



**HAL**  
open science

# Isagogical Questions in Hipparchus' Commentary on the Phaenomena

Victor Gysembergh

► **To cite this version:**

Victor Gysembergh. Isagogical Questions in Hipparchus' Commentary on the Phaenomena. Isagogical Crossroads in Antiquity, In press. hal-03092649

**HAL Id: hal-03092649**

**<https://hal.science/hal-03092649>**

Submitted on 2 Jan 2021

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Isagogical Questions in Hipparchus' Commentary on the *Phaenomena*\*  
Victor Gysembergh (CNRS, UMR 8061)

The earliest known evidence for systematic consideration of the so-called isagogical questions is to be found in the proems of Apollonius of Perga's *Conics* (especially the proem to Book I).<sup>1</sup> Moreover, both Pappus of Alexandria in his *Mathematical Collection* and Eutocius of Ascalon in his Commentary on the Conics appear to have paid special attention to this aspect of Apollonius' writing.<sup>2</sup> Indeed, the overwhelming majority of evidence for ancient isagogical literature and for reference to the isagogical questions comes from after the Hellenistic age, which may have sparked Pappus and Eutocius' curiosity. Therefore, Hipparchus of Bithynia's *Commentary on the Phaenomena*, written in the 2<sup>nd</sup> c. BCE mere decades after Apollonius' heyday, also commands special attention in this regard.<sup>3</sup> This text has all the attributes of an ancient commentary, and in particular its didactic purpose is established by the identity of the *Commentary*'s addressee, a certain Aischrion who is described in the opening sentence as a persistently eager student (τὸ ἐπίμονόν σου τῆς πρὸς φιλομαθίαν οἰκειώσεως, p. 2 Manitius) – which places it firmly within the realm of what is here called 'isagogical writings'.

Due perhaps to the main text's seemingly dry content – rife with polemics on the exact coordinates of the fixed stars –, relatively little notice has been given to the *Commentary* as belonging to the isagogical genre. In Jaap Mansfeld's seminal study of the *schemata isagogica* or standard lists of "questions to be settled before the study of an author or a text", the commentary literature on Aratos is included, but Hipparchus' commentary takes a back seat to other 'Aratea'.<sup>4</sup> This is due in part to Jean Martin's misleading earlier attempts to reconstruct an original *Phaenomena* commentary from which all extant 'Aratea' derive, except Hipparchus' *Commentary*.<sup>5</sup> Therefore, the aim of this paper is to draw attention to the underlying presence of the standard isagogical questions, or "questions to be settled before the study of an author or a text" (to borrow Mansfeld's apt phrase), in Hipparchus' prefatory letter to Aischrion (2, 5 – 8, 7).

Hipparchus attests that by his time there was already an abundant literature of commentaries on Aratos' *Phaenomena*.<sup>6</sup> He quotes only one of his predecessors, Attalos of Rhodes. Rather than an introduction to the poem, Attalos' work seems to have been a critical edition – an *editio correctior*, as Mansfeld put it.<sup>7</sup> Although he considers Attalos to be the most careful of his predecessors (ἐπιμελέστατα p. 4

---

\* My thanks go to the organizers and participants of the "Isagogical Crossroads" workshop (Berlin, December 2018) for their useful questions and answers.

<sup>1</sup> Mansfeld (1998) 36-40, 92 and 95. Apollonius was active a few decades before Hipparchus wrote his *Commentary on the Phaenomena* (on the dates of Apollonius, see Decors-Foulquier and Federspiel (2008) x-xiii).

<sup>2</sup> Mansfeld (1998) 38-39, 40-43 and 92.

<sup>3</sup> Edited by Manitius (1894). References are to the page number and, where necessary, line number in Manitius' edition. On Hipparchus' life and works, see Toomer (1981). It appears rather unlikely to the present author that Hipparchus' *Commentary* was a work of his youth, as has often been claimed, because its astronomy presupposes an accurate catalogue of stars; hence it was probably written in the third quarter of the 2<sup>nd</sup> c. BCE.

<sup>4</sup> Mansfeld (1994) 49-52. Mansfeld (1998) 1 n. 1 writes that he has "nothing" to add on the *Aratea*.

<sup>5</sup> Martin (1956). Mansfeld (1994) 49 is aware of the problems with Martin's reconstruction, but does not entirely detach himself from the belief that inferences can be made about Hellenistic introductions to the *Phaenomena* from the later 'Aratea' material.

<sup>6</sup> Mansfeld (1994) 197.

<sup>7</sup> Mansfeld (1994) 138.

Manitius), Hipparchus generally criticizes him in matters of astronomy. About his other predecessors nothing positive is known: several ancient lists of authors who purportedly wrote commentaries on the *Phaenomena* are preserved, but none of these authors can be securely dated to before Hipparchus (and in many cases it is not at all certain whether they wrote a general introduction to astronomy or a specific treatise on the poem)<sup>8</sup>. Hipparchus' *Commentary* also bears witness to an already existing school tradition of dividing the *Phaenomena* into sections<sup>9</sup>. Yet, however much Aratean scholarship was penned by Hipparchus' predecessors and contemporaries, the scanty evidence does not shed any light on the matter of the *schemata isagogica*.

The ten standard isagogical questions were summarized by Mansfeld as follows<sup>10</sup>:

- 1- Theme, aim or purpose (σκοπός, πρᾶγμα, ὑπόθεσις)
- 2- Position in a corpus (τάξις)
- 3- Utility (χρήσιμον, ὠφέλεια, etc.)
- 4- Explanation of title if necessary (αἴτιον τῆς ἐπιγραφῆς)
- 5- Authenticity if in doubt (γνήσιον)
- 6- Division into parts (διαίρεσις/τομὴ εἰς κεφάλαια/τμήματα/μέρη)
- 7- Relevant field of knowledge or genre (ὑπὸ ποῖον μέρος ... ἀναγεται)
- 8- Clarity or lack thereof (ἀσάφεια)
- 9- Qualities required of the student and/or the teacher
- 10- First work to be read in the corpus

There is no indication that the *Phaenomena* were ever considered part of a larger corpus in Antiquity<sup>11</sup>, or that their authorship was in doubt; consequently, questions 2, 5 and 10 did not apply to this poem. Arguably, all other questions are addressed with reference to the *Phaenomena*, albeit in cursory fashion, in the prefatory letter:

- 1- The purpose of the poem was to imitate Eudoxus' description of the fixed stars (τῇ γὰρ Εὐδόξου συντάξει κατακολουθήσας, 6:9-11 M.).
- 3- Its usefulness was severely limited by Aratos' many inaccuracies (ἐν τοῖς πλείστοις καὶ χρησιμωτάτοις διαφωνοῦντα τὸν Ἄρατον πρὸς τὰ φαινόμενα τε καὶ γινόμενα κατὰ ἀληθείαν, 4:12-14 M.).
- 4- Its title did not call for explanations, as the phrase τὰ φαινόμενα was already used in its technical sense ('celestial phenomena') in the 4<sup>th</sup> c. BCE (cf. e.g. Aristt. *Cael.* 293b7), and was commonly used in this sense by Hipparchus himself. Nevertheless, it is notable that Hipparchus used the phrase repeatedly in the prefatory letter: 4, 9, where the context shows that it is synonymous to τῶν οὐρανίων at 4, 8; 4, 13-14, where it is paraphrased as 'that which truly comes-to-be' (τὰ φαινόμενα τε καὶ γινόμενα κατὰ ἀληθείαν) to avoid any misinterpretation of the phrase as meaning 'the appearances'; 4, 25; and 6, 5<sup>12</sup>. Thus, these instances served as an implicit explanation of the poem's title.
- 6- Reference is made to the 'Simultaneous risings', i.e. Arat. *Phaen.* 451-732, the part of the poem pertaining to the risings and settings of constellations (Συνανατολαῖς, 2, 9).

<sup>8</sup> Martin (1956) 182-191.

<sup>9</sup> Mansfeld (1994) 51.

<sup>10</sup> Mansfeld (1998) 4-5.

<sup>11</sup> Assuming it is accurate, the ascription of Ἀστροκά to Aratos in Tzetzes' Schol. Hes. 1, ll. 47-49 Gaisford more likely refers to a lost poem rather than a corpus of astronomical poems including the *Phaenomena*.

<sup>12</sup> This does not include references to the work by its title at 2, 15; 4, 1; 6, 10; and 6, 14.

- 7- The poem is described as poetic in form (ποιήματα 4, 5 and 4, 26; ποιήσις 6, 7), and astronomical in content (τὰ λεγόμενα περὶ τῶν οὐρανίων, 4, 8).
- 8- Its style is described as simple, concise and clear (ἀπλοῦς τε γὰρ καὶ σύντομός ἐστι ποιητής, ἔτι δὲ σαφής, 4, 6-7).
- 9- The reader need only follow the poem moderately well (καὶ μετρίως παρακολουθηκόσι (4, 7-8).

Remarkably, the same questions are also addressed in the prefatory letter with reference to Hipparchus' *Commentary* itself:

- 1- Its purpose is to indicate what is right and what is wrong in the *Phaenomena* (περὶ δὲ τῶν ὑπὸ Ἀράτου λεγομένων ἐν τοῖς Φαινομένοις νῦν προτέθειμαί σοι γράψαι, πᾶν καθόλου τὸ καλῶς ἢ κακῶς λεγόμενον <ἐν> αὐτοῖς ὑποδεικνύων, 2, 14-16), and to list the mistakes it contains (ἔκρινα ... ἀναγράψαι τὰ δοκοῦντά μοι διημαρτηῆσθαι, 4, 16-18; προεθέμην, 4, 19, referring back to 4, 16-18).
- 3- This is claimed to be very useful for the community, and to have many implications for the mathematical sciences (ὠφελιμώτατον, 4, 10; τῆς κοινῆς τῶν ἄλλων ὠφελείας, 4, 17; ἕκαστον τούτων συντείνει πρὸς πολλὰ καὶ χρήσιμα τῶν ἐν τοῖς μαθήμασι θεωρημάτων, 8, 5-6).
- 4- The title of the *Commentary* as it is transmitted by the manuscript tradition (Τῶν Ἀράτου καὶ Εὐδόξου Φαινομένων ἐξηγήσις) is first paraphrased (τὸ μὲν ἐξηγήσασθαι τὴν ἐν τοῖς ποιήμασι διάνοιαν, 4, 4-5), then expanded upon with special insistence on the correcting of mistakes (τὸ δὲ συνεῖναι τὰ λεγόμενα περὶ τῶν οὐρανίων ὑπ' αὐτοῦ, τίνα τε συμφώνως τοῖς φαινομένοις ἀναγέγραπται καὶ τίνα διημαρτημένως, 4, 8-10);
- 6- Its structure is laid out in detail (6,14-7,5).
- 7- Its content is described as mathematical (μαθηματικῆς ἴδιον ἐμπειρίας, 4, 11; ἕκαστον τούτων συντείνει πρὸς πολλὰ καὶ χρήσιμα τῶν ἐν τοῖς μαθήμασι θεωρημάτων, 8, 5-6).
- 8- The clarity given by the *Commentary* is stressed repeatedly (ἔσται σοι φανερά πάντα, 2, 17; διασαφῶ, 6, 21 and 8, 3).
- 9- Reading the *Commentary* requires love of science and learning (φιλοτεχνίαν, 2, 10; φιλομαθίαν, 4, 16; φιλομαθούτων, 4, 24), and constant attention (παρακολουθῶν ἐκάστοις ἀκριβῶς, 6, 19).

Thus, all of the relevant questions from the canonical list are answered twice in the prefatory letter: once for Aratos' poem, and once for Hipparchus' commentary. While the canonical questions are not the ordering principle of his prefatory letter, in the sense that each question is not taken up one after the other, they can certainly be said to provide (some of) its structure. Strikingly, there are lexical parallels between both answers to some of the questions, such as the use of διασαφῶ in the context of the text's clarity (question 8)<sup>13</sup>, and of παρακολουθῶ with reference to what is expected of the reader (question 9). These parallels provide some basis for the claim that the two series of cursory answers to all of the relevant isagogical questions were intentionally built into the prefatory letter by Hipparchus as an elegant literary device. In some cases, the contrast between both answers serves to underscore the originality of Hipparchus' contribution: this is visible, in particular, with respect to the fields of knowledge that each work is relevant for (question 7), as Hipparchus implies that his own treatment of

<sup>13</sup> The *Ringkomposition* with διασαφῶ used first for the poem, then for the commentary, further signifies the dynamics of Hipparchus surpassing his predecessors, as suggested by Gerd van Riel during the conference.

the subject matter is based on his mathematization of astronomy, whereas his predecessor Eudoxus' work was of a more descriptive nature.

The main text of the *Commentary* contains very little exegetical material in the narrow sense of the term. This was presumably justified, in Hipparchus' eyes, by the clarity of Aratos' style. However, the claim that Aratos' style was simple and clear is contrived at best, considering for instance the allusiveness of Aratos' mythological references; but it served Hipparchus' interest, since it allowed him to focus almost exclusively on astronomical content. On the other hand, the unusually large amount of technical, in this case astronomical and mathematical, material can be explained by the fact that Aratos was not a good astronomer according to Hipparchus. It is only with this in mind that the modern reader can fully understand, in particular, why the second half of the *Commentary*, consisting of a study of simultaneous risings and settings, never quotes or comments Aratos' lines on the same topic. The commentary here is almost a mere vehicle for Hipparchus to expound, apparently in an epitomized form, the results of his investigation of the fixed stars.

In recent years, Hipparchus' *Commentary* has received interest not only as a document for the history of astronomy, but also as a part of Greek scholarly and didactic literature<sup>14</sup>. In particular, Jessica Lightfoot has highlighted Hipparchus' use of didactic authority throughout the commentary – for instance in the openings of Books 2 and 3, with the addresses to Aischrion containing short summaries of what has been done up to then and what is to come in the next book. Hipparchus' show of didactic authority confirms that not only the prefatory letter, but the *Commentary* as a whole is permeated by a duality between isagogical form and technical content. Incidentally, although Aischrion is not known from other sources, it is beyond reasonable doubt that he really existed, as evidenced by the prefatory letter, and particularly by the reference to his personal circumstances, i.e. the premature death of his brothers (πεπλεόνακας ἐν ταῖς βιωτικαῖς ἀσχολίαις διὰ τὴν τῶν ἀξιολογωτάτων ἀδελφῶν ὥμην τελευτήν, 2, 4-5). However, he is used, so to speak, as a prop for Hipparchus to set forth his discoveries. To conclude, these traits of Hipparchus' auctorial strategy in the main text of his *Commentary* – the duality between the predominance of technical material and the insistence upon didactic authority – suggest that the double set of answers to standard isagogical questions that was included in the prefatory letter was intended by Hipparchus to present his own work both as the reference commentary to a classical text and as a new classic in its own right. Indeed, one might add that doing so 'paid off' remarkably well, since it allowed his commentary to pass the test of time, contrary to his other works. In any case, the presence of isagogical questions as a subtext of Hipparchus' prefatory letter makes it all the more plausible, in turn, makes it all the more plausible that standard lists of isagogical questions, that is, *schemata isagogica*, existed in one form or another in Hipparchus' time. Subsequently, it is tempting to infer that these *schemata isagogica* circulated among Alexandrian scholars, perhaps even before Hipparchus' time; however, Hipparchus' biographical ties to Alexandria are a matter of debate, the evidence for such a connection being some observations made at Alexandria that he may not have conducted himself, and an anecdote about him sitting in a cloak in the theater of Alexandria<sup>15</sup>. A case could be made that Hipparchus' approach of the text he was commenting smacks of Alexandrian scholarship: namely, his distinction between κακῶς and καλῶς λεγόμενα (2, 14-16, quoted above) and his readiness to assume that the poet's text is sometimes ignorant, wrong and at odds with

---

<sup>14</sup> See e.g. Bishop (2015); Lightfoot (2017). Francesca Schironi is preparing a monograph on the *Commentary*, with introduction, edition, translation and commentary.

<sup>15</sup> Toomer (1981) 208.

reality (ἀγνοῶ, διαμαρτάνω, διαφονέω etc., *passim*) brings to mind, for instance, the Alexandrian method of ‘judgement of poems’ (κρίσις ποιημάτων).<sup>16</sup> Be that as it may, such a family likeness does not warrant inferences about the use of *schemata isagogica*, and more generally the writing of isagogical texts, in Alexandrian scholarship – but perhaps it gives cause for a reappraisal of the evidence.

### **Bibliography**

Bishop, C. (2015). Hipparchus Among the Detractors? In: C.S. Kraus and C. Stray, eds., *Classical Commentaries: Explorations in a Scholarly Genre*. Oxford: Oxford University Press.

Decorps-Foulquier, M. and M. Federspiel (2008). *Apollonius de Perge, Coniques. Tome 1.2 : Livre 1. Édition et traduction du texte grec*. Berlin : Walter de Gruyter.

Lightfoot, J. (2017). Hipparchus’ Didactic Journey: Poetry, Prose and Catalogue Form in the *Commentary on Aratus and Eudoxus*. *Greek, Roman and Byzantine Studies* 57, pp. 935-967.

Manitius, K. (1894). *Hipparchi in Eudoxi et Arati Phaenomena commentariorum libri tres*. Leipzig : B.G. Teubner.

Mansfeld, J. (1994). *Prolegomena. Questions to be settled before the study of an author or a text*. Leiden: E.J. Brill.

Mansfeld, J. (1998). *Prolegomena Mathematica. From Apollonius of Perga to Late Neoplatonism*. Leiden: E.J. Brill.

Martin, J (1956). *Histoire du texte des Phénomènes d’Aratos*. Paris: C. Klincksieck.

Schironi, F. (2018). *The Best of the Grammarians. Aristarchus of Samothrace on the Iliad*. Ann Arbor: University of Michigan Press.

Toomer, G.J. (1981). Hipparchus. In: *Dictionary of Scientific Biography*, vol. 15, pp. 207-224. New York: C. Scribner’s Sons.

---

<sup>16</sup> On κρίσις ποιημάτων see Schironi (2018) 413-542 with further literature.