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Together, with, against: Building and Reassembling Astronomical Traditions in Three Different Contexts

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All written astronomical cultures attest to the great creativity of astronomers in producing different sorts of manuscripts, printed books and instruments. Embodying the very tools of their practices, these records simultaneously housed and organized the memory that underpinned those practices. These canons and curricula consist of various types of texts, tables and diagrams and they are organized as much around technical astronomical aspects, such as eclipses, planetary motions or daily motion. Historiographical aspects are also part of the process, including the works of a given astronomer or school with their subsequent respective commentaries, the tables concerning a certain date, place, ruler, or even in some cases calendars and astronomical systems attached to ethnic, linguistic or geographical collectives. The formation and continuous negotiation of these astronomical canons and curricula offer invaluable insights into how astronomers curated and managed the intellectual memory of their discipline. This panel brings together three specialists to explore astronomical curricula within three distinct yet deeply interconnected contexts, as evidenced in the Byzantine manuscript tradition of Cleomedes' *The Heavens*, Latin astronomer, master of arts and physician Ludolfus Borchtorp, and Azerbaijani-Ottoman *taqvim* dealing with geomancy. By adopting a comparative approach, the panel seeks to advance research into this relatively understudied but crucial aspect of the history of astronomy.

Presenter: Florence Somer, Observatoire de Paris-CNRS –EIDA project

Title of the paper: The *Taqvim* B-1441 of the Fuzuli Institute of Manuscript (Əlyazmalar İnstitutu) held in Baku

The origins of *Taqvim* date back to around 400 BC, following the Babylonian invention of the zodiac and the various arrangements of ephemerides for the sun, moon and planets, as well as astrological remarks for the days of the month.

In addition to the possible influence of the Babylonians and Hellenists, the impact of Indian and Sassanian astrological knowledge on the formation of Islamic astrology, particularly in the courts of the early Abbasid caliphs, must also be taken into account.

Thābit b. Qurra, in the second half of the 9th century, made the first known mention of a *taqvim* he called *daftar al-sana*. Two centuries later, al-Bīrūnī also used these concepts in his astrological compendium, *Kitāb al-taḥḥīm li-awā'il ṣinā'at al-tanjīm*. The main aims of these annual compositions were to list planetary positions and the exact time at which the sun enters the different signs of the zodiac, to provide calendar information for different chronological systems, and to communicate astrological prognostications.

While it forms part of the continuing tradition of the production of these documents, manuscript B-1441 contains geomancy diagrams (*ilm al raml*) inherited from another tradition adopted and developed in Azerbaijan mainly during the Ottoman period. My contribution will focus on understanding the continuity of an Arab-Iranian model for understanding astronomical data, superimposed on a tradition specific to Central Asia.

Presenter: Sophie Serra, Lund University, Department of Philosophy - Wallenberg Foundation Project "Re-assessing Aristotelian Science" (P.I. Ana Maria Mora Marquez)

Title of the paper: Authorities and Controversies in Latin 15th c. astronomy: The case of manuscript Berlin, Staatsbibliothek, Lat. Fol. 246.

It is challenging to gain an overview of 15th-century Western European astronomy, as it exists within a complex network: taught for itself in some universities but not others, caught between authoritative texts and innovations, and of interest to theologians, philosophers, physicians, and mathematicians. The manuscript Berlin, SB, Lat. Fol. 246 serves as an ideal entry point. It was copied throughout his life by Ludolfus Borchtorp, who was a master in the Faculty of Arts at the University of Erfurt (1445), later became a master in

medicine in Padua, and eventually returned to Brunswick as a physician. The manuscript contains over 50 astronomical works, reflecting the teachings he received and gave, his medical uses of astronomy, as well as contemporary debates on calendar reform, astrological interpretations, and errors in astronomical tables. On fol. 263r, it includes a polemical text titled "Invectiva contra astronugos et specialiter contra quondam rudem et presumptuosum," followed by an example of an astrological judgment "by the said idiot" ("Judicium cuiusdam ydeote de quo supra"). I am currently working on an edition and commentary of these works, and I will present it, alongside the manuscript prepared by Ludolfus, as a testimony of both the traditional curriculum of astronomy in Western universities and the raging polemics in this field.

Presenter: Divna Manolova, Department of Literary Studies –Greek Section, Ghent University

Title of the paper: John Nathaniel's Cosmological Dossier in Vaticanus graecus 1908 and Its Place in the Manuscript Tradition of Cleomedes' The Heavens

Vatican City, Biblioteca Apostolica Vaticana, ms. gr. 1908 is a composite manuscript consisting of codicological units dating to the fourteenth, sixteenth and seventeenth centuries. Its sixth quire puts together cosmological and medical astrological material copied by two professional scribes originating and active in Venetian Crete, namely the teacher, scribe, and theologian John Nathaniel (d. before 1577) and the professional scribe Thomas Bitzimanos (active in the second half of the 15th C). John composed the short text on medical astrology preserved on fols. 32r - 33r, placed it before the Pseudo-Aristotelian *De Mundo* copied earlier by Thomas and brought it to Venice probably in 1559. He also drafted fol. 33r which includes a diagram of the universe that appeared for the first time in a copy of Cleomedes' *The Heavens* prepared in 1450 in Sparta. The large-scale diagram is accompanied by a poem on the zodiac, as well as by smaller diagrams of a solar and a lunar eclipse. It also features short texts providing further information about the sun and the moon. This paper positions the diagram in the tradition of Cleomedean diagrams and analyses John Nathanael's spatial organisation of diverse cosmological material as well as the ways in which he departs from his models and sources.

Short Biography

Florence Somer holds a PhD in Anthropology and Iranian Philology from the Ecole Pratique des Hautes Etudes/ PSL. After 12 years spent making documentaries on Middle Eastern history, her research focuses on the dynamics of the Iranian world and its neighbors' astronomical history in the early Islamic period. She favors an interdisciplinary approach, combining astro-physical, mathematical, philological, historical and geo-physical understanding of astronomical movements with long-term historical analysis. As part of a post-doctorate at the Paris Observatory's EIDA project, she is working on the synchronic and diachronic production of astronomical diagrams, particularly astrological diagrams, in Persian, Arabic and Ottoman manuscripts.

Sophie Serra is a researcher in the History of Science and History of Philosophy, focusing on late Middle Ages in Western Europe. She is currently employed in Lund University as a researcher in the "Reassessing Aristotelian Science" project (P.I. Ana Maria Mora Marquez), funded by the Knut and Alice Wallenberg Foundation, where she investigates scientific norms adopted by 13-14th c. Parisian astronomers, their relationship to aristotelianism, and their possible evolution. She also is an associate member of SPHERE (UMR 7219, CNRS). She defended her PhD in 2015 at University Paris-Sorbonne, "Nicole Oresme: exigences scientifiques et projet politique" (supervision R. Imbach), exploring the hypothesis of a continuity between this 14th c. French philosopher's political career, and his work in promoting theoretical innovations in natural philosophy and cosmology. Since then, she has been working on natural philosophy, cosmology in the Latin and French traditions, from the late 13th c. onwards. She held several teaching positions in philosophy at French universities, and she has been part of research projects in France, Switzerland and Sweden. Between 2021 and 2023, she was a postdoc researcher in the ERC project "ALFA" (P.I. Matthieu Husson) and she expanded her scope by investigating the milieu of Parisian astronomers from the late 13th c. to the middle of the 14th through their manuscript culture as well as through their epistemological statements, found in the prologues of even their most technical works. She is currently building a research project on the notion of error as it was conceptualised and used in medieval scientific debates from the 13th to the 15th centuries.

Divna Manolova is a researcher of the History of Science and Byzantine Studies and a Marie Skłodowska-Curie Actions postdoctoral fellow. She works on theories of space and dimensionality in Byzantine cosmological and astronomical texts and diagrams, and studies the teaching and learning of the astral sciences and philosophy in Palaiologan Byzantium. Her current project –COSMOPOET: Teaching the Cosmos in Poetry and Prose: Aratus' *Phaenomena* and Cleomedes' *The Heavens* in Late Byzantium –studies the medieval Greek and early modern manuscript tradition of the didactic poem *Phaenomena* by Aratus of Soli (d. before 239 BCE) and compares it to the transmission of the introductory astronomical treatise *The Heavens* by Cleomedes (first century CE). COSMOPOET aims to rethink the relationship between poetry and astronomy and ultimately, it investigates medieval Greek solutions to the question as to how to explain the cosmos through literary means. Divna is also a co-founder and core member of the organising and scientific team of the History of Science in

the Medieval World summer school (est. 2021) which is hosted biannually by the University of Veliko Tarnovo (Bulgaria).

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