

Elaheh Kheirandish. *Baghdad and Isfahan: A Dialogue of Two Cities in an Age of Science ca. 750–1750*. London: I.B. Tauris, 2021. 275 pages. ISBN: 978178976883

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Elaheh Kheirandish wrote this book following the discovery of a manuscript titled *Munāzirāt-i Baghdād va Işfahān* (The Dialogue of Baghdad and Isfahan) in Harvard University’s Widener Library during a search for the term *manāzir* (optics).¹ While the manuscript lacks a specific date, surviving as a sole copy, references within offer insights into the likely composition of the text during or after the 7th/13th century. Notably, a mention of Awhad al-Dīn al-Kirmānī (d. 697/1297) places the work within this time. Additionally, a seal record from Mughal India bearing the name Ālemgīr Abū al-Muzaffer Muḥammad Muḥyī al-Dīn Awrangzib, the sixth Bābid ruler reigning between 1658 and 1707, indicates the writing as before 1120/1708.²

The manuscript attributes authorship to Kamāl-i Işfahānī, recounting a dialogue between the historically significant cities of Baghdad and Isfahan. However, under Kheirandish’s adept interpretation, this text undergoes a profound transformation into a multi-layered exploration of the history of science, marked by its original narrative. Kheirandish meticulously crafts her work by drawing from a rich array of primary and secondary sources from the relevant period. Notably, she in-

- 1 The work was later transferred to the British Library. See Kamāl-i Işfahānī, *Munāzirāt-i Baghdād va Işfahān*, British Library Manuscript Add 18, 411, fols. 166a-178b.
- 2 “Padishah Ghazi 1120” for information about the written seal see, Charles Rieu, *Catalogue of the Persian Manuscripts in the British Museum* (Londra: British Museum, 1881), II, 601; Clifford Edmund Bosworth, *The Islamic Dynasties: A Chronological and Genealogical Handbook* (Edinburgh: Edinburgh University Press, 1967), 210-11.

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corporates numerous unpublished materials, including interviews with colleagues, insights from various symposia and conferences, and contributions from history of science exhibitions.

In essence, Kheirandish's narrative unfolds across a broad geographical spectrum, encompassing Baghdad and Isfahan from 750 to 1750. The foundation of her research rests on materials amassed between 2005 and 2019. Within the book, the millennial dialogue of Baghdad and Isfahan takes shape through the perspective of a student named Leo, interwoven with Kheirandish's academic expertise. Consequently, the text evolves into a distinctive narrative of Leo's personal journey through diverse temporal and spatial contexts, rendering it both fluid and appealing to a wide audience.

The initial segment of the book contends that the discipline of history should be comprehended as a composite entity involving diverse elements, ranging from sources and facts to developments and outcomes. In the realm of the history of science, Kheirandish underscores key factors such as locality, authority, methodology, academy, utility, and universality. The author advocates a nuanced approach, urging attention to the roots for historical background, routes for locality, rules for authorities influencing science, books for establishing methodology, schools for defining the relationship with academia, tools for deriving insights from the history of science, and loops for understanding the universality of the history of science.

Within the context of the history of science, the author emphasizes the importance of not only posing "what happened," "when," and "how" questions but also delving into the causes within the framework of historical material. Kheirandish contends that the introduction of *Munāẓirāt-i Baghdād va Isfahān* is an exhaustive encyclopedic text featuring visuals pertaining to Baghdad and Isfahan, accompanied by historical maps and images of the two cities. The *Dialogue's* text represents a rich amalgamation, incorporating not only Arabic and Persian languages but also verse and poetry. It mirrors the refined aesthetic of Isfahan's handicrafts, evident not only in its writing but also in its illuminations, craftsmanship, maps, and binding.

The second part delves into the application of historical methods to the history of science, shedding light on intriguing aspects such as why al-Bīrūnī (d. 453/1061 [?]) remained overlooked by Western scholars for an extended period, resulting in the absence of Latin translations of his works. Kheirandish reveals al-Bīrūnī's quest for copies of his *Kitāb al-Taḥfīm li awā'il ṣinā'at al-tanjīm* and details her utilization

of the archive “The Classical Library of Islam.” She underscores the need for not only names and dates but also printed works and manuscripts, extending beyond cities and libraries to encompass court records and observatories.³ In this section, Kheirandish explores figures such as Musa Khwarizmī (d. after 232/847) and Omar Khayyām (d. 526/1132 [?]) in the early period, followed by Yahyā Maghribi and ‘Ali Qūshjī (d. 879/1474) in the later periods. She illuminates the privileged life and research of ‘Ali Qūshjī, whom she positions as a precursor to Copernicus (d. 1543). The narrative anticipates future researchers unravelling the mystery of why ‘Ali Qūshjī did not make a transformative ‘leap’ to one of the three primary components of Copernicus’ ‘revolutionary’ model.

The third chapter focuses on geometry, identified by the author as the oldest subject transmitted from Islamic geography. The introduction to the chapter draws on Leo’s experiences, citing sources such as the *Catalogue of the Persian Manuscripts*, *Persian Literature*, and *Persia*⁴. It also highlights the establishment of noteworthy centres like the ‘Cambridge Shahnama Center for Persian Studies’ and educational courses like ‘Historical Dialogues from the Near East.’ The chapter delves into the emergence of geometrical constants applied to arithmetic and algebra, a concept attributed to Thābit ibn Qurra (d. 288/901). The narrative also explores the contributions of figures such as Ibn Sinān, al-Qūhī (d. 380-390/990-1000 [?]), and al-Sijzī, providing insights into their respective works in the realm of geometry.

The fourth chapter delves into optics, a subject with major breakthroughs associated with Islamic lands. The author navigates through exhibitions such as ‘Windows into Early Science’⁵, ‘European Travelers to Safavid Iran,’ ‘Homage to al-Ḥasan Ibn al-Haytham’⁶, as well as conferences dedicated to ‘raising awareness of the Arabic manuscript heritage.’ Shifting focus to Ibn al-Haytham, whom she deems a ‘revolutionary’ figure, Kheirandish elucidates the relevant Greek, Arabic, and Latin manuscripts of his optical ‘masterpiece.’ The narrative unfolds through Leo’s expe-

3 Elaheh Kheirandish, ‘Classical Library of Islam’ (Coordinator), Packard Humanities Institute (PHI), Cambridge MA (2000–2004); Founder: David W. Packard; Director: Roy Mottahedeh; Assistants: Stephanie Bass, Kevin Schwarz. <https://persian.packhum.org>.

4 Elaheh Kheirandish, ‘Historical Dialogues from the Near East’, Harvard University, Freshman Seminar, Spring 2008.

5 Elaheh Kheirandish, Exhibit ‘Windows into Early Science’, Ireland, ‘Houghton Exhibit’. <http://news.harvard.edu/gazette/story/2008/04/houghton-exhibit-features-islamic-sciences/>.

6 ‘Hidden [is] in the evident (al-Khafi fi al-Jali), was the title of a calligraphic piece from the Exhibit: Homage to al-Ḥasan ibn al-Haytham by artist Kamal Boullata, Dubai 2009.

rience of the Alexandria conference,⁷ providing a comprehensive exploration of Ibn al-Haytham's work and its impact in both Islamic and European contexts.

The author references the source 'Signatures in Turkish Libraries' from the 1950s, providing valuable insights into Istanbul manuscript libraries. A monograph in German from the 1930s proved instrumental, furnishing titles of Arabic, Persian, and Turkish manuscripts, along with the names of numerous libraries and collections in Istanbul. Leo's perspective guides us through various events related to the legacy of Ibn al-Haytham, highlighting his profound influence.

In the early 2000s, 'The New York Times Magazine' lauded Ibn al-Haytham for "setting in motion the most important idea of the millennium - the rise of the scientific method" and credited him with contributions to optics that "led to the invention of the telescope and microscope." Notably, in 2005, the crater 'Alhazen' was named on the Moon to commemorate the 'International Year of Physics,' aligning with the approximate dates of Ibn al-Haytham's birth and death. The 'Year of Light' in 2015 witnessed events and publications worldwide, celebrating Ibn al-Haytham, from Palermo and Paris to Istanbul, New Haven, New York, and Washington, D.C. Furthermore, in 2017, the European edition of his masterpiece, *Kitāb al-Manāẓir*, found a prestigious display in a rare book library aptly referred to as the 'magic palace.'⁸

Chapter Five directs its focus towards astronomy, a field witnessing extraordinary developments in both Islamic and European realms, with the schools of Qurtuba, Meragha, and Samarkand serving as critical components. The narrative centres around Shaykh Bahā'ī, a mathematician and statesman in Safavid Isfahan, introduced to Leo through an early science exhibition and a virtual exhibition. The author delves into the astronomical advancements of Eastern Islamic scholars, spanning from Ibn al-Haytham in 11th-century Cairo to Ibn al-Shāṭir in 14th-century Damascus, including models by al-Ṭūsī (d. 672/1274) in 13th-century Maragha and Qūshjī in 15th-century Samarkand. Under the term 'pre-Copernican Copernicus,' the author highlights the contributions of Western Islamic scholars in 12th-century Andalusia, featuring Ibn Ṭufayl (d. 581/1185), Al-Bitrūjī, and Maimonides (d. 601/1204). This term captures the essence of their astronomical models, showcasing a unique perspective on the intellectual landscape before Copernicus.

7 Bibliotheca Alexandria: 6–8 May 2008, 5th International Conference: Lost and Embedded Manuscripts. www.bibalex.org/en/events/eventdetails?id=5269.

8 Elaheh Kheirandish, "The Spread of Science: Alhazen, Opticae Thesaurus, 1572' in Carling and Rosenberg, 'An "enchanted palace" '. <https://harvardmagazine.com/2017/03/an-enchanted-palace>.

Chapter Six delves into mechanics and scientific instruments, recognizing their pivotal role in the field's development. The applications of mechanics span various locations, from mosques and schools to observatories and courts. The chapter commences with an exploration of the 'Micromapping Early Science' project, integrating the *Dialogue* manuscript into the realm of digital technology.⁹

Through Leo's perspective, the chapter accentuates the exhibition of the *Dialogue* manuscript and the micro-maps in both digital and virtual formats. It delves into the wealth of digital resources available, emphasizing the transformative impact of evolving science and technology on research methodologies. Notable projects like the 'Library of the Future,' 'A Virtual 17th-century University,' 'Three-Dimensional Encyclopaedia of Life,' 'Geographic Analysis,' and 'Internet and Society' are scrutinized, showcasing the dynamic interplay between science, technology, and research, as witnessed through Leo's eyes.

The chapter sheds light on the socialization of the history of science through digital means, showcasing films such as 'A Quartet of Early Scientific Traditions' and 'When Optics Was More Than Physics.' These film productions leverage clips, predominantly from manuscripts and maps, employing image programs like iMovie and Keynote and integrating audio programs such as iTunes and Garage Band. Leo guides the reader through these digital presentations, demonstrating how the history of science can be effectively communicated in a digital era.

In the late twentieth century, the vast number of manuscripts in Islamic languages, reaching into the millions, and scientific manuscripts in the tens of thousands, along with thousands of scientific instruments, challenged the notion of a 'decline' period. The author cites the 'newly discovered' letters of Jamshid Kāshī (d. 832/1429) from Samarkand to his father in Kashan as compelling evidence against the narrative of decline.

The chapter further explores the realm of scientific instruments through the examples of Ibn Shāṭir (d. 777/1375), whose astronomical instruments endured for centuries, impacting regions beyond his own territory. Additionally, it delves into Kāshī's contributions during the project and construction phases of Ulugh Beg's observatory, and the achievements of Taqī al-Dīn (d. 993/1585), who established the Istanbul Observatory, rivalling the observatory of Tycho Brahe (d. 1601).

9 Elaheh Kheirandish, 'Micromapping Early Science', Harvard University: Academic Technology Group (ATG). <https://www.scholar.harvard.edu/ekheirandish/multimedia>.

Chapter Seven explores the role of ‘perspective’ and ‘chance’ in comprehending the past, representing the present, and envisioning the future, as articulated by Kheirandish. The narrative begins with Leo’s experiences at Topkapı Palace, home to the Ottoman Palace Library inventory, and the Fuat Sezgin Museum of the History of Science and Technology in Islam. Leo’s journey unfolds through the museum’s summer schools, engaging with projects such as ‘History of Science as a Universal Heritage,’ ‘Mobile Sciences for Teaching and Education,’ and ‘Light and Shadow through Interdisciplinary Approaches.’ The chapter underscores the significance of the theme of ‘mobile sciences,’ connecting it to the workshop ‘Around the World with Early Science’ and a visit to the Süleymaniye Library in Istanbul.

Within the context of the ‘International Year of Light,’ the narrative highlights the role of ‘chance’ in the dissemination of Ibn al-Haytham’s optics in both Islamic and European lands. As Leo explores the use of emerging technologies to immortalize monuments destroyed in recent ‘trouble spots,’ the concept of a compelling ‘Museum of Lost Objects’ takes shape. This museum would be dedicated to showcasing various historical scenarios in a ‘Museum of Chances.’ Here, the ‘quartet’ of geometry, astronomy, mechanics, and optics, along with the missing components in their development, are framed as ‘missed chances.’ These could manifest as missing books (in the case of geometry), missing instruments (in the case of astronomy), missing paths (in the case of mechanics), and missing loops in the case of optics.

In the closing passages of Chapter Seven, the narrative introduces the ‘Museum of Innocence,’ which inspired Leo during his visit to Istanbul. Additionally, it touches upon the revelations from the ‘Cities of Stars’ presentation, presented as part of a panel discussion at an international symposium held in Istanbul’s historic palaces.¹⁰ As the chapter concludes, attention turns to the ‘House of Stars,’ a meticulously restored historic site in Kashan, Isfahan. Comprising a seven-room ‘Planet House’ and a twelve-room ‘Zodiac Room,’ it now hosts the Museum of Chances. The narrative unfolds with various descriptions of Leo’s visit to this unique museum, providing insights into the intriguing concept and exhibits within the Museum of Chances.

Kheirandish concludes her seven-chapter narrative spanning a thousand years of history with poignant quotations and poems, including verses penned by her

10 Kheirandish, “Cities of Stars: The Historical Relations of Optics and Astronomy”, International Symposium for the History of Science in Islam, Istanbul University, 15 June 2019. <https://www.scholar.harvard.edu/ekheirandish/projects>.

two sons. The book not only shares Kheirandish's experiences but also reveals her gentle spirit, evident in her engagements—from exhibitions, interviews, and conferences to lectures and meetings with colleagues. For readers, this book promises a journey characterized by fluidity, poetic moments, surprising voyages through time and space, and a wholly unique experience.

For researchers in the history of science, Kheirandish generously offers insights into every facet of her academic journey, presenting an unconventional method for narrating the history of science. The narrative immerses the reader in the world of manuscripts, catalogues, digital technologies, and exhibitions. Kheirandish's adventure, initiated by a search for the word *manāẓir* in library catalogues, culminated in the discovery of *Munāẓirāt-i Baghdād va Isfahān*. This enabled her to craft a thousand-year narrative of the history of science through the engaging dialogue between the cities of Baghdad and Isfahan.

The narrative emphasizes the significant potential for historians of science, highlighting that even the simplest literature review can yield crucial findings. It underscores the idea that the numerous undiscovered works within manuscript libraries hold the potential to reshape perspectives on the history of science, promising a rich field of exploration for future researchers.