
Astrolabes from Medieval Europe by David A. King

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This volume gathers 12 studies written by David A. King and published between 1993 and 2008. King is Emeritus Professor of History of Science at Johann Wolfgang Goethe University in Frankfurt am Main, Germany. He is a historian of medieval astronomy and its instrumentation, specializing in both Islamic and Christian traditions.

It is a heterogeneous collection, offering readers insight into specific medieval sundials and Renaissance astrolabes in addition to the astrolabes from medieval Europe advertized by the book title. Looking like a technical course reader, this is not a book to be browsed lightly, even though the 148 black-and-white illustrations are sure to intrigue those who pick up the book. The target audience for the volume is the specialist—for whom the book does a service in bringing the miscellany together, especially since the titles were originally published in esoteric Festschriften and niche journals. As in other volumes in the Variorum Collected Studies Series, Ashgate has not reformatted or repaginated the originals but reproduced them as they first appeared, so that users may cite the studies using the original pagination. Each article has been given a Roman numeral, however, which will accompany the original page numbers when cited in this review.

The first article, ‘Astronomical Instruments between East and West’, originally appeared in *Kommunikation zwischen Orient und Okzident*, a publication of the Austrian Academy of Sciences [King 1994]. General in purpose, it serves as an introduction to the volume in giving an overview of medieval astronomical instruments, which are generously defined as globes, astrolabes, quadrants, and sundials that were made before 1550 in Europe and 1900 in the Islamic world. At the time of King’s writing, over 1,000 were known to

survive in collections. King surveys the impoverished state of scholarship on the topic and describes his personal efforts since 1989 to remedy the situation with the preparation of a critical catalogue of instruments. He then engages the reader with surprising, preliminary findings that might rewrite the history of the transmission of the astrolabe to Europe, reveal forgotten medieval numerical notations, uncover ‘fakes—a pain in the neck’, and force us to re-evaluate our understanding of many historical issues. The findings are presented as morsels to whet our appetite. Articles that follow in the collection explore some of these findings in greater detail. This one concludes with a checklist of astronomical instruments made in Vienna in the 15th century and another of those found in or lost from Austrian collections.

Indeed, the first article can be read as a call to all historians to widen their gaze from textual sources and learn to read physical artifacts, especially scientific ones:

Historical scientific instruments indeed demand the same kind of respect as manuscripts and incunabula. They call out for attention to their basic design (equivalent to the text, literary style and geographic milieu) as well as to details like inscriptions (author, location, date and title), special markings (colophon, copyist and script), scales and numeral forms (foliation, chapter titles, indexing), and not least additional markings, replacement parts and repairs (marginalia, flyleaves, binding, owner’s marks). Too often amateurs have been given free rein in the delicate field of historical instruments, often with disastrous consequences. Also one cannot work on these instruments from photographs alone; one has to hold the instrument in one’s hands, take it apart, look carefully at the engraving and the markings. This is no armchair science. The information provided by the instruments themselves should always be viewed in the light of that which can be extracted from contemporaneous texts, the documentation of which also leaves much to be desired. [I.167]

King prepared this article for a conference in Krems, Austria that was organized by the Institut für Realienkunde des Mittelalters und der frühen Neuzeit. His audience included fellow medievalists, Byzantinists, and Islamists who presumably valued tangible things as historical resources. Even so, after he delivered his paper, an auditor asked, ‘So what?’ King’s response: ‘What else must I do to attract to these [scientific] instruments the attention they deserve?’ [I.177]. The articles in *Astrolabes from Medieval Europe* that follow help to make his point.

The second article treats ‘The Earliest Known European Astrolabe in the Light of Other Astrolabes’ [King 1996].¹ Here King refers to the ‘Carolingian’ astrolabe first described by Marcel Destombes in 1962 and bequeathed by him to the Musée de l’Institut du Monde Arabe in Paris in 1983.² This remarkable and controversial instrument was the subject of a full session at the Twenty-Ninth International Congress of the History of Science, held in Zaragoza, Spain; and King’s article was published in the proceedings of that special session. In his article, King analyzes all parts of the instrument and its inscriptions in the context of other extant, very early Islamic and European instruments to argue convincingly that this astrolabe originated in late 10th-century Catalonia, Spain. Not everyone agrees. King concedes that other scholars, ‘albeit none with any experience with medieval instruments’, have labelled it a fake. He laments that

it is a sad fact of astrolabe life that once an instrument has been deemed suspicious by people who do not understand it, the piece is essentially doomed forever and it is impossible to reinstate it to its rightful place in history. [pref. x–xi]

The third article in the collection is devoted to another very significant astrolabe from 14th-century Picardy. Its numerals are written as ciphers in a form that was first introduced to England from Greece in the 13th century and then developed by Cistercian monks in the Hainault region of Belgium and France later in the century.³ They are evidence of compact numerical notation in a period when Hindu-Arabic numerals were little known. In addition to the curious monastic ciphers, star names and calendrical inscriptions on the astrolabe are in Gothic script with spellings associated with a dialect of Picardy. Tool marks and engravings by a less-than-steady hand suggest

¹ Although published in September 1996, the article was part of a special issue of *Physis* with the imprint date 1995 [Stevens, Beaujouan, and Turner 1995].

² ‘Carolingian’ astrolabe, Catalonia, Spain, circa AD 980, Musée de l’Institut du Monde Arabe, Paris, AI 86–31, accessed 15 Jul 2016: http://www.qantara-med.org/qantara4/public/show_document.php?do_id=1379.

³ The 14th-century Picard astrolabe with the monastic numbering system is in private hands but its front face can be seen online at ‘Galileo: Images of the Universe from Antiquity to the Telescope’, accessed 15 Jul 2016: <http://brunelleschi.imss.fi.it/galileopalazzostrozzi/object/AnonymousAstrolabeWithMonasticNumberingSystem.html>. For a sample of the cipher notation, see D. A. King, ‘The Ciphers of Monks’, accessed 15 Jul 2016: <http://www.davidaking.org/Ciphers.htm>.

the product of an elderly monk. Lastly, there is a dedication ‘in bold Gothic script with humanistic flourishes’, mentioning two friends of Erasmus:

Hadriano Amerotio Bersel[us] me dono dedit 1522.

Berselius gave me as a gift to Hadrianus Amerotius in 1522.

King speculates why a 150-year-old Picard astrolabe would be a good parting gift from Paschasius Berselius, a humanist author, artist, and Benedictine monk returning to his abbey in Liège from Louvain, to his good friend, Adrian Amerot, a Picard native serving as a second professor of Greek at the College of the Three Languages (*Collegium Trilingue*) in Louvain. This article is entitled ‘Rewriting History through Instruments: The Secrets of a Medieval Astrolabe from Picardy’ and first appeared in a Festschrift for Gerard L’Estrange Turner, a founding figure in the historical study of scientific instruments [King 1993].

Turner joins King as co-author of the 11th article in the collection: ‘The Astrolabe Presented by Regiomontanus to Cardinal Bessarion in 1462’ [King and Turner 1994]. Together they examine this enigmatic astrolabe in all its technical detail—including the configuration of its parts, calligraphy, inscriptions, and metallurgy—and they establish its place among German astrolabes of similar design produced in 15th-century Vienna. Devised by the distinguished astronomer and scientific printer Johannes Müller of Königsberg (better known by his Latin name, Regiomontanus), the astrolabe is precise in its astronomical markings. On the reverse of the *mater*, it has an unusual feature: a recess in which a rotating disk carries a projection of the celestial sphere known as the *organum Ptolemei* (or the de Rojas astrolabe projection). Above the projection, Regiomontanus placed a winged angel; below it, a dedication in the form of an elegiac couplet to his new patron, the Greek scholar and humanist, Cardinal Basilius Bessarion.⁴ During a diplomatic mission to Vienna as papal legate to the Holy Roman Empire in 1460, Cardinal Bessarion commissioned Austrian astronomer Georg von Peurbach to write an epitome of Ptolemy’s *Almagest* to replace the faulty translation of George of Trebizond of 1450. After Peurbach’s untimely death in 1461, his former

⁴ The Regiomontanus astrolabe, which is currently in private hands, is pictured in ‘Galileo: Images of the Universe from Antiquity to the Telescope’, accessed 15 Jul 2016: <http://brunelleschi.imss.fi.it/galileopalazzostrozzi/object/RegiomontanusJohannesMullerVonKönigsbergAstrolabe.html>.

student and collaborator, Regiomontanus, shouldered the burden. Bessarion took Regiomontanus to Rome as a member of his extended household in 1461 and facilitated his access to Greek texts and scholarship. Around 1462, Regiomontanus completed the task (although the *Epytoma...in Almagestum Ptolemei* was not published until 1496).⁵ The quality of the instrument and its association with Regiomontanus and Cardinal Bessarion at the time of the project's completion, led King to see this astrolabe as 'the most important and the most historically interesting instrument of the Renaissance' [pref. xiv]. Since preparing this article in 1994, however, King has continued to ponder the curious style of the dedication and the presence of the angel. It turns out that the dedication is an elaborate acrostic; that the gift celebrated the 400th anniversary of a Byzantine astrolabe made in 1062 (preserved currently in Brescia), which Bessarion presumably showed to his protégé; and that the angel represented St Bessarion of the fifth century, whose name had been adopted by the cardinal when he was a monk. Readers wishing to know more about these puzzles may consult King's *Astrolabes and Angels, Epigrams and Enigmas*, where the whole story is told [King 2007].

Lesser instruments, but no less interesting to specialists, are documented in great detail in the remaining articles collected in the volume. The fourth article, co-authored with Kurt Maier, 'The Medieval Catalan Astrolabe of the Society of Antiquaries, London', analyzes astronomical, linguistic, and aesthetic features of a particular astrolabe in order to place it among the rare group of medieval astrolabes influenced by Arabic and Islamic traditions and originating in Catalonia, the region of Spain where European scholars first learned of the astrolabe [King and Maier 1996].

The volume's fifth article examines a tiny Italian astrolabe in the Museum of the History of Science in Oxford and argues that it was inspired by a medieval Islamic type no longer extant.⁶ At the time of his writing the article published here, 'A Remarkable Italian Astrolabe from ca. 1300—Witness

⁵ *Encyclopaedia Britannica Online*, s.v. 'Regiomontanus' and 'Georg von Peurbach', accessed 15 Jul 2016: <http://www.britannica.com/EBchecked/topic/496038/Regiomontanus>, and <http://www.britannica.com/EBchecked/topic/454669/Georg-von-Peurbach>.

⁶ Although King dates the instrument to about 1300, the Museum of the History of Science, Oxford catalogues it as 'Astrolabe, Sicily?, ca. 1460?' with inventory number 40829 (ICA 169). Images are online at <http://www.mhs.ox.ac.uk/collections/imu->

to an Ingenious Tradition of Non-Standard Astrolabes' [King 2003b], King did not yet know of another astrolabe that he now believes came from the same workshop. It is illustrated in Jan van Eyck's painting, *Saint Jerome in His Study*, ca 1435.⁷ Readers may therefore wish to consult King's more recent version of the article, which is found in his *In Synchrony with the Heavens* and supersedes the one published here [see King 2005]. The value of 15th-century art for instrument studies is also evident in the 10th article, where King analyzes 'The Astrolabe Depicted in the Intarsia of the *Studiolo* of Archduke Federico in Urbino'.⁸

In the sixth article, 'An Astrolabe from Einbeck Datable ca. 1330', King documents the earliest known, dated German astrolabe [King 2008]. This is followed in the book by an exploration of star names on medieval European instruments, with particular attention paid to the Picard astrolabe analyzed in the third article and an Urbino astrolabe discussed in the 10th [King 2000].

The eighth and ninth articles examine the possible roots of two European non-astrolabic, time-finding instruments in 9th- or 10th-century Baghdad. In the first of these—'A *Vetustissimus* Arabic Treatise on the *Quadrans Vetus*' [King 2002]—King establishes the Islamic origin of the universal horary quadrant, which existed independently of astrolabes but is often found inscribed on them. In the second article—'14th-Century England or 9th-Century Baghdad? New Insights on the Origins of the Elusive Astronomical Instrument Called the *Navicula de Venetiis*' [King 2003a]—King studies the type of altitude sundial known as the 'Little Ship of Venice'. It, too, is universal, meaning that it can be used at multiple latitudes.

The last item in the volume is an aid to future research: 'An Ordered List of European Astrolabes to ca. 1500'. Not previously published, this checklist is organized chronologically by provenance and contains 156 instruments. The present location of each astrolabe in a museum or private collection is

[search-page/results/?querytype=basic&query=40829&search=Search&thumbnails=on](http://www.dia.org/object-info/97a8694c-1be0-46b6-a6d4-e55bc61b8c14.aspx?position=1) (accessed 15 Jul 2016).

⁷ *Saint Jerome in His Study*, Jan van Eyck (Netherlandish, ca 1395–1441), oil on linen paper on oak panel, ca 1435, Detroit Institute of Art, 25.4, accessed 15 Jul 2016: <http://www.dia.org/object-info/97a8694c-1be0-46b6-a6d4-e55bc61b8c14.aspx?position=1>.

⁸ The Ashgate/Variorum article is a shortened version of King 2001.

indicated. Also given is each object's number on the International Checklist of Astrolabes, initiated in Price 1955.⁹ The enormity and complexity of King's undertaking is indicated by the taxonomy that he has used to organize his checklist of medieval European astrolabes and the somewhat inscrutable nature of categories 1 and 2:

- (1) Miscellaneous early European astrolabes (I)
- (2) Miscellaneous early European astrolabes (II)
- (3) Astrolabes with quatrefoil decoration (I)
- (4) Astrolabes with quatrefoil and trefoil decoration (II)
- (5) Astrolabes with inscriptions in Judaeo-Arabic or Hebrew
- (6) English astrolabes with a Y-shaped frame on the *rete* in the tradition of Geoffrey Chaucer
- (7) Early French and Italian astrolabes with an upper frame on the *rete*
- (8) 15th-century French astrolabes in the tradition of Jean Fusoris
- (9) 15th-century German astrolabes in the tradition of Regiomontanus and Hans Dorn

It must be noted, nonetheless, that King's useful checklist published here has not been updated since about 1996 and is but one section out of 12 that King envisioned as *A Catalogue of Medieval Astronomical Instruments to ca. 1500*, which included not only European astrolabes, sundials, and quadrants, but also Eastern Islamic instrumentation. That project was supported by the Deutsche Forschungsgemeinschaft until 2002 at the Institute for the History of Science at Johann Wolfgang Goethe University in Frankfurt am Main, where King was professor and director. Since then, there has been no funding to my knowledge and the Institute was dissolved when King retired in 2007. A provisional table of contents (last updated in May 2002) is available on King's personal website, although the Ashgate/Variorum checklist is more complete than the corresponding section online.¹⁰

⁹ Price's International Checklist of Astrolabes was expanded and computerized in Gibbs, Henderson, and Price 1973.

¹⁰ D. A. King, *A Catalogue of Medieval Astronomical Instruments to ca. 1500* (in preparation). See remarks last updated in May 2002 at <http://www.davidaking.org/instrument-catalogue.htm> (accessed Nov 30, 2014). See 'Part 6: Early European astrolabes (to ca. 1500)' at <http://www.davidaking.org/instrument-catalogue-TOC.htm#part6> for a prior version of the checklist published in the Ashgate/Variorum volume.

It is a pity that King's majestic catalogue of medieval astronomical instruments has been put on hold but he has given us a sample of his scholarship and methods of interrogating scientific instruments in this volume. 'All instruments can speak to us if we are prepared to listen', King writes.

They constitute an untapped source for the history of human preoccupation with the celestial environment and man's attempts to understand it. There are enough instruments available and in sufficient variety that even the most hardened sceptic could find at least one of interest.... And one instrument will suffice for a start because enthusiasm for scientific instruments is progressive, incurable, and also—I hope—contagious. [I.179]

I hope that he is right.

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