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Hipparchus' Didactic Journey: Poetry, Prose, and Catalogue Form in the *Commentary on Aratus and Eudoxus*

Jessica Lightfoot

ARATUS' *PHAENOMENA* generated a truly astonishing volume of scholarly comment in antiquity. Perhaps against the expectations of modern readers, who might be surprised by its combination of dry technical subject matter and poetic verse, this third century B.C. didactic poem on the layout of the night sky and the setting and rising of the constellations proved to be an enduringly popular text well into the Middle Ages.¹ As a text which claims the ability to guide the reader across the night sky and teach him or her about the constellations, the *Phaenomena* touches upon issues of power and authority which are inherently found in any text that purports to teach.² The source from which the poem's narrator draws

¹ As E. Gee notes (*Aratus and the Astronomical Tradition* [Oxford 2013] 7), the *Phaenomena* is actually "one of the most heavily annotated works of antiquity." On its use as an astronomical school text as a potential reason for its long-lasting popularity in antiquity see A.-M. Lewis, "The Popularity of the *Phaenomena* of Aratus: A Reevaluation," *Studies in Latin Literature and Roman History* 6 (1992) 94–118; cf. R. Criboire, *Gymnastics of the Mind: Greek Education in Hellenistic and Roman Egypt* (Princeton 2001) 142–143, on the popularity of the *Phaenomena* as a school text because of its use of Homeric language.

² In D. Fowler's words, "didactic is a genre of power": "The Didactic Plot," in M. Depew and D. Obbink (eds.), *Matrices of Genre: Authors, Canons, and Society* (Cambridge [Mass.] 2000) 218; cf. G. W. Most, in *Commentaries – Kommentare* (Göttingen 1999) x–xi, on power, authority, and the commentary tradition. For recent work on the competitive aggression of the commentary genre in general and its dependence upon rivalry—both in

his authority to instruct the reader on astronomical matters is one such issue in Aratus' work. The question is answered in the proem, where the origin of the narrator's didactic authority is explicitly named as Zeus in the first three words ("let us begin from Zeus," ἐκ Διὸς ἀρχώμεσθα).³ This claim is reiterated at the end of the proem when Zeus and the Muses are charged with authorising the narrator's instruction of the reader by providing proofs (i.e. the stars) for his song (15–18):

χαίρε, πάτερ, μέγα θαῦμα, μέγ' ἀνθρώποισιν ὄνειαρ,
αὐτὸς καὶ προτέρη γενεή. χαίροιτε δὲ Μοῦσαι
μειλίχια μάλα πᾶσαι. ἐμοί γε μὲν ἀστέρας εἰπεῖν
ἦ θέμις εὐχομένῳ τεκμήρατε πᾶσαν ἀοιδίην.

Hail to you yourself, Father [Zeus], great wonder, great benefit to mankind, and to the previous generation! And hail to you Muses, all very gentle! In answer to my prayer to speak of the stars as is fitting, give proofs for my entire song.⁴

antiquity and later see I. Sluiter, "The Violent Scholiast: Power Issues in Ancient Commentaries," in M. Asper (ed.), *Writing Science: Medical and Mathematical Authorship in Ancient Greece* (Berlin 2013) 191–213; J. T. Vallance, "Doctors in the Library: The Strange Tale of Apollonius the Bookworm and Other Stories," in R. MacLeod (ed.), *The Library of Alexandria: Centre of Learning in the Ancient World* (London 1999) 244, on Galen; F. Budelmann, "The Classical Commentary in Byzantium: John Tzetzes on Ancient Greek Literature," in R. K. Gibson and C. S. Kraus (eds.), *The Classical Commentary: Histories, Practices, Theory* (Leiden 2002) 149, on Byzantine commentaries.

³ All Aratean text in this article is from the edition of D. Kidd, *Aratus: Phaenomena* (Cambridge 1997); Hipparchan text is from the edition of K. Manitius, *Hipparchi in Arati et Eudoxi Phaenomena Commentariorum libri tres* (Leipzig 1894). Translations are my own, unless otherwise indicated.

⁴ This use of τεκμήρατε in the active is unusual (see Kidd, *Aratus* 174, for discussion). Aratus is asking the Muses to provide proofs which men can see—in this case, the stars in the night sky—to corroborate the truthfulness of his song. A prose paraphrase explaining the poet's meaning found in the Q scholia to line 16 (J. Martin, *Scholia in Aratum Vetera* [Stuttgart 1974] 60.22–28) makes this use of the verb clear: "The meaning in these lines is as follows ... [the poet is saying] Hail to you as well, gentle Muses, and after listening to my prayer provide clear proofs of the observation of the constellations" (ἢ δὲ ἐν τοῖς στίχοις διάνοια τοιαύτη ... χαίρετε καὶ ὑμεῖς, προσηνέσται Μοῦσαι, καὶ τῶν ἐμῶν εὐχῶν ὑπήκοοι γενόμενοι παράσχετε

This appeal to the Muses as the source of the narrator's ability and authority is something the *Phaenomena* has in common with the poem which was itself the origin of the subsequent tradition of didactic hexameter poetry, Hesiod's *Works and Days*.⁵ In the proem Hesiod also invokes the Muses ("Muses from Pieria, who make famous with songs, come here and tell of Zeus and sing of your father," Μοῦσαι Πιερίηθεν ἀοιδῆσι κλείουσαι, / δεῦτε Δί' ἐννέπετε, σφέτερον πατέρ' ὕμνείουσαι, 1–2), and similarly draws his poetic authority, which he uses to chastise and teach the addressee Perses, from Zeus ("Listen you [Zeus], seeing and hearing, and straighten verdicts with justice; I will tell true things to Perses," κλῦθι ἰδὼν αἰῶν τε, δίκη δ' ἴθυνε θέμιστας / τύνη· ἐγὼ δέ κε Πέρση ἐτήτυμα μυθησαίμην, 9–10). Hesiod's poem instituted a tradition of poetry on technical or semi-technical material which sets up a clear power dynamic between an authoritative narratorial voice and an internal addressee—either named or anonymous—who stands in as a reflection of the poem's external audience or reader. It is in this tradition that Aratus' *Phaenomena* places itself and thus draws from it some of its own poetic and didactic authority.⁶

τεκμήρια σαφῆ τῆς τῶν ἄστρον θεωρίας).

⁵ Of course, defining didactic poetry in any simple sense as a codified 'mode' or 'genre' in antiquity is notoriously difficult. Recent attempts to define it using specific categories or typologies can be helpful in some respects, but often these approaches are overly narrow and occlude the nature of the didactic just as much as they enlighten. Cf. e.g. the categorization of didactic poetry into three distinct types, each with varying degrees of commitment to the purported subject matter of the poem, in B. Effe, *Dichtung und Lehre: Untersuchungen zur Typologie des antiken Lehrgedichts* (Munich 1977), and the attempt to define four essential precepts (explicit didactic material, teacher-student constellation, poetic self-consciousness, poetic simultaneity) of true didactic poems in K. Volk, *The Poetics of Latin Didactic: Lucretius, Vergil, Ovid, Manilius* (Oxford 2002).

⁶ On Aratus' presentation of his poem as a reworking of the *Works and Days* and use of Hesiodic phraseology in his proem see R. L. Hunter, "Written in the Stars: Poetry and Philosophy in the *Phainomena* of Aratus," *Arachnion* 1.2 (1995), repr. *On Coming After: Studies in Post-Classical Greek Literature and its Reception* (Berlin/New York 2008) 155–158.

This is reinforced by the fact that Aratus was very often aligned with Hesiod in antiquity in terms of his style, manner, and didactic purpose.⁷ This idea goes back to the poet's earliest reception, as can be seen in the famous Callimachean epigram on his Hesiodic verses (27 Pf. = *Anth. Gr.* 9.507):

Ἡσιόδου τό τ' ἄεισμα καὶ ὁ τρόπος· οὐ τὸν ἀοιδῶν
 ἔσχατον, ἀλλ' ὀκνέω μὴ τὸ μελιχρότατον
 τῶν ἐπέων ὁ Σολεὺς ἀπεμάξατο. χαίρετε, λεπταὶ
 ῥήσιες, Ἀρήτου σύμβολον ἀγρυπνίης.

Hesiod's is the subject matter and the manner: not the ultimate of songs, but it may be that the man from Soli has caught the sweetness of the verses. Hail subtle lines, the sign of Aratus' sleeplessness.⁸

The close association seen here between Hesiod and Aratus is a theme which is often discussed in the dense scholarly tradition which soon sprang up around the *Phaenomena*.⁹ As a sort of 'heir

⁷ For recent discussions of the reception of Hesiod in Aratus see C. Fakas, *Der hellenistische Hesiod: Arats Phainomena und die Tradition der antiken Lehrepik* (Wiesbaden 2001); R. L. Hunter, *Hesiodic Voices: Studies in the Ancient Reception of Hesiod's Works and Days* (Cambridge 2014) 100–111; H. Van Noorden, *Playing Hesiod: The Myth of the Races in Classical Antiquity* (Cambridge 2015) 168–203. As well as being aligned with Hesiod, Homer and Aratus are especially connected through the use of very Homeric language in the *Phaenomena*. As a result the question whether Aratus was more Hesiodic or Homeric became a topos of Aratean criticism in antiquity and this debate is often referred to in the Aratean scholia; see also A. Cameron, *Callimachus and his Critics* (Princeton 1995) 374–386, on the place of Callimachus in the ancient debate over whether Aratus was more Hesiodic or Homeric.

⁸ Translation and text from Hunter, *Hesiodic Voices* 292, with 292–301 for detailed discussion of the difficulties concerning the text, translation, and meaning of this epigram. Cf. recent discussions by Van Noorden, *Playing Hesiod* 172–173; K. Tsantsanoglou, "The λεπτότης of Aratus," *Trends in Classics* 1 (2009) 55–89; S. Stewart, "Emending Aratus' Insomnia: Callimachus *Epigr.* 27," *Mnemosyne* 61 (2008) 586–600; T. Gärtner, "Zur Deutung des kallimacheischen Epigramms über die *Phainomena* des Arat," *AntCl* 76 (2007) 157–162; Cameron, *Callimachus* 374–379.

⁹ Especially in the various *Vitae Arati*, e.g. Martin, *Scholia* 9.10–16 (*Vita* 1), 12.7–18 (*Vita* 2), 21.7–8 (*Vita* 4).

to Hesiod⁹, Aratus himself becomes a figure who is intensely associated with the more general claims of poetry to truth and didactic authority in the Hellenistic period.¹⁰ But Aratus' claims to poetic authority are complicated by the fact that he has chosen to present astronomical knowledge in verse form in a world where such technical subject matter is increasingly presented in the form of prose treatises.¹¹ In fact, Aratus' poem is itself based on a prose astronomical treatise by the fourth-century astronomer Eudoxus of Cnidus. This raises the question: why present this material in poetic form at all? The very form of the *Phaenomena* suggests an answer: poetry which placed itself within the Hesiodic didactic tradition was still more inherently authoritative and truthful than any form of technical or scientific prose treatise.

This implicit claim cannot have escaped Aratus' most ardent later critic, the mid-second century B.C. astronomer Hipparchus of Nicaea. His *Commentary on the Phaenomena of Aratus and Eudoxus* is the only Hellenistic commentary which survives fully intact, and as such it provides us an important view of how literature and science intersected in the Hellenistic period. There has so far been relatively little examination of the *Commentary* as anything other than a means of gleaning information about the astronomer's measurement of the positions of the fixed stars.¹²

¹⁰ On Aratus' exploitation of and place within ancient debates concerning the truth and authority of the poet see Hunter, *On Coming After* 166–175.

¹¹ On the complex relation between didactic prose and poetry, particularly in the Hellenistic period, see G. O. Hutchinson, *Talking Books: Readings in Hellenistic and Roman Books of Poetry* (Oxford 2008) 228–250; “Read the Instructions: Didactic Poetry and Prose,” *CQ* 59 (2009) 196–211; and “Hellenistic Poetry and Hellenistic Prose,” in R. L. Hunter et al. (eds.), *Hellenistic Studies at a Crossroads: Exploring Texts, Contexts and Metatexts* (Berlin 2014) 31–52.

¹² However, two recent works have started the process of reassessing Hipparchus' importance and place in the ancient commentary tradition: M. A. Tueller and R. Macfarlane, “Hipparchus and the Poets: A Turning Point in Scientific Literature,” in M. A. Harder et al. (eds.), *Nature and Science in Hellenistic Poetry* (Leuven 2009) 227–253; and C. Bishop, “Hipparchus among

But a closer examination of the work is needed in order to reassess the complex relations between literature, science, and scholarship in the later Hellenistic age. Unlike a modern lemmatized commentary, Hipparchus' work takes the form of a continuous prose treatise, which allows him to guide the reader expertly through the astronomical terrain of the past and towards his own astronomical discoveries.¹³ In Book 1 of the *Commentary* Hipparchus focusses extensively on pointing out the mistakes of his astronomical predecessors in verse and prose, Aratus and Eudoxus. He must also deal with another commentator on Aratus: the contemporary second-century B.C. astronomer Attalus of Rhodes. But in Books 2 and 3 all three of these figures drop out of the work entirely, and Hipparchus moves into catalogues of his own observations. In this way, over the course of the work, Hipparchus guides the reader from the astronomical ignorance of his predecessors towards purely Hipparchan knowledge.

The reasons why the work culminates in a catalogue of astronomical observations after shifting from explicit polemical engagement with various poetic and prosaic didactic texts have not yet been considered. In this paper I trace the subtle shifts of didactic authority which develop through the text as Hipparchus engages with his many astronomical rivals, past and

the Detractors," in C. S. Kraus and C. Stray (eds.), *Classical Commentaries: Explorations in a Scholarly Genre* (Oxford 2016) 379–396.

¹³ That Hipparchus chooses the commentary form as a vehicle for publishing his original research is not unusual, as commentary writing became one of the main ways of promulgating original scientific research in antiquity; see F. Schironi, "Greek Commentaries," *Dead Sea Discoveries* 19 (2012) 399–441, for an excellent survey of ancient scientific and literary commentaries. On the links between writing commentaries, philological work, and establishing a professional identity as a scientist see H. von Staden, "A Woman Does Not Become Ambidextrous: Galen and the Culture of Scientific Commentary," in *The Classical Commentary* 125; J. König and T. Whitmarsh, *Ordering Knowledge in the Roman Empire* (Cambridge 2007) 25; J. König, "Conventions of Prefatory Self-presentation in Galen's *On the Order of My Own Books*," in C. Gill et al. (eds.), *Galen and the World of Knowledge* (Cambridge 2009) 38.

present, and will suggest that the astronomer's eventual shift into a bare catalogue form is in fact essential to the didactic power of his own work. As the *Commentary* progresses, it becomes clear that Hipparchus is systematically leading the reader on a didactic journey, guiding us first through the landscape of the astronomical texts of the past, before presenting us with a true and accurate path through the night sky itself. In this way Hipparchus' *Commentary* stakes its claim to a status superior to that of an uninteresting and unoriginal parasitical secondary text.

However, the dense scholarly tradition which quickly accrued around Aratus' poem complicates Hipparchus' attempts to stake his own claim as the most accurate and truthful astronomical authority available to the contemporary reader. On the one hand, Hipparchus is keen to appropriate the didactic authority of his source text to support the promulgation of his own astronomical discoveries.¹⁴ He is able to draw on the *Phaenomena*'s Hesiodic didactic authority in a vicarious sense by writing an exegetical work which attaches itself to his poetic predecessors. But on the other hand, this self-positioning does require a considerable degree of caution: Hipparchus must make clear that his own work supersedes that of Aratus, especially in terms of scientific accuracy, while subtly drawing on the didactic authority of his source text when convenient. At the same time, Hipparchus must surpass and refute every previous and contemporary scholarly authority in the dense paratextual tradition which surrounded the *Phaenomena*. As a result of these various and competing considerations the construction of Hipparchus' own authoritative didactic voice takes on a particular complexity. I will demonstrate this by first

¹⁴ See I. Sluiter, "Commentaries and the Didactic Tradition," in *Commentaries – Kommentare* 173–205, for a discussion of how commentaries appropriate the didactic power of their source texts; for the idea that commentary has its own didactic purpose and appropriates aspects of the source text to promulgate the commentator's own views see Kraus, in *The Classical Commentary* 6–7.

examining the *Commentary's* prolegomena, before discussing how Hipparchus deals with what he disparagingly terms the “charm” (χάρις) of the *Phaenomena*. I will then move on to the ways in which Hipparchus specifically deals with his contemporary scientific rival, Attalus of Rhodes, before examining how and why Hipparchus chooses to present his own discoveries in catalogue form in Books 2 and 3 of the *Commentary*.

1. *Setting off on a didactic journey: competing prolegomena*

How then does Hipparchus begin his complex journey through the didactic tradition surrounding the *Phaenomena*? The prefaces of each of the *Commentary's* three books (1.1.1–11, 2.1.1, 3.1.1a) are particularly important places for the construction of the author's didactic voice. The initial development of a distinctive authorial voice at the beginning of a scientific work is a crucial element in presenting the proofs or observations put forward as original developments within a changing and competitive scientific field, and Hipparchus' careful use of prefaces is no exception to this general tendency.¹⁵ The preface of Book 1 in particular creates a didactic scene, setting up Hipparchus as a knowledgeable authority ready to guide the addressee Aischrion—and by extension the reader—first through the manifold mistakes of his astronomical predecessors, and then towards purely Hipparchan astronomical knowledge.¹⁶

¹⁵ Cf. A. Doody and L. Taub, *Authorial Voices in Greco-Roman Technical Writing* (Trier 2009) 8; M. Asper, *Writing Science: Medical and Mathematical Authorship in Ancient Greece* (Berlin 2013) 4.

¹⁶ For discussion of prefaces as particular sites of authorial self-presentation in general see G. Genette, *Paratexts: Thresholds of Interpretation* (Cambridge 1997) 222–224; on the importance of prefaces in ancient scientific writing see von Staden, in *The Classical Commentary* 128–130, on Galen's self-presentation in his commentary prefaces and the tracing of this tradition back to Hipparchus; cf. König, in *Galen and the World of Knowledge* 42–44. On prefaces in ancient ‘auxiliary texts’ such as commentaries see M. Dubischar, “Survival of the Most Condensed? Auxiliary Texts, Communications Theory, and Condensation of Knowledge,” in M. Horster and C. Reitz (eds.), *Condensing Texts – Condensed Texts* (Stuttgart 2010) 44.

The epistolary form of the very opening of the *Commentary* is particularly significant as it allows Hipparchus to establish an authoritative and knowledgeable position (1.1.1):

Ἴππαρχος Αἰσχυρίωνι χαίρειν. ἡδέως ἐπέγνων διὰ τῆς ἐπιστολῆς τὸ ἐπίμονόν σου τῆς πρὸς φιλομαθίαν οἰκειώσεως.

Hipparchus sends greetings to Aischrion. I gladly observed in your letter the continuation of your inclination towards a love of learning.

Hipparchus' use of an epistolary opening immediately sets up the positions of teacher/pupil (or didactic addressee/reader) and allows the creation of certain roles for each of these two positions. The manner of Hipparchus' address also contrasts with that of his source text. In the *Phaenomena* itself, Aratus simply begins from Zeus ("let us begin from Zeus") and never names a didactic addressee in his work. This lack of named addressee perhaps reflects the intended universality of Aratus' message about Zeus: just as Zeus' power can reach anywhere and affect anyone, so too does Aratus' instruction about the constellation apply to every person.¹⁷ In contrast, the *Commentary*'s addressee is portrayed as an interested layman and a friend, rather than a fellow scientist as we might expect.¹⁸ The role of expert is here reserved for Hipparchus, who is now poised to take Aischrion/ the reader on a didactic journey which he alone is qualified to guide. But at the same time as emphasising his own authority at the expense of all previous astronomical writers, Hipparchus is also extremely careful to avoid the appearance of over-competitiveness at the beginning of his work. Instead he creates the impression of an assured,

¹⁷ See P. Bing, "Aratus and his Audiences," *MD* 31 (1993) 99.

¹⁸ Aischrion's status as an interested layman rather than a fellow scientist emphasises Hipparchus' astronomical authority, since most scientific commentaries were addressed to fellow scientists, not laymen: see R. Netz, *The Shaping of Deduction in Greek Mathematics* (Cambridge 1999) 13, and *Ludic Proof: Greek Mathematics and the Alexandrian Aesthetic* (Cambridge 2009) 2, 105, on the way in which scientific work was often addressed to a fellow scientist in response to previous scientific texts.

friendly, and knowledgeable persona, particularly as he later explicitly disavows scholarly display for its own sake, claiming “I did not set out to do this [i.e. correct the mistakes of Aratus and his previous commentators] from a desire to gain prestige for myself by refuting others—for that is completely pointless and mean-spirited” (τοῦτο δὲ ποιῆσαι προεθέμην οὐκ ἐκ τοῦ τοῦς ἄλλους ἐλέγχειν φαντασίαν ἀπενέγκασθαι προαιρούμενος· κενὸν γὰρ καὶ μικρόψυχον παντελῶς, 1.1.6).¹⁹ This claim will turn out to be a disingenuous one, as we shall see, as the *Commentary*'s true agonistic spirit quickly becomes apparent.

The continuing importance of the prefaces in the construction of Hipparchus' authoritative didactic voice is made clear by the reappearance of Aischrion at the beginnings of Books 2 and 3. Interestingly, Hipparchus switches from the initial epistolary opening of his work and instead uses vocative addresses in these books to remind the reader that Aischrion is the purported recipient of the work: both epistolary openings and direct addresses are common in scientific prefaces, but are seldom used in conjunction in the same work.²⁰ For this reason Hipparchus' use of both types of address in conjunction with the renewed reminder of his didactic addressee at crucial turning points in the *Commentary* is worth examining. At 2.1.1 he informs Aischrion that he is about to examine the simultaneous risings and settings of each constellation, while continuing to point out the numerous mistakes of his astronomical predecessors:

¹⁹ Cf. König, in *Galen and the World of Knowledge* 51, on the use of the ‘writing for friends’ motif to avoid the impression of competitiveness in scientific writing, and von Staden, in *The Classical Commentary* 133, on the ‘reluctant commentator’ topos.

²⁰ For the use of epistolary form in scientific treatises see D. R. Langslow, “The *epistula* in Ancient Scientific and Technical Literature, with Special Reference to Medicine,” in R. Morello and A. D. Morrison (eds.), *Ancient Letters: Classical and Late Antique Epistolography* (Oxford 2007) 211–234. See also L. Alexander, *The Preface to Luke's Gospel: Literary Convention and Social Context in Luke 1, 1–4 and Acts 1, 1* (Cambridge 1993) 50–52, on the conventional use of both types of prefatory address in scientific treatises.

τοῖς προειρημένοις, ὦ Αἰσχυρίων, περὶ τῶν ὑπὸ Ἀράτου καὶ Εὐδόξου καταγεγραμμένων ἐν τοῖς Φαινομένοις συνάψωμεν νῦν τὸν περὶ συνανατολῆς καὶ συγκαταδύσεως τῶν ἄστρον λόγον, ὑποδεικνύντες, ὅσα τε δεόντως ὑπ' αὐτῶν εἴρηται, καὶ ἐν οἷς διαφωνοῦντες [οὐ] πρὸς τὰ φαινόμενα τὰς ἀποφάσεις πεποιήνται.

Let us now join, Aischrion, an account of the simultaneous risings and settings of the constellations to the aforementioned discussion of the things written by Aratus and Eudoxus in their versions of the *Phaenomena*, pointing out everything they say correctly and everything on which they disagree and have made denials about in relation to the observed celestial phenomena.

By clearly signposting for the addressee the movement from what has just been covered to what is about to come, Hipparchus simultaneously guides the reader. He also reminds us of the wider didactic frame of the *Commentary* through the explicit highlighting of Aischrion as an addressee in a way that both echoes the preface of Book 1 and recalls his initial criticisms of Aratus, Eudoxus, and Attalus.

A similar effect is created in the preface to Book 3 (3.1.1a). At this point in the *Commentary* Hipparchus has entirely moved away from discussing the mistakes of Aratus, Eudoxus, and Attalus and has launched into a catalogue of his own observations. Again, the initial didactic frame of the work is recalled by highlighting the addressee:

προειρηκότες, ὦ Αἰσχυρίων, ἐν τῷ πρὸ τούτου συντάγματι περὶ τῶν βορειοτέρων ἄστρον τοῦ ζῳδιακοῦ κύκλου ... νῦν ὑπογράψωμεν τὰ αὐτὰ περὶ ἐκάστου τῶν τε νοτιωτέρων τοῦ ζῳδιακοῦ ἄστρον καὶ αὐτῶν τῶν δώδεκα ζῳδίων.

After speaking previously in this work, Aischrion, of the more northerly constellations of the circle of the zodiac ... now I shall trace out the same things concerning each of the more southerly constellations of the zodiac and the twelve zodiacal signs themselves.

Readers are carefully reminded of what has come before, what has just been covered, and what is about to be explained, in a way which suggests they are consciously being led from ignorance to knowledge.

This explicit signposting of the path along which Hipparchus is guiding his pupil/reader is of course reminiscent of the strategies often found in didactic poetry, as the authorial voice attempts to direct the reader and clearly mark the stages of the poem: Aratus' frequent use of exhortations and instructions in the *Phaenomena* to direct readers through the dense and confusing network of constellations is a prime example of this kind of didactic tactic (e.g. οὐχ ὀράας don't you see? 733; σκέπτεο examine! 778, 799, 832, 880, 892; τεκμαίρεο judge! 801; μελέτω study! 819). Although Hipparchus does not use imperatives in the same way, the clear descriptions of his aims and upcoming actions in the prefaces of each book of the *Commentary* fulfil much the same purpose. In this way we already see Hipparchus appropriating some of the strategies of his Aratean source text in an effort to construct his own authoritative voice from the very beginning of the *Commentary*.

This effect is reinforced further by the way in which Hipparchus in the opening of the *Commentary* emphasizes certain prefatory topoi to stress that his work surpasses all previous astronomical authorities in terms of accuracy, clarity, and truthfulness. One of the ways he does this is by repeatedly playing on the notion that the specific purpose of his *Commentary* is to make clear all astronomical matters which have been incorrectly elucidated in the past. For example, at 1.1.2 the idea that Hipparchus alone has the authority to clarify the misleading information perpetuated by Aratus and Eudoxus is inherently tied up with the idea that the *Commentary* is a work meant to be beneficial for the addressee Aischrion and for readers more generally:

περὶ μὲν οὖν τῶν ἄλλων μετὰ ταῦτά σοι τὴν ἰδίαν κρίσιν διασαφήσω· περὶ δὲ τῶν ὑπὸ Ἀράτου λεγομένων ἐν τοῖς Φαινομένοις νῦν προτέθειμαί σοι γράψαι, πᾶν καθόλου τὸ καλῶς ἢ κακῶς λεγόμενον <ἐν> αὐτοῖς ὑποδεικνύων. ἐξ ὧν ἔσται σοι φανερά πάντα καὶ τὰ παρὰ σοῦ διαπορηθέντα.

Therefore after this I shall make clear to you my own judgment concerning these other matters. But now I have set myself the task of writing about what Aratus says in his *Phaenomena* for you—that is, in general terms, pointing out everything which is said

either well or badly in his work, as a result of which everything will be clear for you, even those matters about which you were completely confused.

The twin virtues of clarity and benefit are returned to throughout the opening preface, first at 1.1.5: “I decided for the sake of your [i.e. Aischrion’s] love of learning and for the common benefit of other people to put on record the things which seemed to me to be completely mistaken” (ἔκρινα τῆς σῆς ἔνεκα φιλομαθίας καὶ τῆς κοινῆς τῶν ἄλλων ὠφελείας ἀναγράψαι τὰ δοκοῦντά μοι διημαρτηῆσθαι); then at 1.1.6: “for the sake of common benefit” (τῆς κοινῆς ἔνεκεν ὠφελείας); and finally at 1.1.10–11: “I shall make clear not only the simultaneous risings and settings, but even which stars in each constellation rise or fall first and last ... and in addition to all these things I will even make clear which constellations mark the boundaries of all of the twenty-four hourly intervals” (καὶ διασαφῶ μὲν οὐ μόνον τὴν συνανατολὴν ἢ συγκατάδυσιν, ἔτι δὲ καὶ τίνες ἀστέρες ἐκάστου τῶν ἄστρον πρώτοί τε καὶ ἔσχατοι ἀνατέλλουσιν ἢ δύνουσι ... ἐπὶ πᾶσι δὲ διασαφῶ καὶ τίνες ἀστέρες ἀφορίζουσι πάντα τὰ εἰκοσιτέσσαρα ὠριαῖα διαστήματα). The insistent highlighting of these qualities in the opening preface is therefore important, as Hipparchus’ exposition of the seemingly manifold mistakes of Aratus and Eudoxus in Book 1 goes on to create the impression that in fact only he possesses the ability to comment competently on celestial phenomena, guiding the reader expertly through the *Commentary* as he does so. But, strikingly, Hipparchus’ emphasis on the clarity of his own work here actually echoes his earlier claim (1.1.4) that Aratus’ own poem is itself “clear and easy to follow” (ἔτι δὲ σαφῆς τοῖς καὶ μετρίως παρηκολουθηκόσι). As we shall see in section two, this claim is actually a rather tendentious one, but it seems that Hipparchus makes it in part to align his *Commentary* with the perceived virtues of the *Phaenomena*, mirroring his didactic source text at this point.²¹

²¹ I am grateful to the anonymous reader for drawing my attention to this point.

The importance of the preface for the construction of the authorial voice of the *Commentary* is made even clearer by the fact that Hipparchus' own opening remarks contain select quotations from the preface of a contemporary rival commentator: Attalus of Rhodes. Hipparchus cites Attalus' preface to demonstrate that commentator's very different approach to the *Phaenomena*, thus implicitly signalling the importance of his own preface as an articulation of his particular stance towards his astronomical predecessors. The assessment of Attalus begins at 1.1.3, with the initial seemingly positive remark that Attalus is by far the most competent and careful of all the many previous critics of the *Phaenomena*:

ἐξήγησιν μὲν οὖν τῶν Ἀράτου Φαινομένων καὶ ἄλλοι πλείονες
 συντετάχασιν· ἐπιμελέστατα δὲ δοκεῖ πάντων Ἄτταλος ὁ καθ'
 ἡμᾶς μαθηματικὸς τὸν περὶ αὐτῶν πεποιῆσθαι λόγον.

Very many others have written a commentary on Aratus' *Phaenomena*. But my contemporary, the mathematician Attalus, seems to have produced a commentary on these matters most carefully of all.

However, this initially complimentary judgment is quickly undermined when Hipparchus goes on to repeatedly point out Attalus' mistakes, thereby establishing his own superiority over every other astronomer both past and present by thoroughly dismissing the one rival who is supposedly the most competent of all previous authorities.

Hipparchus later reinforces this impression by repeatedly condemning Attalus for not relying exclusively on observation of the night sky when making decisions about potential inaccuracies in Aratus' text. Unlike Hipparchus, Attalus is consistently portrayed as a figure too much influenced by the misleading poetic charm of the *Phaenomena* at the expense of empirical astronomical observation. This is apparent when Hipparchus cites Attalus' own preface to emphasise the contrasting approach of his predecessor (1.3.3):

λέγει γοῦν ἐν τῷ προοιμίῳ τὸν τρόπον τοῦτον· “διὸ δὴ τό τε τοῦ
 Ἀράτου βιβλίον ἐξαπεστάλκαμέν σοι διορθωμένον ὑφ' ἡμῶν
 καὶ τὴν ἐξήγησιν αὐτοῦ, τοῖς τε φαινομένοις ἕκαστα σύμφωνα
 ποιήσαντες καὶ τοῖς ὑπὸ τοῦ ποιητοῦ γεγραμμένοις ἀκόλουθα.”

[Attalus] speaks in the following way in his preface: “Therefore I have sent to you Aratus’ book, corrected by me [i.e. my edition of the text], and my commentary on it, after making each thing in the poem agree both with the observed phenomena and with the words written by the poet.”

Attalus’ insistence on harmonization (σύμφωνα) between what is seen in the night sky and what is written by the poet is completely antithetical to Hipparchus’ approach, suggesting that Attalus might potentially either amend the text of the *Phaenomena* or change his observations of the sky to ensure consistency between the two. Later Hipparchus again emphasizes Attalus’ differing approach by mentioning that according to Attalus “the most necessary cause of emendation is the poet’s harmony with the phenomena” (ἀναγκαιοτάτην αἰτίαν ἀποδίδομεν τὴν τοῦ ποιητοῦ πρὸς τὰ φαινόμενα συμφωνίαν, 1.3.3). For Attalus, Hipparchus seems to imply, it is essential that Aratus remains an infallible figure at all costs. Far from being an unexpected and egregiously misleading approach to the poem, as Hipparchus suggests here, Attalus’ attitude towards his source text is in fact not unusual in the context of the scholarly milieu of this period, since Hellenistic textual critics almost always adopted an extremely charitable approach to the authors they commented upon and were reluctant to attribute mistakes to canonical authors if at all possible.²² In addition, since textual exegesis on the works of scientific predecessors was an established aspect of scientific as well as literary work in this period, it is no surprise that Attalus should adopt this attitude towards his source text.²³

²² This applies to Homeric scholarship especially, but was clearly a general principle of ancient scholarship on all texts: see I. Sluiter, “Metatexts and the Principle of Charity,” in P. Schmitter and M. van der Wal (eds.), *Metahistoriography: Theoretical and Methodological Aspects of the Historiography of Linguistics* (Münster 1998) 14–16, and “The Dialectics of Genre: Some Aspects of Secondary Literature and Genre in Antiquity,” in *Matrices of Genre* 189, on the general reluctance of ancient commentators to attribute mistakes to their authors.

²³ Attalus’ textual approach to astronomy is not in itself unusual, for Hel-

What *is* surprising is the fact that Hipparchus does not take this approach. He leaves the reader in no doubt that the harmonization of discrepancies between Aratus' text and the observed night sky is not his primary aim. He will instead point out all the instances where Eudoxus and Aratus are "not in accord with the observed phenomena" (ὅσα ἂν ἀποδεικνύωμεν τῶν ὑπὸ τοῦ Ἀράτου καὶ Εὐδόξου κοινῶς λεγομένων διαφωροῦντα πρὸς τὰ φαινόμενα) and where Attalus too is therefore wrong about these things (τὸν Ἄτταλον περὶ τῶν αὐτῶν διημαρτημένως συναποφαινόμενον, 1.3.4). Hipparchus seems to be exaggerating for effect here, since a close reading of the fragments of Attalus' commentary which are later criticised in Book 1 suggests that he was not as uniformly approving of Aratus' correctness as Hipparchus makes out. But by using these choice quotations from Attalus' own prologue so soon after articulating his own stance, Hipparchus quickly establishes his own contrasting—and in his own view, vastly superior—uncharitable approach to his predecessors.²⁴

2. *Moving along: undermining Aratus' poetic charms*

I turn now to the ways in which Hipparchus nullifies the specifically poetic power of Aratus' astronomical project. We have seen that from the very beginning of his *Commentary* he is determined to both combat and draw from the didactic power of Aratus' *Phaenomena* and its position within the Hesiodic didactic verse tradition. Hipparchus' rejection of the didactic force of the *Phaenomena* is made most clear by his initial refusal to acknowledge the poetic authority of Aratus' text. This is

lenistic science and philology took place side by side: see C. Jacob, "La bibliothèque, la carte et le traité: les formes de l'accumulation du savoir à Alexandrie," in G. Argoud and J.-Y. Guillaumin (eds.), *Sciences exactes et sciences appliquées à Alexandrie* (Saint-Étienne 1998) 22. For a useful discussion of the textual criticism of Attalus and Hipparchus see J. Martin, *Histoire du texte des Phénomènes d'Aratos* (Paris 1956) 24–28.

²⁴ See Martin, *Histoire du texte* 24. Cf. Bishop, in *Classical Commentaries* 379–394, on Hipparchus' place among the 'detractor' school of literary critics in antiquity.

most explicit in the explanation of why he undertook the *Commentary* (1.1.6–7):

ἀλλ' ἔνεκα τοῦ μήτε σὲ μήτε τοὺς λοιποὺς τῶν φιλομαθούτων ἀποπλανᾶσθαι τῆς περὶ τὰ φαινόμενα κατὰ τὸν κόσμον θεωρίας. ὅπερ εὐλόγως πολλοὶ πεπόνθασιν· ἡ γὰρ τῶν ποιημάτων χάρις ἀξιοπιστίαν τινὰ τοῖς λεγομένοις περιτίθησι, καὶ πάντες σχεδὸν οἱ τὸν ποιητὴν τοῦτον ἐξηγούμενοι προστίθενται τοῖς ὑπ' αὐτοῦ λεγομένοις.

But for this reason: so that neither you [i.e. Aischrion] nor any other person who is a lover of learning will be led astray from the correct observation of the celestial phenomena—something which many people have suffered, with good reason. For the charm of poetry bestows a certain credibility on the things said, and nearly all those who interpret this poet bestow this credibility on the things said by him.

Hipparchus here isolates *χάρις* (charm) as the particular quality of Aratus' verse which leads its readers away from the truth by bestowing a misleading credibility upon the astronomical content of the poem.²⁵ As a result Hipparchus must challenge

²⁵ Hipparchus' attack on the *χάρις* of the *Phaenomena* perhaps hints at his engagement with contemporary Hellenistic literary critical debates: 'charm' is of course famously associated with the question of poetic truth and falsehood in Pindar's *Olympian* 1.30–32 and seems to be associated with these ideas in Hipparchus' *Commentary* too. We know that Hipparchus was active between 162 and 128 B.C. because of the observations of the equinoxes attributed to him and cited by Ptolemy: it is worth considering what other evidence we have for the engagement of scientific or technical works with the idea of poetic *χάρις* in this period. There is another Hellenistic text roughly contemporaneous with Hipparchus' work which also skirts the boundaries between literature and science, poetry and prose, and similarly engages with the relation of *χάρις* to the specific power of verse: Ps.-Scymnus' *Periodos to Nicomedes*. This geographical *periegesis*, written ca. 135 B.C. and probably dedicated to Nicomedes II Epiphanes of Bithynia, explicitly foregrounds *χάρις* as the reason why the author has chosen to present his work in trimeters, rather than prose (43–44): "Charm runs over the work which combines historical research and rhythmical language" (ἔχει γὰρ ἐπιτρέχουσαν ἐν ἑαυτῇ χάριν, / ὅταν ἱστορία καὶ λέξις ἔμμετρος πλεκῆ), transl. R. L. Hunter, "The Prologue of the *Periodos to Nicomedes* ('Pseudo-Scymnus')," in M. A. Harder et al. (eds.), *Beyond the Canon* (Leuven 2006) 134.

Aratus' poetic art throughout the *Commentary* to neutralize the charm which he regards as the poem's main danger.

One of the most striking ways in which Hipparchus begins this process is by deliberately stripping away some of the poetic aspects of Aratus' work. From the beginning of Book 1, he creates the impression that the text should be treated more like a rival prose treatise than a poem. In particular, the long and repetitive section at the beginning of Hipparchus' actual analysis of the contents of the *Phaenomena* (1.2.1–22) provides parallel passages which he argues demonstrate that Aratus followed the details in Eudoxus' prose work on the night sky almost exactly. For example, at 1.2.5 Hipparchus isolates lines 96–97 of the *Phaenomena* to demonstrate Aratus' supposed dependence on Eudoxus' prose when discussing the position of the Maiden and Bootes:

καὶ πάλιν ὁ μὲν Εὐδόξος· “ὑπὸ δὲ τοὺς πόδας ἡ Παρθένος ἐστίν.” ὁ δὲ Ἄρατος· “ἀμφοτέροισι δὲ ποσσὶν ὑπὸ σκέπτοιῦ Βοώτεω Παρθένον.”

And again Eudoxus says: “The Maiden is beneath the feet” [i.e. of Bootes]. And Aratus says: “Beneath both feet of Bootes you may observe the Maiden.”

Hipparchus' point here is clear: by emphatically stressing Aratus' seemingly slavish use of Eudoxus, it is suggested that the poet's astronomical vision is essentially the same as that of his prose source. This allows Hipparchus to create the impression that Aratus' poem must in turn be scrutinized scientifically in the same way as Eudoxus' work. This opening move, coming as it does at the start of Book 1, is crucial as it allows Hipparchus to demolish the didactic and scientific authority of both Eudoxus and Aratus simultaneously.²⁶ However, Aratus' supposedly strict dependence on Eudoxus may not be as clear cut as the beginning of the *Commentary* makes out, for the poet not only invariably transforms the technical aspects of Eudoxus for poetic effect but also occasionally demonstrates scientific dis-

²⁶ On this point see Netz, *Ludic Proof* 169; cf. Martin, *Histoire du texte* 27.

cernment. For example, in *Phaen.* 498–499 Aratus chooses to use the ratio for terrestrial latitude found in Eudoxus’ *Enoptron* (5:3) instead of the less accurate ratio found in the Eudoxean *Phaenomena* (12:7). Hipparchus himself even admits (1.2.22) that Aratus does this and thereby shows scientific discernment. But by repeated emphasis on Aratus’ supposed dependence on Eudoxus, the reader is encouraged to ignore the poetic aspects of Aratus’ work and concentrate instead on the technical inaccuracies which Hipparchus will swiftly proceed to highlight.²⁷

Another Hipparchan tactic in the *Commentary* is the systematic transformation of certain poetic uses into more technical terminology. For example, the alteration of Aratus’ use of Ὠκεανός to mean “horizon” into Hipparchus’ more technical ὀρίζων is particularly striking.²⁸ The first instance of this comes at 2.1.2 when he discusses Aratus’ point that if the sky is darkened by clouds or the view obscured by mountains when the hour of the night needs to be determined by the observer, the constellations rising up from the Ocean—i.e. the horizon—will allow the observer to tell the time. After first giving his own prose paraphrase of what Aratus is about to say, Hipparchus then quotes lines 559–568 verbatim, including Aratus’ poetic use of Ὠκεανός in 567:

πρῶτον μὲν οὖν ὁ Ἄρατος ὑποδείξει βουλόμενος, πῶς διὰ τῆς
ἀνατολῆς καὶ τῆς δύσεως τῶν ἄστρον ἐπιγνωσόμεθα τὴν ὥραν
τῆς νυκτός, λέγει ταυτί.
οὐ κεν ἀπόβλητον δεδοκημένῳ ἥματος εἶη
μοιράων σκέπτεσθαι, ὅτ’ ἀντέλλωσιν ἕκασται·
αἰεὶ γὰρ τάων γε μὴ συνανέρχεται αὐτὸς
ἥελιος. τὰς δ’ ἄν κε περισκέψαιο μάλιστα
εἰς αὐτὰς ὁρόων· ἀτὰρ εἰ νεφέεσσι μέλαιναί

²⁷ On Hipparchus’ possible exaggeration of Aratus’ dependence on Eudoxus see J. Martin *Aratos: Phénomènes* (Paris 1998) LXXXVII–XCIV; cf. Kidd, *Aratus* 358–359.

²⁸ Aratus was widely understood as following established Homeric poetic usage here, as a scholion on *Phaen.* 26 makes clear: “Ocean is the poetic form of ‘horizon’ ... just as Homer has said everywhere” (ποιητικῶς δὲ ὠκεανός ἐστιν ὁ ὀρίζων ... καθάπερ καὶ Ὅμηρος πολλαχοῦ εἶρηκεν).

γίνονται ἢ ὄρεος κεκρυμμένοι ἀντέλλοιεν,
 σήματ' ἐπερχομένησιν ἀρηρότα ποιήσασθαι.
 αὐτὸς δ' ἂν μάλα τοι κεράων ἐκάτερθε διδοίη
 Ὠκεανός, τὰ τε πολλὰ περιστρέφεται ἐοῖ αὐτῶ,
 νειόθεν ὀππῆμος κείων φορέησιν ἐκάστην.

First Aratus, wanting to demonstrate how we will work out the hour of the night from the rising and falling of the constellations, says the following: “It may be useful, if watching for daybreak, to examine the twelfths of the zodiac, when each rises. For the sun itself always comes up with one of them. It will be best if you can examine them carefully while looking at the constellations themselves. But if they have become dark with clouds or have risen obscured by a mountain, you must produce for yourself well-fitting signs of their rising. The Ocean itself may give to you on each side of its horns the many constellations which turn about itself, whenever he bears each twelfth of the zodiac from below.”

Hipparchus (2.1.3) then immediately provides another prose paraphrase of Aratus' meaning, stripping away the poetic use of Ὠκεανός and replacing it with ὀρίζων, as well as injecting other technical terms (e.g. ζῳδίων, “zodiac sign”; τοῦ ζῳδιακοῦ κύκλου, “zodiac circle”; συνανατέλλει, “rises simultaneously”; ἀντικαταδύνει, “sets opposite”) into the prose paraphrase of Aratus' elegant metrical description of a technical astronomical phenomenon:

εἰ μέντοι γε ἢ διὰ ὄρη ἢ διὰ νέφη μὴ εἶη φανερόν τὸ ἀνατέλλον
 ζῳδίων, ἐκ τῶν λοιπῶν ἀστέρων τῶν ἐκτὸς τοῦ ζῳδιακοῦ
 κύκλου, κειμένων δ' ἐγγὺς τοῦ ὀρίζοντος, ἐπιγνώσεσθαι ἡμᾶς τὸ
 ἀνατέλλον ζῳδίων, ἐὰν ἴδωμεν, ποῖα τῶν ἄστρον ἐκάστῳ ζῳδίῳ
 συνανατέλλει ἢ ἀντικαταδύνει.

However, if because of either a mountain or a cloud the zodiac sign which has risen is not clear, we may recognise the risen zodiac sign from the remaining constellations outside of the zodiac circle—those lying near the horizon—if we see which constellation rises simultaneously or sets opposite each zodiac sign.

This recasting of the Aratean text is typical of Hipparchus' approach throughout the *Commentary*, and is not a result of the obscure language of the poet requiring clarification—or so at least Hipparchus *himself* claims, when he declares in his first

preface that Aratus' poem is simple, brief, clear, and easy for most people to follow (ἀπλοῦς τε γὰρ καὶ σύντομός ἐστι ποιητής, ἔτι δὲ σαφὴς τοῖς καὶ μετρίως παρηκολουθηκόσι, 1.1.4). Despite Hipparchus' claim, the sheer volume of scholarly comment which the *Phaenomena* attracted suggests that Aratus' poem, replete with the rare poetic vocabulary so beloved of Hellenistic poets, was not always particularly easy for people to understand.²⁹ But it suits Hipparchus to claim that this is the case since it allows him to concentrate on astronomical discussion instead of philological help and supports the claim which he will go on to advance, that he is the best interpreter of Aratus' clear language, just as he is the best interpreter of the clear signs of the night sky.³⁰

Hipparchus further confronts the poetic charm of the *Phaenomena* by refusing to interpret the text in a way which allows any room for poetic license.³¹ Again, this is seen most clearly in the way he systematically picks up on and manipulates certain aspects of Aratus' language. For example, Hipparchus insists on interpreting the preposition ὑπό in a consistently technical sense as meaning that one constellation is due south of another, instead of more vaguely suggesting that one constellation is somewhere approximately underneath another. This deliberate misinterpretation leads to the impression that Aratus and Eudoxus are both woefully inaccurate (1.5.1):

²⁹ See n.35 below on the various adaptations of Latin translators of the *Phaenomena*, who occasionally struggled with the content and language of the poem and clearly relied on commentaries when reading it.

³⁰ I am grateful to the anonymous reader for drawing my attention to this point.

³¹ Poetic licence (ποιητική ἄδεια/ἔξουσία) is commonly appealed to as a means of defending poets from criticism in ancient literary criticism, but this sort of approach is far from Hipparchus' mind in the *Commentary*. On poetic licence in scholia in general see R. Meijering, *Literary and Rhetorical Theories in Greek Scholia* (Groningen 1987) 62–67; R. Nünlist, *The Ancient Critic at Work: Terms and Concepts of Literary Criticism in Greek Scholia* (Cambridge 2009) 175–184.

ἐν δὲ τοῖς ἐξῆς περὶ τῆς Ἄρκτου παντελῶς δοκοῦσί μοι ἀγνοεῖν,
ὁ μὲν Εὐδοξος οὕτως λέγων· “ὑπὸ δὲ τὴν κεφαλὴν τῆς Μεγάλης
Ἄρκτου οἱ Δίδυμοι κεῖνται, κατὰ μέσον δὲ ὁ Καρκίνος, ὑπὸ δὲ
τοὺς ὀπισθίους πόδας ὁ Λέων.” ὁ δὲ Ἄρατος·

κρατὶ δὲ οἱ Δίδυμοι, μέσση δ' ὑπο Καρκίνος ἐστί,

ποσσὶ δ' ὀπισθοτέροισι Λέων ὑπο καλὰ φαίνειν.

οἷς ὅ τε Ἄτταλος καὶ οἱ λοιποὶ πάντες συνεπιγράφονται. ὅτι δὲ
ἀγνοοῦσιν, ἐκ τούτων ἐστὶ φανερόν.

And in what follows concerning the Bear they seem to me to be completely ignorant. Eudoxus speaks in this way: “The Twins lie beneath the head of the Great Bear, the Crab lies opposite the middle, the Lion beneath the hind feet.” And Aratus says: “The Twins are beneath the head of the Bear, the Crab is beneath its middle, and the Lion shines beautifully beneath the hind feet” [*Phaen.* 147–148]. Attalus and all the other commentators write in agreement with this. But it is clear from these things that they are ignorant.

In fact it is obvious that ὑπό is being used loosely here and is not meant to be interpreted as meaning precisely ‘due south’ in either Eudoxus’ prose work or Aratus’ poem.³² But Hipparchus has no time for charitable interpretations. He capitalises on the supposed ‘error’ of both writers to compound the impression of Eudoxean and Aratean inadequacy by providing a lengthy proof (1.5.2–13) explaining why Aratus’ positioning of several constellations due south of the Great Bear cannot be accurate or correct. By refusing to acknowledge that Aratus’ usage is poetic, Hipparchus first creates an opportunity to condemn Aratus and his prose source Eudoxus simultaneously. He then goes further and condemns his contemporary fellow commentator Attalus for allowing this seeming mistake to stand.³³ In

³² See Kidd, *Aratus* 235, on Aratus’ more general use of ὑπό. For other examples of Hipparchus’ deliberately uncharitable misreadings of his predecessors’ vocabulary see A. C. Bowen and B. R. Goldstein, “Hipparchus’ Treatment of Early Greek Astronomy,” *PAPhS* 135 (1991) 245.

³³ Cf. also 1.8.21–22, where Aratus is again condemned for his inaccurate use of ὑπό and Attalus is implicitly criticized for not finding this non-technical usage problematic.

this way Hipparchus either recasts or deliberately misinterprets Aratus' poetic language to repeatedly claim that all previous writers on astronomical matters have failed to provide the sort of accurate and truthful account of the observed phenomena which he will go on to provide for the first time in Books 2 and 3 of the *Commentary*.

3. *Bumps in the road: overcoming Attalus of Rhodes*

For the most part it is fairly easy for the reader to be carried along with Hipparchus as he flagrantly rewrites Aratus' poetic text to establish himself as the most authoritative and accurate astronomical teacher of the present. But there are moments on this didactic journey when Hipparchus' dismissal of the *Phaenomena* encounters problems. Almost all of these occur when he confronts both his rivals for didactic authority, Aratus and Attalus, at the same time. The fact that Attalus is a contemporary, and therefore a nearer and more present threat to Hipparchus' authority, creates a significantly more complex didactic situation in the *Commentary*. Hipparchus must maintain his generally negative stance towards Aratus' *Phaenomena* while simultaneously ensuring that the reader is left in no doubt about who is currently the most authoritative commentator on the poem. At times this means that Hipparchus bolsters his own position not only by insisting that Attalus does not understand the *Phaenomena* properly, but even by maintaining that Aratus has in fact managed to accurately and correctly explain the truth of the celestial phenomena even though he is writing in verse, in contrast to Attalus' flawed interpretations. In these instances we see Hipparchus appealing to the *Phaenomena*'s popularity and authority in support of his own views—a stance which he radically disavows elsewhere in the *Commentary*. In this way, he paradoxically both condemns and simultaneously relies on Aratus' poetic text to bolster his own didactic authority, before moving towards the catalogue of his own observations in the latter half of the *Commentary*. Only at this point do the other competing authorities drop out of the work, leaving us with Hipparchus' voice alone.

It is perhaps no surprise that Hipparchus resorts to one of the

key weapons in the arsenal of Hellenistic scholars in an attempt to discredit his rival Attalus: textual criticism. At various points in the *Commentary* Hipparchus goes so far as to claim that his contemporary is not only incapable of successfully observing and interpreting real-world astronomical phenomena, but that he is not even able to read and interpret the text of the *Phaenomena* correctly, never mind the actual night sky. This is made most clear by the persistent presentation of Attalus as an inferior textual critic who is repeatedly unable to understand the thoughts and intentions of Aratus. Hipparchus reinforces the sense that Attalus is a poor critic by heavily criticising some of his suggested emendations, often blaming his predecessor's stated policy of altering either his real-world observations or the text so that they fit together as the reason for his frequent mistakes.

Hipparchus' complaint about one of Attalus' more unlikely emendations is a good example of the perceived weaknesses of his predecessor's methods. In this passage Hipparchus chastises Attalus for emending the Aratean phrase μέσσω δ' ἐφύπερθε καρήνῳ ("right above the mid-point of the head," using the dative case) in *Phaen.* 69 to μέσσου δ' ἐφύπερθε καρήνου ("above the middle of the head," giving the genitive instead). The reason for this emendation is obscure, but it has been suggested that Aratus' use of the dative is meant to bring out the precise position of the star directly above the Dragon's head, whereas Attalus' emendation reflects the more common poetic use of the genitive with the prepositional use of ἐφύπερθε.³⁴ Attalus' focus on Aratus' use of cases here rather than on the real astronomical problem which these lines contain draws a lengthy comment from Hipparchus (1.4.9):

ὁ μέντοι γε Ἄτταλος παρὰ τὸ βούλημα τοῦ ποιητοῦ δοκεῖ μοι τὸ ἡμιστίχιον μετατιθέναι γράφων οὕτως: "μέσσου δ' ἐφύπερθε καρήνου" καὶ τὴν κεφαλὴν τοῦ Δράκοντος ἔξω τοῦ κόσμου στρέφων, ἵνα γένηται αὐτὸ τὸ δεξιὸν μέρος τῆς κεφαλῆς κατὰ τὸν πόδα. τὰ τε γὰρ ἄστρα πάντα εἰς τὸ ἐντὸς τοῦ κόσμου μέρος

³⁴ See Kidd, *Aratus* 204.

ἐπεστραμμένα, ὡς ἔφην, ἀστροθετεῖται ὑπὸ πάντων καὶ ὑπ' αὐ-
 τοῦ τοῦ Ἀράτου, καὶ ἐν πᾶσι τοῖς βιβλίοις γράφεται·
 μέσσω δ' ἐφύπερθε καρήνω
 δεξιτεροῦ ποδὸς ἄκρον ἔχει σκολιοῖο Δράκοντος.

However Attalus certainly seems to me to amend this hemistich in violation of the intention of the poet by writing this, “above the middle of the head,” thereby twisting the head of the Dragon towards the outside of the celestial sphere, in order that it becomes the right side of the head opposite the foot. For all the constellations which are turned towards the inside part of the celestial sphere, as I said before, are grouped together as constellations by everyone, even by Aratus himself, and in all the books of the poem is written: “He [the Kneeler] holds the tip of his right foot right above the mid-point of the head of the crooked Dragon” [*Phaen.* 69–70].

Hipparchus here labels Attalus as a bad textual critic for including this emendation while defending Aratus’ astronomical knowledge. Attalus’ emendation comes within a wider and more convoluted argument about why the poet has not made a mistake by writing that the right foot of the Kneeler is above the mid-point of the Dragon’s head. Hipparchus himself has already extensively demonstrated at 1.4.4–5 that the poet made an obvious technical error here, since Aratus should really have described the left foot of the Kneeler as above the Dragon’s head if the figures of the constellations are viewed as facing the observer on earth. The introduction of Attalus’ apparent failure to pick up on this Aratean error, at this point in the *Commentary*, is thus very significant. It comes only a few sections after the explanation of the mistake concerning the right and left foot of the Kneeler and ensures that the reader, who now understands the astronomical truth of the matter thanks to Hipparchus, can be in no doubt that both Aratus and Attalus are hopelessly confused regarding the correct position of the stars in this constellation.³⁵ In addition, Attalus’ emendation even fails to make the

³⁵ It is interesting to note that this particular Hipparchan criticism of Aratus seems to have been taken into account and acted upon by at least

Aratean text more philologically accurate according to Hipparchus, who suggests that the attestation of multiple manuscript copies is a much more reliable method of finding out what the poet really wrote.³⁶ Attalus thus fails on both counts, first as an astronomer, then as a textual critic.

In contrast to Attalus, Hipparchus presents himself as a consistently superior textual critic who understands the text of Aratus perfectly, with the result that he is able to correct and surpass the poet in terms of astronomical knowledge and didactic utility. In fact, Hipparchus does show very sound judgment in the majority of his suggested emendations.³⁷ However, his eagerness to prove that Attalus cannot even see the text of the *Phaenomena* in front of him correctly, let alone the actual phenomena, repeatedly complicates the attempts to establish his own didactic supremacy over all his scholarly rivals and predecessors as well as over the poetic form itself. This becomes especially clear on the occasions when Aratus' astronomical correctness is actually emphasised by Hipparchus, rather than denigrated. A good example of how Hipparchus' demonstration of the manifold inadequacies of the *Phaenomena* as a didactic text is suddenly undercut by the competing need to

one of the poem's Latin translators as a means of demonstrating mastery over both the poetic and the scientific aspects of the text: Germanicus *Arat.* 69, *Serpentis capiti figit vestigia laeva*. On the incorporation of this and other Hipparchan 'corrections' in Germanicus' version see A. Le Boeuffe, *Germanicus: Les Phénomènes d'Aratos* (Paris 1975) xix–xx; D. B. Gail, *The Aratus ascribed to Germanicus Caesar* (London 1976) 14–16; D. M. Possanza, *Translating the Heavens: Aratus, Germanicus, and the Poetics of Latin Translation* (New York 2004) 58, 92. For discussion of the use of commentaries and other exegetical sources in Cicero's *Aratea* see J. Soubiran, *Cicéron – Aratea* (Paris 1972) 93; E. Gee, "Cicero's Astronomy," *CQ* 51 (2001) 523–524, 527 n.30; C. Bishop, "Naming the Roman Stars: Constellation Etymologies in Cicero's *Aratea* and *De Natura Deorum*," *CQ* 66 (2016) 158–159 n.15.

³⁶ For the use of multiple manuscript copies as a test of reliability in scientific work see L. Totelin, "Galen's Use of Multiple Manuscript Copies in Pharmacological Treatises," in *Authorial Voices* 81–92.

³⁷ See E. Maass, *Commentariorum in Aratum reliquiae* (Berlin 1892) 66–117, and Kidd, *Aratus* 21, on Hipparchus' emendations.

demonstrate Hipparchus' astronomical superiority over Attalus comes at 1.7.16:

τὰ δὲ περὶ τοῦ Κηφέως λεγόμενα ὅτι συμφώνως τοῖς φαινομένοις Ἄρατος λέγει, καὶ οὐ διαφώνως, ὡς ὁ Ἄτταλος ὑπολαμβάνει, δῆλον ἂν γένοιτο διὰ τούτων.

And that the things Aratus says concerning Cepheus are in accordance with the observed celestial phenomena rather than in disagreement, as Attalus interprets it, becomes clear from the following things.

Here Hipparchus departs from his usual criticism of the *Phaenomena* and suddenly affirms its astronomical usefulness, thus undermining his carefully crafted position in the rest of the *Commentary* in an effort to ensure that the reader is left in no doubt about Attalus' ignorance.

Perhaps the most striking and prolonged instance of Hipparchus' complicated didactic positioning between these two rival astronomical authorities comes at 1.8.8–13 when Attalus' attitude towards *Phaen.* 367–385 is discussed. These lines constitute a digression in Aratus' poem on the theme of the naming and arrangement of the constellations, which is precipitated by the description of the anonymous stars under the Hare. This passage was intensely discussed by ancient commentators, who frequently seem to have found the chiasmic pattern of thought in these verses and Aratus' focus on the arrangement and naming of the constellations, rather than the reason for the namelessness of certain stars, somewhat confusing.³⁸ In particular, lines 373–376 seem to have been a mat-

³⁸ D. Kidd, "The Pattern of *Phaenomena* 367–385," *Antichthon* 1 (1967) 12–15 (disproving M. Erren, "Ἀστέρες ἀνόνομοι (Zu Arat. 367–385)," *Hermes* 86 [1958] 240–243), aptly demonstrates the chiasmic pattern of these verses: see esp. 13 for discussion of the frequent confusion this passage seems to have caused amongst ancient commentators; cf. Kidd, *Aratus* 318, and Martin, *Aratos* 302–311. For the confusion this passage caused amongst Aratus' Latin translators see W. W. Ewbank, *The Poems of Cicero* (London 1933) 176–177, on Cic. *Aratea* 155–166; cf. Gain, *The Aratus ascribed to Germanicus* 102, and Le Boeuffle, *Germanicus* 25, on German. *Arat.* 371–378.

ter of dispute and are quoted by Hipparchus as follows:³⁹

τά τις ἀνδρῶν οὐκέτ' ἐόντων
 ἐφράσατ'· οὐδ' ἐνόησεν ἅπαντ' ὀνομαστί καλέσσαι
 ἤλιθα μορφώσας· οὐ γάρ κ' ἐδυνήσατο πάντων
 οἴοθι κεκριμένων ὄνομ' εἰπεῖν οὐδὲ δαῆναι.

The constellations which one of the men who no longer exist named. Nor did he devise a way to call them by name after shaping them compactly. For he was not able to give a name or learn about all of them separated out individually.

This passage is unique in the *Commentary* as it focuses on one of Aratus' set-piece digressions for the first and only time, and sees Hipparchus make by far the longest verbatim quote from the *Phaenomena*—nineteen lines—in an attempt to emphasize Attalus' mistakes. Hipparchus' complicated complaint begins at 1.8.8, as Attalus is criticized first for failing to recognize a technical error of Aratus: “Attalus was not mindful of this error, thinking that Aratus spoke correctly” (ὁ δὲ Ἄτταλος τούτου μὲν τοῦ παροράματος οὐκ ἐμνήσθη, δεόντως εἰρηκέναι νομίζων τὸν Ἄρατον). This error concerns placing the stars which make up the middle of the steering oar of Argo and the Sea Monster among the nameless stars under the Hare, with Attalus seemingly insisting instead that Aratus has in fact written accurately.

Hipparchus then goes on to attack Attalus for criticizing Aratus inappropriately: at this point it becomes clearer that even Aratus' poetic treatment can actually be praised as scientifically accurate in certain circumstances, so long as it entails the failure of Attalus' astronomical judgment as a result. To reinforce his attack Hipparchus cites *Phaen.* 367–385 in full before adding Attalus' complaint about these lines (1.8.9):

ταῦτα δὲ προενεγκάμενος ὁ Ἄτταλος ἐπιφέρει· “ἐν δὲ τούτοις ἀδυνατώτερον ὁ ποιητῆς ἀνέστραπται, πολλάκις ἐπὶ τὴν αὐτὴν διάνοιαν ἐπιφερόμενος καὶ οὐ δυνάμενος τὸν λόγον εὐπεριγράφως ἐξενεγκεῖν. βούλεται γὰρ δηλῶσαι, διότι οἱ μεταξὺ τοῦ

³⁹ Hipparchus' version contains the important variant οὐδ' ἐνόησεν instead of the generally accepted ἡδ' ἐνόησεν in 374: cf. Kidd, *Aratus*, and Martin, *Aratos* 303–305.

Κήτους καὶ τοῦ Πηδαλίου τεταγμένοι ὑποκάτω τοῦ Λαγωοῦ ἐν οὐδενὶ ἄστρῳ καταριθμοῦνται, ἀλλ' εἰσὶν ἀνόνημοι.”

And after citing these words Attalus adds: “In these words the poet has become impossibly confused, often returning to the same thought and not able to deliver his account by easily sketching it out. For he desires to be clear, since those stars arrayed between Cetus and the Steering Oar and beneath the Hare are not reckoned among the constellations, but remain nameless.”

Attalus fundamentally misunderstands Aratus’ purpose in these lines, which is not so much to explain why certain stars are nameless, as to return to one of his major themes, first expressed in the *Phaenomena*’s proem: the arrangement and naming of the constellations.⁴⁰ Since Aratus does not explain why the stars under the Hare are nameless, Attalus sees these lines as failing in their aim. Hipparchus disagrees entirely (1.8.11):

δοκεῖ δέ μοι πᾶν τούναντίον ὁ μὲν Ἄτταλος μὴ κεκρατηκέναι τῆς τοῦ ποιητοῦ διανοίας, καὶ οὐ μόνον τοῦτο, ἀλλὰ καὶ ἦν προέθετο διάνοιαν τῶν στίχων ἀποδοῦναι μηδὲ τὰύτην σαφῶς, ἀλλ' ἀσυνέτως ἐξενηνοχέναι, ὁ μέντοι γε Ἄρατος κεκρατημένως ἀποδεδωκέναι.

But the complete opposite seems to me to be the case: Attalus did not grasp the thought of the poet, and not only this, he also attempted to restore the thought of the verses and failed to do this clearly, instead doing it without understanding. Aratus, however, explained it in a magisterial manner.

Here Hipparchus once again invokes one of his favourite refrains regarding Attalus and accuses his fellow commentator of failing to grasp what the poet was really saying, since Aratus has in fact explained everything in a masterly manner. As this instance demonstrates, the author of the *Commentary* presents himself not just as a superior reader of the actual sky but of the text of the *Phaenomena* itself, thus creating a tension between

⁴⁰ On Attalus’ confusion about these lines see Kidd, *Antichthon* 1 (1967) 13, and M. Pendergraft, “On the Nature of the Constellations: Aratus, *Ph.* 367–385,” *Eranos* 88 (1990) 100.

undermining the scholarly pretensions of Aratus' verse while simultaneously relying on Aratus' didactic authority to bolster his own astronomical project.

4. *End of the line: reaching the Hipparchan catalogue*

We have seen then that over the course of the *Commentary* the consistent engagement with multiple past astronomical authorities necessitates a complex response. But in the last two books of the work Hipparchus takes a different approach. All discussion of his rivals drops away as the reader is instead guided towards a catalogue of his own observations on the simultaneous risings and settings of the constellations along with their zodiac signs in both the northern and the southern hemispheres. Astronomical information is thereby represented in its purest form, in a way which seemed to have particularly appealed to Hipparchus. The astronomer seems to have made a name for himself in antiquity for his use of the catalogue form, and was known to have produced a star catalogue using his own observations.⁴¹ It is not known whether the *Commentary* was written before or after this star catalogue—or indeed if the latter half of the *Commentary* is broadly the same as the star catalogue proper—but it seems clear that the data used in the latter part of the work on Aratus' poem was the same as that used in a potentially separate star catalogue, and that all of Hipparchus' observations were taken from the latitude of Rhodes.⁴²

⁴¹ The star catalogue in Books 7 and 8 of Ptolemy's *Almagest* seems to have been based on Hipparchus' catalogue in certain respects, though the precise degree of Ptolemy's dependence on Hipparchus is one of the most fraught debates in the history of ancient astronomy. For recent views see A. K. Dambis and Y. N. Efremov, "Dating Ptolemy's Star Catalogue through Proper Motions: The Hipparchan Epoch," *JHA* 31 (2000) 115–134; D. W. Duke, "The Depth of Association between the Ancient Star Catalogues," *JHA* 34 (2003) 227–230.

⁴² O. Neugebauer, *A History of Ancient Mathematical Astronomy* (Berlin 1975) 281, argues that the information derived from Hipparchus' observations used in the *Commentary* and the star catalogue is the same. Cf. Kidd, *Aratus* 20, on Hipparchus' star catalogue more generally. On Hipparchus and his

The use of the catalogue form as the end point of the movement of Hipparchus' *Commentary* is significant. It is specifically through this presentation of astronomical knowledge in its barest configuration that Hipparchus sets forth his challenge to his didactic predecessors, ultimately championing new 'scientific' values of accuracy, clarity, and empirical observation over the charm of Aratus' verse. The gradual movement of the *Commentary* away from combating the multiple didactic antagonists of Book 1 and towards a catalogue of astronomical risings and settings in its simplest form thus allows Hipparchus to stake a strong claim for his own position as the preeminent astronomical scholar of his day.

One way in which he bolsters his own didactic authority at the moment when he turns towards his catalogue is by focusing on its potential utility. The explanation at 2.4.6 of why his catalogue will benefit the reader is particularly significant in explaining his aims, since it returns to one of the foremost concerns of the opening prologue when he repeats his promise made there (cf. *περὶ μὲν οὖν τῶν ἄλλων μετὰ ταῦτά σοι τὴν ἰδίαν κρίσιν διασαφήσω*, 1.1.2) to elucidate the various observations he is about to recount (*ἕκαστον δὲ τούτων διασαφήσομεν*). He also makes very clear that this section of the *Commentary* is meant to displace the works which had their astronomical authority demolished earlier, claiming that his treatment of the issues "is more useful by far than those put together by previous authorities" (*γὰρ ἡ τοιαύτη πραγματεία πολλῶ τε τῶν ὑπὸ τῶν ἀρχαίων συντεταγμένων ἐστὶν εὐχρηστοτέρα*) and that it is also easy for Aischrion to understand (*εὐκατανόητον εἶναί σοι νομίζω*). Once again the *topoi* of the opening prologue are invoked, with Hipparchus asserting his own ability to clarify the astronomical information which his predecessors have so conspicuously failed to understand. The utility of his catalogue is invoked through the explicit labelling

work at Rhodes see G. Grasshoff, *The History of Ptolemy's Star Catalogue* (New York 1990) 174, and Neugebauer 275.

of the coming approach as “more useful” (εὐχρηστοτέρα) in comparison to previous works, obviously hinting especially at those of Eudoxus, Aratus, and Attalus which he has just dismissed.

The reiterated appeal to the didactic addressee through the declaration that the following Hipparchan observations are bound to lead to easier understanding also links the first and second halves of his work by strongly reminding the reader of the concerns of the opening proem. The end point of the didactic journey of Hipparchus' *Commentary* is thus made clear as his catalogue commences (2.5.1):

ὁ μὲν οὖν Βοώτης συνανατέλλει τῷ ζῳδιακῷ ἀπὸ τῆς ἀρχῆς τῆς Παρθένου ἕως ζ' καὶ κ' μοίρας τῆς Παρθένου· μεσουρανεῖ δ' ἀνατέλλοντος αὐτοῦ τοῦ ζῳδιακοῦ τμήμα τὸ ἀπὸ Ταύρου ζ' καὶ κ' μοίρας μέσης ἕως Διδύμων κζ' μοίρας. καὶ πρῶτος μὲν ἀστὴρ τοῦ Βοώτου ἀνατέλλει ὁ ἐν τῇ κεφαλῇ, ἔσχατος δὲ ὁ ἐν τῷ δεξιῷ ποδί. μεσουρανοῦσι δὲ τῶν ἄλλων ἀστέρων ἀρχομένου μὲν ἀνατέλλειν τοῦ Βοώτου ὁ τε ἀριστερὸς ὦμος τοῦ Ὠρίωνος καὶ ὁ ἀριστερὸς πούς, ὡς ἡμιπῆχιον προηγούμενοι τοῦ μεσημβρινοῦ. λήγοντος δὲ αὐτοῦ μεσουρανεῖ τοῦ Κυνοῦς ὁ ἐπὶ τῶν ἰσχύων λαμπρός. ἀνατέλλει δὲ ὅλος ὁ Βοώτης ἐν ὥραις ἰσημεριναῖς δυσὶν ὡς ἔγγιστα.

And so Bootes rises simultaneously with the zodiac from the beginning of the Maiden until the 27th degree of the Maiden. While this rises the section of the zodiac from the middle of the 27th degree of the Bull until the 27th degree of the Twins is in mid-heaven. And the first star of Bootes which rises is the one in the head, and the last is the one in the right foot. Of the other stars at the start of Bootes' rising both the left shoulder and the left foot of Orion are in mid-heaven, having gone forward a half-cubit beyond the meridian. When Bootes ceases rising the bright star in the haunches of the dog is in mid-heaven. The whole of Bootes rises in approximately two equinoctial hours.

This systematic approach continues until 2.5.16, with the simultaneous risings and settings of each of the constellations and their zodiac signs set out clearly. The second half of Book 2 goes on to concentrate on the northern hemisphere in this manner, while Book 3 concentrates on the southern, and provides a catalogue of the hours of various risings and settings.

After examining the play of various forms of didactic authority in Hipparchus' *Commentary* it is clear that the accurate and precise measurements made from personal observation offered in the latter half of the text are what Hipparchus really wants the reader to take away from the work. The *Commentary* thus purports to lead readers away from their own ignorance towards a core of original Hipparchan knowledge. Rather than relying on the 'charm' of poetry as a protreptic to knowledge, Hipparchus turns to the new 'scientific' values of accuracy, clarity, and truthfulness. The complex interplay between the interconnected nexus of poetry, science, and scholarship throughout the *Commentary* is continually made clear by Hipparchus' nuanced response not only to Aratus' poem, but also to the tradition it engendered. By paying attention to these connections, rather than simply plucking astronomical measurements from the work without examining the intricate self-positioning of its author, the way in which Hipparchus both carefully navigates this tradition and consummately guides the reader through his composition makes clear that the *Commentary* has didactic ambitions which rival those of didactic poems of the past.⁴³

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