

Introduction: History of early astronomy in Centaurus*

Jonathan Regier¹ | Koen Vermeir² 

¹FWO and Department of Philosophy and Moral Sciences, Ghent University, Ghent, Belgium

²Laboratoire SPHERE (UMR 7219), CNRS and Université de Paris, Paris, France

Correspondence

Koen Vermeir, Laboratoire SPHERE (UMR 7219), CNRS and Université de Paris, 5 rue Thomas Mann - Case 7093, 75205 Paris Cedex 13, France.

Email: eic.centaurus@zoho.eu

Abstract

Since its founding, *Centaurus* has served as a journal of reference for the history of astronomy. To celebrate this tradition, our first virtual issue assembles ten articles from our archives and one article that is currently in press. Together, these articles show off the range of contributions in history of astronomy that have appeared in the pages of *Centaurus* from the 1950s onward. Articles cover a number of contexts that have strongly informed the development of mathematical astronomy and celestial physics in Europe: from ancient (Babylonian, Greek, Roman) to medieval (Arabic, Jewish, Latin) to early-modern. A second important theme of this issue arises naturally from these contributions placed side-by-side: the history of European astronomical development is one of trade, circulation, appropriation, innovation and continuity, over great differences in culture and geography.

KEYWORDS

astronomy, history of astronomy, history of astrology, Babylonian astronomy, Greek astronomy, Roman astronomy, Islamicate astronomy, medieval astronomy, Jewish astronomy, Hebrew astronomy, Renaissance astronomy, early-modern astrology, medieval astrology, early-modern astrology

2019 marks the four-hundredth-year anniversary of Johannes Kepler's *Harmony of the World* (*Harmonice mundi*), the work that gave us Kepler's third law. Kepler's astronomy, of course, would prove to be essential for the development of Newtonian physics. As it so happens, 2019 also celebrates the centenary of the expeditions by Arthur Stanley

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Eddington and Frank Watson Dyson confirming the predictions of Albert Einstein's general theory of relativity, published in 1916. Einstein's theory and Eddington and Dyson's observations created a radically new framework for physics, astronomy, and cosmology. All of this seems a fitting context for our first Virtual Issue, which offers a voyage through the history of early astronomy, a discipline for which *Centaurus* has over decades served as a journal of reference. Indeed, one reason for the scope of the Virtual Issue is the particular strength of *Centaurus* in this subject, having published hundreds of important articles since 1950. Even a glance through our archives reveals an incredible richness and variety of research. It would be impossible to do justice to it all, and to the many historians who have contributed their expertise. We can only highlight some remarkable articles that struck our imagination and show the diversity of *Centaurus*' older and more recent publications in the history of early astronomy.

In order to keep the present Virtual Issue from becoming unwieldy, we have limited ourselves to articles at least ten years old. In addition, we wanted to show the broad, even global scope of the articles on early astral sciences, including ancient Neo-Babylonian and Greek astronomy, Islamicate, Jewish and Latin Medieval astronomy, and a few texts venturing into the Renaissance and Early-Modern period. These cultures spanned a period from the 6th century BC till the 16th century AD, but they shared the Mediterranean as an important locus for trade and circulation of knowledge. We did not include some major astronomical cultures, with the expectation that later archival issues as well as new submissions to *Centaurus* can fill this lacuna. We hope that the Virtual Issue will inspire our readers to conduct their own impromptu voyages through the *Centaurus* archives.

We should also mention the 2016 Special Issue *How do Writings in the Early Astral Sciences Reveal Mathematical Practices and Practitioners?* (*Centaurus* volume 58, Issue 1-2), edited by Matthieu Husson and Richard L. Kremer, with contributions by Seb Falk, Liang Li, Matthieu Husson, Sho Hirose, Daniel Patrick Morgan and Richard L. Kremer. That issue explores how early astronomical or astrological texts and material objects reveal a diversity of mathematical practices. The authors are interested in ways of writing, in how different formats and conventions in astral sciences relate to mathematical practices. They look at tables, diagrams, charts and other paper tools, for instance, and how they are used in the management of sometimes long, complex computations. This special issue mirrors the current Virtual Issue in its theme, temporal scope and global perspective. We did not include any of these articles, however, because they are very recent; they are readily available online, and the issue in which they are published provides them already with an appropriate context.

This Virtual Issue opens with a 2005 contribution from Lis Brack-Bernsen and John M. Steele on a key matter in Babylonian astronomy: "Eclipse Prediction and the Length of the Saros in Babylonian Astronomy." Brack-Bernsen and Steele uncover two functions likely at the source of the important Saros cycle, used to calculate eclipse times in Late Babylonian astronomy. For ancient Greek astronomy, we have selected a classic tandem: Asger Aaboe's "On the Babylonian Origin of Some Hipparchian Parameters" (1955) and G. J. Toomer's "Hipparchus' Empirical Basis for His Lunar Mean Motions" (1980). Aaboe establishes that Hipparchus manipulated "well-known Babylonian parameters" to compute lunar mean motion, this despite the fact that Ptolemy later characterized Hipparchus's work as an achievement of observation over and above the Saros cycle of Babylonian astronomy. Toomer, in turn, shows that Hipparchus did not simply recalculate but most likely *did* perform his own eclipse observation; Toomer is then able to suggest an earliest-possible date for Hipparchus's lunar theory. For our selection on Roman astronomy, we pick up the theme of Babylonian continuities with Alexander Jones's "Studies in the Astronomy of the Roman Period: I. The Standard Lunar Scheme" (1997), the first article in a tetralogy exploring the presence of Babylonian-style methods in Roman Egypt. Here, Jones gives a detailed reconstruction of an extremely prevalent arithmetic astronomy for calculating lunar positions; this scheme, as he describes it, was in a "parallel, indeed symbiotic" relationship with kinematic, Ptolemaic astronomy.

Our selection on medieval astronomy contains four articles. George Saliba's "The Determination of New Planetary Parameters at the Maragha Observatory" (1986) discusses a central point in Maghribī's project to update the whole of Ptolemy, all while establishing that Maghribī used a clock as an astronomical instrument—and was perhaps the first medieval astronomer to do so. For Hebrew medieval astronomy, we have chosen an article considering the philosophical implications of astronomy, "Gersonides Unusual Position on 'Position'" (2003) by Ruth Glasner. Glasner shows how Gersonides, anchored within a diverse tradition of Aristotelian commentaries, was led to offer a

synthetic—astronomical *and* philosophical—account of position. Glasner's article, it should be mentioned, appeared in a sensational volume dedicated to the work and legacy of Bernard R. Goldstein, who published a number of major studies in *Centaurus*. With this in mind, we have selected a classic article by Goldstein: "The Status of Models in Ancient and Medieval Astronomy" (1980). Here, Goldstein takes up one of the central themes in the historiography of pre-modern astronomy: the relationship between mathematical models and physical or philosophical principles. Without mentioning Pierre Duhem by name, his study undermines Duhem's Manichean, realist-versus-instrumentalist take on astronomy from the Greeks to Galileo, as Peter Barker points out in a 2008 commentary on the article. We draw from the 2003 Goldstein volume again for our article on medieval Latin astronomy: Michael H. Shank's "Rings in a Fluid Heaven: The Equatorium-Driven Physical Astronomy of Guido de Marchia (fl. 1292–1310)." Shank examines a fascinating cosmological model which imagines planetary deferents as rings. In doing so, he reassesses Duhem's views on the Latin influence of Ptolemy's *Planetary Hypotheses*.

For our Renaissance or Early Modern selection, we have included a contribution which looks at the nexus of astrology and politics: Darin Hayton's "Martin Bylica at the Court of Matthias Corvinus: Astrology and Politics in Renaissance Hungary" (2007). Finally, we include J.D. North's classic "Astrology and the Fortunes of Churches" (1980). This text is not a precise case-study or analysis of an unknown source, but North presents us with a general meditation on the perceived relationship between the heavens and the rise and fall of religions, offering a bridge between medieval and Early Modern astrology.

This is the first "virtual issue" of *Centaurus*, that is, an online-only issue featuring articles from the archives of the journal. A proximate cause of this Virtual Issue on early astral sciences is a new article on Renaissance astronomy by Philipp Nothaft. Nothaft analyses the contributions of an obscure treatise "De triplici motu octave spere" (1450) by the Paduan astrologer Nicolò Conti and compares it with Peurbach's "Theoricae novae planetarum" (1454). The article is published alongside a Special Issue on a very different topic (*Fun and Fear: the banalisation of nuclear technologies through display*). In fact, with *Centaurus* issue 61:1-2, we introduce the novelty of publishing individual articles and other contributions in addition to a "Special Issue", all in the same issue.

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ORCIDKoen Vermeir  <https://orcid.org/0000-0002-7903-3512>

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