astrolabes in Medieval Cultures” held at the Warburg Institute at the University of London in April 2014. The meeting was the culmination of a 3-year research project, “Astrolabes in Medieval Jewish Culture,” undertaken by scholars based at the Warburg in conjunction with those at the British Museum and the Museum of the History of Science (now the History of Science Museum) at Oxford University. The original goal was to study Hebrew astrolabes and produce a translation of Hebrew texts on their construction and use, but the participants found that the instruments and texts traveled more widely than was previously assumed, and medieval makers, users, and readers used the Hebrew, Catalan, Judaeo-Arabic, Arabic, Ladino, and Castilian languages. Moreover, Jews frequently served as astrologers in Muslim and Christian courts where they wielded the astrolabe to forecast the future of kingdoms. Finding this diversity and entanglement, the conference organizers decided to open up the meeting to scholars interested in all cultures using the astrolabe and all different approaches to the instrument. The enthusiasm generated led the organizers to publish the papers in a special issue of the journal *Medieval Encounters* in 2017, for which they invited additional essays to fill out the subject matter, as well as including David King's list of European astrolabes up to ca. 1500. The 15 studies reprinted here contain updates and additions that researchers in medieval astronomy and the astrolabe will appreciate.

The astrolabes encountered in this book cover a wide gamut of sizes, materials, and itineraries. Josefina Rodríguez-Arribas describes the brass astrolabe finger ring

devised before 1492 by Bonetus de Latis (Jacob ben Immanuel Provenzale), a Jewish astronomer and later physician to several popes; while Sreeramula Rajeswara Sarma analyzes a monumental astrolabe more than half a meter in diameter, made for the Mughal Emperor Shāh Jahān. Constructed between 1648 and 1658 by Ḍiyā' al-Dīn Muḥammad of Lahore, the Arabic inscriptions were later reworked in Sanskrit. Laura Fernández Fernández scrutinizes possible sources for astrolabes that exist only on parchment in Alfonso X's *Libro del saber de astrologia* (a codex compiled from the mid-1250s to 1278); and Günther Oestmann puts in focus the changing orientation of stereographic projections (from the North Pole to the South Pole) deployed on the astrolabe dials of European astronomical tower clocks erected from the mid-14th century through the end of the 16th. And Petra Schmidl finds evidence of knowledge in motion from the Arabic- to Latin-speaking parts of Europe in the 11th century, by means of tangible marks of the peregrinations of a particular astrolabe now preserved in Oxford. She makes a compelling case that the astrolabe left Zaragoza, al-Andalus (northern Spain) after April 1086 and journeyed to Paris, France, with a possible detour to Italy and back to Paris before March 1091. Her process includes not only close inspection of the instrument's design but also paleography on the mater, tympan, and rete.

John Davis also offers a close reading of design elements on an astrolabe, in this case the great Sloane astrolabe in the British Museum. The largest medieval English astrolabe extant (nearly half a meter in diameter), it features a rete with quatrefoils, trefoils, and a menagerie of zoomorphic star-pointers. The back of the matter is ornamented with trefoil-shaped foliage, leopards, bulls, falcons, wyverns, and anthropomorphic hybrid beasts. Here be dragons! By comparing the astrolabe with two illuminated manuscripts—the Milemete Treatise and a copy of the *Secretum secretorum* used in the education of Prince Edward of Windsor, soon to become King Edward III—Davis argues that the astrolabe was commissioned around 1326 as a teaching tool for Edward by his tutor Richard de Bury. The argument is circumstantial and relies on the presumed symbolic nature of Gothic ornaments, but Davis reinforces it with an analysis of saints' days on the astrolabe.


Many essays include one or more Latin or Arabic texts, transcribed, translated, and edited with commentary. These include Johannes Thomann's and Flora Vafea's reproductions of previously unpublished ninth-century Arabic texts on astrolabe-like instruments for computing eclipses. Emilia Calvo analyzes a 13th-century old-Castilian translation of an 11th-century Arabic treatise on the *lámina universal* by 'Alī ibn Khalaf, an Andalusi mathematician and astronomer contemporaneous with Ibn al-Zarqālluh (Azarquiel), who invented a similar universal form of astrolabe (the *azafea*). And Taro Mimura discusses the redundancy of medieval Arabic manuals on the astrolabe, showing that many repeat each other word-for-word except when they refer to the author's particular astrolabe; by way of example, Mimura compares texts by Kūshyār ibn Labbān (fl. second half of 10th century) and Athīr al-Dīn al-Abharī (d. 1262 or 1265).

Other essays address the distinction between instrumentalism and realism in the practice of astronomy. Flora Vafea shows how the astrolabe evolved from the

celestial globe, making it a more portable and precise mathematical instrument, if not as realistic an astronomical model. Miguel Forcada examines Andalusí texts written by physicians and philosophers between the 12th and early 14th centuries that admired or criticized the work of earlier 11th-century Toledan astronomers for their instrumentalist practices (represented by their endorsement of Ptolemy's mathematical astronomy). Ptolemaic methods offered good predictions of planetary positions that were needed for the work of physicians and astrologers, but which were not compatible with Aristotelian natural philosophy.

How little we know of workshop practices in the medieval production of astrolabes is underscored by Azucena Hernández in her essay on the astrolabe inscribed “Barcelona, in the year of Christ 1375, by Petrus Raimundi of the House of the King of Aragon” (pp. 428–429), which is the only signed and dated Latin astrolabe extant from medieval Spain. Who was Petrus Raimundi, and what was his role in the making of this instrument? The topic is taken up as well in Giorgio Strano's masterful condemnation of modern “scientific” methods of dating astrolabes by means of their star positions or the position of the vernal equinox on their calendar scales. Historians have long criticized this approach for not taking into account errors in construction, as well as for a false presumption by modern scientists that past instrument-makers would use the most up-to-date data available for their times. While it has been assumed that makers may have used older instruments and star tables as models, Strano goes further by measuring stars on a group of Chaucer-type astrolabes in accordance with the coordinate system that was the basis of medieval star tables. He finds that star positions and identifications on some of the astrolabes match well with the Pseudo-Messahalla star table, whereas others fall into sub-groups using additional sources.

Despite the encouraging title, *Astrolabes in Medieval Cultures*, there is very little socio-cultural context offered by the authors, nor is an overarching storyline presented by the editors. The book is a collation of independent, technical monographs presenting new (and even first) editions of texts with translations and fine-grain catalogue descriptions of instruments. But where else can you find this stuff? For this reason, specialists will love this book as a resource and geek out on the minutiae. They can infer how the papers begin to fill in gaps of knowledge about the astrolabe, the history of medieval astronomy and related fields of work, and the transfer of scientific knowledge between Jewish, Christian, and Muslim cultures. General readers, however, will be lost.

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