


RESEARCH ARTICLE

## Callimachus, Conon and Ptolemy: an Alexandrian epigram between geography and astronomy

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### Abstract

A neglected, anonymous and undated epigram on the world map of Ptolemy's *Geography*, here critically edited for the first time on the basis of all existing manuscripts, proves a rare case of reception of Callimachus' *Lock of Berenice*, with an emphasis on the bonds between geography and astronomy, and with so-called 'geographical astrology'. It may stem from Late Antique Alexandria.

**Keywords:** geography; epigram; astronomy; Callimachus; Ptolemy

### I. A neglected epigram on Ptolemy's *Geography*

Ptolemy's *Geography* has inspired a handful of Greek epigrams, among which no less than five by the great scholar Maximus Planoudes († ca. 1305), who famously rediscovered the *Geography* in Byzantium;<sup>1</sup> hardly any of these, however, are transmitted in manuscripts alongside Ptolemy's text itself.<sup>2</sup> The sole exception is a seven-line poem that, like Planoudes' epigrams 6–8 Taxidis, celebrates a geographical diagram of the world.

This hexameter text, which has attracted virtually no scholarly attention,<sup>3</sup> appears at the end of no less than 25 manuscript witnesses of Ptolemy's *Geography*, all obviously later than Planoudes, and belonging to seven different families of the so-called  $\Omega$  recension in Schnabel's classification.<sup>4</sup> Below I present the text (admirably and consistently preserved in the older manuscripts, and therefore in no need of a proper *apparatus criticus*),<sup>5</sup> a working translation and a list of the manuscript witnesses.

<sup>1</sup> Nobbe (1843) xxxii–xxxiv. Taxidis (2017) 87–102 (*Epigr.* 5–9); Pontani (2012).

<sup>2</sup> Planoudes' epigrams (otherwise preserved in manuscripts of a different nature) do appear in manuscripts Londiniensis Burney 111 and Vaticanus Palatinus Graecus 388 of the *Geography* (sigla v and A, see below; Vaticanus Graecus 1411 and Ambrosianus N 289 sup. only contain extracts. See Taxidis (2017) 38–43).

<sup>3</sup> The most recent editions are Nobbe (1843) xxxiv (from Vindobonensis historicus Graecus 1, see below m) and Stückelberger and Großhoff (2006) 920–21. The epigram is repeatedly mentioned (as *Anhang* 7, see p. 138) in the invaluable descriptions of Ptolemy's manuscripts provided by Burri (2013). It ought to have been mentioned among the 'ausserptolemäische Hinweise' to the circulation of Ptolemy's world map in Mittenhuber (2009) 321–42.

<sup>4</sup> Schnabel (1938); Schmidt (1999) 8–15. Many apographs stem from the popularity of the *Geography* in humanist Italy, on which see Gautier Dalché (2009) and the bibliography quoted in Gentile (2019). A new, thorough philological investigation of this manuscript tradition is badly needed, as the preliminary results of Burri (2013) show abundantly (see especially pp. 84–88).

<sup>5</sup> Among a number of clerical mistakes irrelevant to the *constitutio textus* (some of which are listed below in the footnotes to the individual families), I single out what looks like a bold and fantastic conjecture by the 15th-century Cretan scribe Michael Apostolis in line 7 (it is carried by the entire  $\zeta$  family, and curiously implies

Ἐν γραμμαῖς τὸν κόσμον ἀριθμηθέντα νόησον·  
 ἄρκτους, ὠκεανόν, δύσιν, ἀντολίην τε νότον τε,  
 χεῖμα, θέρος, φυσικὰς τ' ἀτραποὺς σκολιάς τε κελεύθους,  
 Αἰθίοπας τ' ἀδρανεῖς, Γερμανῶν δύσμορα φύλα,  
 Σαυρομάτας χοίροισιν ἑοικότας ἠδὲ καὶ αὐτῆς  
 αἰνομόρου Σκυθίης χαλεπὸν γένος, ἄχρις ἐς ἠῶ  
 Ἴνδῶν τε Σηρῶν τε· τὸ γὰρ πέρας ἀντολίης γῆς.

Behold the world arithmetically disposed in a diagram:  
 the Bears, the Ocean, the Sunset, the Sunrise and the South,  
 the winter, the summer, the natural roads and the winding paths,  
 the weak Aithiopians, the unlucky tribes of the Germans,  
 the Sarmatians similar to pigs, and the rude race  
 of doomed Scythia, all the way to the dawn  
 of the Indians and the silk people, for that is the limit of the eastern land.

The families and manuscripts are:<sup>6</sup>

- **α: v** = Londiniensis Burney 111, fol. 114r (late 14th century, Constantinople), and its apograph **A** = Vaticanus Palatinus Graecus 388, fol. 149v (1435–1437, Constantinople); likely from **A** (the codex used by Erasmus for the *editio princeps* of the *Geography* in 1533) derives the copy of the epigram in fol. 22r–v of Vaticanus Barberinianus Graecus 74, a collection of Byzantine poetry compiled by the erudite Vatican librarian Leone Allacci in the 17th century;

- **ζ: Z** = Vaticanus Palatinus Graecus 314, fol. 223r (1460–1470, Crete: Michael Apostolis), its apograph **E** = Parisinus Graecus 1403, fol. 225v (1472–1473, Crete: Michael Apostolis) and E's apograph **H** = Parmensis Palatinus 9, fol. 205r (post-1473, Crete: Antonios Damilas);<sup>7</sup>

- **κ: K** = Istanbul, Seragliensis G.I.57, fol. 122r (fragmentary) (1295–1303, Constantinople);

- **v: f** = Parisinus Coislinianus 337, fol. 264r (early 14th century, Constantinople);

- **ρ: C** = Parisinus Supplementi Graeci 119, fol. 231v (early 14th century, Constantinople); **V** = Vaticanus Graecus 177, fol. 240v (early 14th century, Constantinople) and its apograph **p** = Marc. Gr. 388, fol. 101r (ca. 1453, Italy: John Rhosos); **R** = Marcianus Graecus 516, fol. 116r (14th century: Andreas Telountas); other possible members of this family (but the philological evidence is too slim) may be Scorialensis Graecus Ω.I.1, fol. 182r (*anno* 1523, Carpi: Donato Bonturellio) and Bodleianus Laudianus 52, fol. 77r (*anno* 1568, Venice: Antonios Episkopoulos);<sup>8</sup>

that the eastern land has no end): Ἴνδῶν τε Σηρῶν τε· οὐ γὰρ πέρας ἀντολίης γῆς (see below section III for the importance of *πέρατα* of the known world in this context).

<sup>6</sup> Several of these families embrace other manuscript witnesses of the *Geography*, not listed here because, for whatever reason, they lack our epigram. Most of the codices are described in Burri (2013), to which I refer the reader: I add in the footnotes some more recent bibliography, with no ambition to completeness (the *Pinakes* website, pinakes.irht.cnrs.fr, provides further information for each codex). I select in the footnotes only the most important errors, without drawing any general stemma or any overarching conclusion about the genealogy of the text of the *Geography* itself. I am grateful to Renate Burri for reproductions of manuscripts **K** and Bodleianus Laudianus Graecus 52.

<sup>7</sup> On manuscript **H** and this 'Cretan' family (whose genealogy is very clear) see Burri (2021) with further bibliography. On the reading in line 7 see above n.5.

<sup>8</sup> The philological relationships between the members of this family remain unclear. The dating of manuscript **R** is still controversial, oscillating between 1320 and 1360–1380 (the watermarks are ambiguous, but that on fol. 141 is certainly a *fleur* type 3976 Mošin-Traljić, *anno* 1318).

- **ψ: U** = Vaticanus Urbinas Graecus 82, fol. 110v (1295–1303, Constantinople), its apograph **d** = Laurentianus Conventi soppressi 626, fol. 104v (*ante* 1434, Florence), **d**'s apographs **m** = Vindobonensis historicus Graecus 1, fol. 98v (*anno* 1454, Florence: John Scoutariotes) and **D** = Parisinus Graecus 1402, fol. 71v (15th century, Florence: John Scoutariotes), as well as **m**'s apograph Bodleianus Archivi Seldeniani B 45, fol. 176v (*anno* 1482, Buda: John Athesinos);<sup>9</sup>

- **ω: O** = Laurentianus 28.49, fols 110v–111r (early 14th century, Constantinople), its three apographs **s** = Ambrosianus D 527 inf., fols 89v and 2v (*ca.* 1361–1381, Constantinople), **S** = Laurentianus 28.9, fol. 132r (early 15th century, Florence) and Vaticanus Reginensis Graecus 82, fol. 166v (early 16th century, Rome?: Michael Rhosaitos); **S** in turn has two apographs, **B** = Laurentianus 28.38, fol. 177v (early 15th century, Florence) and **P** = Laurentianus 28.42, fol. 147v (*anno* 1445, Florence: Demetrios Kykandyles); finally, codex Vaticanus Barberinianus Graecus 163, fol. 231v (15th century, Florence: John Scoutariotes) is an apograph of **B**.<sup>10</sup>

In a number of manuscripts the epigram is written as prose, with no distinction of lines, although they are mostly separated by dots. A title, στίχοι ἡρωϊκοὶ εἰς τὴν Πτολεμαίου Χωρογραφίαν, ‘Hexameters on Ptolemy’s *Chorography*’ (but manuscript **R** gives Γεωγραφίαν, ‘Geography’, probably a learned conjecture by Andreas Telountas) appears in just two of the families (**α** and **ρ**; family **ζ** has στίχοι ἡρωϊκοί), and is probably secondary: the term χωρογραφία rather than γεωγραφία is particularly absurd in light of the discussion on the disciplines of learning in Ptol. *Geog.* 1.1 (and of the title unanimously transmitted by manuscripts Γεωγραφικὴ Ὑφήγησις, ‘Geographical Instruction’), but it corresponds to what we find in the 12th-century scholar John Tzetzes.<sup>11</sup>

More importantly, in virtually all manuscripts the epigram either immediately follows (**ψ** and manuscript **C**) or, more commonly, precedes (**α**, **κ**, **ν**, **ρ**, **ω**) the hotly debated subscription by a mysterious Alexandrian engineer named Agathodaimon, who presents himself as the producer of a world map:

ἐκ τῶν Κλαυδίου Πτολεμαίου γεωγραφικῶν βιβλίων ὀκτώ τὴν οἰκουμένην πᾶσαν Ἀγαθὸς Δαίμων Ἀλεξανδρεὺς μηχανικὸς ὑπετύπωσε.<sup>12</sup>

I, the engineer Agathodaimon from Alexandria, drew the entire *oikoumenē* on the basis of the eight books on geography by Klaudios Ptolemaios.

<sup>9</sup> Manuscript **U** has minor mistakes such as φύλα (l. 4) and ἡῶ (l. 6), largely inherited by its apographs. On **dDm** and this family see Gentile (2019) 221–23; Martinelli Tempesta (2012) 520.

<sup>10</sup> The derivation of **sSBP**, Reginensis and Barberinianus from **O** (on which Burri (2013) 314 casts some doubt) is guaranteed for the epigram by the material damage suffered by **O** (line 2 χεῖμα is not clear, line 3 φυσικά[ς τ’ ἀ]τραπούς has a rasura; see also the mistakes κελυθούς (l. 3), ἀνατολῆς (l. 7)), and variously inherited by the later manuscripts (for example **S** omits χεῖμα and the scarcely legible ἐς ἡῶ Ἴνδῶν in lines 6–7, it has ἀνατολικῆς in line 7 and adds its own mistake in l. 4 φύλλα, inherited by its apographs); Barberinianus Graecus 163 shares **B**'s σηνῶν for Σηρῶν in line 7; in Reginensis Graecus 82 (watermark similar to *ancra* type 22 Harflinger, Rome 1523) a second hand corrects the mistakes in line 3, and the Agathodaimon subscription (see immediately below) is omitted altogether.

<sup>11</sup> See Tzetzes’ scholion to his own *Historiae* 11.396.890 Leone ἴαμβοι ἐμοὶ ἐκ τῆς εἰς τὴν Πτολεμαίου Χωρογραφίαν μεταφράσεως (‘my own iambs, from the metaphrasis of Ptolemy’s *Chorography*’). On this, and on the early Byzantine reception of Ptolemy’s *Geography* before Planoudes, see d’Agostini (2021).

<sup>12</sup> The first-person ὑπετύπωσε is beyond doubt the form that emerges from the manuscript tradition, since ὑπετυπώσατο is a correction by a later hand in manuscript **O** (more on **O**'s hands and final folios in a forthcoming study by Olivier Defaux), and ὑπετύπωσε surfaces only in few later manuscripts: see Burri (2013) 138–39 (with further bibliography on the subscription), *contra* Schnabel (1938) 93.

This world map must be the same one for whose production instructions are given by Ptolemy in *Geography* 7.5–7.<sup>13</sup> Given that our epigram evidently describes a world map, and that it consistently features in close proximity to a subscription referring to the ὑποτύπωσις (‘template’) referred to by Ptol. *Geog.* 7.4.14,<sup>14</sup> one may well surmise that the two texts originally went hand in hand (their respective positions may vary, as in **Ψ** and **C**, but their proximity is a constant). Agathodaimon cannot be dated with any degree of precision, but he certainly lived prior to Alexandria’s fall to the Arabs (641), most likely some time between the third and the fifth century CE.<sup>15</sup> A date in late antiquity is also entirely compatible with the metrical *facies* of the epigram,<sup>16</sup> as well as with its linguistic features (see below sections II–III);<sup>17</sup> indeed, it ties in well with the taste for hexameter (rather than elegiac) that surfaces in Greek epigrammatic poetry in the third century CE.<sup>18</sup> But whereas exact date and authorship of this ‘traditional allographic paratext’<sup>19</sup> are bound to remain obscure, the epigram’s literary texture, with its undeclared but unmistakable Alexandrian flavour, has more to tell.

## II. Callimachean intertexts

The topos of ‘seeing’ is common in connection with Ptolemy’s world map: it represents, for instance, the thematic backbone of Planoudes’ epigrams 4 and 6. In line 1 of our epigram, Ἐν γραμμαῖς τὸν κόσμον ἀριθμηθέντα νόησον, however, the occurrence of the locution ἐν γραμμαῖς together with a verb of seeing (the imperative νόησον, which also implies a wider act of ‘perception’, ‘understanding’, that may spill over to the deeper comprehension

<sup>13</sup> In section III we shall come back to these crucial chapters of book 7 (on which see Berggren-Jones (2000) 3–5): their connection with this subscription and with the epigram is also apparent from the peculiar textual layout of families **ω** and **ζ**, where epigram and subscription (the latter is omitted in family **ζ**) feature after a bizarre abridgement of *Geog.* 7.1–4, dealing with the regions of the Far East, and ending on the populations of Taprobane/Ceylon (explicit *Ναυαγηροί*: on this curious ‘résumé’, whose earliest witness is manuscript **O**; see Burri (2013) 136). It is clear that epigram and subscription refer to the same *Weltkarte* described out in *Geog.* 7.5.

<sup>14</sup> The general representations of the world are presented by Ptolemy in the important statement of *Geog.* 7.4.14 ἐπεὶ δὲ ὑπεδείξαμεν ἐν ἀρχῇ τῆς συντάξεως, πῶς ἂν καταγράφοιτο τὸ ἐγνωσμένον τῆς γῆς μέρος ἐπὶ τε σφαίρας καὶ ἔτι εἰς ἐπίπεδον ἐπιφάνειαν, ὁμοίως τε καὶ συμμετρῶς ὡς ἐνὶ μάλιστα τοῖς ἐπὶ τῆς στερεᾶς σφαίρας καταλαμβανομένοις, ἀρμόζει δὲ ταῖς τοιαύταις τῆς ὅλης οἰκουμένης ἐκθέσεσιν ὑπογραφήν τινα κεφαλαιώδη παραθέσθαι πρὸς ἔνδειξιν τῶν καθόλου θεωρουμένων (‘But since we demonstrated at the beginning of the compilation how the known part of the earth could be mapped on a globe, and also on a plane surface, in a way that is, as far as possible, both similar [in appearance] and proportionate to the things that are comprehended on the solid globe, it is appropriate to add to these portrayals of the whole *oikoumene* a summary caption that will indicate the things that are generally seen [in the map]’, tr. Berggren-Jones (2000) 108).

<sup>15</sup> See Mittenhuber (2009) 322–23; Gautier Dalché (2009) 17–18; Dilke (1987a) 271–72. Burri (2013) 139 goes so far as to suggest that Agathodaimon may have been an assistant of Ptolemy himself; on diagrams in Ptolemy’s manuscripts see the overview in Burri (2018).

<sup>16</sup> The text shares none of the typical uncertainties of Byzantine prosody and metre: the short initial **α** in ἀτραπός (l. 3) and ἀδρανής (l. 4) is unusual (for the former see *Anth. Pal.* 6.314.2 = Page (1981) 544 and the third-century CE *Anthologiae Appendix, epigr. dedicatoria*, 319.6 Cougny; I cannot find any parallel for the short **α** in ἀδρανής in poetry, but that **α** is in fact short by nature, and only lengthened by position). No ‘law’ is violated except Naeke’s in line 4 (where we also find a rare contraction of the third *biceps*: but the *Häufung* of proper names must be taken into account); six hexameter patterns are used, including one (ssddd in line 7) not admitted by Nonnus and his school: see West (1982) 152–57; Agosti and Gonnelli (1995) 375.

<sup>17</sup> The only certain intertext, apart from Callimachus (line 1: see section II) and Dionysius the Periegete (lines 3, 4: see section III), might be Quintus of Smyrna, if he is indeed the source of the clausula in line 6, ἄχρισ ἐς ἠῶ (Quint. Smyrn. *Posthomerica* 6.177, 10.259, where the locution carries a temporal, not a spatial, meaning however).

<sup>18</sup> The best account is still Wifstrand (1933) 155–77 (one is reminded particularly of the famous epigram *Anth. Pal.* 9.198 on Nonnus).

<sup>19</sup> The terminology is taken from Demoen (2019) 74–75: our epigram is certainly a ‘book-epigram’, even if it refers more directly to a map rather than to the book itself.

of Ptolemy's own text, see, for example, νόησον in Aristotle, *Problema bovium* 11) unmistakably conjures up a 'parody' of the famous incipit of Callimachus' *Lock of Berenice* (*Aitia* 4, *fr.* 110.1 Pf. = 110.1 Harder = 213.1 Massimilla):

Πάντα τὸν ἐν γραμμαῖσιν ἰδὼν ὄρον ἧ̃ τε φέρονται ...  
Having observed the whole sky divided in lines, and the movements ...

Miraculously preserved by a quotation in the Milan papyrus of the *Diegesis* (*P.Mil.Vogl.* I.8, col. V.40; first published in 1934), this verse is the only extant line from the proem to the *Lock*, itself entirely lost except for two lines (commonly identified as lines 7–8) quoted by the scholia to Aratus' *Phainomena* (*scholia in Aratum* 146, p. 147.15 Martin = *fr.* 110.7–8 Pf. = 110.7–8 Harder = 213.7–8 Massimilla):<sup>20</sup>

τήτ με Κόνων ἔβλεψεν ἐν ἡέρι τὸν βερενίκης  
βόστρυχον, δὲν κείνη πᾶσιν ἔθηκε θεοῖς.

Conon saw me in the sky, the lock of Berenice  
which she dedicated to all the gods. (tr. Harder (2012) 1.289)

Even if the exact wording of these lines has sometimes been called into question,<sup>21</sup> we can be relatively sure that the speaking lock of Berenice's hair opened this *aition* by narrating how it had been discovered in the sky (ἔβλεψεν ἐν ἡέρι) by the Alexandrian astronomer Conon of Samos, who had previously seen (ἰδὼν) the entire heavenly vault (τὸν ὄρον) in a diagram (ἐν γραμμαῖσιν).<sup>22</sup> Modern translations are not always clear on this point,<sup>23</sup> and it is true that ἐν γραμμαῖσιν (a reference to the lines dividing the sky into regions and connecting stars on charts)<sup>24</sup> might be taken either with ἰδὼν (as opposed to ἐν ἡέρι in line 7: this is clearly the way our epigrammatist also understands it in his imitation) or, in a more obvious if semantically less satisfying syntax, as an attribute of τὸν ὄρον:<sup>25</sup> in either case, the fact remains that Callimachus started his elegiac poem by praising Conon's activity as a map-maker of the sky.

As can be gleaned from the comparison with Catullus' poetic translation of the *Lock* in his *carmen* 66,<sup>26</sup> the opening lines of Callimachus' *aition* (the extant line 1 and the lost 2–6)

<sup>20</sup> They were first detected by Angelo Poliziano, *Miscellanea* 1.68: see Cattaneo (2017) 244–46; Pontani (2011) 93–96.

<sup>21</sup> See Bing (2009) 72–75.

<sup>22</sup> Ὀρος is properly the 'boundary' of the universe, hence the heavenly vault: see Bickel (1941) 101 ('die äußerste Kugelschale der Sphaira, die die Fixsterne trägt'); Cassio (1973) 329 n.1; Marinone (1984) 103–04 *ad loc.*, who also rejects in Catullus 66.1 (see immediately below) the emendation *limina*, proposed by Rehm, and potentially still attractive).

<sup>23</sup> See especially Asper (2004) 173: 'Als er den ganzen Sternenhimmel in seinen Zeichnungen betrachtet hatte'. Rawles (2019) 116: 'He who observed the whole firmament delineated and the movements'. Harder (2012) 1.289: 'Observing the whole sky as divided by lines'. Massimilla (2010) 208: 'Avendo guardato nei disegni tutto lo spazio celeste'. D'Alessio (2001) 523: 'Avendo in disegni l'orizzonte tutto veduto'. Trypanis (1978) 81: 'Having examined all the charted (?) sky'. Less persuasive is Berrey (2017) 2: 'Looking at every boundary in the lines'.

<sup>24</sup> See Berrey (2017) 2: 'both the imaginary visual lines which connect the fixed stars in the heavens as well as a star-chart drawn on papyrus'. As a technical term, γραμμῆ occurs in Dionys. Per. 236, Leonidas, *Anth. Pal.* 9.344.1 and elsewhere: see Pfeiffer (1965), Massimilla (2010) and Harder (2012) *ad loc.*

<sup>25</sup> See Harder (2012) 2.802. The former interpretation is suggested by Pfeiffer (1965) 112 and embraced, for example, by Marinone (1984) 105 and Massimilla (2010) 467.

<sup>26</sup> Among the caveats against the risks of automatically projecting Catullus' wording onto Callimachus, see particularly Bing (2009) 65–82 and Acosta-Hughes and Stephens (2012) 229–33.

were devoted to the presentation of Conon's astronomical wisdom, clad in a clever effect of suspense that illuminates his 'savoir total':<sup>27</sup> that our epigram on Ptolemy's *Geography* uses a similar number of lines (7) to celebrate the extraordinary achievement of another Alexandrian scientist might thus not be entirely the fruit of chance. Above all, if we consider the blend of 'scientific and mythical allusion',<sup>28</sup> we can see that in Catullus 66 (and so in Callimachus?) lines 2–4 of the poem list the natural elements studied by Conon (constellations, solar eclipses, *parapēgmata*, all topics on which Conon had written important treatises known to Ptolemy and more widely in the Imperial age)<sup>29</sup> and then lead on to the myth of Selene (the moon) and Endymion in the following couplet. So, too, lines 2–3 of our epigram list the cardinal points and the geographical elements to be found in Ptolemy's map, and then lines 4–7 introduce by name certain populations that can be traced and found on the same map. It is particularly interesting that precisely the same combination of astronomy and mythology (as a pivotal part of Aratus' didactic poetry and of the Alexandrian pairing of literature and science) lies at the heart of the intertextual appropriation of the *Lock's* incipit recently detected by Richard Hunter in two first-century inscribed poems from Tenos and Corcyra.<sup>30</sup>

For those lacking the skill and self-confidence of Joseph Scaliger and Eric Arthur Barber,<sup>31</sup> it is hard to speculate as to what line 2 of Callimachus' *Lock* may have looked like, particularly given the uncertainty about the correlative implied by τε in line 1 (another object of ἰδών in the accusative, another participle coordinated with ἰδών, for example εὐρών or Barber's δαείς, as in Catull. 66.2 *comperit?*).<sup>32</sup> Still, it is highly probable that the subject of φέρονται was ἀστέρες or ἄστρα, and that like Catullus 66 the line contained a reference to the stars' *ortus* and *obitus*, or rather ἀντολῖαι and δύσεις.<sup>33</sup> It may be no coincidence that both of these words also appear in line 2 of our epigram on Ptolemy, albeit with the different, geographical, meaning of 'east' and 'west' in the singular.<sup>34</sup>

In other words, it looks as if, however we wish to reconstruct the incipit of Callimachus' *Lock*, the author of our epigram followed its pattern quite closely, thus deserving to be defined as its only Greek testimonium (with the possible exception of the aforementioned inscriptions); among the Romans, as demonstrated long ago by Albio Cesare Cassio,<sup>35</sup> line 1 inspired Virgil's reference to Conon in *Ecl.* 3.40–41 *Conon et—quis fuit alter, | descripsit radio totum qui gentibus orbem.*

<sup>27</sup> Catull. 66.1–6: *Omnia qui magni dispexit lumina mundi, | qui stellarum ortus comperit atque obitus, | flammeus ut rapidi solis nitor obscuratur, | ut cedant certis sidera temporibus, | ut Truiam furtim sub Latmia saxa relegans | dulcis amor guro deuocet aërio.* On the stylistic effect of this incipit see Videau (1997) 39–40.

<sup>28</sup> Gutzwiller (1992) 373–74.

<sup>29</sup> See in particular the mentions of Conon in Ptolemy, *Phaseis* p. 14.16 Heiberg etc. concerning the φάσεις ἀπλανῶν ἀστέρων (the passages are listed by Marinone (1984) 109); Sen. *QNat.* 7.3.3 (*defectiones solis seruatas ab Aegyptiis collegit*); Probus, *On Virgil's Eclogues* 3.40 (*libros de astrologia septem reliquit*). For a detailed analysis of the scientific doctrines evoked in Catull. 66.3–6 see Marinone (1990) 102–05 and (1984) 108–10 and 112–14.

<sup>30</sup> Hunter (forthcoming).

<sup>31</sup> Scaliger (1615) 86–88; Barber (1936).

<sup>32</sup> See Massimilla (2010) 468.

<sup>33</sup> See Pighi (1951) 43, whose defence of the transmitted *habitus* for *obitus* in Catullus is, however, best forgotten.

<sup>34</sup> On the popularity of the formula ἀντολῖαι δύσεις τε (which may well have first occurred in Callimachus), cf. Ypsilanti (2018) 293 on Crinagoras, *Anth. Pal.* 16.61.1. Scaliger (1615) 86 had φάσις ... καὶ δύσις. It should be remarked that the same ἀντολίη comes back in l. 7 as an adjective (a very rare construct: see Nonnus, *Dion.* 25.98 with the noun ἀρούρη). I refrain from suggesting here that the reference to the sun and its *flammeus nitor* (Catull. 66.3) may have inspired the use of θέρος in l. 3, which has a rather different astronomical meaning, namely the Tropic of Cancer (see below); but it is indeed true that the tropics are implied in the annual φάσεις of the constellation of the *Lock* as described in ll. 67–68 of Callimachus' poem: see Massimilla (2010) 468.

<sup>35</sup> Cassio (1973).



Two questions arise at this point: why did our epigrammatist choose Callimachus, and why did he choose Conon? As for the first issue, it may be recalled that Callimachus' *Aitia* was not only the masterpiece of Alexandrian verse but, as recent scholarship has recognized, a fundamental text in the shaping of the new, Hellenistic geopolitical horizon. While it did not envisage or imply a coherent and systematic description of the world, through its manifold references to local myths and tales the *Aitia* embodied the Ptolemaic ambition to encompass and foster the Panhellenic heritage by recentring it around its new political and cultural capital, Alexandria.<sup>36</sup> From this perspective, the choice of the *Aitia* as a primary intertext for an epigram devoted to a map (and a book) bound to revolutionize (once again, from Alexandria) the geographical knowledge of the world seems natural. Whether this resonance also implied political overtones (the relationship between science and power, the shaping of a world-leading authority, etc.) is difficult to say given the lack of a more precise date for our epigram. Yet, in narrower disciplinary terms, the epigram seems to evoke Conon in order to define Ptolemy's epistemological role at the crossroads of geography and astronomy.

### III. Geography and astronomy

We have seen that the allusion to the *Lock* was an act of literary homage to the most important poet of the Alexandrian age,<sup>37</sup> and particularly to the last part of his masterpiece the *Aitia* (our epigram also in some way 'rounds off' the *Geography*). But this allusion also served to create a direct connection between Conon and Ptolemy, and thus between the disciplines of geography and astronomy, a mutual bond that lay at the heart of Ptolemy's scientific agenda and writing.<sup>38</sup> Ptolemy's other main scientific achievement, the *Almagest* or μαθηματικὴ σύνταξις, was the standard reference work on ancient astrothesy (see particularly 7.5–8.1), and it included a brief reference to the *Lock of Berenice*.<sup>39</sup>

Both geography and astronomy had recourse to diagrams (γραμμαί, essentially the same lines on the 'outer' sphere of the sky and on the 'inner' sphere of the earth)<sup>40</sup> and to mathematical calculus: this explains the otherwise surprising choice of the participle ἀριθμηθέντα in line 1 of our epigram: the verb does not mean 'to count', 'to number' here (κόσμος is a conspicuously uncountable noun), but rather 'to describe through numbers', much as the method of geography is presented *vis-à-vis* that of chorography in *Geography* 1.1.6–7.<sup>41</sup>

<sup>36</sup> See Asper (2011); Acosta-Hughes and Stephens (2012) 148–203. On Conon's role in particular see Berrey (2017) 1–4.

<sup>37</sup> On the importance of Callimachus in later Greek poetry see De Stefani and Magnelli (2011), especially 550–57 on his popularity among imperial authors; Hollis (2002).

<sup>38</sup> See, for example, Gautier Dalché (2009) 20: 'La Géographie ne se comprend pleinement que dans un contexte culturel où l'astrologie est fortement présente: les cartes de Ptolémée déploient l'espace réglé et mesuré où s'exercent et se comprennent les influences planétaires et astrales'.

<sup>39</sup> See Marinone (1984) 34–38.

<sup>40</sup> Gautier Dalché (2009) 20: 'les cercles qui constituent le réseau de coordonnées terrestres étant la projection sur la sphère terrestre des cercles de la sphère céleste'. See Berggren-Jones (2000) 6–7.

<sup>41</sup> Ptol. *Geog.* 1.1.6–7 ἐπιποιεῖ γὰρ καὶ διὰ ψιλῶν τῶν γραμμῶν (X: γραμμάτων Ω) καὶ τῶν παρασημειώσεων δεικνύναί καὶ τὰς θέσεις καὶ τοὺς καθόλου σχηματισμούς. Διὰ ταῦτα ἐκείνη (sc. τῇ χωρογραφίᾳ) μὲν οὐ δεῖ μεθόδου μαθηματικῆς, ἐνταῦθα δὲ τοῦτο μάλιστα προηγείται τὸ μέρος ('it enables one to show the positions and general configurations [of features] purely by means of lines and labels. For these reasons, [regional cartography] has no need of mathematical method, but here [in world cartography] this element takes absolute precedence'), tr. Berggren-Jones (2000) 58.

Both geography and astronomy produced two-dimensional visual representations of a large surface: Ptolemy himself described the technical and epistemological difference between sketching an external, overarching surface that can be comprehended by the human eye (such as the sky), and that of the earth on which we live, which no human being can possibly view in its entirety.<sup>42</sup> But even more importantly, the two representations are so inextricably linked (one sphere being contained in the other), that it is impossible to consider them separately, as Ptolemy argues in *Geography* 1.1.8.<sup>43</sup> Moreover, the geographical elements enumerated in lines 2–3 of our epigram are closely connected to Ptolemy's doctrine.

First of all (I owe this point to Fabio Guidetti), the mention of the Ocean in line 2 interrupts the canonical quadripartite enumeration of the cardinal points<sup>44</sup> by adding an element that has a special role in the *Geography* as a case of explicit denial of earlier doctrine: the Ocean is, for Ptolemy, exclusively what we call the Atlantic (in all its various parts),<sup>45</sup> not the all-encircling river that surrounds the entire *oikoumenē*,<sup>46</sup> as was the case for example in Dionysius the Periegete, who famously started his own geographical poem precisely from the Ocean (line 3 μνήσομαι Ὠκεανοῦ βαθυρροῦ, 'I shall name deep-flowing Ocean'). Therefore, its mention between the north (ἄρκτοι) and the west (δύσις) represents an accurate description of Ptolemy's image of the world, and a statement of belief in Ptolemy's doctrine.

Furthermore, line 3 of our epigram lists the two tropics (χειμα and θέρος evidently do not stand for the respective seasons,<sup>47</sup> but for the χειμερινός τροπικός and the θερινός τροπικός, Capricorn and Cancer, respectively), whose exact position is discussed as a pivotal element in Ptolemy's refutation (by means of astronomical arguments) of Marinus' world map and geographical projection in *Geog.* 1.7–9: as a matter of fact, one of the main conclusions of Ptolemy against Marinus was that the *oikoumenē* did not stretch south as far as the Tropic of Capricorn, but only to the so-called Anti-Meroe parallel.<sup>48</sup> As for the following φυσικαὶ ἀτραποὶ and σκολιαὶ κέλευθοι, while they have been interpreted as

<sup>42</sup> Ptol. *Geog.* 1.1.9 τὴν δὲ γῆν διὰ τῆς εἰκόνης, ὅτι τὴν ἀληθινὴν καὶ μεγίστην οὖσαν καὶ μὴ περιέχουσιν ἡμᾶς, οὔτε ἀθρόαν οὔτε κατὰ μέρος ὑπὸ τῶν αὐτῶν ἐφοδευθῆναι δυνατόν ('the earth through a portrait, since the real [earth], being enormous and not surrounding us, cannot be inspected by any one person either as a whole or part by part'), tr. Berggren-Jones (2000) 59. It is precisely this apparent adynaton, which Ptolemy's *magnum opus* attempts to overcome, that inspires Planoudes' *Epigr.* 7 Taxidis εἰς πόλον εἰ γαίθην ἴδης, ἅμα πάντα δοκεῖς, | εἰς χθόνα δ' οὐρανὸν εἰσαναβάς, ἅμα πᾶσαν ἂν εἶδες. | Νῦν οὖν πᾶσαν ὀρῶν ἅμα γῆν ἔμην ἐς πόλον οἴου. Interestingly, precisely this image of 'looking from above' pushed Barrett (1982) to defend the transmitted *despexit* (p. 136: 'an omniscient astronomer who can survey the whole universe merely by looking down at his charts') for Calpurnius' conjecture *dispexit* in Catullus 66.1. On the issue of 'bird's-eye view' in geographical representations see Lightfoot (2014) 120–26.

<sup>43</sup> 'Thus the first thing that one has to investigate is the earth's shape, size, and position with respect to its surroundings [i.e. the heavens], so that it will be possible to speak of its known part, how large it is and what it is like, and moreover under which parallels of the celestial sphere each of the localities in this [known part] lies (ὑπὸ τίνος εἰσὶ τῆς οὐρανίου σφαίρας παραλλήλους). From this last, one can also determine the lengths of nights and days, which stars reach the zenith or are always borne above or below the horizon (τοὺς ὑπὲρ γῆν ἢ ὑπὸ γῆν αἰε φερομένους), and all the things that we associate with the subject of habitations' (tr. Berggren-Jones (2000) 58).

<sup>44</sup> For example Gregory of Nazianzus, *Carmina* 1.2.1.129 (*Patrologia Graeca* 37.532.5) ἀντολίη τε δύσις τε, νότου πλευρή, βορέου τε ...; *Oracula Sibyllina* 3.26 (cf. 8.321 and *Anth. Pal.* 16.369.1) ἀντολίην δε δύσιν τε μεσημβρίην τε καὶ ἄρκτον.

<sup>45</sup> See Ptol. *Geog.* 2.2.1 Ὠκεανὸς Ὑπερβόρειος (North Atlantic), 2.2.4 Δυτικός (Atlantic), 2.2.6 Οὐεργιούσιος (Celtic Sea), 2.2.8 Ἰουέριος (Irish Sea), 2.3.1 Δουκαληδόνιος (North Atlantic), 2.3.4 Βρετανικός (The English Channel), 2.3.5 Γερμανικός (Baltic Sea), 2.6.3 Καντάβριος (Cantabrian Sea), 2.7.2 Ἀκουιτάνιος (Cantabrian Sea), 3.5.1 Σαρματικός (Baltic Sea).

<sup>46</sup> See Gisinger (1937) 2334–35. Ptol. *Geog.* 7.7.4 ὡς περιρρέοντος αὐτὸ τοῦ Ὠκεανοῦ μηδαμόθεν ...

<sup>47</sup> As for example in a line with a similar incipit: *Oracula Sibyllina* 14.299 χειμα θέρος ποιεῖ (see also 8.426–27).

<sup>48</sup> See Berggren-Jones (2000) 37–38; Dilke (1987b) 184.



purely astronomical features (the tropics and the ecliptics),<sup>49</sup> it is more likely that they refer to the natural roads leading from one continent to the other, and to the winding paths of rivers or other physical features: these certainly figured to some extent in the world map, as documented by *Geog.* 7.5.5–7. Moreover, σκολιάς τε κελεύθους looks like an explicit verbatim quotation from Dionysius' *Periegesis* 62–63 (ὕμεις δ' ὧ Μοῦσαι σκολιάς ἐνέποιτε κελεύθους, | ἀρξάμεναι στοιχηδὸν ἀφ' ἑσπέρου Ὀκεανοῖο, 'And you, o Muses, tell the twisted paths, / In linear course from Ocean in the west'),<sup>50</sup> where this rather obscure expression refers to the paths of the rivers and gulfs deriving from the Ocean,<sup>51</sup> and features at the beginning of the poet's invocation to the Muse, a 'second proem' as it were.<sup>52</sup>

Finally, in Ptolemy's view, geography and astronomy work together in what is called 'geographical astrology', namely the doctrine that informs a large section of his *Tetrabiblos* (or *Apotelesmatica*), and according to which the ethos and customs of each population depend on the physical characteristics of the land it inhabits, as well as on the zodiacal signs presiding over it. This combination, which is instrumental to the presentation of the southern European peoples as 'normal' and the 'marginal' peoples as variously eccentric (see Ptolemy, *Apotelesmatica* 2.2), lies behind lines 4–7 of our epigram. On the one hand, the choice of the populations named here closely matches the paragraph of Ptolemy's *Geography* listing the limits of the known world,<sup>53</sup> the only significant deviation being the reference to the Γερμανοί instead of the βρεττανοί or other northern peoples (a choice for which I have no real explanation, the idea of a reference to the central role of Magna Germania in the political and ethnic turmoil of the late Imperial age being highly speculative).<sup>54</sup> By contrast, the more or less conventional attributes accompanying each population find no match in the *Geography* (where ethnographic interests are altogether absent), but prove often (though not always) comparable with the relevant paragraphs of the *Tetrabiblos*: the weak Aithiopians,<sup>55</sup> the unhappy Germans,<sup>56</sup> the wild Sarmatians,<sup>57</sup> the

<sup>49</sup> Thus Stückelberger and Graßhoff (2006) 921 n.88. On these elements see Berggren-Jones (2000) 11–13.

<sup>50</sup> See Lightfoot (2014) 203 and 278.

<sup>51</sup> A terrestrial 'pendant' to the star orbits, the *caeli meatus* (Verg. *Aen.* 6.849, with Cassio (1973) 331) described in lines 1–2 of the *Lock*?

<sup>52</sup> Vox (2002).

<sup>53</sup> *Geog.* 7.5.2: 'It is bounded to the east by the unknown land that is situated next to the eastern peoples of Great Asia, [namely] the Sinai and the people in *Serike* (ἐν τῇ Σηρικῇ); to the south likewise by the unknown land that encloses the Sea of *India* and surrounds *Aithiopia* south of *Libye* (this [part of *Aithiopia*] is called the country of *Agisymba*); to the west by both the unknown land surrounding the *Aithiopian Bay* of *Libye* and the adjacent *Western Ocean* (δυτικῶ Ὀκεανῶ), which lies next to the most western parts of *Libye* and *Europe*; and to the north by the continuation of the *Ocean* that contains the islands of *Britain* and the most northern parts of *Europe* ..., and by the unknown land that is situated next to the most northern countries of *Great Asia*, [namely] *Sarmatia*, *Skythia*, and *Serike*' (tr. Berggren-Jones (2000) 108–09, my emphasis; see also 20–22).

<sup>54</sup> But see *Geog.* 2.3.5 and 2.11.1 for the proximity of *Germany* to the *Ocean*.

<sup>55</sup> See Ptolemy, *Apotelesmatica* 2.2.2 'contracted in form and shrunken in stature (τὰς μορφὰς συνεσπασμένοι καὶ τὰ μεγέθη συντετηγμένοι), sanguine of nature, and in habits for the most part savage' (tr. Robbins (1940) 123), but also Ps.-Alexander, *Problemata* 2.6.9 (of the *Aithiopians*) 'these come from a very hot region, and are therefore cowardly, vile, and dark (δειλοὶ εἰσι καὶ ἄνδρροι καὶ μέλανες)'.

<sup>56</sup> We have here a mixture between a generic tragic expression (Soph. *Aj.* 784 δύσμορον γένος), the specific descriptions of the *Germans* in Dionysius the *Periegete* (285 λευκά τε φύλα ... ἀρειμανέων [v.l. ἐρισθενέων] Γερμανῶν) and in Ptolemy, *Apotelesmatica* 2.3.15 ἀγριώτεροι καὶ αὐθαδέστεροι καὶ θηριώδεις ('fiercer, more headstrong, and bestial', tr. Robbins (1940) 135).

<sup>57</sup> Ptolemy, *Apotelesmatica* 2.3.36 'more ungentle, stern, and bestial' (μᾶλλον ἀνήμερα καὶ αὐστηρὰ καὶ θηριώδη, tr. Robbins (1940) 147). A specific hint to their eccentric eating habits is provided by Nicolaus of Damascus *FGrH* 90 F103f = Nicolaus the *Paradoxographer*, fr. 6 Giannini. It must be admitted, however, that such a strongly negative appreciation as 'similar to pigs' has to my knowledge no parallel in extant sources.

rude Scythians,<sup>58</sup> the ‘extreme’ Indians and silk people,<sup>59</sup> who live on the edge (πέρας) of the known world.<sup>60</sup>

#### IV. Conclusion

By interweaving reminiscences of Callimachus and Dionysius the Periegete, by establishing a link with the geopolitical dimension of the *Aitia*, by finding inspiration in Ptolemy’s doctrine and by indirectly paying tribute to Conon, our epigram on the world map of the *Geography* boasts so many links to Alexandrian science and literature that it is hard to imagine that it could have been written anywhere else but in the Egyptian capital. That its author may have been the same Agathodaimon who proudly defines himself as Ἀλεξανδρεύς in the subscription to the work and to the map, may be more than a simple guess.

#### Bibliography

- Acosta-Hughes, B. and Stephens, S. (2012) *Callimachus in Context* (Cambridge)
- Agosti, G. and Gonnelli, F. (1995) ‘Materiali per la storia dell’esametro nei poeti cristiani greci’, in M. Fantuzzi and R. Pretagostini (eds), *Struttura e storia dell’esametro greco 1* (Rome) 289–434
- Asper, M. (2004) *Kallimachos. Werke* (Darmstadt)
- (2011) ‘Dimensions of power: Callimachean geopoetics and the Ptolemaic Empire’, in B. Acosta-Hughes, L. Lehnus and S. Stephens (eds), *Brill’s Companion to Callimachus* (Leiden and Boston) 155–77
- Barber, E.A. (1936) ‘The Lock of Berenice: Callimachos and Catullus’, in *Greek Poetry and Life: Essays Presented to Gilbert Murray on His Seventieth Birthday, January 2, 1936* (Oxford) 343–63
- Barrett, A.A. (1982) ‘Catullus 66.1: *dispexit* or *despexit*’, *RhM* 125, 135–37
- Berggren, J.L. and Jones, A. (2000) *Ptolemy’s Geography: An Annotated Translation of the Theoretical Chapters* (Princeton and Oxford)
- Berrey, M. (2017) *Hellenistic Science at Court* (Berlin and Boston)
- Bickel, E. (1941) ‘Der Kallimachospapyrus “Die Locke der Berenike” und Catull als Übersetzer’, *RhM* 90, 81–146
- Bing, P. (2009) *The Scroll and the Marble* (Ann Arbor)
- Burri, R. (2013) *Die Geographie des Ptolemaios im Spiegel der griechischen Handschriften* (Berlin and Boston)
- (2018) ‘Some notes on the tradition of the diagrams (and maps) in Ptolemy’s *Geography*’, in R. Ceceña (ed.), *Claudio Ptolomeo. Geografía (capítulos teóricos)* (Mexico City) 219–49
- (2021) ‘Michele Apostolio e la produzione di manoscritti di contenuto geografico: il Parm. Pal. 9 nel suo contesto’, *Scripta* 14, 51–60
- Cassio, A.C. (1973) ‘L’incipit della *Chioma callimachea* in Virgilio’, *RFIC* 101, 329–32
- Cattaneo, G. (2017) ‘Angelo Poliziano e gli *Scholia vetera* ad Apollonio Rodio’, *Medioevo e Rinascimento* n.s. 28, 237–64
- d’Agostini, C. (2021) *Mapping Empires: Re-appropriations of Ptolemy’s Geography from the 12th to the 15th Century* (Ph.D. Diss. Odense)
- d’Alessio, G.B. (2001) *Callimaco. Aitia, Giambi, frammenti elegiaci minori* (Milan)

<sup>58</sup> Ptolemy, *Apotelesmatica* 2.2.4 λευκοί τε τὰ χρώματα καὶ τετανοὶ τὰς τρίχας τὰ τε σώματα μεγάλοι καὶ εὐτραφεῖς τοῖς μεγέθεσι καὶ ὑπόψυχοι τὰς φύσεις, ἄγριοι δὲ καὶ αὐτοὶ τοῖς ἦθεσι διὰ τὴν ὑπὸ τοῦ κρούου συνέχειαν τῶν οἰκήσεων (‘white in complexion, straight-haired, tall and well-nourished, and somewhat cold by nature; these too are savage in their habits because their dwelling-places are continually cold’, tr. Robbins (1940) 123). The adjective αἰνόμορος recalls the δύσμορα φύλα in line 4 (see also *Anth. Pal.* 9.210.8 αἰνόμορους Σαρακηνοῦς; Nonnus, *Dion.* 17.174 about the Ἴνδοι), and χαλεπὸν γένος may be a quotation from Orpian (*Halieutica* 1.174, about rats).

<sup>59</sup> See, for example, Strabo 11.11.1 (p. 516.27 C.) μέχρι Σηρῶν καὶ Φρυγῶν; Dionys. Per. 752 ἔθνεα βάρβαρα Σηρῶν; and particularly Ptol. *Geog.* 7.5.13 τὸ μὲν ἀνατολικὸν πέρασ τῆς ἐγνωσμένης γῆς ὀρίζει μεσημβρινὸς ὁ γραφόμενος διὰ τῆς τῶν Σινῶν μητροπόλεως (‘the eastern limit of the known world is bounded by the meridian drawn through the metropolis of the Sinai’, tr. Berggren-Jones (2000) 110). The traditional identification of the Σῆρες, the ‘silk people’, with the Chinese has been challenged in favour of other populations living in Central Asia and the Far East: see Radt (2008) 294–95.

<sup>60</sup> The physical πέρατα of the ἐγνωσμένη γῆ are explicitly evoked in Ptol. *Geog.* 7.5.12–14. On the peculiar variant reading of line 7 in the ζ family see n.5 above.

- Demoen, K. (2019) 'Epigrams on authors and books as text and paratext', in M. Kanellou, I. Petrovic and C. Carey (eds), *Greek Epigram from the Hellenistic to the Early Byzantine Era* (Oxford) 66–82
- De Stefani, C. and Magnelli, E. (2011) 'Callimachus and later Greek poetry', in B. Acosta-Hughes, L. Lehnus and S. Stephens (eds), *Brill's Companion to Callimachus* (Leiden and Boston) 534–65
- Dilke, O.A.W. (1987a) 'Cartography in the Byzantine Empire', Ptolemy', in J.B. Harley and D. Woodward (eds), *The History of Cartography* 1 (Chicago) 258–75
- (1987b) 'The culmination of Greek cartography in Ptolemy', in J.B. Harley and D. Woodward (eds), *The History of Cartography* 1 (Chicago) 177–200
- Gautier Dalché, P. (2009) *La Géographie de Ptolémée en occident (IVe–XVIe siècle)* (Turnhout)
- Gentile, G. (2019) 'La *Cosmographia* di Ptolomeo', in S. Martinelli Tempesta, D. Speranzi and F. Gallo (eds), *Libri e biblioteche di umanisti* (Milan) 209–32
- Gisinger, F. (1937) 'Okeanos', *RE* 17.2, cols 2308–49
- Gutzwiller, K. (1992) 'Callimachus' *Lock of Berenice*: fantasy, romance, and propaganda', *AJPh* 113, 359–85
- Harder, A. (2012) *Callimachus: Aetia* (2 vols) (Oxford)
- Hollis, A.S. (2002) 'Callimachus: light from later antiquity', in L. Lehnus, G. Bastianini, C. Calame and F. Montanari (eds), *Callimaque* (Vandœuvres and Geneva) 35–57
- Hunter, R. (forthcoming) 'Epigraphical evidence for the Aratean tradition', in R. Hunter, K. ní Mheallaigh and J. Lightfoot (eds), *Aratus and Aratean Reception* (Berlin and Boston)
- Lightfoot, J.L. (2014) *Dionysius Periegetes: Description of the Known World* (Oxford)
- Marinone, N. (1984) *Berenice da Callimaco a Catullo* (Rome)
- (1990) 'Conone, Callimaco e Catullo', in *Analecta Graecolatina* (Bologna) 101–05
- Martinelli Tempesta, S. (2012) 'Nuovi codici copiati da Giovanni Scutariota', in F. Bognini (ed.), *Meminisse iuvat: studi in memoria di Violetta de Angelis* (Pisa) 519–48
- Massimilla, G. (2010) *Callimaco. Aitia, libro terzo e quarto* (Pisa and Rome)
- Mittenhuber, F. (2009) *Text- und Kartentradiation in der Geographie des Klaudios Ptolemaios* (Bern)
- Nobbe, C.F.A. (1843) *Claudii Ptolemaei Geographia* (Leipzig; repr. Hildesheim 1990)
- Page, D.L. (1981) *Further Greek Epigrams* (Oxford)
- Pfeiffer, R. (1965) *Callimachus, Vol. 1: Fragmenta* (Oxford)
- Pighi, G.B. (1951) 'Emendationes Catullianae', *RhM* 94, 42–45
- Pontani, F. (2011) 'Callimachus cited', in B. Acosta-Hughes, L. Lehnus and S. Stephens (eds), *Brill's Companion to Callimachus* (Leiden and Boston) 93–117
- (2012) 'Esametri nonniani e mappae mundi: l'epigramma di Massimo Planude per la *Geografia* di Tolomeo', in C. Gallazzi, B. Kramer and S. Settis (eds), *Intorno al Papiro di Artemidoro II. Geografia e cartografia* (Milan) 197–217
- Radt, S. (2008) *Strabons Geographika, Vol. 7: Buch IX–XIII: Kommentar* (Göttingen)
- Rawles, R. (2019) *Callimachus* (London)
- Robbins, F.E. (1940) *Ptolemy: Tetrabiblos* (Cambridge MA and London)
- Scaliger, J. (1615) *Poemata Graeca versa ex Lat. Ital. et Gall.* (Leiden)
- Schmidt, N.G. (1999) *Die Nebenüberlieferung des 6. Buchs der Geographie des Ptolemaios* (Wiesbaden)
- Schnabel, P. (1938) *Text und Karten des Ptolemäus* (Leipzig)
- Stückelberger, A. and Graßhoff, G. (2006) *Klaudios Ptolemaios. Handbuch der Geographie* (2 vols) (Basel)
- Taxidis, I. (2017) *Les épigrammes de Maxime Planude* (Berlin and Boston)
- Trypanis, C.A. (1978) *Callimachus: Aetia, Iambi, Lyric Poems* (Cambridge MA and London)
- Videau, A. (1997) 'Catulle élégiaque: la "Boucle de Bérénice"', *REL* 75, 38–63
- Vox, O. (2002) 'Dionigi Alessandrino e Apollonio Rodio: cornici innodiche', *Lexis* 20, 153–70
- West, M.L. (1982) *Greek Metre* (Oxford)
- Wifstrand, A. (1933) *Von Kallimachos zu Nonnos* (Lund)
- Ypsilanti, M. (2018) *The Epigrams of Crinagoras of Mytilene* (Oxford)