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Τὰ μαθήματα for Byzantinists*

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This article presents a brief historiographical survey of scholarship on the history of science and history of knowledge in Byzantium since the 1920s and proposes several directions for future research. These include the study of instruments; of the language that Byzantine scientific texts, diagrams, and even instruments employ; the study of the involvement of women and of the knowledge created, transferred, and owned by non-elites. Ultimately, the article argues, a critical historiographical approach enables an understanding of the field of Byzantine studies as an element of the global and multidisciplinary systems of historical knowledge, including the history of science and the history of knowledge.

Keywords: history of science; history of knowledge; historiography; Byzantine studies

Why does it seem easier to think of contemporary scholars rather than of topics and themes when it comes to history of science and history of knowledge within Byzantine studies? This was the question that initially prompted this contribution and gave it its direction. Fifteen years ago, in a medieval studies department, I was taking my first steps into the history of the astral sciences in Byzantium with Nikephoros Gregoras and his astronomical works as my point of departure. I was reading Anne Tihon and David Pingree, among others, learning as much as I could about what was for me a new area (the history of astronomy and astrology in Byzantium), while remaining

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unaware that there was the whole discipline of history of science, with its historiography, major questions, methodologies, and debates. In 2020, *A Companion to Byzantine Science* was published, and one can only hope that it will facilitate and improve the integration of the history of science within Byzantine studies and conversely, of Byzantine material within history of science as a whole.[1] With this convenient teaching tool now available, both Byzantinists and historians of science can teach the history of the sciences in Byzantium within their undergraduate courses.[2] The publication of the Dumbarton Oaks symposium volume *The Diagram as Paradigm: Cross-Cultural Approaches* (2022),[3] together with ongoing research projects such as *DyAs*, *EIDA*, *The Sphere*, *VHS*, and *VoH*[4], indicate the recent and growing interest in scientific diagrams in manuscript cultures and print, which echoes the visual and material turns in the history of science. Sources produced in Byzantium are now being studied as an integral and integrated part of a wider medieval world.

Within Byzantine studies, however, the history of science is still a niche subject, and the history of knowledge is in its infancy. Few are the institutions in which a student is exposed to the history of the sciences in Byzantium as part of studying Byzantine history and culture. Similarly, sessions on the sciences are not systematically included in the International Congresses of Byzantine Studies. Until fairly recently, scholars of the sciences in Byzantium have not generally been publishing their research in the most prominent Byzantine studies journals such as *BMGS*.[5] A survey of all articles published in its pages since the appearance of the first issue in 1975 reveals that while not the preferred venue for historians of science and historians of knowledge, the back

1 S. Lazaris (ed.), *A Companion to Byzantine Science* (Leiden 2020).

2 Throughout this short paper I use the expression 'the history of the sciences' rather than 'history of science' when referring to the Byzantine context. Using this unconventional phrase is my operational solution for suspending the discussion as to how science should be defined for the Byzantine evidence. 'The sciences' translates *τὰ μαθήματα* which can be understood both in a strict sense as standing for the mathematical sciences and more broadly, as disciplinarily defined knowledge domains.

3 J. F. Hamburger, D. J. Roxburgh, and L. Safran (eds.), *The Diagram as Paradigm: cross-cultural approaches* (Cambridge MA 2022).

4 *DyAs* – Lines and Colours: Lunisolar Diagrams in Byzantine Astronomical Manuscripts (9th–15th C) <https://data.iledefrance.fr/pages/prfp-detail-en/?headless=true&q=id:2022-16#firstdiv> [accessed 22 March 2024]; *EIDA* – Editing and analysing hIstorical astronomical Diagrams with Artificial intelligence <https://eida.hypotheses.org/> [accessed 22 March 2024]; *The Sphere* – Knowledge System Evolution and the Shared Scientific Identity of Europe <https://sphaera.mpiwg-berlin.mpg.de/> [accessed 31 March 2024]; *VHS* – Computer Vision and Historical Analysis of Scientific Illustration <https://vhs.hypotheses.org/> [accessed 22 March 2024]; *VoH* – Visualization and Material Cultures of the Heavens in Eurasia and North Africa (4000 BCE–1700 CE) <https://www.mpiwg-berlin.mpg.de/research/projects/visualizations-of-the-heavens-working-group> [accessed 22 March 2024].

5 Research on science, technology and medicine in Byzantium does find a place in the pages of Byzantine studies journals (*BZ*, *REB*, *BMGS*, *RGBS*, *DOP*, *Estudios Bizantinos*, to name a few). It is difficult, however, to argue that there has been a consistent, purposeful, and systematic engagement with the promotion of this subfield. History of science journals such as *Isis*, *Centaurus*, *JHA*, *Almagest*, and so forth also publish studies of Byzantine material.

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numbers of *BMGS* nevertheless include a number of contributions on related topics. Best represented are discussions of military technology and equipment with five publications (Haldon 1975; Dennis 1981; Anastasiadis 1994; Dawson 1998 and 2007); followed by medicine with three (Tuerk 1999; Alwis 2012; Bouras-Vallianatos 2016); and silk production with two pieces (Shepard 1997; Wu 2022). Single articles have tackled issues related to glass production and mosaic manufacture (James 2006), dream interpretation (Calofonos 1985); history of astronomy and of astronomical instruments (Fisher 2012); and cartography (Arad 2023). In other words, were one to map the studies of the sciences in Byzantium based on *BMGS*, the emphasis would be on technology and medicine and the methods employed would be those of history, archaeology, and art history. My 'reconstruction' is not meant to suggest that *BMGS* has favoured an approach to the history of the sciences in Byzantium that lays emphasis on the practices creating knowledge and on its materiality, as well as on technology and medicine.[6] Nevertheless, the reader may find it interesting that as it stands, the *BMGS* selection presents an alternative to the historically more common approach focusing on the mathematical sciences. At the same time, the *BMGS* articles listed above, if published again today, would fit well into under the headings of history of technology and medicine, and history of knowledge.

Already at the beginning of the twentieth century the domains of mathematics, astronomy, and medicine, among others, were defined by the editors of the *Byzantinische Zeitschrift* bibliography as distinct thematic categories. As early as 1961, Milton V. Anastos organized a Dumbarton Oaks Symposium dedicated to the theme of *The History of Byzantine Science*. For Anastos, who had defended his doctoral thesis by 1940, the state of the subject twenty years later was such that a symposium was both feasible and needed in order to move the field forward. Anastos delivered two papers – *The Byzantine Concept of Science* and *Byzantine Training in the Sciences* – while other contributors such as Robert L. Van Nice, Harry A. Wolfson, Otto Neugebauer, Aubrey Diller, Marshall Clagett, Owsei Temkin, and Lynn Thorndike covered topics such as philosophy, astronomy, geography, architecture and engineering, mathematics and physics, medicine, astrology, and magic. The general observations formulated by Anastos in his report published a year later would become the predominant understanding shared by Byzantinists and non-Byzantinists alike for decades to come: 'it should not be assumed that the Byzantines were altogether unimaginative or completely unworthy of attention in the history of science. They attained significant results in many areas... Byzantine science would undoubtedly have reached even greater heights, had it not been for the debilitating force of traditionalism.'[7] More than a decade later, in his first Variorum Collected Series volume *Studies in Byzantine Intellectual History* (1979), Anastos included five articles on

6 The fourteen articles I singled out are a negligible number in the over six hundred articles, short notes, critical studies, and other pieces (excluding editorials, obituaries, and reviews) published by *BMGS* to date.

7 M. V. Anastos, 'The history of Byzantine science: report on the Dumbarton Oaks Symposium of 1961', *Dumbarton Oaks Papers* 16 (1962) 409–11 (411).

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geography and astronomy in a section titled *History of Science*. Nevertheless, in the four-page preface (1978), he summarized them in a single short paragraph, dedicating the rest to his theological studies. Finally, when reflecting in the same preface on the areas studied by intellectual history, in which 'Byzantium made contributions of permanent value and direct contemporaneous relevance',[8] Anastos distinguished art and architecture, law and theology, thus leaving the sciences aside.

Towards the end of the 1950s, René Taton published the first volume of the *Histoire générale des sciences* dedicated to the history of science in antiquity and the Middle Ages (1957).[9] A three-volume collective enterprise, the *Histoire* presented the first Francophone historical survey of the global history of science from its recorded beginnings up until the 1960s and was addressed to a general educated reader. It followed in the footsteps of earlier, equally if not more ambitious but unfinished projects such as the *Histoire des sciences* of Pierre Brunet and Aldo Mieli (1935)[10] and George Sarton's three-volume *Introduction to the History of Science* which reached the end of the fourteenth century and was published between 1927 and 1948.[11] Taton's *Histoire* has been reissued twice since the 1950s, in 1966 and in 1995. While the most recent publication is just a reprint, the 1966 edition included substantial revisions. Remarkably, it also added a section on the sciences in the medieval Slavonic world. The survey of the sciences in Byzantium, however, was already included as early as 1957. As remarked by one reviewer, '[i]t is pleasing to find a useful chapter on Byzantine science, that too-frequent blind spot in the Western medievalist's vision.'[12] Taton entrusted the section on Byzantine science to Jean Théodoridès (1926–99). A parasitologist and historian of biology and medicine, Théodoridès would twenty years later publish a short book on the biological and medical sciences in Byzantium[13] and in 1983 would contribute a paper on the treatment of rabies in Byzantium to the 1983 Dumbarton Oaks Symposium on Byzantine Medicine.[14] In his chapter on Byzantine science, Théodoridès classified the sciences into the exact (the mathematical sciences), the natural (alchemy, chemistry, botany, zoology), and the medical (human and veterinary, pharmacology). He postulated that Byzantium's highest achievement was the fact that it ensured the survival of the classical Greek culture, while at the same time under the rule of emperors Justinian, Constantine VII Porphyrogennetos, and

8 M. V. Anastos, *Studies in Byzantine Intellectual History* (London 1979) i.

9 R. Taton (ed.), *Histoire générale des sciences, publiée sous la direction de René Taton: Vol. 1: La science antique et médiévale (des origines à 1450)* (Paris 1957).

10 P. Brunet and A. Mieli, *Histoire des sciences, Antiquité* I (Paris 1935).

11 G. Sarton, *Introduction to the History of Science* (Baltimore 1927). Sarton passed away in 1956, a year before the publication of Taton's first volume.

12 A. C. Crombie, 'Review of *Histoire générale des sciences. Tome I: La science antique et médiévale (des origines à 1450)*, by René Taton', *The English Historical Review* 74, no. 291 (1959) 281–4 (283).

13 J. Théodoridès, *Les sciences biologiques et médicales à Byzance* (Paris 1977).

14 J. Théodoridès, 'Rabies in Byzantine Medicine', *Dumbarton Oaks Papers* 38 (1984) 149–58.

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later under the Palaiologan dynasty, scholars made worthwhile contributions.[15] Unfortunately, according to Théodoridès, who embraced the so-called conflict model of interaction between science and religion, 'the total subordination to the church' stifled the development of their ideas.[16]

Not long after, in 1961 in the Soviet Union Adolph P. Yushkevich published his *History of Mathematics in the Middle Ages*, the second volume in a larger project dedicated to the history of mathematics before the time of the Renaissance.[17] Yushkevich divided his history into four major parts, *Mathematics in China*, *Mathematics in India*, *Mathematics in Islamic Countries*, *Mathematics in Medieval Europe*, thus imposing the chronological framework of the European Middle Ages on the history of Eurasian mathematics. The fourth part, *Mathematics in Medieval Europe,* included a short section on mathematics in Byzantium which underlined that Byzantine scholars were familiar with treatises in Arabic and Persian and were not drawing their knowledge only from Latin and Greek sources.[18] Yushkevich also dedicated a short section to Nicholas Artabasdos Rhabdas.[19]

A decade after Taton, Kurt Vogel published the first English-language overview of Byzantine science as a chapter in *The Cambridge Medieval History* (Vol. IV *The Byzantine Empire*, 1967). Vogel proposed an achievement-and-decline narrative of the history of Byzantine science, according to which 'Byzantium is important in the history of science and especially that of mathematics and astronomy..., not because any appreciable additions were made to the knowledge already attained by the Greek of the Hellenistic era, but because the Byzantines preserved the solid foundations laid in antiquity until such time as the Westerners had at their disposal other means of recovering this knowledge.'[20] Vogel surveyed in detail the domains of mathematics and astronomy; medicine, dentistry, and veterinary medicine; and technology. He covered mechanics, optics, acoustics, zoology, botany, mineralogy, chemistry, pharmacology, and geography in a series of concise subsections of up to or under a page for each discipline. Vogel deemed the so-called occult sciences unscientific and discussed them together with superstition, though he also conceded that astrology and alchemy, though pseudoscientific, had advanced knowledge. Lecanomancy, catoptromancy, and other forms of divination were defined as 'degenerate forms of soothsaying'.[21] Medicine was assessed as not theoretically progressive and yet was

15 J. Théodoridès, 'La science byzantine', in R. Taton (ed.), *Histoire générale des sciences, publiée sous la direction de René Taton: Vol. 1: La science antique et médiévale (des origines à 1450)* (Paris 1957) 490–91.

16 Théodoridès, 'La science byzantine', 501.

17 Yushkevich also contributed to the revised 1966 edition of Taton's *Histoire*.

18 A. P. Yushkevich, *Istoriya matematiki v srednie veka* (*History of Mathematics in the Middle Ages*) (Moscow 1961) 319.

19 Yushkevich, *Istoriya matematiki*, 323–5.

20 K. Vogel, 'Byzantine science', in J. M. Hussey (ed.), *The Cambridge Medieval History, IV: The Byzantine Empire. Part II: Government, Church and Civilisation*, vol. 4.2 (Cambridge 1967) 264–305 (264).

21 Vogel, Byzantine science', 299.

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listed as a field in which all societal actors were invested in contrast to other knowledge domains which Vogel presented as interesting only for the scholars engaged in them. In terms of technological advancements, he highlighted the areas of 'apparatus and instrument construction, and of military, pharmacological and chemical technology'.[22]

It was in the 1950s and 1960s that history of science as a discipline came to be established in North American and European academic institutions.[23] Not coincidentally, it is during the same period that the historiographical surveys in both Francophone and Anglophone scholarship were published. Their reading uncovers well known and by now revised narratives of historical development such as the achievement-and-decline paradigm (Vogel) and the decision to portray the coexistence in pre-modern societies of faith and religious practice, on the one hand, and the study and practices of the sciences broadly defined, on the other, as a contrarian and contradictory relationship, and even as a simple and uncomplicated relationship (Théodoridès). At the same time, the selection of twentieth-century surveys discussed thus far gives us clues as to the place and role of history of science within Byzantine studies. On the one hand, the history of the sciences in Byzantium was included albeit briefly in early historiographies adopting a global approach written between the 1920s and the 1950s (Sarton, Taton, and later Yushkevich). Soon after, in the 1960s, followed the organization of a thematic Dumbarton Oaks symposium, which remained unpublished, and Vogel's survey, the latter significantly included in the *Cambridge Medieval History*, vol. IV *The Byzantine Empire*. These first steps, on the other hand, do not seem to have induced a momentum that would encourage studying the history of the sciences in Byzantium.[24] If anything, the foundations for the development of the sub-field were laid by Belgium-based scholars when it came to critically editing and translating source literature. Most important in this respect are the *Corpus des astronomes byzantins* (CAB) and the *Catalogus Codicum Astrologorum Graecorum* (CCAG) projects. The CCAG was published between 1898 and 1953 in Brussels. Its entries often include transcriptions and editions of hitherto unknown cosmological, astronomical, astrological and even magical texts. As a general rule, CCAG authors noted the presence of diagrams in the manuscripts but would not publish or discuss them in detail. Since the 1983, continuing the editorial work of three generations of philologists and historians of science active at the Université catholique de Louvain, namely Adolphe Rome (1889–1971), his successor

22 Vogel, Byzantine science', 300.

23 L. Daston, 'The history of science and the history of knowledge', *KNOW: A Journal on the Formation of Knowledge* 1.1 (2017) 131–54 (133).

24 Decades earlier, Michael Stephanides had taught the history of Byzantine science as Professor of History of Science at the University of Athens (1924–39). Stephanides was the first incumbent of the position which was announced in *Isis* in 1924 and whose significance was celebrated in the same journal two years later by George Sarton. The chair was abolished in 1939. On this see, G. Katsiampoura, 'An appraisal of the current status of research on Byzantine sciences', *Centaurus* 64.4 (2022) 919–24; F. E. Brasch et al., 'Notes and correspondence', *Isis* 6, no. 4 (1924) 538; and G. Sarton, 'Notes and correspondence', *Isis* 8, no. 1 (1926) 158.

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Joseph Mogenet (1913–1980), and Mogenet's own students André Allard (1937–2014) and Anne Tihon, CAB has been laying down the kind of groundwork that makes the constitution of a discipline in the remit of the historical studies possible, namely it made sources available in a critical edition and a modern translation. Most recently (since 2023), the Université catholique de Louvain announced the next step for CAB, namely the creation of its digital and open access version (eCAB, ISSN 2983-8037).[25]

While CAB, eCAB, and CCAG focus on the astral sciences, the *Companion to Byzantine Science* (2020) facilitates the inclusion of material from Byzantium in the teaching and learning of history of science beyond the remit of the astral sciences.[26] In the *Companion*'s conclusion, Anne Tihon wrote that 'it is time to stop apologizing for using the word "science" when studying Byzantine civilisation. The word "science" may cover many different activities: study, teaching, creating manuals, commenting on scientific treatises, applying ancient or modern methods, conducting research, experiments and so on.' Tihon then highlighted areas where scholarship could centre its efforts next, such as the editing, translation, and commentary of source texts. There are three other themes mentioned by Tihon that I discuss below, albeit in a different order. One of them is what she dubbed 'the question of language'; another the history of instruments and of technology. Finally, Tihon raised the topic of the role played by women in the learning, teaching, and practice of the sciences in Byzantium.[27]

In 2017, Lorraine Daston posed a couple of questions that deserve our sustained reflection: 'how the history of science is becoming, haltingly and hesitatingly, the history of knowledge—and why this is happening now'.[28] Two years earlier and along the same lines, Jürgen Renn observed that

> [f]or many historians of science, science no longer seems distinguishable from other forms of cultural practices ... This insight has opened up many new perspectives on the study of the history of science, which is turning more and more into a history of knowledge. It thus includes not only academic practices, but also the production and reproduction of knowledge far removed from traditional academic settings, for instance, in artisanal and artistic practices, or even in family and household practices.[29]

25 A presentation of eCAB and access to the first two uploaded volumes is available at their website <https://uclouvain.be/en/node/108289> [accessed 19 March 2024].

26 Lazaris (ed.), *A Companion to Byzantine Science*. While of more limited scope, the volume edited by P. Magdalino and M. Mavroudi, *The Occult Sciences in Byzantium* (Geneva 2006), should also be mentioned here, among the pioneering publications that have had the greatest impact on the studies of the history of science and history of knowledge in Byzantium.

27 A. Tihon, 'Conclusion', in S. Lazaris (ed.), *A Companion to Byzantine Science*, 496–500.

28 Daston, 'The history of science and the history of knowledge', 132.

29 J. Renn, 'From the history of science to the history of knowledge – and back', *Centaurus* 57.1 (2015) 37–8.

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Turning – or returning – to the study of the history of instruments and of technology, to the history of the involvement of women, and more generally, studying the social and material dimensions of knowledge shared and transmitted within both elite and non-elite groups delineate, methodologically to say the least, productive directions for future research. Consider, for instance, the *Engineering the Byzantine Water Supply: Procurement, Construction and Operation* research project (University of Edinburgh) whose goal was to examine the long and short distance water supply infrastructure of Byzantine Constantinople.[30] While textual evidence about the restoration, and continuous use of the Roman hydraulic systems exists, none of it addresses explicitly the engineering and construction knowledge the Byzantines required for the maintenance of the old systems and the implementation of the new.[31] Masons, brickmakers, plasterers, and other artisans and labourers maintained aqueducts and cisterns continuously for centuries; that is, these non-elite groups successfully preserved their expertise and transmitted it to the next generations. To study the materiality and social dimensions of their knowledge together with the archaeologists and civil engineers, could be the task of the historian of knowledge, of technology and of science. The same principle could be applied when approaching various aspects of knowledge, craft and expertise of other highly specialised non-elite professional groups in Byzantium, such as glass and textile makers, goldsmiths, agricultural workers, builders, and pottery makers, among many others.

An individual might belong to more than one such group and occupational boundaries intersected with definitions based on gender, age, ethnicity, and many other markers of identity. A village woman's bones bear the markings of heavy manual labour (possibly in an agricultural setting), as well as of the action of spinning wool.[32] Elite women active in an urban setting were more likely to be literate, some assisted their fathers who were professional scribes,[33] while few, such as the imperial princess and historian Anna Komnene, were exceptionally learned. Due to the nature of the evidence, similarly as in the case of the stone masons, a history of knowledge approach allows historians to cast a wider net and to restore female and non-elite groups their agency in creating, owning, and sharing knowledge. Nevertheless, the involvement of women in erudite practices such as the teaching and learning of the sciences, in particular of the mathematical sciences – and of philosophy, for that matter –, remains elusive and often even anecdotal. An example of that is the report by

30 J. Crow, 'The imagined water supply of Byzantine Constantinople: new approaches', *Travaux et Mémoires* 22.1 (2019) 211–35. See also J. Crow, J. Bardill, and R. Bayliss, *The Water Supply of Byzantine Constantinople* (London 2008).

31 Crow, 'The imagined water supply', 234.

32 S. Gerstel, 'The village woman', in *Rural Lives and Landscapes in Late Byzantium: art, archaeology, and ethnography* (Cambridge 2015) 70–101.

33 M. Mavroudi, 'Learned women of Byzantium and the surviving record', in D. Sullivan, E. Fisher, and S. Papaioannou (eds.), *Byzantine Religious Culture. Studies in honor of Alice-Mary Talbot* (Leiden 2012) 65, n. 52 with bibliography.

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Matthew Paris, – a story entirely absent from Byzantine sources – concerning the daughter of the archbishop of Athens Konstantina: she was so knowledgeable that she provided instruction to a certain Master John (identified as Matthew's acquaintance John of Basingstoke, archdeacon of Leicester and known for his mastery of Greek):[34]

> There was a young woman, the daughter of the archbishop of Athens, Constantina by name, who was not twenty years old, endowed with every virtue, and had learned all the difficulties of the trivium and the quadrivium; from which circumstance, on account of her remarkable learning and knowledge, the said Master John used jestingly to call her another Catherine, or simply Catherine. She was the mistress of Master John, and whatever good he acquired in the way of science, as he often asserted, he had begged from her, although he had studied and read for a long time at Paris. This young woman foretold pestilence, thunders, eclipses, and, what was more remarkable, earthquakes; and thus gave an infallible forewarning to all her auditors.[35]

Fictional or not, the remarkable story of Konstantina's teaching John of Basingstoke during his stay in Athens exposes a blind spot in the history of the sciences in Byzantium. Traditionally, narratives of the history of the sciences follow the narratives of the history of the Empire. Hence, following the Fourth Crusade, many of us historians tend to follow and examine evidence concerning the knowledge, books, teachers, and institutions available in Nicaea rather than in Frankish Corinth, Athens, or Latin Constantinople. Dedicating our and our discipline's efforts to understanding better the Byzantine thirteenth century should become a higher priority. Equally urgent and complex is the study of the languages and the literature of the sciences. It includes, among many other aspects, the study of the intersections between rhetorical and scientific discourses and diagrams,[36] the examination of multilingual vocabulary employed especially in astronomy, astrology, pharmacology, and medicine, and the study of translations.[37] To complicate the matter even further, I propose to entertain the possibility of combining it with the issue of studying Byzantine scientific instruments.

34 As Maria Mavroudi notes ('Learned women of Byzantium and the surviving record', 6), 'Matthew Paris knew John of Basingstoke personally and is explicit that his report is based on his friend's oral communications. Yet modern scholars are inclined to dismiss his account of Konstantina as literary fiction.'

35 Matthew Paris, *Matthew Paris's English History. From the Year 1235 to 1273*, tr. J. A. Giles, II (London 1853) 485.

36 As explored currently by the *Necessity by Design: The Mathematics of Rhetoric in Middle Byzantine Culture* research project (University of Southern Denmark).

37 The bibliography is extensive. Most recently, see J. Glynias, Z. Chitwood, and J. Pahlitzsch, 'Laying a framework for Arabo-Greek studies: the translation of Arabic scientific texts into Greek between the ninth and fifteenth centuries', *Mediterranea. International Journal on the Transfer of Knowledge* 7 (2022) 137–42 and M. Mavroudi, 'Byzantine translations from Arabic into Greek: old and new historiography in confluence and in conflict', *Journal of Late Antique, Islamic and Byzantine Studies* 2.1–2 (2023) 215–88.

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Source gallica.bnf.fr / Bibliothèque nationale de France. Département des Manuscrits. Grec 2183

Fig. 1. A drawing of an armillary sphere. Paris, Bibliothèque nationale de France, Par. gr. 2183, f. 165v. Source gallica.bnf.fr / Bibliothèque nationale de France.

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Since very few astronomical instruments from Byzantium survive, they are rarely the subject of a thorough, sustained, interdisciplinary or cross-cultural examination. The same holds true for the surviving construction-and-use instrumental diagrams. Even a superficial examination of the manuscript evidence raises a number of questions regarding the terminology employed by the historical actors in order to describe instruments and instrument-like diagrams. For instance, the term ἀστρολάβος was used to denote the astrolabe whose construction and use Nikephoros Gregoras (d. *c.* 1359) discusses, in text and diagrams, in the autograph Vatican City, Biblioteca Apostolica Vaticana, Vat. gr. 1087, fols. 312v–320v. Neophytos Prodromenos (fl. 1329/39–77) applied the same label to an astral diagram of his own design preserved in Paris, Bibliothèque nationale de France (BnF), Par. gr. 2286, fol. 112r. This diagram uses a feature typical for instruments, namely graduation, and yet it is not an astrolabe or even an obvious instrument of some different kind.[38] Finally, the label ἀστρολάβος is inscribed also above the freehand drawing of a handheld armillary sphere preserved on fol. 165v in Paris, BnF, Par. gr. 2183 (Fig. 1). Not only is the language about instruments a topic for future investigation, but so is also the language of and on the instruments themselves, as is the case with the verse epigrams on the astrolabe described by Synesios in his letters or the one on the sole surviving Byzantine astrolabe, commissioned by the protospatharios Sergios and dated to 1062.[39]

This concise survey of the historiography of the history of the sciences in Byzantium is unable to do justice to research in the field. My hope is that, despite its condensed nature, it will provide a point of reference and a motivation for students of Byzantium and historians of science to approach Byzantine material seriously and unapologetically. Finally, I have emphasized the importance of historiography, of continuously writing and re-evaluating the history and the story of our field. In doing so, my goal was to demonstrate that the critical historiographical approach enables understanding of Byzantine studies as an element of the global and multidisciplinary systems of historical knowledge – an element that should be neither excluded nor exclusive.

Divna Manolova is a researcher of the History of Science and Byzantine Studies. 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. At the time of writing the present article, she was a fellow of the MSCA Cofund Paris Region Fellowship Program supported by the Paris Region and of EIDA – Editing and analysing hIstorical astronomical Diagrams with Artificial intelligence. *Currently, she is a MSCA Postdoctoral Fellow at the Department of Literary Studies of Ghent University.*

38 I discuss Neophytos' diagram in detail in my forthcoming monograph.

39 O. M. Dalton, 'The Byzantine Astrolabe at Brescia', *Proceedings of the British Academy* 12 (1926) 133–46.

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