

RESEARCH ARTICLE

Back to the future: a belated history of ‘new’ science in the Ottoman Empire

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Abstract

What happens when fragmentary and too much information is flowing across the world? This article sketches the emergence of one such informational flow through the ubiquitous concept of ‘new medicine’ in the seventeenth-century Ottoman Empire in a historiographical corrective. Rather than presenting it as a unified category, I argue that Ottoman physicians used ‘new’ as a loose, multivalent and discursive term whose potentiality lay in its malleability for future use. Ready to bear any contingent meaning at a certain point in the future, the ‘new’ became a strategic tool to cope with the uncertainties evoked by early modern globalization and local epistemic crisis. It also helped Ottoman scholars and physicians develop a tentative design for how much information, and of what sort, was just enough for the learned and laypeople to know during precarious times. I further discuss the fact that since the Ottoman motivation for the usage of the notion of the ‘new’ is without a decisive motive, it still haunts our historiographical debates about what was truly new about Ottoman science.

During an era of profound change in the ways distinct peoples saw and understood the natural world, certain substances turned into global products that connected Asia, Europe, the Americas and the Ottoman world. In his fascinating account of his travels, the Ottoman traveller Evliya Çelebi (1611–84) recounted a dispute between local butchers and Egyptian merchants in Istanbul.¹ The merchants notoriously called butchers ‘blood-shedding people’ and accused them of spreading plague. As a response to the allegations, the guild of butchers claimed that meat was the first of all consumable goods ever known to humans. The merchants, on the other hand, were overwhelmingly introducing the new and the superfluous from all around the world. Often, to make illicit profit out of these unnecessary substances, they produced an artificial famine. Yet, the butchers asked, did the inhabitants of Rum really want their rice or hemp to come from Egypt? Or did they need sugar while they consumed pure honey?²

Even with this ongoing discomfort with the new and foreign, Istanbul’s bazaars gradually became replete with flavours and smells from all corners of the then known world. From Peruvian bark to tobacco, novel substances accentuated the inability of knowledge on the move to guarantee a trustworthy use. Where new substances were concerned,

1 Evliya Çelebi, *Narrative of Travels in Europe, Asia, and Africa in the Seventeenth Century* (tr. Joseph von Hammer), vol. 1, Cambridge: Cambridge University Press, 2012, p. 136.

2 Evliya Çelebi, op. cit. (1), p. 137.

opinions rarely remained unanimous in the increasingly interconnected world of the seventeenth century. They instead produced much churning, upheaval and social unrest, as exemplified in the famous tobacco debate that eventually led to the Ottoman state's bans for the sake of moral surveillance.³ From the late sixteenth century onwards, new forms of consumption and sociability fuelled by the arrival of unfamiliar substances made manifest the relevance of medicine in determining the beneficial or harmful impacts of substances on the body. At a time when Muslim jurists, preachers, physicians and consumers of the 'new' grappled with the vague and uncertain qualities of these substances, the Ottoman state saw no assured fulfilment of practical utility by the present state of medical knowledge. In 1703, banning the growing practice of 'new medicine' (*tıbb-ı cedid*) seemed the most convenient solution to Sultan Ahmed III (1673–1726) and his chief physician Nuh Efendi (d. 1707).⁴ Rather than daring to risk the sketchy and tentative contours of new medicine, the state decided to restrict its practice instead of inciting the seemingly impossible quest for certainty.

For some anxious Ottoman physicians and polymaths, however, solace was to come from scaling expectations relative to new ways of making their local nature relatable – that is, something as yet neglected or unrealized could be perceived anew and came to matter. As Alix Cooper has aptly demonstrated, the increased contact with exotic and foreign substances following the Columbian exchange prompted an in-depth reevaluation of old knowledge of Europe's own indigenous nature.⁵ In a similar vein, foreign nature's materiality became relevant to understanding how to come to terms with one's own nature in the seventeenth-century Ottoman Empire.⁶ Rapidly changing knowledge of wide-ranging foreign substances at the medical market not only raised suspicions about the efficacy of these new medicines, but also raised questions about the fallibility of the Islamic medical corpus.⁷ A solution to such challenges was often offered by colossal collections of prior knowledge. These seemingly bookish and omnivorous quests embarked upon by physicians and polymaths in the Ottoman capital have often been misunderstood as a reflection of repetitive forms of preserving and transmitting inherited

3 James Grehan, 'Smoking and "early modern" sociability: the great tobacco debate in the Ottoman Middle East (seventeenth to eighteenth centuries)', *American Historical Review* (2006) 111, pp. 1352–77.

4 Ahmed Refik, *Hicri On Birinci Asırda İstanbul Hayatı: (1000-1100)*, İstanbul: Devlet Matbaası, 1931, pp. 8–9.

5 Alix Cooper, *Inventing the Indigenous: Local Knowledge and Natural History in Early Modern Europe*, Cambridge: Cambridge University Press, 2007.

6 Scholarship on the history of science and medicine in the Ottoman Empire is growing. See Miri Shefer-Mossensohn, *Science among the Ottomans: The Cultural Creation and Exchange of Knowledge*, Austin: University of Texas Press, 2015; M. Alper Yalçınkaya, *Learned Patriots: Debating Science, State, and Society in the Nineteenth-Century Ottoman Empire*, Chicago: The University of Chicago Press, 2015; Harun Küçük, *Science without Leisure: Practical Naturalism in Istanbul, 1660-1732*, Pittsburgh: University of Pittsburgh Press, 2019. For an overview see Jane H. Murphy and Sahar Bazzaz, 'Re-examining globalization and the history of science: Ottoman and Middle Eastern Experiences', *BJHS* (2022) 55, pp. 411–22.

7 On the drug trade in the early modern period see Harold J. Cook, *Matters of Exchange: Commerce, Medicine, and Science in the Dutch Golden Age*, New Haven, CT: Yale University Press, 2007; Dániel Margócsy, *Commercial Visions: Science, Trade and Visual Culture in the Dutch Golden Age*, Chicago: The University of Chicago Press, 2014; Pratik Chakrabarti, *Materials and Medicine: Trade, Conquest and Therapeutics in the Eighteenth Century*, Manchester: Manchester University Press, 2015; Suman Seth, *Difference and Disease: Medicine, Race, and the Eighteenth-Century British Empire*, Cambridge: Cambridge University Press, 2018; Benjamin Breen, *The Age of Intoxication: Origins of the Global Drug Trade*, Philadelphia: University of Pennsylvania Press, 2019; Samir Boumediene and Valentina Pugliano, 'The substitute route: exotic remedies, medical innovation and the market for substitutes in the 16th century', *Revue d'histoire moderne et contemporaine* (2019) 66, pp. 24–54; He Bian, *Know Your Remedies: Pharmacy and Culture in Early Modern China*, Princeton, NJ: Princeton University Press, 2020; Paula De Vos, *Compound Remedies: Galenic Pharmacy in Colonial Mexico*, Pittsburgh: University of Pittsburgh Press, 2020; and Clare Griffin, *Mixing Medicines: The Global Drug Trade and Early Modern Russia*, Montreal and Kingston: McGill-Queen's University Press, 2022.

knowledge that were barren of innovation. Yet, if the body of available knowledge was reorganized for the purpose of preserving or managing information overload alone, it could not have served the polymathic Ottoman scholars' intentions of overcoming an epistemological crisis in the transit of natural and medicinal knowledge.⁸

This present article offers some insights toward exploring the epistemological landscape appropriating fragmentary medical and natural knowledge that was constantly changing yet remained tentative during early modern globalization. A growing number of scholars have charted Ottoman 'new medicine' as a rising interest in global currents in the seventeenth century and the early eighteenth. In taking 'new' as the point of comparison with the Paracelsian movement in Europe, contemporary scholars have focused primarily on the content and practicality of Ottoman translations and adaptations from foreign sources of knowledge in circulation. In the process, recent studies have confronted how previous scholarship identified 'new' as the westernization of Ottoman medicine, and have claimed that the new-medicine movement was intrinsically about the proliferation of 'recipes that banked on the alleged novelty of some diseases', which eventually marginalized theory and method.⁹ Moving beyond the grain of these discussions, I approach 'new' not as a monolithic keyword but as an abstract, ubiquitous, fleeting and multi-layered concept of diverse usage in Ottoman medical writing. While surveying all Ottoman attitudes toward new medicine is beyond the remit of a single article, I comparatively focus here on two understudied examples to excavate how this pluralistic concept hints at incomplete states of knowledge ranging from suspended to potential in the pursuit of the knowledge of the unknown. I argue that rather than merely being the equivalent of Paracelsian medicine in practice, 'new' was an epistemic foothold for open-endedness employed by Ottoman scholars dealing with the challenges of producing knowledge in and about an ungraspable world. Instead of assuredly defining what was 'new' about knowledge then in circulation, learned Ottomans used the term to make tentative suggestions that could be realized at some future moment.¹⁰

Over the course of the seventeenth century, the new infrastructures for sharing heterogeneous, transient or even occult forms of knowledge produced under the auspices of 'new' medicine eventually proved extensive in their sweep of possible epistemic claims. First, the upending of boundaries between distinct kinds of knowledge became a means to criticize bold promises and overconfidence in absolute medical certainty. Instead of a futile quest to grasp all trustworthy knowledge, Ottoman polymathy considered medical practice to be replete with uncertainties. Acknowledging inconsistencies and fallibility thus offered an alternative to unfeasible epistemic decorum; that is, to the pedantic desire to know everything. Second, the practical need for useful medicinal knowledge necessitated new strategies for the sake of a more active communication with diverse audiences. Navigating accessibility winnowed down how much information, and of what sort, was just enough to know for daily use. Rather than reflecting the onerous scholarly task of reorganizing valuable knowledge, medicinal encyclopedias foreground simple recipes that seem practical, easy to use and, most crucially, safe to test at home.

In recent decades, historiography has sought a middle ground that compounds and challenges two oppositional takes on the histories of science and medicine: revolutionary and rapid forms of knowledge production versus accumulative and incremental changes at

8 On information management practices in premodern Europe see Ann Blair, *Too Much to Know: Managing Scholarly Information before the Modern Age*, New Haven, CT: Yale University Press, 2010; Alberto Cevalini, *Forgetting Machines: Knowledge Management Evolution in Early Modern Europe*, Leiden: Brill, 2016.

9 Küçük, op. cit. (6), p. 144.

10 For a recent article on how the term *tıbb-ı cedid* corresponds to the ancient paradigm see Mustakim Arıcı and Esra Aksoy, 'Tıbb-ı cedid ne kadar yenidir? Osmanlı tıbbında yenilik tartışmaları ve yeninin mahiyeti (1650-1750)', *Osmanlı Bilimi Araştırmaları/Studies in Ottoman Science* (2023) 24, pp. 841-76.

a slower pace.¹¹ From Steven Shapin's famous assessment that 'there was no such thing as the Scientific Revolution' to diffusionist and fluvial models of science, historiography has recently turned to a direction that renders the field, in Carla Nappi's words, 'pulsing and alive'.¹² Metaphors of movement and circulation have captured the literal and ontological meanings of objects and things in a number of interdisciplinary studies in parallel with the so-called 'material turn'.¹³ Yet this framework does not fully capture the broader stakes involved in knowledge-in-the-making, particularly in non-Western local contexts. Knowledge, to be sure, is never static, yet certain kinds of circulation and movement appear as prototypical in the historiography since they impose a sense of directness and unity on complexities that were in fact multilayered, fragmentary and messy.¹⁴ In this reckoning, non-Western sciences under consideration should either have had a direct influence on Western ones, or be in a contemporaneous dialogue with the developments in Western science so that they can be relevant to the dominant historiography of science. As Marwa Elshakry argued, this line of thinking puts emphasis on certain kinds and communities of knowledge that, as a result, shaped much of the historiography of the sciences outside Europe; for instance, 'there are only a handful of histories written on subjects such as astrology, alchemy, magic, and talismans in the Arabic-speaking lands for much of the medieval and early modern periods, despite the fact that these were among the most popular and most significant of the applied sciences'.¹⁵ Fluvial metaphors employed in historiography tacitly and tautologically privileged technical knowledge over natural philosophical knowledge, too.

In what follows, I focus on how Ottoman medical authors engaged with the capacious domain of the 'new' even when it was not always apparently future-oriented. Ottoman physician Emir Çelebi's work demonstrates the emerging conflict with models of commonplacing authoritative medical texts even prior to the popularization of *tibb-ı cedid*. In the following case, we will encounter Hekim Dendani ('the bucktoothed physician', d. c.1683). A productive translator of Arabic medical works into Turkish, Dendani chose not to introduce the most curious and rare substances he might have encountered during his travels seeking knowledge. Instead, he presented the most frugal form of information management: turning worthless bodily waste into effective medicines. Such episodes allow us to examine shifting authoritative credentials in the production of medical knowledge, but they also reveal what it meant to reinvest in ordinary things and find relevance in nature. I conclude with some final insights into why 'new' does not always mean onward-marching progress in the global histories of science, but often suggests halts in expressing certain knowledge. Our tendency to map out one intellectual triumph after

11 James A. Secord, 'Knowledge in transit', *Isis* (2004) 95, pp. 654–72; Lissa Roberts, 'Situating science in global history: local exchanges and networks of circulation', *Itinerario* (2009) 33, pp. 9–30; Sujit Sivasundaram, 'Sciences and the global: on methods, questions, and theory', *Isis* (2010) 101, pp. 146–58; Neil Safier, 'Global knowledge on the move: itineraries, Amerindian narratives, and deep histories of science', *Isis* (2010) 101, pp. 133–45; Gabriela Soto Laveaga and Pablo F. Gómez, 'Introduction', *History and Technology* (2018) 34, pp. 5–10; James Delbourgo, 'The knowing world: a new global history of science', *History of Science* (2019) 57, pp. 373–99.

12 Steven Shapin, *The Scientific Revolution*, Chicago: The University of Chicago Press, 1996; Carla Nappi, 'The global and beyond: adventures in the local historiographies of science', *Isis* (2013) 104, pp. 102–10; Amit Prasad, 'West-centric divide, global health, and postcolonial intervention', *Science & Technology Studies* (2017) 30, pp. 66–74.

13 Paula Findlen, 'Objects of history: the past materialized', *History and Theory* (2020) 59, pp. 270–82; Giorgio Riello, 'The "material turn" in world and global history', *Journal of World History* (2022) 33, pp. 193–232.

14 This is a point also made by Fa-ti Fan in 'The global turn in the history of science', *East Asian Science, Technology and Society* (2012) 6, pp. 249–58.

15 Despite the fact that Elshakry made this comment in 2010, the direction of the historiography has not changed much since then. Marwa Elshakry, 'When science became western: historiographical reflections', *Isis* (2010) 101, pp. 98–109, 108.

the next in early modern Ottoman science and beyond overlooks the various ways knowledge has looped and contorted.

Loose knowledge: extending Ottoman medicine outwards

Training its lens on medicine – a subject that infused many aspects of life in the Islamic worlds – my empirical analysis here takes flight fully from the liminality of medicine between the historical, material and spiritual worlds.¹⁶ Let me begin with a brief preamble on the early modern distinctions between science (*epistêmê*) and craft (*technê*). Science, in modern understanding, is ‘neither deductive nor logically necessary; and it most certainly deals with matter and change’.¹⁷ In the sixteenth and seventeenth centuries, the sciences and crafts were not mutually exclusive; in fact, they ‘cross-fertilized one another in ways that transformed both categories’.¹⁸ The in-betweenness of medicine both as craft and as science became the linchpin of Ottoman ways of knowing the natural world. Ottoman polymaths, physicians and medical practitioners pondered the ways in which medicine as craft could be teachable for public utility either via a set of precepts and maxims or via simple how-to instructions.

Loosely translated as ‘medicine’ today, *tibb* (learned medicine) has a specific history involving the amalgamation of various forms of knowledge in the vast regions stretching between South East Asia and Iberia where Islam was a prominent component of culture and regimes of knowledge before the modern period. *Tibb*, indeed, represents the capaciousness of its engagements with distinct forms of knowledge, ranging from the transmission of Greek medical knowledge to medical opinions attributed to the Prophet Muhammad called ‘prophetic medicine’.¹⁹ The varied religious and cultural identities of practitioners of *tibb* included not just Muslims but also Jews, Christians and Hindus.²⁰ From ‘the Balkans to Bengal’, various physicians and practitioners of medicine produced in the cosmopolitan registers of Arabic, Persian and Hebrew, while themselves speaking in a variety of vernacular languages that did not always gain visibility in textual scholarship.²¹ While this rich tradition has fostered a steady stream of modern publications on medieval *tibb*, our understanding of early modern science and medicine in the Middle East is still insufficient in comparison with the so-called ‘golden age’ of the Islamic sciences.

In the burgeoning medical market of an Ottoman imperial city, there were certain kinds of question that resonated with the issues animating European natural philosophy. The expansion of the early modern drug trade required a new sort of engagement with inherited knowledge. Widely and loosely used in the late seventeenth century among learned medical writers, *tibb-ı cedid* (new medicine) demanded a new commitment to provisioning information management, conditioning rivalry at the medical marketplace, and

16 I use ‘Islamic’ instead of ‘Islamicate’ following Shahzad Bashir’s criticism of the latter as used by Marshall Hodgson. The Islamic/Islamicate distinction is about what belongs to the category of ‘religion’; however, the term ‘Islamicate’ defines Islam as a timeless entity ‘that exists apart from the thoughts, actions, and circumstances of Muslims who profess belief in it’. See Shahzad Bashir, ‘On Islamic time: rethinking chronology in the historiography of Muslim societies’, *History and Theory* (2014) 53, pp. 519–44, 527.

17 Lorriane Daston, *Rules: A Short History of What We Live By*, Princeton, NJ: Princeton University Press, 2022, p. 46.

18 Daston, op. cit. (17), p. 46.

19 Irmeli Perho, *The Prophet’s Medicine: A Creation of the Muslim Traditionalist Scholars*, Helsinki: Finnish Oriental Society, 1995.

20 Helen E. Sheehan and S. J. Hussain, ‘Unani tibb: history, theory, and contemporary practice in South Asia’, *Annals of the American Academy of Political and Social Science* (2002) 583, pp. 122–35; Seema Alavi, *Islam and Healing: Loss and Recovery of an Indo-Muslim Medical Tradition, 1600–1900*, Basingstoke: Palgrave Macmillan, 2008.

21 Shireen Hamza, ‘Vernacular languages and invisible labor in Ṭibb’, *Osiris* (2022) 37, pp. 115–38.

responding to the urgent expectations of diverse communities.²² Simply put, *tibb-ı cedîd* historiographically signifies a Paracelsian movement in the early modern Ottoman context, yet the term has prompted some issues among modern historians precisely because both the chemical ingredients and methods were already present in Istanbul before the emergence of new medicine. According to Harun Küçük, such interpretive challenges stem from ‘the assumption that the familiar canon of Islamic medicine, most notably Avicenna’s *Canon of Medicine*, was still central to concerns of Istanbul’s physicians’.²³ In fact, the works of imperial head physician Emir Çelebi (Seyyid Mehmed el-Tabib, d. 1638) suggest an epistemological crisis in Ottoman medical scholarship even before the direct engagement with Paracelsian practices.

Following his medical education in Edirne, Emir Çelebi pursued further medical knowledge in Cairo, where he succeeded in securing a prestigious position at the Qalawun Hospital until 1622. Additionally, he served as the personal physician to Ottoman chief admiral Recep Pasha during his stay in Cairo before ultimately relocating to Istanbul. Once in Istanbul, he served as the chief physician to successive sultans. However, Emir Çelebi’s tenure in this esteemed position drew the ire of influential adversaries, who reported on the physician’s opium addiction to the Sultan. As Murad IV (r. 1623–40) maintained a strong stance against tobacco and opium consumption, he reacted with fury, and during a game of chess with Emir Çelebi, he compelled the physician to ingest a lethal dose of opium that led to his untimely demise.²⁴ It is worth noting that Emir Çelebi’s *Enmûzecü’t-tibb* (Paragon of Medicine) included a definition of opium (*afyon*) as solely a pleasure-inducing substance, rather than a medicinal one. In line with the commonly held belief of his time, he observed that ‘the people of this era excessively consume opium and coffee for the sake of pleasure’.²⁵ To counter the adverse effects of opium consumption on the body, he provided some simple recipes within his work.

Enmûzecü’t-tibb (1624) conveys Emir Çelebi’s sceptical stance toward the exclusive reliance on the textual tradition in medical writing, which allowed little room for experience and experimentation in the profession. While he did not necessarily use the term *cedîd* (‘new’) for the medical practice for which he advocated, he underlined a temporal distance by differentiating *mütekaddimûn* (predecessors) from *müteahhirûn* (successors) in scholarship.²⁶ This distinction equipped Çelebi with a conceptual framework for constructing a novel account of medicine in Ottoman lands. The basic principles of the former medicine in suggesting universal qualities for all the known medicinal substances had never been questioned – until he did it in a comprehensive way.²⁷ Despite including descriptive pharmacopoeias based on the Islamic corpus, Emir Çelebi explicitly rejected the notion that prescribing useful recipes should be the ultimate objective of a learned physician. He directed much invective at his fellow physicians who depended solely on the ancient accounts to determine the use of a medicinal substance. Prescribing substances based solely on their humoral qualities could be misleading, as nature displays variations in different geographies. As an example, he mentioned the scammonia plant (*mahmûde*), which had had different characteristics in the times of Ibn Sina (Avicenna) and had evolved over time. Moreover, scammonia cultivated in different locations exhibited distinct qualities, with Istanbul’s scammonia having different effects on the body than that indigenous to

22 For a general view of Ottoman engagements with European medical practices see Ebru Boyar, ‘Medicine in practice: European influences on the Ottoman medical habitat’, *Turkish Historical Review* (2018) 9, pp. 213–41.

23 Küçük, op. cit. (6), 143–4.

24 Ayşegül Demirhan Erdemir, ‘Emîr Çelebi’, TDV İslâm Ansiklopedisi, at <https://islamansiklopedisi.org.tr/emir-celebi> (accessed 23 April 2023).

25 [Emir Çelebi, *Enmûzecü’t-tibb*], Süleymaniye Yazma Eserler Kütüphanesi, MS Mihrişah Sultan 342, 29b.

26 Arıcı and Aksoy, op. cit. (10), p. 848.

27 Emir Çelebi, op. cit. (25), 4a.

Egypt. Similarly, the people of Istanbul had distinct qualities, too: they were gentle and sensuous.

In response to this taxonomic challenge, Emir Çelebi promoted a new appreciation for nature as an object of study, emphasizing the need to understand the relationship between soil, climate, air and medicinal substances in order to observe those substances' properties. He further buttressed the novelty that his meticulous work offers: 'this book of mine ... is concomitant with the temperament and necessities of the men of this day'.²⁸ Yet only when the reader acts (*amel ederse*) using the concept of his book instead of merely following and applying its content can he be certain of his own practice.²⁹

Emir Çelebi's discursive departure from conventional scholarship was centred on the human body, which he provocatively characterized as an empirical object for physicians. He emphasized the critical role of experience and practice in acquiring medical knowledge, underlining that Muslim physicians lacked experience with dissection and therefore were exclusively reliant on medical texts.³⁰ To achieve complete mastery of medicine, he argued, observing a skilled practitioner proficient in dissection was essential. However, when that was not possible, physicians should work on the deceased bodies of war casualties or on animals, such as swine and monkeys, that share similar anatomical structures with humans.³¹ Emir Çelebi's approach reflected a shift toward a more experiential and practical approach to medicine, where the human body and the observation of nature played a key role.

Emir Çelebi's descriptions of the nerves and organs in *Enmûzecüt-tibb* suggest that he practised dissection himself. Similarly, he listed anatomical experience among the ethical standards physicians should follow. Moral integrity, as a combination of self-doubt, sensibility, and consultation with fellow physicians, was a quality constantly demanded from physicians in the eyes of Emir Çelebi. He also stressed that proper medical thinking was a process distilled through logic, which could be executed thoroughly by studying philosophy along with the mathematical and natural sciences (*ulum-i riyazi ve tabiiye*). Yet prudence stands in caution; otherwise the physician could easily fall under the illusion that he was the main agent of healing, forgetting the will of God. To Emir Çelebi, the relevance of this fallacy was nowhere clearer than in the case of astrologers (*müneccims*) who indulged in the domain of overconfident autonomy. His acute concern with hierarchical agency, or final causality, in the process of healing was evident – if a cautious physician acknowledged his intermediary position in attaining certain knowledge, his epistemic posture was not to be reduced to one comparable to the reckless state of astrologers. To Emir Çelebi, practices pursued by physicians and astrologers for the sake of reaching the truth were innately incommensurable due to the overconfidence astrologers had.³²

This robust insistence on anatomical experience marks a methodological crisis in Ottoman medical understanding. In fact, *Enmûzecüt-tibb* stands as one of the rare exemplary works mentioning *ilmü't-teşrih* (the science of dissection) in the early modern Ottoman context.³³ The scarcity of Ottoman anatomical works, compared to their European counterparts, has raised questions about the legitimacy of practising dissection in the Islamic world. While there is no unified Sunni Islam across time, it pays to say a few words about generic Islamic attitudes toward dissection. As Vardit Rispler-Chaim clarifies,

28 Emir Çelebi, op. cit. (25), 4b.

29 Emir Çelebi, op. cit. (25), 4b.

30 Emir Çelebi, op. cit. (25), 7a.

31 Emir Çelebi, op. cit. (25), 365b.

32 For a survey on astronomers in the Islamic worlds see Stephen Blake, *Astronomy and Astrology in the Islamic World*, Edinburgh: Edinburgh University Press, 2016.

33 Esin Kahya, 'Teşrih', TDV İslâm Ansiklopedisi, at <https://islamansiklopedisi.org.tr/tesrih> (accessed 8 June 2020).

'prior to the twentieth century, postmortems as an independent subject were not mentioned in the Islamic legal literature'.³⁴ Perceiving the human body as a trust instead of private property, Islamic philosophy and ethics 'were reluctant to discuss such violations'.³⁵ Yet learned travellers to Ottoman lands, such as the naturalist Luigi Ferdinando Marsigli (1658–1730), pondered the relative lacuna of dissection in Ottoman practices of science and circulated even further the biased assumption that the Qur'an prohibited mutilation of the Muslim body for the sake of studying anatomy. Marsigli attributed this alleged taboo to the belief that the soul does not immediately leave the body at the time of death. As a result, if the body happens to be dismembered, the patient may still suffer even though they are already deceased.³⁶ Marsigli's reasoning reflects a legacy that survived into later decades. In his *Della letteratura turchesca* (1787), the Venetian author Giambattista Toderini cites Marsigli on the same perplexing issue and adds a footnote on how Turks hold different opinions regarding dissection. To dispel his own confusion, he even wrote a petition requiring clarification from the *shaykh al-Islam* (the chief juriconsult) but to no avail.³⁷

As Emilie Savage-Smith remarked, modern historiography also claimed that dissection was prohibited by law in Islam.³⁸ Yet premodern documents suggest insufficient evidence to consolidate this persistent claim that reflects religious doctrines as being not so conducive to science. Likewise, Emir Çelebi's emphasis on the internal workings of the body indicates a shift toward a more empirical approach to medicine by differentiating physical from spiritual medicine (*ilm-i ruhani*). His argument on dissection (*tashrih*) reveals the dynamics behind the transformations of ontologies and epistemologies related to the ideas of human corporeality and the natural world in Ottoman ways of knowing.³⁹

Enmûzecü't-tibb plays a vital role in our understanding of the emergence of first-hand experience as the predominant agent for knowledge production in seventeenth-century Istanbul. Emir Çelebi was definitely on to something, but he was not very sure about what exactly to suggest to his fellow physicians. He tried his hand at different domains of knowledge and underlined a difference between theory and practice, yet his epistemic discontent with the actual state of medicine was not an end in itself. His work's open-ended state prompts us to reconsider the role of dialectical encounters in stimulating knowledge exchange. It is important to note that the crisis within the Islamic medical tradition did not arise solely from interactions with European experiential breakthroughs. On the basis of Emir Çelebi's representative work, one might argue that, over the course of the seventeenth century, the Ottoman interest in European 'new medicine' evolved in parallel to this pre-existing epistemological trajectory, which deepened the discrepancy between empirically based medicine and the learned medical establishment. Whereas Ottoman interest in Paracelsianism has often been read as springing from hindsight on the epistemic failures of their former intellectual tenets, it is imperative to disentangle this causal narrative from our local global histories both chronologically and

34 Vardit Rispler-Chaim, 'Postmortem examinations in Egypt', in Muhammad Khalid Masud, Brinkley Morris Messick and David Stephan Powers (eds.), *Islamic Legal Interpretation: Muftis and Their Fatwas*, Cambridge, MA: Harvard University Press, 1996, pp. 278–85, 278.

35 Rispler-Chaim, op. cit. (34), p. 278.

36 Luigi Ferdinando Marsigli, *Stato militare dell'Imperio Ottomano, incremento et decrement del medesimo: L'Etat militaire de l'Empire Ottoman, ses progrès et sa decadence*, The Hague, 1732, p. 39.

37 Giambattista Toderini, *Türklerin Yazılı Kültürü ve Edebiyatı* (tr. Mehmet Serdar Bekar), Istanbul: Yeditepe, 2018, p. 82.

38 Emilie Savage-Smith, 'Attitudes toward dissection in medieval Islam', *Journal of the History of Medicine* (1995) 50, pp. 67–110; Nahyan Fancy, 'Anatomy', in Peter Pormann (ed.), *1001 Cures: Contributions in Medicine and Healthcare from Muslim Civilisation*, Manchester: FSTC, 2018, pp. 42–51.

39 Emir Çelebi, op. cit. (25), 364a–365b.

conceptually. The increasing intensity of medical crisis made Paracelsianism relevant as one possible route, yet it was only a step on the way to solving a bigger problem rather than a quick fix for the ongoing crisis in Ottoman medical scholarship.

The liminality of bodily waste

Early modern Ottoman medical culture housed diverse medical and healing traditions.⁴⁰ Over the course of the seventeenth century, the inclusiveness of Ottoman medical writing expanded even further along with the increased availability of foreign medicinal substances in urban settings. Learned medics and practising physicians were not the only group that held claims to localized medical knowledge, since historians, jurists and Sufis executed their agency in laying out the contours of leading a healthy life.⁴¹ These non-medical experts mediated and disseminated knowledge through providing a relevant vocabulary for the common culture. The epistemological basis of the Islamic sciences was mediated by men of religion employing a diverse array of methods ranging from jurisprudence to *kalām*.⁴² Precarious substances such as coffee, hashish and tobacco became the subjects of debates regarding both the bodily and the social effects of these substances and the legal implications of consuming them.⁴³

Precisely because of its prudential nature, medical knowledge operated at differing levels of expertise and common sense, coordinating interaction between knowledge holders – both physicians and laypersons – and patients.⁴⁴ Tracing the footsteps of medieval scholars in the various lands of Islam, Ottoman scholars were committed to producing medical texts in four main categories to address multifarious needs: introductory treatises for students, manuscripts on single topics, medicinal encyclopedias and handbooks, and commentaries.⁴⁵ A historian of ambitious encyclopedic compilations, Hezarfenn Hüseyin Efendi (d. 1691), for example, merged home remedies and classical medicine in his medicinal encyclopedias.⁴⁶ Written in accessible vernacular Turkish, his pharmacopoeias presented simple recipes for broad audiences, including those who did not have any medical training. While the cures were introduced through a Galenic humoral framework, the prefaces in Hezarfenn's pharmacopoeias highlight the porosity and plurality of his approaches to medical knowledge. These works of compilation were the harvest of his self-study and encyclopedic erudition. Yet Hezarfenn also kept a beady eye out for experiential knowledge to test whether simple medicines had already

40 Miri Shefer-Mossensohn, *Ottoman Medicine: Healing and Medical Institutions, 1500-1700*, Albany: State University of New York Press, 2009. On early modern Ottoman experiences of plague see Nühket Varlık, *Plague and Empire in the Early Modern Mediterranean World: The Ottoman Experience, 1347-1600*, Cambridge: Cambridge University Press, 2015.

41 On Sufis and practices of healing during times of plague see John Curry, 'Scholars, Sufis, and disease: can Muslim religious works offer us novel insights on plagues and epidemics among the medieval and early modern Ottomans?', in Nühket Varlık (ed.), *Plague and Contagion in the Islamic Mediterranean*, Kalamazoo, MI: Arc Humanities Press, 2017, pp. 27-55.

42 Justin Stearns, 'Writing the history of the natural sciences in the pre-modern Muslim world: historiography, religion, and the importance of the early modern period', *History Compass* (2011) 9, pp. 923-51.

43 Islam Dayeh, 'Islamic casuistry and Galenic medicine: hashish, coffee, and the emergence of the jurist-physician', in Carlo Ginzburg and Lucio Biasiori (eds.), *A Historical Approach to Casuistry: Norms and Exceptions in a Comparative Perspective*, London: Bloomsbury Academic, 2020, pp. 132-50.

44 Steven Shapin, 'Trusting George Cheyne: scientific expertise, common sense, and moral authority in early eighteenth-century dietetic medicine', *Bulletin of the History of Medicine* (2003) 77, pp. 263-97.

45 Peter E. Pormann, 'Medicine', in Sonja Brentjes, Peter Barker and Rana Brentjes (eds.), *Routledge Handbook on the Sciences in Islamicate Societies: Practices from the 2nd/8th to the 13th/19th Centuries*, London: Routledge, 2023, pp. 130-9, 131.

46 For a brief list of Hezarfenn's writings see Mücteba İlgürel, 'Hüseyin Efendi, Hezarfen', TDV İslâm Ansiklopedisi, at <https://islamansiklopedisi.org.tr/huseyin-efendi-hezarfen> (accessed 30 March 2023).

been tried and proven to be effective (*güzide ve mücerreb müfredât*), since he uneasily underlined the risks of dealing with unknown and rare substances.⁴⁷

Such sources, however, are rarely subjects of global histories on the presumption that they reflect a deadlock in knowledge making. Perhaps, then, to speak of other texts in which bodily waste appears as medicinal substances might constitute the very summation of this wilful disregard in the current historiography. The incommensurable horizon of their reconciliation refers to two extremes in the scholarship: materialist globalization and enigmatic folk medicine. Despite its extensive use globally, folk medicine often remains an insular subject, since it is far less visible in the historiography on global science.

Take, for example, Hekim Dendani's Turkish translation of physician and philosopher al-Suwaydî's (1204–92) memorandum book (*Tadhkirah*).⁴⁸ Presenting various medicaments extracted from an extensive corpus of Islamic, Greek and other resources, *Tadhkirah* included magical and occult remedies. As a lay and disabled practitioner, Hekim Dendani was self-educated in medicine, and he often made clear how much he learned from his conversations with fellow physicians.⁴⁹ Working intimately and intensively with experienced physicians, Dendani presented himself as in sovereign command of both the Islamic tradition and the newly circulated Paracelsian medicine. His translation of *Tadhkirah* was part of the ongoing enterprise of vernacularization of the literature on self-care in seventeenth-century medicine. Yet it also shows how opportunity-minded practitioners were interested in a wide range of sources. Every now and then, they saw relevance in enigmatic texts and often took inspiration from these potentially controversial sources.

The recipes Dendani faithfully included in his translation present materia medica in its absolute plenitude; from menstrual blood to smoked flies, serendipitous substances were everywhere available – be they in the backyard garden or from one's own body.⁵⁰ Against eye pain, a recipe suggests applying a religious man's saliva. Fried flies can cure eyelash loss. What can someone use immediately if still drunk at prayer time? Or, how one can get rid of an annoying bug that went into their ear? Apart from these otherwise mundane disturbances, one should try out wearing a ring made of donkey hooves to prevent possession. Body hair, urine and menstrual blood are no longer impure entities in the trap of conundrums, but they are liminal substances that might be repurposed in the hidden potentiality of the natural world. For those with limited access to costly global drugs at the market, Dendani presented provisional and thrifty ways to treat oneself at home.⁵¹

Insofar as there is no unifying term for the 'supernatural' in classical Ottoman Turkish, the very idea had a continued presence in astrology, dream interpretation and medical treatises especially against plague.⁵² Over the course of the seventeenth century, in particular, Ottoman perceptions of the occult began to transform under pietistic movements

47 Duygu Yıldırım, 'Bevanda asiatica: scholarly exchange between the Ottomans and Europeans on coffee', *Journal of Ottoman Studies* (2020) 56, pp. 25–48, 40–1.

48 Ali Haydar Bayat, 'İbnü's-Süveydî', TDV İslâm Ansiklopedisi, at <https://islamansiklopedisi.org.tr/ibnus-suveydi> (accessed 25 March 2023). On *The Epitome of Suwaydî's 'Memorandum Book'*, see the website Islamic Medical Manuscripts at the National Library of Medicine, www.nlm.nih.gov/hmd/arabic/ther4.html.

49 Küçük, op. cit. (6), p. 153.

50 For the transcription and facsimile of the manuscript see Gürkan Kanaatli, 'Hekîm-i Dendânî Mehmed Bin Ahmed'in *Terceme-i Muhtasar-ı Müfîd Fî 'ilmî't-tıbb* adlı eseri (Vr. 4b–28b) (İnceleme-metin-dizin-tıpkıbasım)', Yüksek Lisans Tezi, Marmara Üniversitesi, 2018.

51 For a comparison with 'thrifty' attitudes in scientific practice in early modern Europe see Simon Werrett, *Thrifty Science: Making the Most of Materials in the History of Experiment*, Chicago: The University of Chicago Press, 2019.

52 Marinou Sariyannis, 'Studying Ottoman views of the supernatural: the state-of-the-art and a research agenda', *Acad'ib: Occasional Papers on the Ottoman Perceptions of the Supernatural* (2020) 1, pp. 5–20.

that denied supernatural apparitions in the mundane world. In the face of such tensions, Dendani recognized the relevance of bodily waste as diversionary things in the midst of overwhelming chunks of medicinal information regarding new and foreign substances that many people did not have the wherewithal to try out.

Moving across long-distance trade, materials and medicinal substances obtained many lives, changing their meanings in distant settings, as historical studies in material culture have shown.⁵³ Despite the fact that Dendani's interest in using bodily waste as medical treatment was shared across different early modern worlds, such practices have not been fully registered in the narratives on global science except for some occasional gestures. As Justin Stearns has shown, for example, recipes from seventeenth-century Morocco include 'contraceptives such as drinking the urine of a ram or menstrual blood to prevent pregnancy forever, or smearing civet musk on one's penis to prevent pregnancy on a one-off basis'.⁵⁴ Likewise, missionary pharmacopoeias like that of the Jesuit Johannes Steinhöffer (1664–1716) incorporated indigenous medical knowledge in which bodily waste emerges operative: '(although unpleasant) it is effective to squeeze the juice of stallion's *buñigas* [dung] when the patient is a man; and from a mare, if a woman, and give it as a warm drink'.⁵⁵ The phenomenal appearance of such everyday substances cast out of the disenchanting world of medicine often falls under the static category of 'occult'. In fact, 'magical', 'supernatural', and 'occult' are not helpful descriptors at all, in part because they obscure, rather than clarifying, the basis on which the recipes were being deemed efficacious. Otherwise put, bodily waste has a copular function, as a site at which the presumed antinomies of learned and lay medicine, pure and impure, rational and superstitious, overlap for a wider readership.

Knowledge is bent when knowledge seekers find relevance in equivocal, incomplete and simply quotidian things. By mining and thinking through, and with fragmentary knowledge and liminal substances, they moved beyond the refined objects of the empirical world into revealed ones. Similar to various other grand narratives that rendered such revocable practices invisible and irrelevant, many case studies like the ones examined here 'have long been considered illiterate and parochially provincial'.⁵⁶ Dendani's efforts were directed toward a contingent future with a promise of certain knowledge that could be obtained only through trying out safely at home. Such recipes 'instantiate the active fulfillment of futuristic knowledge only when they are performed'.⁵⁷ While they may

53 Pamela H. Smith and Paula Findlen (eds.), *Merchants and Marvels: Commerce, Science, and Art in Early Modern Europe*, London and New York: Routledge, 2002; Pamela H. Smith and Benjamin Schmidt (eds.), *Making Knowledge in Early Modern Europe: Practices, Objects, and Texts, 1400–1800*, Chicago: The University of Chicago Press, 2007; Laurel Thatcher, Ulrich Ivan Gaskell, Sara Schechner and Sarah Anne Carter, *Tangible Things: Making History through Things*, New York: Oxford University Press, 2015; Anne Gerritsen, 'From long-distance trade to the global lives of things: writing the history of early modern trade and material culture', *Journal of Early Modern History* (2016) 20, pp. 526–44; Sarah Easterby-Smith, 'Recalcitrant seeds: material culture and the global history of science', *Past & Present* (2019) 242, Supplement 14, pp. 215–42; Mackenzie Cooley, Anna Toledano and Duygu Yıldırım (eds.), *Natural Things in Early Modern Worlds*, London and New York: Routledge, 2023.

54 Justin Stearns, 'Medicine, God, and the unseen in eleventh/seventeenth-century Morocco', *Early Science and Medicine* (2021) 26, pp. 459–79, 474.

55 Johannes Steinhöffer, *Florilegio medicinal de todas las enfermedades*, México, 1712, p. 122. I am grateful to Sebastian Kroupa for bringing this source to my attention.

56 Jorge Cañizares-Esguerra, 'The imperial, global (cosmopolitan) dimensions of nonelite colonial scribal cultures in the early modern Iberian Atlantic', in Joan-Pau Rubiés and Neil Safier (eds.), *Cosmopolitanism and the Enlightenment*, Cambridge: Cambridge University Press, 2023, pp. 144–76, 176.

57 Debapriya Sarkar, *Possible Knowledge: The Literary Forms of Early Modern Science*, Philadelphia: University of Pennsylvania Press, 2019, p. 59. For the loosening of knowledge structures in early Stuart England see Vera Keller, *The Interlopers: Early Stuart Projects and the Undisciplining of Knowledge*, Baltimore: Johns Hopkins University Press, 2023.

not be offering the ‘new’ knowledge we are so circumscribed to look for, the hope for certainty drives Dendani’s translations from older texts. As such, these recipes are precisely the foils against which circulation-based ‘new’ histories have defined science – one that has directionality and holds onto its essence in spite of moving around the world.

What the current historiography on the global history of science neglects, to a large extent, is the role of so-called ‘occult’ or ‘supernatural’ means in shaping scientific practice.⁵⁸ While models of circulation pinpoint only certain sorts of motive and visibility in global science, what is often missed as merely ‘occult’ is the missing piece.⁵⁹ Yet different currents of discomfort with the information overflow and the relevance of bodily waste – blood, saliva and hair – were indeed shared across distinct early modern worlds, despite lingering on the margins of modern scholarship. As less abstract, traceable and materialist forms of knowledge outweigh a Eurocentric global history of science from a provincially post-seventeenth-century perspective, historiography falls back on an *a priori* assumption that imposes a monolithic thought-world. In fact, the long shadow of Weberian disenchantment still monopolizes our historical narratives on global science. This positivist narrative arc gestures toward a deeper and deeper certainty about what really mattered in science, while at the same time obscuring possibilities that uncertainty was once able to afford. The materialist craving was the fuel for mechanisms of exploitation and colonialism in science, yet the brute worldliness of such projects should not blind us to the incessant blend of material and spiritual aspirations especially in early modern worlds.

Conclusion

At the cusp of its historiographical relevance, the history of Ottoman science reflects unsolicited and often missed encounters in scholarship.⁶⁰ If we grant that Ottoman science bears little relevance and ‘practical importance’ as yet another example of ‘area studies’, but a great deal if situated in global history by eliding its locality, we should maybe seek to differentiate or even treat as opposites what relevance there is for dominant trends across disciplinary boundaries. There is, perhaps, more nuance to be added to this teleological stance beyond the presumed paucity of the archival materials available for writing such histories. Yet, now that there is a global turn in the scholarship that tends to evade particularity lest it seem too area-specific, Ottoman science ostensibly risks once again being reduced to the history of non-Western science 2.0.

58 Mathew Melvin-Koushki, for example, envisions the post-Mongol age to have been characterized by the utilization of occult science in the pursuit of building empires. In his own words, ‘More than any other object of historical and anthropological study, Islamicate occult science cuts to the quick of what it means to be modern, to be Western, to be scientific.’ Mathew Melvin-Koushki, ‘Is (Islamic) occult science science?’, *Theology and Science* (2020) 18, pp. 303–24. For some of his numerous writings on this subject see also Mathew Melvin-Koushki, ‘How to rule the world: occult-scientific manuals of the early modern Persian cosmopolis’, *Journal of Persianate Studies* (2018) 11, pp. 140–54; and Melvin-Koushki, ‘Another scientific revolution’, in Brentjes, Barker and Brentjes, op. cit. (45), pp. 328–39.

59 Liana Saif, Francesca Leoni, Mathew Melvin-Koushki and Farouk Yahya (eds.), *Islamicate Occult Sciences in Theory and Practice*, Leiden: Brill, 2020.

60 On cross-cultural encounters in the early modern period see Kapil Raj, *Relocating Modern Science: Circulation and the Construction of Knowledge in South Asia and Europe, 1650–1900*, New York: Palgrave Macmillan, 2007; Simon Schaffer, Linda Roberts, Kapil Raj and James Delbourgo (eds.), *The Brokered World: Go-Betweens and Global Intelligence, 1770–1820*, Sagamore, MA: Science History Publications, 2009; Sanjay Subrahmanyam, *Three Ways to Be Alien: Travails and Encounters in the Early Modern World*, Waltham, MA: Brandeis University Press, 2011; Daniela Bleichmar and Peter C. Mancall (eds.), *Collecting across Cultures: Material Exchanges in the Early Modern Atlantic World*, Philadelphia: University of Pennsylvania Press, 2011; Miles Ogborn, ‘“It’s not what you know ...”: encounters, go-betweenes and the geography of knowledge’, *Modern Intellectual History* (2013) 10, pp. 163–75; Mary Terrall and Adriana Craciun (eds.), *Curious Encounters: Voyaging, Collecting, and Making Knowledge in the Long Eighteenth Century*, Toronto: University of Toronto Press, 2019.

Although ‘the decline paradigm’ attributed to the seventeenth-century Ottoman state has been aptly critiqued in the historiography by highlighting the changes in political power and centralization policies on the eve of modernity, the odour of the declinist framework hangs heavy in our discussions of what Ottoman science looked like.⁶¹ Aside from methodological uncertainties, what is persistent is the search for commensurable episodes of allegedly innovation-driven change in the history of Western science. In hailing the growing interest in the global turn, Ottoman studies recently have sought to foreground tapestries of plural and variegated histories of science in the Ottoman Empire.⁶² Yet defining what constituted Ottoman science per se remains formidably difficult. At the nexus of its affinities and divergences, scholarship on Ottoman science is already divided between two lines: there is one side that cleaves to state-centric explorations that focalize the agency of the Ottoman state in shaping and regulating science and medicine, while others have insisted on entangled components of knowledge through cross-cultural interactions.⁶³ There are, of course, concurrences between these historiographical tendencies, yet time and again epistemological boundaries persistently reinscribe the divide between area studies on the one hand and, on the other, a Eurocentric global history of science that reshuffles diverse non-Western practices and distinct ways of knowing under the ‘global’ carpet. The fact that the early modern Ottoman Empire was not directly linked to contemporaneous European colonial aspirations makes historiographical rubrics of ‘colonial bioprospecting’ and ‘exoticism’ even less relevant to Ottoman science. This is why, despite the evolving interest, Ottoman knowledge-making praxes remain, by and large, footnotes to the history of science and medicine.

While the dominant historiography of global science imposes a single definition of ‘new’ that is imbued with (ex)change and progress, it also rescinds possibilities that exist beyond such limits. But historical actors saw distinct worlds in plurality and potentiality. Rather than determining what was ‘new’, early modern Ottoman scholars fashioned newness as an epistemic tool for speculating about what knowledge should look like in the future. Was their engagement with the new a form of knowing or of doing? If ‘doing’ is science and ‘knowing’ is erudition, where does attentiveness to the future abide? Emir Çelebi’s and Dendani’s texts are not merely instances of a shift from knowing (*ilm* or *gnosis*) to doing (*amal* or *praxis*) in Ottoman learned culture; they capture the moments in which uncertain predictions and possible resolutions might be obtained from the intersection of the two. They ran to and fro, and projected a malleable design for the future shape of knowledge. These vague characteristics might seem less appealing to our selective gaze toward what the history of science should be, but are more inviting to recent trends in the history of knowledge. Yet, to borrow from Taylor M. Moore, ‘this turn cannot help but feel like another polite ushering away from the grand arena of the

61 For some key studies on the question of the decline of Ottoman political power see Cemal Kafadar, ‘The question of Ottoman decline’, *Harvard Middle Eastern and Islamic Review* (1998) 4, pp. 30–75; Baki Tezcan, *The Second Ottoman Empire: Political and Social Transformation in the Early Modern World*, Cambridge: Cambridge University Press, 2010.

62 On Ottoman imperial science in relation to environmental history see Alan Mikhail, *Nature and Empire in Ottoman Egypt: An Environmental History*, Cambridge: Cambridge University Press, 2011.

63 Sonja Brentjes, *Travellers from Europe in the Ottoman and Safavid Empires: Seeking, Transforming, Discarding Knowledge*, Burlington: Variorum, 2010; Avner Ben Zaken, *Cross-cultural Scientific Exchanges in the Eastern Mediterranean, 1560–1660*, Baltimore: Johns Hopkins University Press, 2010; Palmira Brummett, *Mapping the Ottomans: Sovereignty, Territory, and Identity in the Early Modern Mediterranean*, New York: Cambridge University Press, 2015. On premodern astronomy between Islamic science and the European Renaissance see George Saliba, *Islamic Science and the Making of the European Renaissance*, Cambridge, MA: MIT Press, 2007.

history of science and another way of maintaining the stronghold on the field by scholars of and from the Global North'.⁶⁴

Ottomans' own diversity in defining 'new' has also resulted in a challenge to define what was indeed new about Ottoman science for modern scholars. This belatedness of the history of 'new' Ottoman science with all of its variations points to an imperative for a more capacious and diverse critical historiography. The failure to identify the relevance of Ottoman science occasioned by our own epistemic priorities requires us to drive critique both ways: the disposability of analytical tools safeguarded by area studies can engender a form of relevance set up between the local and the global, while, at the same time, such crossings are able to unfold the open-ended question whether histories of non-Western science are already intrinsically global, and thereby to place them in contraposition to the all-encompassing derivative force of locality. For one thing, it can be easily asserted that all factual knowledge on the move is necessarily mediated and reproduced in local production. Locality, in this light, is read as subsidiary to measure proximity and distance to global currents. Yet acknowledging stopgaps and loose, equivocal strategies in knowledge making can leave larger room for non-Western contexts such as the Ottoman Empire to come into their own orbit. Rather than shared methods, discoveries and inventions, what early modern cultures held more in common, perhaps, were gaps of knowledge.

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⁶⁴ Taylor M. Moore, 'An (un)natural history: tracing the magical rhinoceros horn in Egypt', *Isis* (2023) 114, pp. 469–89, 471 n. 9.

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