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Mašhad, Kitābḫāna-i Āsitān-i Quds-i Raḍawī 300, f. 1v
Paris, Bibliothèque Nationale de France, grec 1853, f. 186v

É. Villey (éd.), *Les sciences en syriaque*, Geuthner, Paris 2014 (Études Syriaques, 11), pp. IX + 353

Syriac literature provides a number of texts which have been devoted to scientific disciplines, and whose importance still deserves to be taken into account. The scarcity of editions and documentation is the main obstacle that prevents scholars from evaluating in depth the role played by the Syriac intellectuals in the Abbasid renaissance and, more generally, in the history of science. The present volume, which brings together most of the studies originally presented at the eleventh round table of the 'Société d'études syriaques' held in Paris in 2013, is dedicated to this literature and its transmission. It opens with a brief introduction (pp. 1-8) by Émilie Villey and an introductory chapter by Muriel Debié. The other chapters cover all the scientific disciplines investigated by Syriac authors: mathematics, geography, astronomy, alchemy, agronomy, medicine[1] and botany, with the exception of zoology, music and metereology.[2]

Debié's long essay ("Sciences et savants syriaques: une histoire multiculturelle", pp. 9-66) serves as a general introduction to the Syriac scientific literature and its main figures. Since this chapter is somewhat fragmented, it will be useful to present its three main points of focus. The first part of Debié's chapter (pp. 9-16) contains some remarks about the significance of Syriac scientific literature, which one should consider "comme l'expression dans une langue particulière de savoirs et de pratiques communs aux différentes cultures du Proche-Orient tardo-antique et médiéval, sans distinction d'appartenance religieuse ou linguistique" (p. 9). This assumption, however, cannot conceal the fact that the milieux which inherited the Greek scientific knowledge and then promoted it among the Arabs were Christian; as Debié observes later on (pp. 38-39), this was particularly the case with the monastery of Qennešre.[3] Moreover, the importance of Syriac intellectuals cannot be restricted to the well-known influence of their translations on the transmission of the Greek science to Abbasid Baghdad in the 8th and 9th centuries, because "d'autres mouvements de traduction ont joué un rôle très important avant et après cette période et se sont accompagnés d'un travail de commentaire original souvent passé sous silence" (p. 13).[4] The historical continuity of the different movements of translation is also shown by a number of Syriac grammars and lexicons dating to between the 7th and the 13th centuries, which are to be considered the very linguistic tools that favoured the transmission of ideas (pp. 14-16). In the second part of the chapter (pp. 16-33) Debié reflects upon some typical characteristics of the Syrians' approach towards scientific disciplines. These include the idea that each scientific discipline is complementary to the other, the interaction between astrological and astronomical themes, and medicine and political history, and the coexistence between scientific and

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[1] Another study of the medical texts of the Abbasid and Mongol period presented at the conference is missing (see Villey, *Introduction*, p. 4).

[2] As to meteorology, É. Villey (p. 4) duly refers to H. Takahashi, *Aristotelian Meteorology in Syriac. Barhebraeus, Butyrum Sapientiae, Books of Mineralogy and Meteorology*, Brill, Leiden-Boston 2004 (Aristoteles Semitico-Latinus, 15).

[3] On this point see also J. Watt, "Von Alexandrien nach Bagdad. Ein erneuter Besuch bei Max Meyerhof", in A. Fürst (ed.), *Origenes und sein Erbe in Orient und Okzident*, Aschendorff, Münster 2010 (Adamantiana: Texte und Studien zu Origenes und seinem Erbe, 1), pp. 213-26 (not mentioned in Debié's bibliography). Watt emphasized the importance of Christian intellectuals and monastic schools (especially that of Qennešre) in the transmission of Greek knowledge from Alexandria to Baghdad. He criticized the famous article by M. Meyerhof ("Von Alexandrien nach Bagdad. Ein Beitrag zur Geschichte des philosophischen und medizinischen Unterrichts bei den Arabern", *Sitzungsberichte der Preussischen Akademie der Wissenschaften. Phil.-hist. Klasse* 23 (1930), pp. 389-429). Meyerhof sustained, by mainly relying on a passage ascribed to al-Fārābī, that Greek knowledge passed from Alexandria to Antioch, then to Ḥarrān, and finally to Baghdad.

[4] Here Debié refers to D. Gutas, *Greek Thought, Arabic Culture: The Graeco-Arabic Translation Movement in Baghdad and Early ʿAbbāsid Society (2nd-4th/8th-10th Centuries)*, Routledge, London - New York 1998.

religious medicine, as well as that between scientific and religious ideas in the Hexaemeron literature. The last part of Debié's study is dedicated to the social role played by Syriac scholars (pp. 33-58), especially doctors, since many of them were able to live and gain diplomatic positions in the courts of shahs, caliphs and khans. After making a short reference to the importance of Alexandria as a source for the teaching system for the Syriac world, as well as to the monastery of Qennešre as the main center where the Greek cultural heritage was preserved and kept alive, Debié dwells upon of the establishment and the organization of hospitals, pointing out that Syriac sources provide more information than the Greek ones about the history of hospitals. Already in the fifth century, Syriac clerics run hospitals in Edessa (where also the existence of hospices is attested) and in Karka d-Bet Slok (modern Kirkūk), and one of the so-called "Canons of Maruta" (p. 41) even established that every city had a hospital under the direction of a monk elected by the bishop. Information about the organization of Christian hospitals is drawn especially from the documentation regarding the school of Nisibis, where theological and medical studies were carried out. The local hospital, founded in the 6th century, depended administratively on the school and was likely used for the practice of medicine. We are less informed about the organization of the hospital founded in Bet Lapaṭ/Gundišapur (8th century?), but there is no question that the doctors educated at its school were esteemed in the Abbasid Baghdad just as much as the doctors educated at Nisibis in the court of the Persian shahs. Further pages are devoted to the main figures of Christian doctors in the Abbasid and Buyid periods and to the Syriac astronomers who visited the observatories founded in Baghdad (9th-10th centuries) and in Maragha (Ilkhanid dynasty, 13th century).

Henri Hugonnard-Roche ("Mathématiques en syriaque", pp. 67-106) provides a history of mathematics in the Syriac world.[5] Though Hugonnard-Roche declares to have restricted himself to the mathematics in the strict sense (p. 67. n. 1), it is the geometry to appear to be mostly concerned in this history. For the first three centuries of the scientific literature in Syriac, traces of mathematical studies are mostly found in texts of astronomical and astrological interest. Sergius of Rešʿayna, who had likely attended the classes of Ammonius on Nicomacus' arithmetic and Ptolemy's astronomy, does not appear to have mastered the mathematical tools provided by Ptolemy's works. The first Syriac author to have shown grounded knowledge of the mathematical techniques of Ptolemy's *Tables* in application to astronomical calculations is Severus Sebokht, the famous teacher at monastery of Qennešre in the 7th century. No Syriac versions of Greek mathematical works of the Abbasid period are extant, but the scattered information about their existence supplied by Arabic bibliographers and manuscripts allow the assertion that, in all likelihood, works by Archimedes (*On the Sphere and Cylinder*; *On Triangles*), Menelaus (*Sphaerica*) and Nicomacus (*Introduction to Arithmetic*) were translated into Syriac during the first decades of the 9th century. Hugonnard-Roche soundly assigns to this same period also the versions of Ptolemy's *Mathematical Syntaxis* (or *Almagest*) and of Euclid's *Elements*. Special attention is given in discussing this latter case. Indeed, the translation of Euclid's *Elements* is the only Syriac version of a Greek mathematical text actually attested by a fragment contained in the ms. Cambridge *Gg*. 2. 14 (f. 355r-362v, d. 15th-16th cent.), but Giuseppe Furlani had argued that the Syriac fragment was a paraphrase based on the Arabic translation of al-Ḥaǧǧāǧ having compared these texts with the Greek version and those in Arabic which were preserved in a treatise wrongly ascribed to Naṣīr al Dīn al-Ṭūsī. Hugonnard-Roche, who also

[5] Here Hugonnard-Roche draws on some of the results of a previous study, "Textes philosophiques et scientifiques", in *Nos Sources. Arts et Littérature Syriaques*, Antelia 2005 (Sources Syriaques, 1), pp. 405-33 (not mentioned in this chapter's bibliography of this chapter).

devotes an annex to the comparison of all these versions, as well as others (pp. 91-101), confirms the relationship detected by Furlani between the method of translation of the Syriac fragment and that of al-Ḥaǧǧāǧ's version, but does not consider it sufficient enough to establish a dependence of the former on the latter. Hugonnard-Roche's accurate reading of the Pseudo-Ṭūsī seems to corroborate the suggestion that a Syriac version of Euclid's *Elements* was already extant in al-Ḥaǧǧāǧ's time. While the composition and the translation of astrological and astronomical works by other Syriac figures (Theophilus of Edessa, Timotheus I) is attested during the first period of the Abbasid age, and may have facilitated the transmission of the mathematical heritage, Syriac mathematical works seem to have disappeared starting from the 9th century, with the exception of the treatises "on the parallels" by Ṯābit ibn Qurra. Among the subsequent Syriac authors, only two have shown a certain interest in mathematics: Severus Jacob bar Šakko and Barhebraeus (pp. 86-91).

Olivier Defaux ("Les textes géographiques en langue syriaque", pp. 107-47) counts about ten texts of geographical interests in the astronomical, historiographical, theological-exegetical literature in Syriac. He offers a careful, yet not exhaustive, inquiry about the geographical sources used by Severus Sebokht (*Treatise on the constellations*), Barhebraeus (*Book of the Ascension of the Spirit*) and Pseudo-Zachary (*Historia ecclesiastica*), as well as a handful of short accounts of geographical contents in other minor writings. This study, in particular, confirms that Ptolemy's *Geography* and *Handy Tables* have been used by Severus Sebokht; it also argues that Pseudo-Zachary (6th cent.) knew an abridged version of Ptolemy's *Geography*, and shows Barhebraeus' versatility in making use of Greek and Arabic sources. Defaux then deals with the reception of two peculiar geographical ideas among Syriac authors: the definition of the Mediterranean sea as the "Adriatic sea" and the theory of the seven climates. Finally, the chapter also offers a list of the Syriac manuscripts containing cartographical images (globes and circular portrayals), with brief descriptions of almost all of them.

Villey's essay ("Qennešre et l'astronomie aux VIe et VIIe siècles", pp. 149-90) focuses on the school of Qennešre as a centre of astronomical studies. Villey shows confident acquaintance with Syriac astronomical works, both published and unpublished,[6] which allows her to deepen our knowledge on the history of the monastery and, above all, to update the lists of the astronomical writings that were available there at the end of the 7th century. On the basis of her direct knowledge of the scientific epistolary of Severus Sebokht (which, until now, is partially known thanks to the studies of François Nau, as almost all the rest of the Syriac astronomical text), Villey is able, for instance, to shed new light on the pedagogic-didactic motivations behind Severus' translations of astronomical texts and on the links between Qennešre and a certain Syriac community in Cyprus. More important are her findings on the astronomical corpus, which she recovers with the help of five manuscripts (London BL *Add.* 12154; London BL *Add.* 14538; Paris BnF *syr*. 346; Mardin *syr*. 553/13; Berlin, *Petermann* 26). Villey provides a single catalogue of the (strictly) astronomical writings held in the monastery of Qennešre, listing both those which were originally written in Syriac and those mentioned in them, supplying each case to different degrees with useful descriptions, sound argumentations and, at times, proposals for the amendments of previous attributions of authorship. Among the works

[6] Villey, who has carried out her doctoral thesis on this subject (*Les textes astronomiques syriaques produits aux VIe et VIIe siècles: établissement d'un corpus et de critères de datation, édition, traduction et lexique*, Université de Caen, 2012), announces (p. 151) the forthcoming edition and translation of Severus Sebokht's *Letter on the Ascending and Descending Nodes* and of three fragments of an anonymous treatise that Villey has entitled "Astronomical sum". To her and to Henri Hugonnard-Roche we owe a recent collection of François Nau's articles focusing on Syriac astronomy and cosmography: *Astronomie et cosmographie syriaques. Recueil d'articles de F. Nau*, Introduits et annotés par É. Villey, H. Hugonnard-Roche, Gorgias, Piscataway (NJ) 2013 (L'œuvre des grands savants syriacisants - Scholars of Syriac: Collected Works, 1).

originally written in Syriac Villey lists one anonymous treatise (*Astronomical sum*), one anonymous letter (*On the Origin of the Astronomical Science*, the famous letter, traditionally attributed to Severus Sebokht, that refers to the Indian numerals), and two treatises and four letters by Severus Sebokht. Among the writings mentioned in the texts cited above, Villey detects four works: Ptolemy's *Handy tables* (either in Greek or in Syriac), Theon of Alexandria's *Little commentary* on Ptolemy's *Handy tables* (although the *Great commentary* is not excluded), an anonymous *Treatise of the Calculation of the Movement of Antalya* (Villey argues in favour of its Akkadic origins), Ammonius of Alexandria's *Memoir on the Astrolabe* (which is identified from a manuscript of Severus' *Treatise on the Astrolabe* which was unknown to Nau).[7] Another possible work available at the monastery of Qennešre is Ptolemy's *Almagest*, though its presence remains under question. Finally, Villey adds a list of six partially astronomical texts not related to Qennešre, and two annexes illustrating the accurate use of Ptolemy's *Handy tables* by Severus Sebokht in the *Treatise on the constellations* and in a passage of the *Letter on the Ascending and Discending Nodes* (the latter edited here for the first time).

The chapter by Matteo Martelli on alchemy, that is, the techniques used to dye materials ("L'alchimie en syriaque et l'œuvre de Zosime", pp. 191-214), is divided into two parts. First, Martelli examines the few Arabic and Syriac sources that bear witness to the interest in alchemy of some Syriac figures: while the ascription of alchemical works to Sergius of Reš'ayna by Arabic authors remains in question, a certain circulation of alchemical interest and written collections in some Syriac monastic milieux in the 7th-9th centuries appears credible. However, the only two collections of Syriac alchemical writings known to us are preserved in three manuscripts dating to the 15th and 16th centuries (Cambridge, *Mm*. 6.29; British Library, *Egerton* 709; British Library, *Or*. 1593). In the second part of his inquiry, Martelli studies the sections in these collections that contain passages which likely stem from the works of Zosimus of Panopolis. One of these sections, preserved in the manuscript of Cambridge (ff. 120v-129v), lists under Zosimus' name four passages derived from books 9-11 of Galen's *On Simple Drugs*, probably in the translation made by Sergius of Reš'ayna.

Christophe Guignard ("L'agriculture en syriaque: l'*Anatolius Syriacus* (*Géoponiques syriaques*)", pp. 215-52) provides the preliminary, though substantial, results of his studies of the sole Syriac version of a Greek agricultural work, Vindanius Anatolius' *Synagogė*. This text, which is now lost in Greek except for one chapter, is preserved also in two Arabic versions, and was quoted by the Latin agronomist Palladius and indirectly used in the Arabic *Nabatean agricolture*. Paul de Lagarde had edited the Syriac *Synagogė* as a translation of the Greek *Geoponica*,[8] while, in fact, the *Geoponica* (6th/10th cent.), which exists in two recensions, is essentially the result of the expansion of the *Eclogae peri georgías* by Cassianus Bassus (5th cent.), who amply used Anatolius' *Synagogė* (4th cent.), made by an anonymous author on the basis of the *Synagogė* itself. In order to assess the value of the Syriac tradition of the *Synagogė*, Guignard also dedicates an annex to the examination of some of its relations with the other versions.

Alexey Muraviev's essay on medicine is restricted to the pre-Abbasid period ("La médecine thérapeutique en syriaque [IVe-VIIe siècle]", pp. 253-84). It begins with a historical, though somewhat unsystematic, survey of the presence of medical themes in the texts of Syriac authors writing in Greek (as Tatian and Nemesius), and in hagiographical and theological literature, and with a short introduction to the main Syriac medical schools (Nisibis, Gundišapur) and figures (Aḥudemmeh, Sergius of Reš'ayna). Subsequently, Muraviev deals with the Syriac translations of Greek medical

[7] See the article by É. Villey in the present volume of *Studia graeco-arabica*.

[8] P. de Lagarde, *Geoponicon in sermonem Syriacum versorum quae supersunt*, Teubner, Lipsiae 1860.

texts, that is, the translations of Sergius of Reš'ayna. Indeed, the Syriac version of Hippocrates' *Aphorisms* preserved in the manuscript Paris BnF *ar*. 6734, whose ascription to Ḥunayn ibn Isḥāq is doubtful, cannot be attributed to Sergius. Before this translation, Hippocrates was known in Syriac translation only through some passages in Sergius' translations of Galen and of Gesius' commentary to the sixth book of Hippocrates' *Epidemics*.[9] Muraviev presents "la liste des traités de Galien que Sergius est supposé avoir traduit, d'après la lettre d'Ḥunayn ibn Isḥāq" (p. 266), supplying it with references to the existing manuscripts and editions (namely, eleven items out of thirty-four titles of translations), and touches on the problems posed by these attributions. A brief account is given of the unsolved dispute about the ascription to Sergius of the translations of Galen's passages contained in the anonymous *Book of Medicines*. Muraviev concludes his chapter with rather generic references to the use of medical terms and methods in Syriac ascetical authors of the East until the 8th century, which could attest the presence of the Galenic medicine in monastic environments, an appendix on the principles of the Hippocratic-Galenic medicine, and a short medical Syriac lexicon.

Siam Bhayro and Robert Hawley ("La littérature botanique et pharmaceutique en langue syriaque", pp. 285-318) divide the Syriac literature concerning the vegetal world into two categories of writings. The category of botany is characterized by a theoretical approach, while that of pharmacology has a practical focus. The *Book of Treasures* of Job of Edessa (8th-9th century) and the *Hexaemeron* of Jacob of Edessa (8th cent.) are selected as representatives of the first group. More space is devoted to the second group, which is represented by the pharmaceutical collections contained in the works of Sergius of Reš'ayna, Ḥunayn ibn Isḥāq and Barhebraeus, which were veritable pharmaceutical lexicons intended for guaranteeing "la cohérence (...) des traductions orientales du vocabulaire pharmaceutique grec" (p. 307). In the final part of their essay, Bhayro and Hawley offer their general considerations on the historical elements that shaped the constitution and the transmission of the Syriac pharmaceutical collections by reflecting on Sergius of Reš'ayna's work as the paradigmatic example that sums up the features of this literature.

Hidemi Takahashi deals with the Syriac astronomical literature from the 9th century onward ("L'astronomie syriaque à l'époque islamique", pp. 319-37).[10] For the Abbasid period, Takahashi acknowledges the existence of a (now lost) Syriac translation of Ptolemy's *Almagest* and points out that there are no versions of Greek astronomical works, nor original texts of specific astronomical interest extant in Syriac, except for the fifth book of the anonymous *Causa causarum* (10th-11th cent.) and a particular section of the *Book of Dialogues* by Severus Jacob bar Šakko (d. 1241), which is the first case of a Syriac work to unequivocally treat astronomy. In both cases Takahashi recognises that there may have been Arabic influences. The study then focuses on the astronomical knowledge of Barhebraeus; here Takahashi highlights in particular the direct influence of the works of Naṣīr al-Dīn al-Ṭūsī on the *Book of the Ascension of the Spirit* and admits that Barhebraeus might have known Severus Sebokht's *Treatise on the constellations* and Theon of Alexandria's *Little commentary* on Ptolemy's *Handy tables*. The final pages of this essay are dedicated to Ignatius Ni'matullāh, the syro-orthodox patriarch who took part in the project of the calendar reform in the time of Gregory XIII. Takahashi illustrates the astronomical contents of the manuscripts which the patriarch brought with him to Italy (now preserved at the Biblioteca Laurenziana) and his influence on Joseph Scaliger with

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[9] G. Kessel, "The Syriac Epidemics and the Problem of its Identification", in P.E. Pormann (éd.), *Epidemics in Context: Greek Commentaries on Hippocrates in the Arabic Tradition*, De Gruyter, Berlin - Boston (Scientia Graeco-Arabica, 8), pp. 93-123.

[10] Here Takahashi develops some of the subjects he already treated in "The Mathematical Sciences in Syriac: From Sergius of Resh-'Aina and Severus Sebokht to Barhebraeus and Patriarch Ni'matallah", *Annals of Science* 68/4 (2011), pp. 477-91.

regard to oriental astronomical calculations. Three tables are annexed to the end of this chapter: one shows that the figures of the latitudes of the seven climates supplied by Barhebraeus in the B*ook of the ascension* stem from al-Ṭūsī's *Taḏkira fī ʿilm hayʾa* (*Memoir on the astronomical science*); the second shows the structural resemblances structure between the Ascension and al-Ṭūsī's *Zubdat al-idrāk fī hayʾat al-aflāk* (*Cream of the Knowledge on the Form of the Celestial Spheres*); and the third provides the Chinese list of the cycle of the twelve animals according to Barhebraeus, Niʿmatullāh/Scaliger, al-Ṭūsī and Ulugh Beg.

The book concludes with three indices for manuscripts, geographical names and personal names.

Even though the reader may find certain discrepancies in the quality and objectives of the studies collected in Villey's volume, overall it presents a useful assessment of the current state of the research on the scientific disciplines in Syriac literature and can offer a reliable point of departure for further studies.

Francesco Celia