

A Companion to Byzantine Science

Edited by

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Contents

- Acknowledgments IX
List of Figures X
Notes on Contributors XI
- Introduction 1
- 1 'Inner' and 'Outer' Knowledge: the Debate between Faith and Reason in Late Antiquity 27
Hervé Inglebert
- 2 Science Teaching and Learning Methods in Byzantium 53
Inmaculada Pérez Martín and Divna Manolova
- 3 Logistic, Arithmetic, Harmonic Theory, Geometry, Metrology, Optics and Mechanics 105
Fabio Acerbi
- 4 Byzantine Theories of Vision 160
Katerina Ierodiakonou
- 5 Meteorology and Physics in Byzantium 177
Ioannis Telelis
- 6 Astronomy and Astrology 202
Anne-Laurence Caudano
- 7 Geography 231
Inmaculada Pérez Martín and Gonzalo Cruz Andreotti
- 8 Zoology 261
Arnaud Zucker
- 9 Botany 302
Alain Touwaide
- 10 Medicine and Pharmacy 354
Alain Touwaide

- 11 Veterinary Medicine 404
Stavros Lazaris
- 12 The Byzantine Science of Warfare: from Treatises to Battlefield 429
Thomas Salmon
- 13 The Occult Sciences in Byzantium 464
Maria K. Papathanassiou
- Conclusion 496
Anne Tihon
- Bibliography 503
- Indices 630
Antonio Ricciardetto

Geography

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1 Introduction

To manage space and time and to reflect upon their nature is connatural to any human society. Views on space were as plural as the ways to perceive it and experiment with it and geography was the intellectual tool used to explain them. Even if it was never central to elite training during antiquity and the Middle Ages, the need for understanding and explaining reality, beyond the daily experience of the *oikos* or the *polis*, gave birth to geographical knowledge. Geography began with empirical experience and eventually became a conceptual and analytical tool that evolved alongside the great historical changes, producing different geographical narratives according to each cultural and ideological framework. In this process, the main Greek contribution involved the implementation of an extraordinarily abstract way of thinking, which, in its turn, created a peculiar geographical and cartographic language developed from more limited and fragmented realities.¹

In Byzantium, geographical knowledge played a major role in the shaping of its cultural identity, since it was an essential part of a Roman past enduringly revindicated.² This becomes evident when, in 9th-century Constantinople and probably under the influence of the Abbasid scientific policy, the imperial power hired Leo the Mathematician (c. 790–after 869) to promote the study of the *Quadrivium*—a choice that eventually laid the foundation for a scientific and observational approach to the understanding of the *oikoumene*. Shortly after, the first Macedonian emperors boosted the reading of Greek history and the recovery of geographical and ethnographic data.³ Again, this choice led

1 Prontera, “La Geografia dei greci.”

2 It is interesting to point out that Strabo, the champion of the *pax romana*, did not find readers (but see below Basil of Caesarea) until the *Geography* was used in 6th-century Constantinople among others by Procopius, with the similar aim of presenting Justinian as the new forger of a pacified Empire; see Maas, “Strabo and Procopius,” pp. 67–70, 75–83.

3 The earliest preserved copies of Xenophon or Plutarch date back to this moment, the end of the 9th and the beginning of the 10th centuries, while we must wait a few decades before finding the first preserved copies of Herodotus, Thucydides or Strabo. The great ethnographic compendium of Constantine Porphyrogenetos, *De Administrando Imperio*, composed in 948–952, comprises geographical excursus, for example, on the Dnieper’s rapids. On the

to the recognition of the historical space Byzantines shared with Romans and contributed to model the apparent continuity with the past that shaped their identity.⁴ The most important geographical texts read and copied in Byzantium (Ptolemy and Strabo, together with Dionysius Periegetes and Pausanias) were considered the ultimate outcome of the knowledge generated by antiquity.⁵

As might be expected, the Byzantine worldview was also imbued with biblical Cosmogony. At a political level, the imperial (Constantinian and Theodosian) notion of the *oikoumene* and the *orbis terrarum* mixed and developed with the concept of God's government;⁶ in this context, the Barbarian easily became the non-Christian and, just as the Romans had tried to assimilate the surrounding nations, the Church aimed at expanding Christianity beyond its imperial borders.⁷ Building on this foundation, the assimilation of classical paradigms was achieved smoothly. In late antiquity, biblical cosmogony was assimilated in different ways, based on the philosophical sensibility of the writer.⁸ Bible scholiasts, such as Theodore of Mopsuestia (c. 350–428), tried to deny the sphericity of the earth. Their failure to impose their ideas, however,

irregular focus of this work on topography and ethnic geography, see Magdalino, "Constantine VII and the Historical Geography," 34–37.

- 4 Good overviews on the subject, Wolska-Conus, "Geographie"; Koder, "Sopravvivenza"; Külzer, "Η γεωγραφία στο Βυζάντιο"; a concise introduction in Pérez Martín, "El libro en Bizancio, compañero de viaje," 257–262.
- 5 Strabo's and Ptolemy's contributions probably hindered the survival of previous authors, even those who were prestigious in their time, such as Eratosthenes or Posidonius. For instance, Stephanus of Byzantium's *Ἐθνικά*, or *Περὶ πόλεων*, a geographical dictionary compiled in alphabetical order, very rich in historical and mythological information, was only preserved through excerpts and Hermolaos' epitome, from the 6th century. The preserved copies are not Byzantine, but they were produced later in time, as it happened with the manuscripts of Pausanias' *Guide to Greece*. Cf. Bouiron, "Du texte d'origine à l'Épitomé des *Ethnika*."
- 6 Contemporarily, according to Traina, a basic geographical knowledge and the use of maps became popular and transformed into the overt expression of Roman power, in which the elite liked to see itself reflected. Cf. Traina, "Geografia dell'Impero," "Mapping the World under Theodosius II," "Mapping the New Empire"; on the intertwining of political geography and geographical learning, see Gautier Dalché, "L'enseignement de la géographie," 171–4, who advocates the use in a learning context of the map set up by Theodosios II in 425 near to the Capitolium where the imperial higher education was bestowed.
- 7 Racine, "Geography, Identity," goes beyond this notion and proves, through the convincing example of St Christopher, that the Christianization of remote people and places transformed the limits of the known world in Late Antiquity.
- 8 See Inglebert, *Interpretatio christiana*. On Basil of Caesarea's doctrine, Mendieta, "La préparation," pp. 353–54, and on other hexaemeral literature, Robbins, *Hexaemeral Literature*; Scholten, "Einleitung"; John Philoponus, *De opificio mundi*, vol. 1, pp. 52–62. This corpus has been explored as part of the traditional quest for lost philosophical texts, but still needs an overall assessment of the different cosmographies involved.

prevents us from equating their worldview with the Byzantine one. As shown in these pages, Byzantium was the heir to the ancient conception of the oikoumene as a part of the earth's globe, and as such, its own thoughts revolved around that conception. Our aim here is not to describe this mix of biblical tradition and scientific discussion in terms of innovation or progress, nor to characterize certain texts that offer geographical knowledge,⁹ but to explore at different levels the view Byzantines had of the oikoumene.¹⁰ By doing this, we will be able to critically assess the traditional vision of Byzantine culture as a uninterrupted connection with the past and we will explain the developing contexts of its reception of and contribution to geographical knowledge.

There are many and long-standing geographies: one measuring and explaining the inhabited world as a whole with the help of the stars; one used as an instrument of prestige and power by the military, commercial, and economic interests of the empire;¹¹ one defining boundaries, with a clear diplomatic value and a strong paradoxographical content, resulting from the observation of the surrounding peoples;¹² one religious, associated with ritual places and routes.¹³ But it is not a matter of distinguishing which “geographies” move in or out of the classical inheritance—with Ptolemy as a reference—, but to gain a glimpse, at least, of the reasons why a certain geographical wisdom was put aside, while other traditions adapted, re-read and reinterpreted themselves.¹⁴ On this basis, our contribution, without claiming to be exhaustive, aims at

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- 9 The chapter by Dilke, dedicated to Byzantine cartography, in the prestigious series *The History of Cartography* (Dilke, “Cartography”) focuses on the classical tradition from this continuist perspective. The entire study, basically focussed on the antagonism between Kosmas and Ptolemy, is intended to assess to what extent Byzantium assumed, or not, a substantial part of Graeco-Roman cartography. A similar outlook on the conservatism of the scarcely groundbreaking Byzantine geography may be found in Della Valle, “La cartografia bizantina.” Brodersen, “Cartography,” offers a critical view, different from Dilke’s, on the modernist perspective of *The History of Cartography*, and Podossinov, “Karte und Text,” p. 9. Cf. the approach of Koder, “Sopravvivenza,” and Makris, “Geographische Kenntnisse,” who refuse to speak of “regression” vis-à-vis with the past.
- 10 For a classification of Byzantine geography in academic, political, and popular, see Angelov, “Asia and Europe Commonly Called East and West,” pp. 45–52.
- 11 “For the most part, geography exists for the needs of states,” has written Strab. 1.1.16.
- 12 Kaldellis, *Ethnography*; Magdalino, “Constantine VII and the Historical Geography.”
- 13 On gardens and mountains as spiritual places in hagiographical writings, Della Dora, “Gardens of Eden.” *Pilgrimage in the Byzantine Empire, 7th–15th centuries*, was the subject of the Dumbarton Oaks Symposium 2000, published in *Dumbarton Oaks Papers*, 56 (2002).
- 14 Jacob/Mangani, “Nuove prospettive,” already called for an approach free of cultural and scientific essentialisms; cf., in full, Jacob, *L’empire des cartes*.

drawing attention to some lesser-known texts and images, which may contribute towards a more thorough knowledge of Byzantine geographies.

Although every classification is revocable, especially in a civilization such as the Byzantine one, where studies testify to very different perspectives and methods, it is useful to pay attention to what is proposed by the texts themselves:

1. What is usually taken for Byzantine geography: the cosmology or global explanation of the universe based on beliefs. In the Greek world, geography cannot be separated from philosophical tradition, and in late antiquity it took the form of commentaries on Genesis (*Hexaemera*), the first and most influential being Basil of Caesarea's *Homilies on the Hexaemeron*. Other commentaries on Genesis were lost, because of the condemnation of their authors, although at least Kosmas Indikopleustes' *Christian topography* was preserved, as well as a very interesting and more successful continuation of Basil's attempt: *De opificio mundi* by John Philoponus.
2. The physical geography, based on the Aristotelian tradition and the Stoic synthesis, which tackles the known world according to its physical elements (water courses, types of terrain and flora, tides, seasons, etc.).¹⁵ This is probably the most common Byzantine approach to the understanding of phenomena concerning the human environment, becoming a frequent subject in popularized works, such as the question-and-answer compendia composed by Michael Psellos (1017/8–1078?) or Symeon Seth (second half of the 11th century).
3. A political and literary geography, deeply rooted in Homer, which included Strabo, Pausanias, Dionysius Periegetes, Stephanus of Byzantium, and the corpus of short archaic *peripli*.¹⁶ In this tradition, Byzantium produced chrestomathies of Strabo, commentaries on Dionysius and short pieces, such as Michael Psellos' *On the Athenian places and names*.¹⁷ Photios (c. 810/820–893) deserves a special mention since his *Myriobiblon* abridged and commented on several geographical books.¹⁸

15 Cf. Arist. *Meteor.* 1.13 (349b–351a), 2.5 (362a–b), but also the post-Alexandrian tradition represented by Ps.-Aristotle, *De mundo*, § 3, especially 393a–394a. See Telelis' chapter on Meteorology and Physics.

16 On the contribution of Marcianus of Heraclea to this corpus, preserved by Par. suppl. gr. 443, see Diller, *Minor Geographers*, pp. 45–47; Marcotte, *Géographes*, pp. cxx–cxxiv; Prontera, "Marciano di Eraclea," 522–23; González Ponce, *Periplógrafos*, pp. 23, 41–42.

17 The piece reworks Strabo 9, 1; see Rhoby, "Untersuchungen."

18 On Photios' contribution to our knowledge of ancient geographical texts, see Micunco, *La geografia*.

4. Finally, mathematical or astronomical geography lies the closest to the current concept of the discipline. Byzantium not only read entirely its Ptolemaic version, but knew different summaries of Posidonius' and Eratosthenes' theories by means of Strabo, Geminus, Cleomedes, or Macrobius.

Besides the oldest manuscripts of the Ptolemaic maps (and especially, the MS Vatican, Biblioteca Apostolica Vaticana, Urb. gr. 82)¹⁹ and Strabo's oldest preserved copy (MS Paris, Bibliothèque nationale de France, gr. 1397, from the second half of the 10th century),²⁰ we may consider two miscellanies as the most important Byzantine codices transmitting ancient geographical wisdom. The first one is a 9th-century codex, MS Heidelberg, Universitätsbibliothek, Palat. gr. 398, which gathers, among paradoxographical collections, Strabo's *Chrestomathy* with a small group of *peripli* and *hypotyposesis* probably shaped in late antiquity and linked to the Neoplatonic school.²¹ In Byzantium, these short geographical or chorographical introductions were always marginal, compared with the longer prose texts of historical geography (see below). It was their eventual compilation with other geographical texts that guaranteed their survival. This operation took place again at the end of the 13th century, when a huge parchment codex, now scattered between Mount Athos (MS Vatopedi Monastery 655, the main part of the original manuscript), London (MS British Library, Additional 19391, 21 fols.) and Paris (Bibliothèque nationale de France, suppl. gr. 443A, 7 fols.), brought together all the major and minor geographical texts then available in Constantinople.²²

In the following pages, we do not adjust to the quadripartite scheme described above but we propose what we believe are the most interesting discussion threads on Byzantine geography (not significantly different from the debates around Greek and Roman geography), as evidenced by the study of the Byzantine, mostly Constantinopolitan, texts and manuscripts. In our case, the conclusions must be considered provisional since the field still requires a big amount of research on the largely unexplored documentation. For instance, authors such as Strabo, Dionysios Periegetes or Ptolemy require on their own a much more thorough approach than we may provide in these pages.

19 Gentile, *Scoperta*, pp. 78–80 (No. 38); Burri, *Die Geographie*, pp. 479–83.

20 Bianconi, *Cura et studio*, pp. 6–8.

21 Ronconi, *I manoscritti*, pp. 34–75; Marcotte, *Géographes*, pp. xx–xxi; id., “Le corpus géographique,” pp. 172–75; id., “Priscien de Lydie.”

22 Burri, *Die Geographie*, pp. 238–55.

2 The Christian Cosmography: Geography and Theology

The ideas expressed by Kosmas Indicopleustes' *Christian Topography* (written in Alexandria in the middle of the 6th century) are usually upgraded to become a paradigm of Byzantine cosmography.²³ The *Topography* was an offspring of the literal interpretation of the Bible, backed by the Antiochean school, and stood for Theodore of Mopsuestia's reading of Genesis, not in Antiochia, but in Alexandria.²⁴ In the Byzantine tradition, it was an eccentric contribution, isolated from the ancient, general worldview of the earth as a sphere, and never obtaining the recognition or the attention it attracts now.²⁵ The poor dissemination of the work (only three manuscripts from the 9th–11th centuries are preserved) helps to drastically resize its hypothetical influence, and the status it holds nowadays as paradigm of Byzantine geography. In the codex of the *Myriobiblon* dedicated by Photios to the *Christian topography*, Kosmas' views of the earth and the heaven are branded as "absurdities": "He relates much that is incredible from an historical point of view, so that he may fairly be regarded as a fabulist rather than a trustworthy authority," wrote Photios.²⁶ Even if the famous shape of the cosmos modelled according to Moses' tabernacle, belonging to the set of illustrations in Kosmas' manuscripts,²⁷ astounds us, we must admit that it was just a peculiar and isolated attempt to link cartography and creed, namely the Alexandrian and the Mosaic geographical traditions.

In Alexandria, a quick response to Kosmas' cosmology was offered by John Philoponus in his *De opificio mundi*,²⁸ a documented introduction to the *oikoumene* and a defense of his creation against the Aristotelian and Neoplatonic conceptions of world's eternity. As might be expected from a significant connoisseur of Aristotle's philosophy and a student of the Neoplatonic school in

23 Kosmas Indicopleustes, *Topographie Chrétienne*, ed. Wolska-Conus; Kominko, *The World of Kosmas*. On Kosmas see chapter 1 of this volume.

24 Kitamura, "Cosmas Indicopleustès," pp. 81–83, Congourdeau, "Cosmas Indicopleustès," pp. 50–66.

25 On the Byzantine tradition of the Antiochean Cosmology, Caudano, "Un univers sphérique ou voûté?," Ead., "Le ciel a la forme d'un cube." It seems also that the *Topography* could have had some impact on the Canterbury School; see Bischoff/Lapidge, *Biblical Commentaries*.

26 Photios, *Myriobiblon*, ed. Henry, pp. 21–22 (codex 36).

27 Kominko, *The world of Kosmas*, pp. 105–32. On the influence of the *Christian topography* in the world map drawn in Bologna, Biblioteca Universitaria, 3632, see Caudano, "These Are the Only Four Seas," pp. 176–80, 190.

28 Ed. Scholten, vol. 2, pp. 382–93; cf. Scholten, *Antike Naturphilosophie*; Sorabji, *Philoponus*, pp. 49, 78–81, 92–94.

Alexandria,²⁹ Philoponus' commentary on Genesis 1 is a fine analysis which awakened the admiration of Photios, due to its purity and clarity (codex 43). This did not prevent *De opificio mundi* from practically disappearing, since nowadays it is preserved only in a single manuscript (Wien, Österreichische Nationalbibliothek, Vindob. theol. gr. 29). Another codex of the *Myriobiblon* (codex 240) offers a summary of Philoponus' arguments on the creation of the world; they materialize another attempt to overlap biblical cosmogony with recent scientific Alexandrian acquisitions.³⁰ On behalf of the geographical content, Philoponus, using general data provided by Aristotle and Ptolemy, aligned with Basil of Caesarea in the defense of the sphericity of the earth against Theodore of Mopsuestia, as well as in other points in dispute.³¹

Photios pointed to the similar content *De opificio mundi* shared with a work much better known in Byzantium than Kosmas' or Philoponus' writings, Basil of Caesarea's *Homilies on the Hexaemeron* (or the six-day creation of the world according to the beginning of Genesis), written in 378.³² Basil's geographical notions concentrate on *Hom.* 3 and 4, and more specifically on the paragraphs devoted to the distribution of water and dry land throughout the earth's surface (*Hom.* 3.6, 4.2–4). This topic involved discussion about tide levels, underground currents and the volume of seawater, as well as on the central issue of the Ocean's edges. Discussion also took place as to whether the Caspian and Hyrcanian Seas were gulfs or closed basins (*Hom.* 4.4, p. 63.11–15) and the difference of level between the Mediterranean and the Red Sea (*Hom.* 4.3).³³

These remarks are specifically mentioned as arising from the contemplation and admiration of the divine creation (*Hom.* 4.1), although Basil's perception was evidently biased by his classical background. In the past, his sources have been the subject of lively debate, since the issue at stake was the fragmentary remains of thinkers such as Posidonius, Ephorus, or Eudoxus.³⁴ It is likely that

29 He was a disciple of Ammonius and wrote several Aristotelian commentaries: this commentary on *Meteorologica* is partially preserved and the remaining fragments do not deal with any geographical issue.

30 Schamp, "Photios et Jean Philopon," p. 136.

31 Congourdeau, "Cosmas Indicopleustès," pp. 153–57.

32 It enjoyed widespread dissemination in view of its extant Byzantine copies and, from an early date, versions in other languages: Basilius Caesariensis, *Homilien zum Hexaemeron*, ed. Mendieta/Rudberg.

33 This discussion went on relentlessly from Herodotus (1.203) onwards; see Janni, "The Sea of the Greeks and Romans," pp. 28–30; Gehrke, "The 'Revolution' of Alexander the Great," pp. 85–87.

34 On Basil's sources, Mendieta, "La préparation," pp. 360–67. On his dependence on the Aristotelian tradition in Physics and Natural Sciences, see Müllenhoff, "Aristoteles bei Basilius von Caesarea" and Sorof, *De Aristotelis geographia*.

much of the literature available to Basil no longer exists and that he used compendia such as the epitome of Posidonius' *Commentary* preserved in a papyrus.³⁵ The bishop may also have read Strabo³⁶ and he mentions the testimony of the "geographies of the authors that narrated (those facts)" (ταῖς τῶν ἱστορησάντων προσέχειν γεωγραφίαις), suggesting that he had access to some geographical accounts on the edges of the *oikoumene* that could be part of the Alexandrian propaganda.³⁷

Unlike the much discussed sources of the *Hexaemeron*, this tradition in Byzantium still awaits study.³⁸ The approach to Genesis undertaken by Basil constituted a first, influential, although not entirely consistent, attempt.³⁹ The next work was Philoponus' *De opificio mundi*, which provided in chapter 4.5 a balanced and well-structured answer to the question "How one sea may be many seas at the same time?"⁴⁰ The section contains a panoramic view of the Inner and Outer Seas,⁴¹ which leads him to deal with the Torrid zone, the Nile's course, and the lack of differentiation among seas. Philoponus knew Basil's *Hexaemeron*, even if he did not follow it and paid more attention to the texts of Aristotle, Ptolemy and other Alexandrian mathematicians he had at hand. Indeed, the issue dates back to the 6th century BCE, when the first geographers outlined the Ocean as a circle around the Earth, starting with Hecateus and Herodotus (4.36.2).

35 See Lasserre, "Abrégé inédit."

36 Even if Basil never followed Strabo's wording, he mentioned the Western Sea's tides (*Hom.* 6.11, p. 108.19–22, but not Pytheas) and the lakes Asphaltitis and Serbonitis (*Hom.* 4.4, p. 63.7–9); cf. Strab. 7.5.8 and 16.2.42–43. Strabo has been proposed as a source for a passage in *Hom.* 4.4 (p. 63.11–15) by Cataudella, "Geografia e propaganda."

37 Authors such as Arrianus pushed eastwards the Asiatic adventures of Alexander by modifying the names of seas and rivers. This is the tradition Basil follows when he introduces the Caspian and Hyrcanian seas as gulfs; see Cataudella, "Alessandro Magno," and Id., "Geografia e propaganda," 13. Cf. Gómez Espelosín, "La imaginación geográfica." This precise misunderstanding was also pointed out in Strabo by Georges Gemistos Pletho, who wrote a *Correction of some mistakes made by Strabo* (ed. Diller, "A Geographical Treatise") in Strab. 2.118–131.

38 Some hints in Nicolaidis, *Science and Eastern Orthodoxy*, pp. 17, 102–3. The last link in the chain is Palamas' *Kephalaia*, § 9–14, with cosmological content (pp. 92–99 ed. Sinkewicz).

39 Addressing these homilies to a mixed audience was the alibi given by Gregory of Nissa for the inconsistencies reported by cultivated contemporaries; cf. DeMarco, "The presentation," p. 333; on Basil's intellectual acrobatics in order to respect the literal interpretation of the Bible, Mendieta, "La préparation," pp. 352–54.

40 The question is asked at the beginning of chapter 4.5, but the title ("That the Ocean does not embrace the entire earth nor connects with the Red Sea, but there are more water systems") contradicts Philoponus' statements and was probably added later in time.

41 See ed. Scholten, vol. 2, p. 384, n. 13.

In contrast, and contemporary to Philoponus, although in Constantinople, Ps.-Kaisarios' *Erotapokriseis* § 79–81⁴² offered an abridged rephrasing of Bas. *Hom.* 4.3–4 that involved the spreading of the *Hexaemeron* in monastic circles. Ps.-Kaisarios' text is so close to the source, that not only the answers, but also the questions, are taken from Basil's homilies.⁴³ However, this is an isolated case; other examples of the genre of the *erotapokriseis* or *kephalaia*, despite being central to the understanding of the "popularization of science" in Byzantium, did not hold a prominent place in the dissemination of geographical knowledge. Even when dealing with the creation of the world, they rarely went into sufficient detail concerning the description of the *oikoumene*.

The opposite situation is found in two collections from the late Macedonian period, using the same format, yet embedded in the Aristotelian tradition regarding the nature and the *oikoumene's* place in the cosmos. Michael Psellos' *De omnifaria doctrina*, a doxographical collection of theological and philosophical common notions, written in very simple language, included a few paragraphs *On winds* (§ 146), *On the earth's tilt* (§ 160), *On what right and left are* (§ 162), as well as on some harbours, rivers, and the flooding of the Nile (§ 174–177).⁴⁴ The 150 manuscripts preserving this question-and-answer collection testify to its success and suggest the widest dissemination of a tradition. Its content does not stand up to a scholar such as Psellos, but it helps us to frame this wisdom within a philosophical context. Indeed, the only chapter dealing with the creation (§ 157) leads him to point out the differences between Aristotle, Plato, and Christian thought; in the same mode, when he writes back to John Xiphilinos to continue a discussion on ancient philosophy, Psellos mentions the fact that geography had already been a topic of debate between them,

although shortly before you did not know that the South and not Asia is in front of the Ursa major, or that we say the Europeans live further north than the Africans; but now if this geographical wisdom makes you attack me, separate the climatic zones as you want. For I did not write you my previous letter with the purpose of dealing with geography or dividing the entire earth, but in order to prove your unyielding determination to hide any sign of feebleness.⁴⁵

42 Ed. Riedinger, pp. 64–65.

43 On Ps.-Kaisarios' use of Basil's homilies, see Papadogiannakis, "Encyclopedism," p. 35.

44 Ed. Westerink. See Hunger, *Die hochsprachliche profane Literatur*, vol. 1, p. 522.

45 Psellos, *Epistle to John Xiphilinos*, § 5, ed. Criscuolo, pp. 53–54 (ll. 138–146).

The magistros Symeon Seth, perhaps a Psellos' disciple, dedicated his *Physical synopsis* to an unknown emperor.⁴⁶ The abstract of book 1, “*On the earth and the oikoumene*,” devoted to the description of the basic principles of the human environment, reads as follows: “On the earth, that has a spherical shape and is in the middle of everything; how many stadiums has its perimeter; how much and which part of it do the human beings occupy; how the seven climates are distributed; how far eastwards do the human beings live, and which is the western limit of their dwelling, and which is the northern, and the southern.”⁴⁷ Book 1 offers indeed in its few pages a clear and elementary presentation of some geographical notions rooted in antiquity, which are completely foreign to biblical cosmology. The simple syntax and vocabulary ease the reading of the text; the subjects are presented in short chapters; and these choices made by Seth explain the success of the *Synopsis*, very often copied from the 13th century onwards.

3 The Teaching of Geography: Texts and Images⁴⁸

Basil's *Homilies* as well as Psellos' and Seth's collections may have supplied Byzantine minds with some information on rivers, lakes and seas. However, the average schooled Byzantine also had access to a compendium of Roman geographical knowledge, Dionysius Periegetes' *Description of the Known World*, a brief encyclopedia in 1,187 verses.⁴⁹ In Byzantium, the *Periegesis* probably became the most popular text to provide a succinct description of the *oikoumene*, thanks to the prestigious patina granted by Homer and to the mnemonic

46 Symeon Seth, *Σύνοψις τῶν φυσικῶν*, ed. Delatte, *Anecdota Atheniensi*, vol. 2, pp. 17–89. This is its table of contents: logos 1: the earth and the *oikoumene*; logos 2: the elements between the earth and the sky; logos 3: the sky and the stars; logos 4: the matter, the form, the nature, the soul and spirit; logos 5: the first cause and the providence.

47 Symeon Seth, *Σύνοψις τῶν φυσικῶν*, p. 18.

48 Dalché, “De la glose a la contemplation,” is an outstanding study on the connection of maps with adjacent texts in Latin manuscripts. Not only does it shed light on the different types of illustrations (basically diagrams and maps, with various combinations), but it also explains their place in the codex and their connection to referential texts (inside and outside the figures), establishing whether the images were created or added by the writer or by the reader. The result is somewhat heterogeneous and resists classification. Nevertheless, the many examples provided prove that the image, even if it is connected to the text, can also become on its own a powerful vehicle for the transmission of knowledge and ideology. What follows is only meant to be a first approach to the Greek transmission from this perspective.

49 Dionysius Periegetes, *Description of the Known World*, ed. Lightfoot.

usefulness of its lines.⁵⁰ Dionysius was not a traveller or an astronomer, but his schoolbook of geography succeeded in giving a clear, coherent and organized picture of the world and in providing the Roman citizen with a global framework or mental representation of unseen regions and peoples.⁵¹ The *Prolegomena* and scholia to the poem preserved by many codices still need to be studied, although it is evident that Byzantines learned from this poem geographical data, as well as ethnographical and mythological-historical information. For that matter, the *Periegesis* was usually copied along with other texts in verse such as Aratos or Hesiod and the accordingly shaped miscellanies prove that Dionysius' work survived by being read in educational contexts.⁵² In the West as well as in the East, the key to its success lies in the mixing of geographical, cartographical/figurative, mythical and literary notions organized according to a general picture and to lists of places that eventually demand to be read and studied along with a map.⁵³

Eustathius of Thessalonike (c. 1115–1195/6) wrote a commentary on the *Periegesis* when he was *maistor ton rhetoron* in Constantinople in 1168–78, before undertaking the commentaries on the Homeric poems.⁵⁴ His purpose was allegedly not to correct or to supplement Dionysius' words, but to paraphrase and amplify them with historical and geographical information.⁵⁵ In order to do so, he used extensively Herodotus and Strabo, who in a sense wrote in the wake of Homeric geography, a field Eustathius was comfortable with, although

50 On the ancient mnemotechnical procedures, see Lazaris, *Art et science vétérinaire*, pp. 98–103; on didactic poetry, see chapter 2 of this volume.

51 On the *Periegesis* see Ilyushechkina, *Studien zu Dionysios von Alexandria*; as a window to the mental image of the world, see Jacob/Detienne, *La description de la terre habitée*, pp. 28–35. Like Strabo (see below), Dionysius turns to geometrical *schemata* or familiar objects in order to visualize a space; see Fig. 7.1.

52 On miscellanies including the *Periegesis*, Reeve, "Dionysius the Periegete." According to Aujac, *La Sphère*, pp. 66–68, Aratos' *Phaenomena* influenced Dionysius, who aspired to do with geography and the map what Aratos had made with astronomy and the celestial sphere. On the complementarity of Aratos and Dionysius, see below. On the Periegetes' transmission, Tsavari, *Histoire du texte*; Marcotte, "La Periegesi."

53 On Dionysios' map, Jacob, "L'œil et la mémoire," pp. 38–42. We make our own the words of Gautier Dalché "L'enseignement de la géographie," 163: "Il n'est pas question d'entrer ici dans le débat sur l'existence ou l'absence de cartes dans l'Antiquité, largement biaisé par des interprétations personnelles ou des a priori sur ce qu'est ou devrait être une 'carte,' la conclusion négative ignorant totalement de nombreuses références dans la littérature antique." On the distinction between "scientific map" and "figurative map," running parallel throughout Antiquity, see Prontera, "Carta e testo nella geografia antica."

54 On Eustathios, Pontani/Katsaros/Sarris, *Reading Eustathios*. On the *Commentary*, Cassella, "Sul commentario di Eustazio"; Pérez Martín, "Geography at School." The text was edited by Müller, *Geographi Graeci minores*, vol. 2, pp. 201–407.

55 Ed. Müller, pp. 205–6.

he also read Ptolemy, Aratos, and doubtless other texts. Dionysius' lines inspired Eustathius' reflections and erudition on the inhabited space, as did the introductory epistle addressed to John Doukas Kamateros,⁵⁶ which allowed him to establish a general framework and some notions on the representation of the *oikoumene* from Anaximander onwards: the definition of topography, chorography, *periodos ges* and periegesis, and the political and historical value of geography. In order to accomplish all this, he used the introductory books of Strabo and Ptolemy.⁵⁷

In this epistle, Eustathius states: "They certainly have done this [sc. to circumscribe what lies under the skies] in a small space, those who have dealt with the map (*pinakographia*) of the *oikoumene*, when they enclosed infinity in something as small as a nail and they circumscribed the boundless totality of the earth to a surface of minimal dimensions. It is said that the first to do so was Anaximander, disciple of Thales, and after him, Hecataeus also dedicated himself to the same task, and after him, Democritus, and in the fourth place, Eudoxus" (translated from ed. Müller, p. 208.9–17).

Other testimonies prove that it is not through the reading of Strabo that Eustathius became familiarized with the use of maps, but that these small-scale representations formed an integral part of his reality.⁵⁸

Strictly contemporary with Eustathius, the possessor of the MS Milano, Biblioteca Ambrosiana, C 222 inf. thought it was worth transcribing the following conversation with the rhetor John Kamateros in a brief note on fol. 339:

According to Kamateros' words, of all the poetical books, two poets need to be sensed and kept in a book: the Periegetes and Aratos, for the former has described the map and the latter the sphere. Without them, the young man trying to decipher the texts would not understand anything: the map does not go without the text, so that the beholder has a sense of what is written and understands it; and the same is true for the sphere. But Aratos is the most difficult of both, as the rhetor told me.⁵⁹

56 John Doukas was the eparch of the City; see Stone, "The Grand Hetaireiarch," p. 146, who does not mention the testimony of this epistle.

57 Ed. Müller, pp. 207–16.

58 The scholia of Dionysius Periegetes also mention maps where certain places or geographical features are missing; cf. Müller, *Geographi Graeci*, vol. 2, p. xxiv.

59 Ed. Mazzucchi, "Ambrosianus C 222 inf.," 421: ὡς εἶπεν ὁ Καματηρὸς ὅτι ἀπὸ τῶν ὄλων ποιητικῶν βιβλίων, δύο ποιηταὶ εἰσὶ τὰ δεόμενα καὶ αἰσθήσεως, καὶ βιβλίου· ὁ, τε Περιγηγῆς καὶ ὁ Ἄρατος· ὁ μὲν γὰρ ἔχει τὸ χαρτίον ἱστορημένον, ὁ δὲ τὴν σφαίραν· καὶ ἄνευ τούτων, οὐκ ἂν νοήσῃ τί, ὁ ἔρμηνευόμενος ταῦτα νέος· μόνον τὸ γράμμα νοήσῃ ἔχει· οὐδὲ χαρτίον ἄνευ λόγου δίδεται, ἵνα βλέπει ταῦτα τὰ γραφόμενα αἰσθητῶς· καὶ νοήσῃ αὐτά· ὡσαύτως καὶ τῆς σφαίρας· ἔστι δὲ δυσκολώτερος τῶν δύο ὁ Ἄρατος· ὡς εἶπε μοι τοῦτο ὁ ῥήτωρ:— A brief treatise from the

Michael Psellos, who became ὑπατος τῶν φιλοσόφων and taught a great variety of philosophical subjects in Constantinople from 1047, wrote a *Περὶ τοῦ γεωγραφικοῦ πίνακος*, explaining how to draw a map of the *oikoumene*. With this in mind, he positioned important places, using cardinal points or providing locations by relating them to others—a very traditional practice in geography. Although the treatise is an epitome of Strabo, it must be understood as a secondary product, of purely academic dissemination, proving that Psellos taught geography to his students by using maps.⁶⁰ This is confirmed by his *Encomium in matrem*, vv. 1911–13: “I thus need to explain to them [*sc.* disciples who often come and ask him about various disciplines] all geography, and correct or integrate for them what is lacking in the geographical map.”⁶¹ Maximos Planudes’ (c. 1255–1305) *ep.* 86 mentions a γεωγραφικὸν πινάκιον showing Thessalonike, while Gregory of Bulgaria’s (1313/4–1327) *ep.* 3 speaks about a map (γεωγραφία πινάκιον) showing the position of Trebizond.⁶²

The topic comparing the immensity of the universe with its small representations, already found in Eustathius, appears once again in the encomium of Manuel Holobolos (fl. 1261/2–1296/1310) to Michael VIII, written after the recovery of Constantinople in 1261 (or. 1). Regarding the difference between the praise itself and the object of praise, i.e., between the modesty of the written work and the greatness of the subject (in this case, the emperor), Holobolos states:

For the sky is certainly great and high and, even when students make it spin around a sphere,⁶³ using a delicate, wicker structure, thus making it turn as light as a bird, this does not mean it is small; in the same manner, the earth is wide and spacious, and even when those who ponder the books of geographers and *periegetai*, inscribe it in a parchment of scant dimensions, this does not mean it is narrow. Is the sun great? And yet, the scribes compress it into a pyramidal drawing, which can easily be turned, and this does not mean it is small.⁶⁴

7th c., Leontius, *De sphaerae Arateae constructione*, ed. Maass, proves that the sphere was considered a necessary complement to the reading of Aratos.

60 Lasserre, “Étude,” pp. 76–9, publishes it without any comment; cf. Diller, *The Textual Tradition*, p. 84; Koder, “Sopravvivenza,” p. 58. A new critical edition (based on all the manuscripts) and translation in Pérez Martín, “Miguel Pselo, *Sobre el mapa*.”

61 See Pontani, “The world,” p. 181 (his translation).

62 Both texts pointed out by Pontani, “The world,” p. 182.

63 It is doubtless an armillary sphere. On its use in ancient and medieval times, Aujac, *La Sphère*, p. 19 and Arnaud, *La cartographie à Rome*, vol. 1, pp. 192–204.

64 *Manuelis Holoboli Orationes*, pp. 49–50 Treu. Cf. Strabo 2.5.10, where he describes, on the other hand, how a sphere “at least ten feet in diameter” is needed in order to locate with

The passage suggests that, in the different contexts implied by these words (educational, learned and cultivated), the use of objects of geographical nature (spheres or maps), whether constructed or drawn, were commonplace. From a conceptual point of view, these texts demonstrate the acceptance of the sphere or the map as devices which simplify and reproduce reality, and therefore, validate the admission of visual language as a form of communication alongside writing, as explicitly pointed out by Holobolos. This would explain the circumstance suggested here: that in the students' hands, text and map could be exchangeable.

A similar educational context is expressed in the scene relative to the Socratic school in the *Clouds* of Aristophanes (vv. 200–21), represented in 423 BCE. Here, the use of the sphere, a map (γῆς περίοδος, v. 206) and instruments of calculation and measurement are shown, although it also clearly contrasts with the hodological and routine perception of space held by most citizens, who did not recognize anything in them.⁶⁵ Aristotle takes on its educational role when, in book 1, 349b of *Meteorologica*, at the beginning of his short “cartographical description,” he points out that the largest rivers flow from the biggest mountains (and vice versa) and that this is obvious for people beholding (θεωμῆνοις) the maps (γῆς περιόδους) that were outlined (ἀνέγραψαν) from the testimonies of other individuals or from the personal observation.⁶⁶

Two texts of Plutarch on the dispute between Nicias and Alcibiades in the Assembly of 415 BCE regarding the invasion of Sicily, highlight how young and old Athenians met at their schools and places of leisure, before taking a decision, in order to draw maps of Sicily and study the plans of its ports and navigation charts.⁶⁷ It is possible that Plutarch was extrapolating Roman reality of the 1st century CE, since Roman evidence is clearer. For instance, in 296–297, Eumenius, *magister equitum* at the court of Maximian (286–305 and 307–308) who later taught rhetoric in Augustodunum, supplicated the governor for the restoration of the ruined school and highlighted the educational virtues of a

any clarity significant parts of the map of the *oikoumene*, an experiment performed by Crates (frg. 6 Mette); in any case, the map, in order to be synoptic, while still having chorographic precision, must not be less than seven feet. For these reservations in Strabo (2.5.10; cf. 2.5.1 y 2.5.16) or Ptolemy (1.20.1), concerning the possibilities of moulding the terrestrial globe and the details of the map of the *oikoumene* into a single figure, vid. Arnaud, *ibidem*, who does not doubt the widespread use of models of celestial and terrestrial spheres.

65 Dan et al., “Common Sense Geography,” 571–4.

66 Gehrke, “The ‘Revolution’ of Alexander the Great,” 84–6.

67 Plutarch, *Parallel Lives*, *Nic.* 12.1 (and cf. *Alc.* 17.3–4).

map reproduced on one of its walls.⁶⁸ The process may be defined as a “democratization” of education in geography, taking place during the imperial period, when the subject ceased to circulate only among specialists. Nevertheless, this text evidences for a monumental cartography, which reminds of Agrippa’s map on the Vipsana Portico⁶⁹ or that of Theodosius II near to the Capitolium.⁷⁰

The educational use of geography, and therefore of cartography, even when not a formal discipline in the school training (despite Strabo’s efforts of comparing it to Philosophy), must have become widespread during the Roman period.⁷¹ The understanding of the new, universal and ecumenical dimension of historical space is inconceivable without prior instruction in the geographical and mathematical astronomy acclaimed by Strabo (1.1.21; 2.5.1).⁷² It is true that in antiquity there is no evidence of the combination of text and map in the same document.⁷³ Textual descriptions frequently used a visual reference system based on analogy. For example, Iberia was compared to a bull skin; the Peloponnese to a chestnut leaf or to a mulberry tree (eventually naming the Peninsula “Morea”); the *oikoumene* to a *chlamys*, etc.⁷⁴ These analogies may also evoke, rather than represent, a geometric figure (a diamond shape, a paral-

68 *Eumenii Oratio pro restaurandis scholis*, xx-xxi, ed. AE. Baehrens, *XII Panegyrici Latini*, Lipsiae 1874, pp. 130–31: “Further, in its porticoes let the young men see and contemplate daily every land and all the seas and whatever cities, peoples, nations the unconquered rulers restore by affection or conquer by valour or restrain by fear. Since for the purpose of instructing the youth, to have them learn more clearly with their eyes what they comprehend less readily by their ears, there are pictured in that place, as I believe you have seen yourself, the sites of all locations with their names, their extent, and the distances between them, the sources and terminations of all the rivers, the curves of all the shores, and the Ocean, both where its circuit girds the earth and where its pressure breaks into it” (transl. Nixon/Rodgers 1994).

69 Plin., *Nat.* 3.17; *Diculi Liber de mensura orbis terrae*, ed. J.J. Tierney, Dublin 1967; see Arnaud, “Marcus Vipsanius Agrippa.”

70 Traina, “Mapping the World under Theodosius II”; Wolska-Conus, “Deux contributions,” 274–9.

71 On geographical learning in late antiquity, see Racine, *Literary Geography*; Gautier Dalché, “L’enseignement de la géographie”; Clausi, “Scuola e geografia nella tarda antichità.”

72 This is not to say that every geographical description was necessarily accompanied by a cartographic image or that the authors had in mind an Alexandrian type of “map”; in fact, many works assumed a descriptive model or point of view, based on often a hodological itinerary, as expressed by Janni, *La Mappa e il Periplo*. Cf. extensively Prontera, “Carta e testo nella geografia antica” and Arnaud, *La cartographie à Rome*, vol. 1, pp. 218–33, and below what is said about the *Tabula Peutingeriana*.

73 The exception would be the papyrus of Artemidorus, but there are serious doubts as to its authenticity; Marcotte, “Le papyrus d’Artémidore.”

74 Bertrand, “De l’emploi des métaphores descriptives”; Angelov, “Asia and Europe Commonly Called East and West,” p. 49; Dueck, “The Parallelogram and the Pinecone.”

lelogram, etc.), which does come closer to the proceedings of an Alexandrian cartographer.⁷⁵ In any case, for elite circles, it is possible to assume different degrees of cartographic knowledge and the handling of maps, varying in complexity and regularity. Undoubtedly, in the Roman period the boundaries between scientific work and the curiosity of a learned man were extremely porous: there was a continuous transfer between them, as evidenced by Cicero when he manifests the desire to write a geography in the wake of Eratosthenes (cf. Cicero, *Ad Att.*, 2.4; 2.6; 2.7). This transfer took place either through non-specialized texts, such as encyclopedias and rudimentary reference works, or through more elaborate texts with a solid Graeco-Roman philosophical and scientific base—a tendency that would have continued up to the Middle Ages.⁷⁶

This is the context in which a multiplication of drawings, diagrams, sketches, and maps accompanied the text in Byzantine manuscripts. Regardless of the meaning each one held, they testify to an indisputable relation between image and text, in which the former may even take precedence over the latter. Just to mention a few examples, some Palaiologan manuscripts of Oppian's *Halieutica* illustrate the migration routes of fish with diagrammatic maps focussed on the Bosphorus or Sicily.⁷⁷ In a manuscript of Dionysius Periegetes the Cyclades are represented by eleven circles encircling Delos (Fig. 7.1). In a manuscript from the 14th century with medical and astrological opuscula, a unique map of Cyprus has been recently discovered: it carefully records the outline of the island as well as its populations.⁷⁸ In Strabo's manuscripts it is not uncommon to find geometrical figures, ranging from the most simple square or rhombus with cardinal points (Fig. 7.2), to more elaborate images

75 The most significant example is Strabo. In the first two books of the *Geography*, where he revised Eratosthenes' and all of his successors' canon, he necessarily leads us to a map—which he helps to elaborate: 2.5.13; 2.5.14; 2.5.16; 2.5.34, whilst acknowledging the practical difficulties (Strab. 2.5.10). Likewise, in Strabo's chorographic or regional books the image is dispensable and easily conceivable (cf. more recently Moret, "Strabo. From maps to words," 178–91, with nuances, Biffi "È simile a... L'uso delle immagini" and Prontera, "Da Strabone a Tolomeo: cartografia generale e regionale," 84–7). Neither does Polybius' map of the *oikoumene* (cf. 3.36–38) look much like an Alexandrian map; it reminds more of the *archaioi pinakes* (cf. Prontera, "Carta e testo nella geografia antica," 81–87).

76 Obrist, *La cosmologie médiévale*, pp. 27–31; Gautier Dalché, "L'héritage antique"; Prontera, "Materiali di reimpiego."

77 Marcotte, "Une carte inédite"; Cariou, "La géographie en marge."

78 Cronier/Gautier Dalché, "A Map of Cyprus."

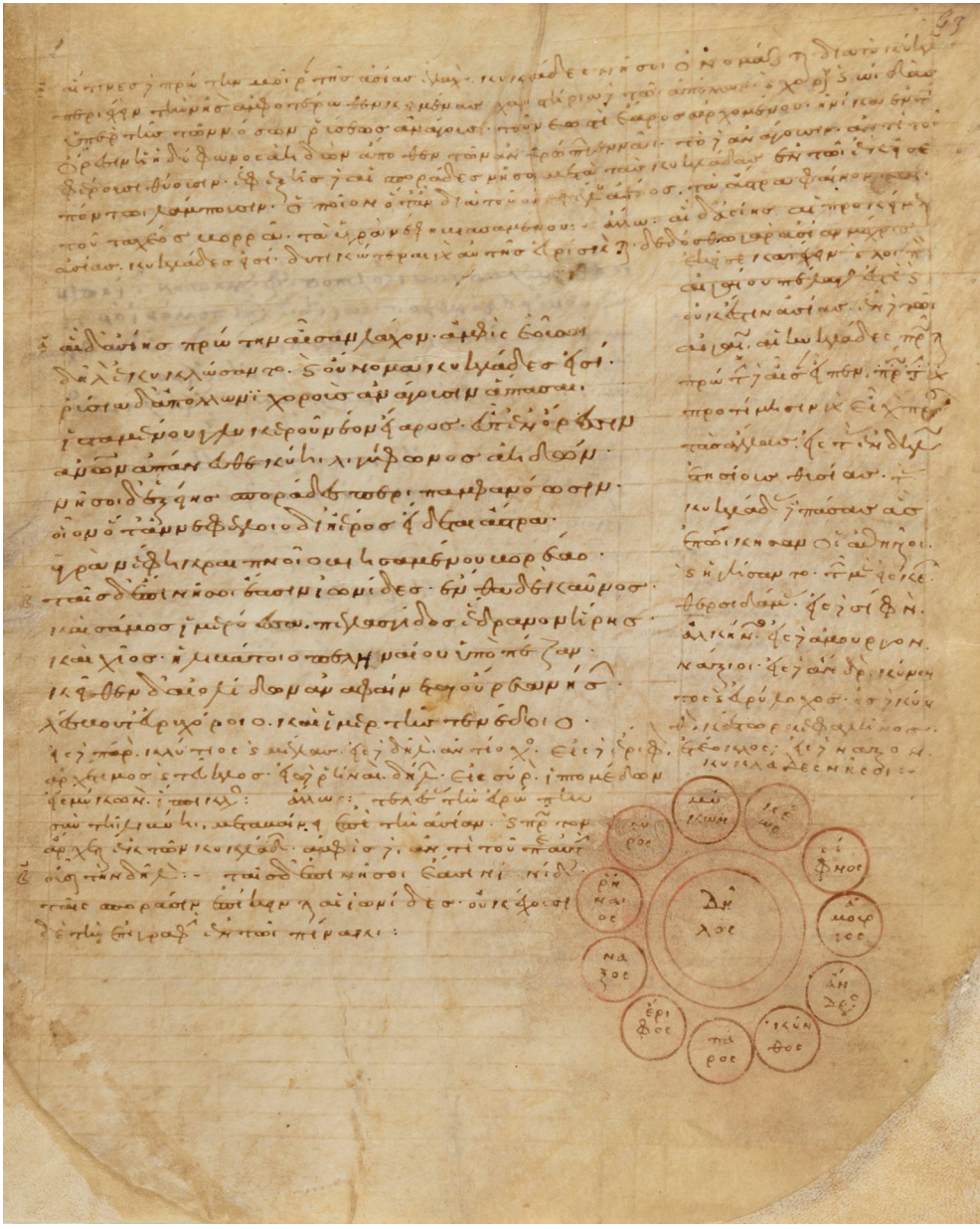


FIGURE 7.1 Cyclades Islands around Delos

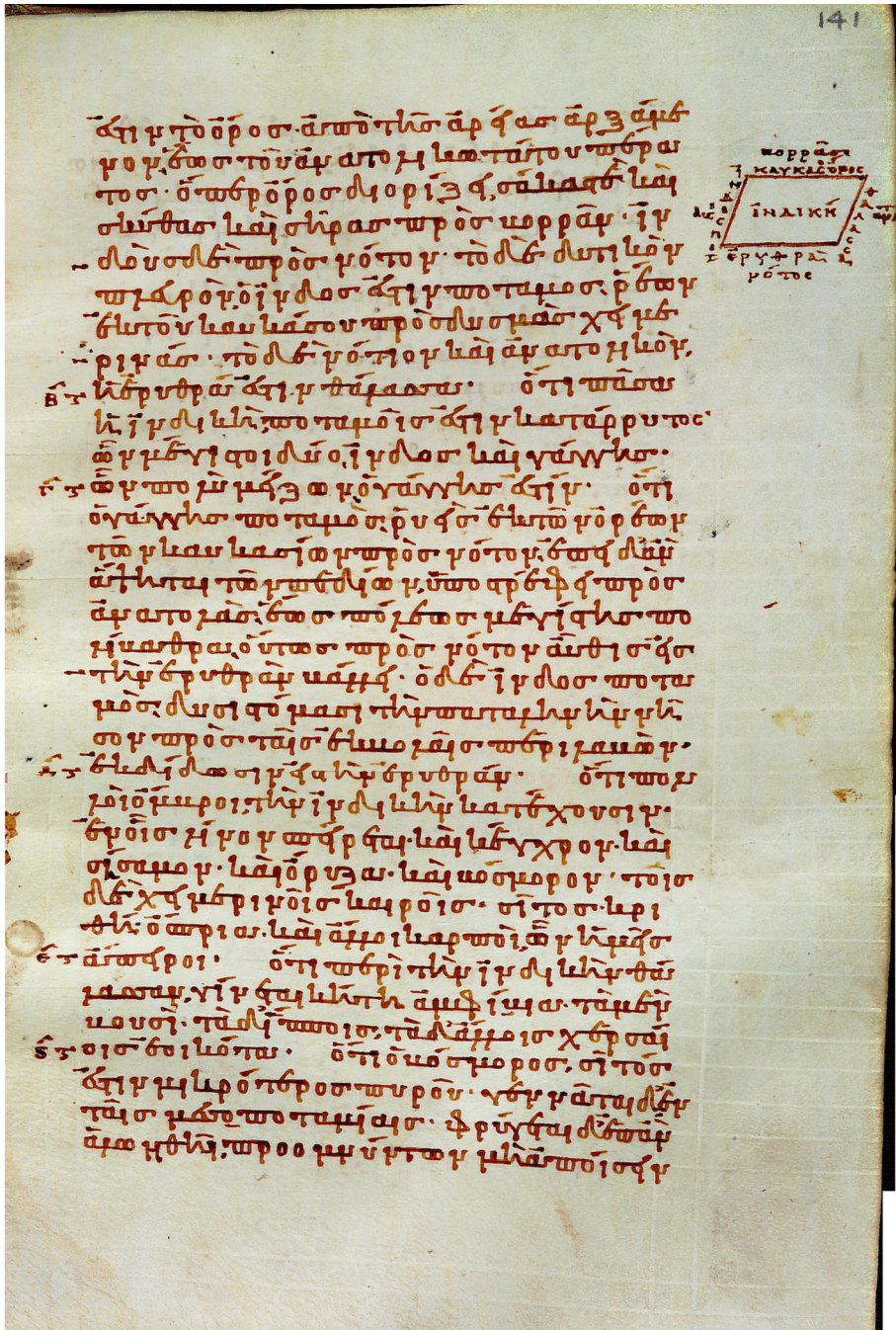


FIGURE 7.2 Eratosthenes' first *sphragis* (India)

where the geographical features are indicated by different kinds of lines.⁷⁹ The text suggests, here and elsewhere, graphic representations.⁸⁰

A manuscript with Aristotle's *Meteorologica*, preserved at the University of Salamanca (Biblioteca de la Universidad, ms. 2747), shows a special set of figures: a wind rose, the distribution of mountains and rivers flowing from them, and the earth divided into climates and surrounded by the name of the winds in the corresponding places.⁸¹ These schemata are not always based on *Meteorologica*, the adjacent text; rather, the illustrator has used the information provided by other texts in order to design the figures.⁸²

One final point: Macrobius' *Commentary on the Dream of Scipio*, translated by Maximos Planudes at the end of the 13th century (see below), was illustrated with five diagrams to which the text specifically refers.⁸³ The Greek version reproduces all of them except for the fifth, the representation of the Θ -shaped earth, with the double Ocean separating the four quarters (and the inhabited one in the shape of the Strabonian *chlamys*), according to Crates' theory. It appears intentional for the Planudean version to omit the diagram of the Θ -shaped earth⁸⁴ and, in some copies, the figure (that eventually will become the archetype of medieval mappaemundi) is even substituted by another sphere incorporating the width of each zone in stadia (Fig. 7.3). Therefore we may conclude that Planudes, whilst respecting the Latin text, exercised a silent criticism of Macrobius by deleting his sketch.⁸⁵ If our interpretation is correct, the image introduced in the Greek version challenges what Byzantines

79 Curiously enough, those figures appear mainly in the margins of Strabo's *Chrestomathy*, in manuscripts such as the MS Palat. Heidelb. gr. 398 (5 figures, see p. 252) or Paris, Bibliothèque nationale de France, gr. 571 (2 figures); on this MS, see Marcotte, "Orbis triquadrus, monde triparti," pp. 278–79.

80 Strab. *Chr.* xv 1, p. 328 Radt: ὅτι ἡ Ἰνδικὴ σχήμα ἔχει ῥομβοειδές, cf. Strab. 15.1.11.

81 Graux/Martin, "Figures"; Harlfinger, *Die Wiedergeburt*, pp. 31–43. The 15th-century manuscript Moscow, Gosudarstvennyj Istoričeskij Musej, Sinod. gr. 415 (Vlad. 509), fol. 77v displays a very similar figure of the earth's rivers and mountains; see Podossinov, "Karte und Text," pp. 16–17, with reference to his previous publication in Russian, and a picture of the map. The Moscow manuscript has on fols. 76v–77r a sketch or outline of the *oikoumene* that Ivanov, "An anonymous Byzantine geographical treatise," dates from 1360–90.

82 Graux/Martin, "Figures," 7–8.

83 On the diagrams of the Latin manuscripts of Macrobius, Gautier Dalché, "De la glose a la contemplation," 713–22.

84 Ed. Armisen-Marchetti, vol. 2, Annexes, Schéma 3; cf. Stahl, "Astronomy and Geography," pp. 254–58.

85 Likewise, in a few marginal notes, Planudes denied some statements on the diameter of the Sun, the Egyptian waterclocks, and the combination of similar materials; cf. ed. Megas, pp. 193–95, sch. 47, 50 and 52.

considered to be a wrong perception of the general framework of the inhabited world.

4 *Itineraria and Periplus: the Geographical Knowledge Applied to Warfare and Navigation*

Even if applied geographical knowledge lay outside the limits of proper science, it is worth mentioning the scarce pieces of information preserved on how Byzantine used some guides to navigate the Mediterranean. In ancient times, maritime *periplus* reflected the unidimensional and hodological concept of space that typified navigational practice. The narrative genre of *periplus*, which usually took the form of short poems, was marked by the following of a coastal route and the different topographical features encountered, as well as by time expressed in the number of days for a journey. A great number of works were composed using this model, both in verse and prose, transferring relatively verifiable information of a diverse nature, which was not always geographical.⁸⁶

To a certain extent, this itinerary form is present in the only ancient “map” preserved in its entirety, the *Tabula Peutingeriana*, a copy from the late-12th/early-13th century of a “world map itinerary”—paraphrasing Miller.⁸⁷ This was first elaborated in the later imperial period and adapted during the Carolingian period.⁸⁸ Monumental in character (m 6.75 × 0.34 in 12 parchment sheets), it assumes an itinerary perspective in which the accumulation of textual and ideographic information, following main routes and secondary ways, is so overwhelming that it notably skews the image of *oikoumene*. This contrasts with the harmonious synthesis of the whole, which in a single view can

86 González Ponce, *Periplógrafos*; Marcotte, *Géographes*; Prontera, “Períplói.” On the oral transfer of knowledge on sailing and harbour maneuvers, see Kowalski, *Navigatio et géographie*, pp. 27–30.

87 Miller, *Die Weltkarte des Castorius*, pp. 48–56 and 75–83.

88 Prontera (ed.), *Tabula Peutingeriana*; Rathmann, “The Tabula Peutingeriana”; Talbert, *Rome’s world*; Salway, “The Nature and Genesis of the Peutinger Map.” For the Roman foundations of the Carolingian imperial ideology, cf. Lozovsky, “Maps and Panegyrics,” pp. 174–76. The hypothesis considering the Tabula as a Carolingian product recently formulated by Albu, “Rethinking the Peutinger Map,” 111–9, has not found consensus; for her (Ead., *The medieval Peutinger map*), the Roman idea of universal space, power, and authority of the model lingers in the claim of the Carolingian *imperium* and *romanitas*, in contrast to the idea of divine and timeless order and space displayed by the ecclesiastical circular maps. A digital reproduction of the *Tabula* is available online: <<http://data.onb.ac.at/rec/AC13945113>>.

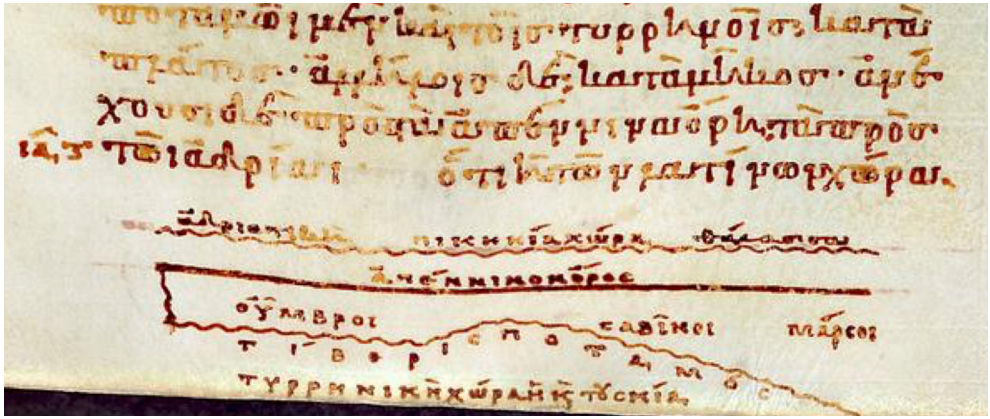


FIGURE 7.4 Strabo, *Chrestomathy*, 5.9–13; Central Italy's *itinerarium*

summarize the form and extension of the *oikoumene*, which is the real added value of the map (as concisely defined by Strab. 2.5.11). Designed to be viewed as a journey with all the enjoyment of the details of the numerous roads, *ciuitates* and *mansiones* mentioned, the *Tabula* cannot constitute the paradigm of ancient cartography, from an Alexandrian perspective, nor can it be considered a practical “travel guide,” but rather as an example of the hodological perception of space in which detail overrides any possibility of understanding the whole. Pictorially it exalts the “real” extension of the Roman dominion of the world, representing in a single *volumen* or scroll an enormous mass of information (not always updated or coherent), which would be very difficult to find in a “Greek” ecumenical map. This is a considerable innovation that abandons, therefore, the harmony of shape in favour of content.⁸⁹

The already cited MS Palat. Heidelb. gr. 398, preserves on fol. 77 (lower margin), a representation of Central Italy (Τυρρηνική χώρα καὶ Τουσκία), illustrating Strabo, *Chrestomathy*, 5.9–13 (Fig. 7.4). The image (very similar to the respective image in the *Tabula Peutingeriana*) condenses many of Strabo's pages (5.2.1–5.4.2), using a thick line to indicate a “mountain range” (τὸ Ἀπέννινον ὄρος) and a wavy line to suggest a river (Τίβερις ποταμός) or the sea shore (Ἀδριατική θάλασσα), using the convention proper to the *itineraria picta*. The figure puts the Adriatic sea on the top and the Tirrenum sea in the bottom, following the orientation of the Ptolemaic maps; besides, it mentions Picenum

89 Arnaud, *La cartographie à Rome*, vol. 3.1, pp. 985–91.

(Πικηνία χώρα) and the three tribes of Central Italy: Οὔμβροι, Σαβίνοι, Μάρσοι. It is clear that this figure occurs as part of a Roman tradition of itineraries and it is a unique example of the combination of ethnography and toponymy provided by Greek descriptive geography with the hodological, properly Latin, representation of space by a Strabo's reader. Nevertheless this map of Central Italy raises several questions, which are difficult to answer. Was it found in the copy of Strabo used by the *Chrestomathy's* author? Did the model have more maps of this kind? Why particularly Central Italy?

The *periplus* preserved by the Heidelberg MS belongs to a genre cultivated from the 4th century BCE to the 6th century CE, the practical nature of which has been questioned.⁹⁰ Except for two moments of intense recovery of texts involving the patriarch Photios and Maximos Planudes, the Byzantines do not seem to have a special interest in this genre, whose tradition they did not continue. However, under strange circumstances, at the end of the 10th century, a manuscript in Madrid, Biblioteca Nacional de España, Mss/4701, preserved a section of a so-called *Stadiasmos*, a Mediterranean *periplus*, which dates back to the Augustan era and was incorporated in the 3rd century by Hippolytus into his *Synagoge*.⁹¹ Ultimately, in the 16th century, an epigone of the ancient *periplus* was born, the Greek portulan, which did not belong to Byzantine navigation knowledge, but to the western, mostly Venetian, tradition of navigational maps. These practical texts were conceived as tools for navigation in the Mediterranean, gathering information about winds, harbours, distances and geographical accidents, allowing sailors to determine their vessel's position.⁹²

The absence of portulans does not mean that guides or itineraries were unavailable to the army or the administration. As an appendix of *De Cerimoniis* (2.45), dating back to 949, a short *stadiodromikon* was preserved, a list of stages (indicating the distance in stades between locations) of the journey from Constantinople to Crete.⁹³ The document fits in very well with the historical context of Byzantine attempts to conquer the island, then under Muslim rule; nevertheless it does not show the real route followed by the imperial navy, but according to Haldon, it must be understood as "a theoretical statement

90 González Ponce, "El corpus periplográfico griego," pp. 41–75; González Ponce, "Utilidad práctica, ciencia y literatura en la periplografía griega de época helenística," pp. 147–75.

91 Pérez Martín, "Chronography and Geography"; Arnaud, "Playing Dominoes."

92 All the texts edited by Delatte, *Les portulans*, are preserved in 16th-century manuscripts; cf. Gautier Dalché, "Portulans," who mentions the *Stadiasmos* as the only preserved Greek portulan written before the modern age.

93 Ed. Haldon, "Theory and practice," p. 235, cf. *ibidem*, pp. 301–02; Pryor/Jeffreys, *The Age of the dromon*, pp. 547–70.

of a desired route.⁹⁴ The *De ceremoniis* manuscript, Leipzig, Universitätsbibliothek, I, 17, preserves a short list of *aplekta* that cross Asia minor from Malagina to the Armeniakon (tit. “Exposition of imperial expeditions and roster of marching camps.”)⁹⁵ The already mentioned manuscript Ambros. C 222 inf. (fol. 42), preserves a similar itinerary from Constantinople to Cyprus and Crete.⁹⁶ In any case, handbooks of warfare or administrative guides, mostly written in the Macedonian period, did not mention this kind of itineraria or maps.⁹⁷

We know only of one rare testimony concerning the appreciation of geographical knowledge by a commander of the navy.⁹⁸ It is found in a later version of the work known as *Περὶ θαλασσομαχίας* and attributed to the general Nikephoros Ouranos (c. 980–c. 1010), a warfare handbook from the 11th century:

While sailing into sea, it is in the commander’s interest to keep by his side experienced men who know which winds make the sea move and which ones blow from the shore; and who may know of the rocks covered by the sea; the shallow waters; the navigated coastline; the islands in close proximity; the ports and the distance between them; and who may know, as well, inhabited places and watering points. For many have died,

94 Haldon, “Theory and practice,” p. 302 and n. 251.

95 Ed. Haldon, *Constantine Porphyrogenitus, Three treatises*, p. 80.

96 Ed. Mazzucchi, “Ambrosianus C 222 inf.,” pp. 430–31.

97 The reason may lie beyond the proverbial lack of definition of some Byzantine texts, given that it was considered inconvenient to write down strategic information that might find its way to the enemy; see Christides, “Two parallel naval guides,” p. 85. According to Kowalski, *Navigation et géographie*, pp. 27–28, the absence of written records about sailing routes would confirm the vitality and usefulness of an orally transmitted knowledge, while an incomplete and therefore useless knowledge about an area of the sea shore, for example, would be written down in order to ease the possibility of its future completion and consultation. Emperor Leo VI’s (866–912) *Taktika* mentions the importance of surveyors (§ 12.43, § 17.30, § 20.174), but pays no attention to itineraries or any kind of instrument to guide the march. The *Sylloge Tacticorum*, compiled during the reign of Constantine VII Porphyrogenetos, in a chapter *On the earth’s measures* (a list of measurement units), gives the value of the *milion* “according to the precise geographers Eratosthenes and Strabo” (ed. Dain, § 2).

98 Ed. Dain, *Naumachica*, p. 93, who used the MS Firenze, Biblioteca Nazionale Laurenziana, Plut. 57.31 (16th c.). The text edited by Pryor/Jeffreys, *The Age of the dromon*, pp. 571–605 (here p. 575), is based on MS München, Bayerische Staatsbibliothek, Monac. gr. 452 (14th c.); on the text, see *ibidem*, pp. 181–83. In Pryor/Jeffreys’ edition, this paragraph (according to the editors, a paraphrase of Leo VI) is shorter and more vague, ignoring in fact the references to geographical knowledge. On Byzantine science of warfare, see chapter 12 of this volume.

inexperienced at sea and ignorant of these places, because the winds blew frequently and the ships dispersed. It is not only convenient for the commander to have experts on board such as those described, but also for every ship to have them, so that they may adequately advice on which is the best way to act.

5 Ptolemy, the Scientific Description of the *Oikoumene* and Planudes' Role

As previously pointed out, the main ancient text describing the *oikoumene* according to astronomical parameters which survived in Byzantium, was Ptolemy's *Geographike hyphegesis* (the real name of the text, although *Geography* is widely used).⁹⁹ The role played by Maximos Planudes in the survival of the work has given way to a complex and much debated issue, mainly focussed on the elaboration of the maps conceived by Ptolemy and transmitted along with the list of localities.¹⁰⁰ This sharp focus (or the disregard for Byzantine scholarship) has blurred other contributions to geography in the 14th century, which has fortunately been addressed by Basilios Tsiotras, who has studied the versions of the *Geography* by Nikephoros Gregoras and Isaak Argyros and the geographical materials of John Chortasmenos in MS Vatican, Biblioteca Apostolica Vaticana, Vat. gr. 1059 and Urb. gr. 80.¹⁰¹

It would take a long time to describe every argument in favour or against the antiquity of the maps or the relationship among texts and maps¹⁰² preserved by the earliest testimonies of the *Geography*, traditionally dating from the end of the 13th century,¹⁰³ but in any case we must present at least two kinds of

99 See Aujac, *Claude Ptolémée astronome, astrologue, géographe*. On the reception of the text in Byzantium, see Gautier Dalché, *La Géographie de Ptolémée en Occident*, pp. 71–86.

100 See Mittenhuber, "The Tradition," Burri, *Die Geographie*.

101 Tsiotras, *Ἡ ἐξήγητική παράδοση*, pp. 71–193 and cf. Miller, *Die ältesten Separatkarten*, Laue/Makris, "Isaak Argyros." On the translation of the *Geography* in Florence, see Gautier Dalché, "The Reception," and Id., *La géographie de Ptolémée en Occident*.

102 Berggren/Jones, *Ptolemy's Geography*, pp. 45–46, establish two main categories of sets of maps, either directly coming from or not dependent of Vat. Urb. gr. 82. The scheme preferred by Ptolemy himself (10 maps of Europe, 4 of Lybia, 12 of Asia) required big sheets to accommodate the maps (this is what Diller calls "Atlas-branch"). The second category multiplies the maps and splits some regions into two or more parts, in order to reduce the size of the codex.

103 The more precise dating around 1295 comes from a mistaken appreciation (see f. ex. Pontani, "The World," 181 and 190) of Planudes' *ep.* 119 (dating from the spring of 1294, see Beyer, "Die Chronologie," 121), in which the scholar expresses his desire to possess the books of Ptolemy (τάς Πτολεμαίου μοι βιβλους γενέσθαι). The *Geography* is not the only

evidence, the manuscripts and the texts, in order to clarify the Byzantine intervention in the textual transmission.

Some points seem certain: a poem by Gregory of Bulgaria claims that “it was thanks to your (sc. Planudes’) labours that Ptolemy’s labour, hidden in the depths of oblivion, was revealed in numerous images.”¹⁰⁴ Secondly and more important, an epigram by Planudes¹⁰⁵ states that “the *Geography* has just come to light” and congratulates Andronikos II for that enterprise, which locates the recovery of the text after 1282 under the patronage of the emperor. Planudes played a very active role in the recovery of texts, either scattered (such as Plutarch’s *Moralia*) or preserved in bad shape (Diophantus), just to mention two. That Andronikos II supported him in this task is beyond any doubt, but in Ptolemy’s case aid was more necessary than ever, because of the monumentality of the operation. Nevertheless the texts of the epigram do not specify the intervention of Planudes in the project and its title was not written by Planudes himself, since it varies depending on the testimony. The oldest witness of the poem is MS Milano, Biblioteca Ambrosiana, A 119 sup., on whose fly-leaves (fols. 11v–111) some students of Planudes gathered and transcribed a group of poems related to Ptolemaic *Geography*.¹⁰⁶ This means their copy is the closest to the scholar. The title reads as follows: “Of the most holy and wise sir Maximus Planudes, on the diagram of Ptolemy that he himself conceived and drew from the book of Ptolemy, without taking his cue from anyone else.”¹⁰⁷ This “diagram” must be the general map of the *oikoumene* based on Ptolemy’s text,

Ptolemaic writing Planudes dealt with and therefore the letter does not suggest a date for the *Geography*’s recovery.

104 Ed. and transl. by Pontani, “The World,” p. 193–4, and Chrysochoou, “Maximos Planoudes,” pp. 127–28, from Ambros. A 119 sup., fol. 11v.

105 First publication by Stückelberger, “Planudes,” a new version in Pontani, “The World,” 197–9, with English transl., but also and independently by Mazzucchi, “Il Tolomeo Ambr. D 527 inf.,” pp. 263–64, with Italian transl.; see also Chrysochoou, “Maximos Planoudes,” 123–4 (who does not know Pontani’s or Mazzucchi’s papers and in pp. 123–27 wrongly assigns to Gregory of Bulgaria all the poems in Ambros. A 119 sup. and to Planudes a fragment in Nikephoros Gregoras’ notebook Palat. Heidelb. gr. 129), and Mazzucchi, “Ancora sugli esametri.” The most recent edition (with French translation and commentary), by Taxidis, *Les épigrammes de Maxime Planude*, pp. 87–97, and *ibidem*, pp. 97–102, other poems related to Ptolemy’s *Geography*.

106 Mazzucchi, “Il Tolomeo Ambr. D 527 inf.,” p. 262 and n. 16, “Ancora sugli esametri,” 183–4, nn. 6–7, identified the hand of John Zarides on fol. 111 and imprecisely on fol. 111v the main hand (A) of the Strabo Marc. gr. xi.6, for which see Cohen-Skalli/Pérez Martín, “La *Géographie* de Strabon,” where we propose to identify the scribe with a student of Planudes, Georges Lakapenos. In Ambros. A 119 sup. we see his hand, surprisingly similar to Planudes’, on fol. Iv, the top of fol. 11v, and the poem Εἰς τὰς ἑβ’ ἐορτὰς on fol. 111v.

107 Transl. by Pontani, “The World,” p. 192.

and to be distinguished perhaps from the entire set of maps,¹⁰⁸ but clearly designed by the Byzantine scholar merely from Ptolemy's text. Another, later, testimony of the poem (MS Napoli, Biblioteca Nazionale, Neap. 111.C.3) shows a different title: "(...) Heroic lines on Ptolemy's *Geography*, which had disappeared for a long time and was then found by him with great toil."¹⁰⁹ If the title is contemporary with the copy of the Naples manuscript, we must date it a century after the recovery, when the legend of Planudes, the book-hunter or recoverer of Greek texts, was already set. Also, the famous Latin note written in Vat. gr. 177 (fol. 11v: *Claudii Ptolomei liber geographie et est proprius domini Maximi philosophi greci ac monaci in monasterio Chore in Constantinopoli emptus a quodam Andronico Yneote*) may be understood in terms of Planudes' fame, if the Maximus monachus mentioned was indeed Planudes and the westerner who bought the manuscript did it with the belief that he was buying Planudes' very exemplar.¹¹⁰

Regarding the manuscripts: the earliest copies of the *Geography*, hypothetically linked by Diller to Maximus Planudes, have deserved much attention, although their palaeographical analysis is sometimes faulty.¹¹¹ Literature on the subject ignores, for example, that the MS Vat. gr. 191, an important but incomplete copy without maps of the *Geography* and many other geometrical and astronomical texts, is a miscellany organized by John Pediasimos, *hypatos ton philosophon* and rival of Planudes.¹¹² Furthermore, although neither the Planudean copy of the *Geography*, nor even a manuscript of this text annotated by him have been preserved, the oldest manuscripts (Vatican, Biblioteca Apostolica Vaticana, Urb. gr. 82 and İstanbul, Topkapı Sarayı, Seragl. G.I.57 +

¹⁰⁸ Chrysochoou, "Maximos Planoudes," pp. 124–25, thinks that "diagram" does not refer to a map but to the graticule of meridians and parallels. It is true that diagram usually stands for the schema or figure resulting from a demonstration, but such a figure would contradict the description given by lines 15–18 of the poem and it would not deserve such a laudatory text. The map of the *oikoumene* is drawn on the basis of the graticule and of Ptolemy's calculations, and this explains its name, which reinforces the scientific value of the operation.

¹⁰⁹ Transl. Pontani, "The World," 199.

¹¹⁰ Against the identity of "Maximus philosophus monachus" with Planudes, see Estangüi, "Saint-Sauveur de Chôra." On the identity of Andronikos Oinaiotos, see *ibidem*, 154–61.

¹¹¹ The Swiss team of classicists who edited the *Geography* in 2009 have published several studies on the textual transmission and the manuscripts; see at least Mittenhuber, "The Tradition"; Stückelberger/Grafshof (eds.), *Klaudios Ptolemaios. Handbuch der Geographie. Ergänzungsband*; Burri, *Die Geographie*; Defaux, *The Iberian Peninsula in Ptolemy's Geography*.

¹¹² Pérez Martín, "L'écriture de l'hypatos," and Acerbi, "Byzantine Recensions," 192–5. According to Berggren/ Jones, *Ptolemy's Geography*, p. 44, Vat. gr. 191 is the only copy uninfluenced by a Byzantine revision.

København, Det Kongelige Bibliotek, Haun. 23 (1 fol.), the “Atlas-branch” of the transmission), have been linked to Planudes since Diller’s study in 1940. According to Diller they were produced under Planudes’ personal direction, but the evidence gathered by the American scholar is very scant. It is based on the fact that the first scribe of Seragl. G.I.57 also copied Strabo’s manuscript Paris, Bibliothèque Nationale de France, gr. 1393, from which Planudes selected some passages for his *Sylloge*.¹¹³ Another testimony to the “Atlas-branch” of Ptolemy’s text is an anonymous *Diagnosis*, preserved by Paris, Bibliothèque Nationale de France, suppl. gr. 443A (fol. 10) and other later codices. Diller has argued that Planudes may be the author, but the question has not been clarified.¹¹⁴ Therefore the involvement of Planudes in this group of testimonies would be based on the equation imperial patronage = lavish manuscripts. In fact, Planudes’ handwriting has not been found in any of these manuscripts (and we are well aware of Planudes’ willingness to take to the pen and write, correct or comment on a text).

Ptolemy or Strabo¹¹⁵ were not the only roads to geographical knowledge considered by Planudes. He also read Cleomedes’ astronomical treatise *De cyclica theoria* (*Cyclic Theory*, written around 200 CE), which offers the most informative account of Eratosthenes’ method of measuring the circumference of the Earth, and copied part of the oldest preserved copy.¹¹⁶ Cleomedes’ treatise had been the source of a long excerpt linked to Psellos’ teachings and preserved in a miscellany copied by the middle of the 13th century in the MS Oxford, Bodleian Library, Barocci 131.¹¹⁷ Likewise, in the approach to the physical geography embedded by Nicephorus Blemmydes (1197/8–1271/3, the most influential scholar in Byzantium in the central decades of the 13th century) in his *Epitome physica*,¹¹⁸ Cleomedes was the main source used by him. Two geographical texts attributed to him were not written by Blemmydes, but represent 16th-century forgeries.¹¹⁹ Instead, his *Epitome*, a compilation intending to

113 Diller, “The Oldest Manuscripts,” pp. 65–66.

114 Diller, “The Anonymous Diagnosis,” and Wolska-Conus, “Deux contributions,” 259–73.

115 Strabo’s books 1–2 are a fascinating introduction to the ancient geographical thought that used to be read along with Ptolemy’s book 1, see Chrysochoou, “Maximos Planoudes,” pp. 117–18.

116 Todd, “The Manuscripts.” The text was contemporarily commented by John Pediasimos for his students: his scholia have been edited by Caballero, *El comentario*.

117 The miscellany was published by Pontikos as a text in itself and in this edition the chapter from Cleomedes is § 30; see Pontikos, *Anonymi Miscellanea Philosophica*, pp. 93–96, where the text also deals with the climates and belts, the antipodes, etc.

118 Lackner, “Zum Lehrbuch der Physik,” p. 164.

119 Diller, “Two Greek Forgeries”; Brodersen, “Die geographischen Schriften” (*pace* Koder, “Nikephoros”).

assemble the most relevant philosophical subjects, and still lacking an appropriate edition,¹²⁰ presents three chapters (§ 28–30) dealing with the foundations of astronomical geography: the measurement of the earth and the belts or climates, the antipodes, the length of day and night, the seasons, and the habitability of the earth.¹²¹

Finally, in the realm of astronomical geography we still need to recall a text already mentioned, this time not written in Greek but translated into Greek by Planudes, Macrobius' *Commentary on the Dream of Scipio*, a scientific compendium that successfully transferred the Greek geographical and astronomical wisdom to the Latin west, using as an excuse the *Dream of Scipio*, the worldview and oracles of Scipio Africanus which close Cicero's *Republic*. The geographical section (2.5–9) is presented as the natural extension of the astronomical chapters and deals succinctly, although substantially, with the terrestrial belts and their measures, the antipodes, the ocean and the inhabited world.¹²² Although Macrobius' editors do not attribute any textual value to the Greek translation of the text,¹²³ the Planudean version, preserved in several Byzantine copies, did constitute a recovery of the Greek tradition defending a theory of the earth's surface that had faded away a long time ago, namely Crates of Mallos' theory on the four inhabited worlds.

6 Conclusion

In this chapter it has emerged that Byzantium collected, transformed, and adapted to its own concerns and cultural parameters different geographical traditions and practices, much as happened in other scientific disciplines. In this case though, peculiar and positive conditions exist: on one side, geography established the ideal of a universal empire, independently from the meagre reality, through the emphasis on the spatial and cultural continuity from the very inaugural moment of the Homeric poems; on the other, it enhanced the diversity and perfection of the divine creation expressed through the richness and the natural variety collected by descriptive geography. Therefore, the

120 Ed. PG 142: 1269–1299. Stefano Valente prepares its edition; as a hint for the content and the school context, see Valente, "The Doctrine of Winds."

121 Blemmydes' influence is evident in the outnumbered writings of the emperor Theodore II Laskaris on nature; for the centrality of the Greek territory in his thinking, see Koder, "Die Hellenis als Mitte der Ökumene," pp. 195–205.

122 Stahl, "Astronomy and Geography," pp. 249–58.

123 Macrobe, *Commentaire*, ed. Armisen-Marchetti, the most recent edition, does not even mention it. A reappraisal of the translation in Pavano, "Osservazioni."

confluence between the Alexandrian and Roman approach to the world and the Christian cosmology took place without shrillness or insoluble contradictions.

Consequently, it is no accident that the geographical poem of Dionysius Periegetes was so diffused and studied, or that Strabo found in Byzantium and the Renaissance the place he could not get in his own period's geographical tradition. These facts have to do with the descriptive conditions, accumulative and encyclopaedical, shared by both works together with another celebrated one: the *Tabula Peutingeriana*. But if the outcome of the Byzantine geographical tradition was the recovery of Ptolemy that took place in the imperial learned circles, this was not a matter of chance either, but an eloquent fact about the cultural and scientific Byzantine practices. The Alexandrian scientist embodied tradition as well as change: tradition because his work represented the outcome of the wisdom accumulated for centuries in the environment of the Library; change because his lasting spherical projection of the earth meant the final overcoming of the anomaly between the spherical outlook of the world and the orthogonal projection of the map. By doing so, in a natural way, Byzantine geographical knowledge assumed the map that accompanied and completed the textual information.

We may conclude this approach to the geographical knowledge in Byzantium by paraphrasing Planudes' words in the epigram on the *Geography* of Ptolemy mentioned above. In lines 19–27,¹²⁴ Planudes, the outstanding scholar who studied all the available ancient poetry and at the same time worked on the mathematical inheritance of antiquity, makes a declaration of principle when he recommends ignoring what poets say on the ocean surrounding the *oikoumene* and declares the superiority of Ptolemy over Dionysius of Alexandria. A good point to state and reassess what Science meant for the Byzantines.

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¹²⁴ Taxidis, *Les épigrammes de Maxime Planude*, pp. 87–88.