

The Ambiguous Terms ἑώα and ἑσπερία ἀνατολή, and ἑώα and ἑσπερία δύσις¹

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Abstract

It is demonstrated in this article that the terms ἑώα and ἑσπερία ἀνατολή (*heōia* and *hesperia anatolē*), and ἑώα and ἑσπερία δύσις (*heōia* and *hesperia dusis*) have at least three different meanings in astrological and astronomical texts. For this reason definitions of the terms found in Autolycus of Pitane, Theon of Smyrna and Paul of Alexandria are analysed in detail. To exemplify the confusion caused by the ambiguity of the terms, two ancient texts will be consulted. The first is a horoscope ascribed to Antigonus of Nicaea. It is shown in this article that an epitomist as well as a modern translator misunderstood the terms in question. The second is a scholium to Paul of Alexandria's definition of the terms. The scholiast misunderstood the text of Paul of Alexandria and is himself misunderstood by a modern translator.

Every scholar of ancient astrology regrets the lack of a reliable dictionary of astrological technical terms. This article will make a contribution to the understanding of the technical terms ἑώα and ἑσπερία ἀνατολή and ἑώα and ἑσπερία δύσις. Since on the one hand, different authors use different terms to describe the same position of the planets, and on the other hand, different authors use the same terms to describe different positions of the planets, these ambiguous terms have caused misunderstandings up to the present day.²

¹ I am deeply grateful to Dorian Greenbaum for her careful help concerning the English text.

² This article summarises the main results of the detailed analysis of these terms, attached as Appendix I to Susanne Denningmann, *Die astrologische Lehre der Doryphorie. Eine soziomorphe Metapher in der antiken Planetenastrologie* (Beiträge zur Altertumskunde [hereafter BzA], 214, Munich/Leipzig, 2005) [hereafter *Die Doryphorie*], pp. 386-474.

The Different Meanings of the Terms in Question

Morning and evening rising and setting

In about 310 BCE the astronomer and mathematician Autolycus of Pitane wrote an astronomical treatise entitled *Περὶ ἐπιτολῶν καὶ δύσεων* (*On risings and settings*). Of special interest for us is the following passage (Autol. 1 praef., p. 214.4-10 Mogenet):³

τῶν ἀπλανῶν ἄστρον αἰ ἐπιτολαί τε καὶ δύσεις αἰ μὲν λέγονται ἀληθιναί, αἰ δὲ φαινόμεναι. τῶν δὲ ἀληθινῶν ἑῶα μὲν ἐστὶν ἐπιτολή, ὅταν ἅμα τῷ ἡλίῳ ἀνατέλλονται ἄστρον τι συνανατέλλῃ· ἑῶα δὲ δύσις, ὅταν ἅμα τῷ ἡλίῳ ἀνατέλλονται ἄστρον τι δύνῃ· ἑσπερία δὲ ἀνατολή, ὅταν ἅμα τῷ ἡλίῳ δύνονται ἄστρον τι ἀνατέλλῃ· ἑσπερία δὲ δύσις, ὅταν ἅμα τῷ ἡλίῳ δύνονται ἄστρον τι συνδύνῃ.

Some of the risings and settings of the fixed stars are called true, others visible. Of the true ones it is a morning rising whenever a star rises together with the rising Sun, a morning setting whenever a star sets while the Sun rises, an evening rising whenever a star rises while the Sun sets, an evening setting whenever a star sets together with the setting Sun.

This is the earliest definition of the terms *ἑῶα ἐπιτολή* (*epitolē*), *ἑῶα δύσις*, *ἑσπερία ἀνατολή* and *ἑσπερία δύσις*.⁴ Autolycus distinguishes

³ Joseph Mogenet, ed., *Autolycus de Pitane*, Histoire du texte suivie de l'édition critique des traités de la sphère en mouvement et des levers et couchers (Recueil de travaux d'histoire et de philologie. 3. ser. 37, Louvain, 1950). On Autolycus see [F.] Hultsch, 'Autolykos' [9], in *Paulys Real-Encyclopädie der classischen Altertumswissenschaft* II 2 (Stuttgart, 1896) [hereafter *RE*], cols 2602.46-2604; Otto Neugebauer, *A History of Ancient Mathematical Astronomy* (3 vols, Berlin/Heidelberg/New York, 1975) [hereafter *HAMA*], vol. II, pp. 744-50; Menso Folkerts, 'Autolykos' [3], in *Der Neue Pauly. Enzyklopädie der Antike* 2 (Stuttgart/Weimar, 1997) [hereafter *DNP*], cols 356-57. All abbreviations of Greek authors in this paper follow the style of H. G. Liddell, R. Scott and H. S. Jones, *A Greek-English Lexicon* (9th ed., Oxford, 1996).

⁴ For the missing differentiation between *ἀνατολή* and *ἐπιτολή* in this treatise see Denningmann, *Die Doryphorie*, pp. 397-98. The oldest surviving text which distinguishes between *ἀνατολή* and *ἐπιτολή* is probably a fragment attributed to the

between the true and the visible morning and evening risings and settings. This passage deals with the true ones. The terms *ἑῶα ἐπιτολή* and *ἑῶα δύσις* refer to the rising and the setting of a star in the morning at sunrise. In the case of the *ἑῶα ἐπιτολή* the star rises in the morning together with the Sun (see **Figure 1**), and in the case of the *ἑῶα δύσις* it sets in the morning at sunrise (see **Figure 2**).

Figure 1. Morning rising⁵

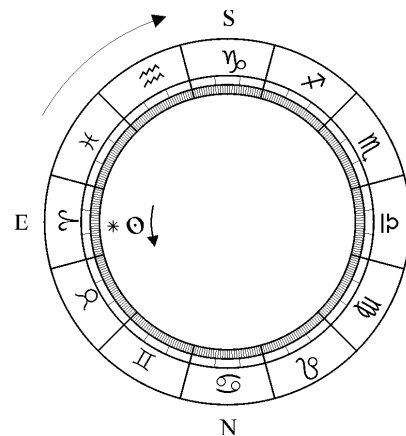
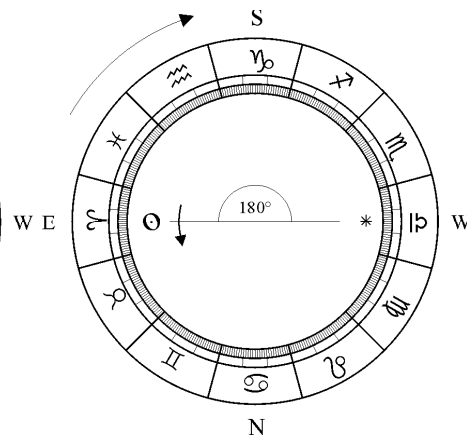


Figure 2. Morning setting



The terms *ἑσπερία ἀνατολή* and *ἑσπερία δύσις* signify correspondingly the rising and the setting of a star in the evening at sunset. In the case of the evening rising the star rises on the eastern horizon in the evening at sunset, i.e. in opposition to the sun (see **Figure 3**), in the case of the evening setting the star sets in the evening together with the Sun (see

Stoic Chrysippus, who lived in the third century BCE. Chrysippus calls the daily risings of a star *ἀνατολαί* and the yearly risings, i.e. the risings in regard to the position of the sun, *ἐπιτολαί* (SVF II 683 p. 200.21-27 von Arnim = Ar. Did. Epit. Frg. Phys. 32, p. 466.22-26 Diels = Stob. Ecl. 1,14 p. 206.25-207.4 Wachsmuth). In the first century BCE the astronomer Geminus differentiates between *ἀνατολή* and *ἐπιτολή* in the same way (Gem. 13.2-4), whereas both Chrysippus and Geminus do not distinguish between the true and the visible risings terminologically: both are called *ἐπιτολή*. For a detailed analysis see Denningmann, *Die Doryphorie*, pp. 398-402.

⁵ The arrows outside the zodiac demonstrate the daily motion, the arrows inside the course of the planets.

Figure 4). The true risings and settings cannot be observed and, therefore, have to be computed.⁶

Figure 3. Evening rising

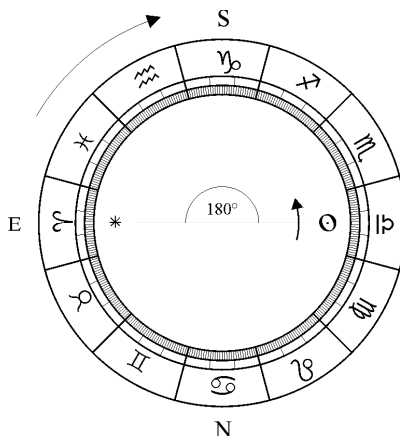
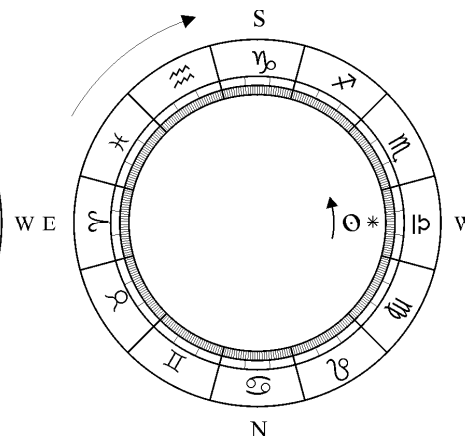


Figure 4. Evening setting



Thus, the adjectives *έφα* and *έσπερία* refer to the daytime, while the substantives *άνατολή* or *έπιτολή* and *δύσις* denote the rising or setting of a star, which results from the daily rotation of the earth. The substantives in combination with the adjectives signify the so-called yearly risings and settings; the adjectives indicate the position of the Sun regarding the horizon, whereas the substantives denote the position of the star regarding

⁶ In the following passage Autolycus deals with the visible morning and evening risings and settings (Autol. 1 praef., p. 214.11-16 Mogenet): τών δέ φαινομένων έφα μέν έστιν έπιτολή, όταν πριν τον ήλιον άνατειλαι άστρον τι πρώτως φανή άνατέλλον· έφα δέ δύσις, όταν πριν τον ήλιον άνατειλαι άστρον τι πρώτως φανή δδνον· έσπερία δέ έπιτολή, όταν μετά τδ τον ήλιον δδναι άστρον τι έσχάτως φανή άνατέλλον· έσπερία δέ δύσις, όταν μετά τδ τον ήλιον δδναι άστρον τι έσχάτως φανή δδνον. 'It is a morning rising of the visible ones [sc. risings] whenever a star becomes visible for the first time rising before sunrise, a morning setting whenever a star becomes visible for the first time setting before sunrise, an evening rising whenever a star is visible for the last time rising after sunset, an evening setting whenever a star is visible for the last time setting after sunset.' So the visible morning rising is the first visible rising of a star on the eastern horizon before sunrise. The visible morning setting is the first visible setting of a star on the western horizon in the morning before sunrise. The visible evening rising is the last visible rising of a star in the east after sunset and the visible evening setting is the last visible setting of a star in the west after sunset.

the horizon. Though Autolycus distinguishes between the visible and the true morning and evening risings and settings factually, he does not differentiate between them terminologically.⁷

In the second century CE Ptolemy, however, defines the terms ἑώρα ἀνατολή, ἑώρα δύσις, ἑσπερία ἀνατολή and ἑσπερία δύσις in his astronomical treatise *On the phases of the fixed stars* (Φάσεις ἀπλανῶν ἀστέρων)⁸ in the same sense as Autolycus, but he distinguishes terminologically between the true morning rising which he calls ἀνατολή and the first visible rising in the morning which he calls ἐπιτολή. In the same way he distinguishes between the true evening setting (δύσις) and the last visible setting in the evening (κρύψις).⁹

⁷ This distinction is missing in Chrysippus and Geminus as well. They differentiate between the daily rising (ἀνατολή) and the yearly rising (ἐπιτολή). See above, note 4.

⁸ J[ohann] L[udvig] Heiberg, ed., 'Claudii Ptolemaei Φάσεις ἀπλανῶν ἀστέρων', in *Opera quae exstant omnia*, vol. II *Opera astronomica minora* (Leipzig, 1907), pp. 1-67. On this treatise see B[artel] L[eendert] van der Waerden, 'Ptolemaios', *RE* XXIII 2 (1959), cols 1813.31-1815.68. Otto Neugebauer, *HAMA*, vol. II, pp. 926-27, 928-931. G[erald] J. Toomer, 'Ptolemy', *Dictionary of Scientific Biography* 11 (Oxford, 1975) [hereafter *DSB*], pp. 186-206, here p. 197. Gerd Graßhoff, 'The Babylonian Tradition of Celestial Phenomena and Ptolemy's Fixed Star Calendar', in Hannes D. Galter (ed.), *Die Rolle der Astronomie in den Kulturen Mesopotamiens. Beiträge zum 3. Grazer Morgenländischen Symposium (23.-27. September 1991)*, ed. Hannes D. Galter (Grazer Morgenländische Studien, 3, Graz, 1993), pp. 95-134, at p. 96. Menso Folkerts, 'Ptolemaios' [65], in *DNP* 10 (2001), col. 560.

⁹ Ptol. Phas. 5 p. 8.3-15 Heiberg. Cf. the definition of κρύψις and ἐπιτολή in Ptol. Synt. 8.4 p. 186.11-15 Heiberg: κρύψιν μὲν γὰρ καλοῦμεν, ὅταν ἄρχηται τις ὑπὸ τὰς ἀγὰς γινόμενος τῶν φώτων ἀφανίζεσθαι [...], ἐπιτολήν δέ, ὅταν ἐκφυγὼν τὰς ἀγὰς αὐτῶν ἄρχηται φαίνεσθαι. 'We call it last visibility (κρύψις) whenever a star gets under the rays of the luminaries and begins to become invisible [...], first visibility (ἐπιτολή) whenever it escapes from the rays of the luminaries and begins to become visible.' The same distinction of ἀνατολή and ἐπιτολή is to be found in the *Introduction to the Phenomena of Aratus* written by Achilles (Tatius) in the third century CE. See Ach. Isag. 39 p. 74.26-29 Maass. See Denningmann, *Die Doryphorie*, pp. 406-412.

First and last visibility

The mathematician and philosopher Theon of Smyrna¹⁰ wrote, in the second century CE, an introduction to mathematics and the works of Plato.¹¹ He largely takes excerpts from a now lost commentary to Plato's *Timaeus* made by the Peripatetic Adrastus of Aphrodisia also in the second century.¹² Within one of these excerpts we find the following definition of the terms in question (Adrast. apud Theon. Smyrn. p. 137.23-138.8 Hiller):¹³

¹⁰ On Theon of Smyrna see K[urt] von Fritz, 'Theon' [14], in *RE V A 2* (1934), cols 2067.13-2075.29; Joëlle Delattre, 'Théon de Smyrne: modèles mécaniques en astronomie', in *Sciences exactes et sciences appliquées à Alexandrie, actes du colloque international de Saint-Étienne (6-8 juin 1996)*, Gilbert Argoud and Jean-Yves Guillaumin, eds, (Centre Jean Palerne: Mémoires. 16, Saint-Étienne, 1998), pp. 371-395, here p. 372; Menso Folkerts, 'Theon' [5], in *DNP 12/1* (2002), cols 374-75.

¹¹ Τὰ κατὰ τὸ μαθηματικὸν χρήσιμα εἰς τὴν Πλατόνως ἀνάγνωσιν [Exposition of Mathematics useful for understanding Plato], *Theonis Smyrnaei philosophi Platonici Expositio rerum mathematicarum ad legendum Platonem utilium*, ed. Eduard Hiller (Leipzig, 1878).

¹² On Adrastus of Aphrodisia see E[duard] Hiller, 'De Adrasti Peripatetici in Platonis Timaeum commentario', *Rheinisches Museum* (1871), vol. 26, pp. 582-89; Thomas Heath, *A History of Greek Mathematics* (2 vols, Oxford, 1921), vol. II, pp. 238-44; Hans Gottschalk, 'Adrastos' [3], in *DNP 1* (1996), col. 131.

¹³ The passage occurs almost literally in the Latin commentary to Plato's *Timaeus* made by Calcidius, who lived in the fourth century CE. Cf. Calc. comm. 71 p. 119.4-10 Waszink: 'matutinus ortus dicitur, quotiens solis splendore praevento stella quaequam ante ortum eius apparet, ut Canicula, vespertinus, cum post occasum solis primitus exoriens astrum videtur, ut lunam novam dicimus exoriri. similiter occasus matutinus quidem, quotiens stella, quae pridie ante solem orta est, proximante sibi sole splendore eius obumbrata obscuratur et latet, ut lunam videmus, vespertinus vero, cum in occasu positam stellam aliquam sol consecutus primam eam corusco splendore condit.' On Calcidius see W[ladislaus Bronislaus] Switalski, *Des Chalcidius Kommentar zu Plato's Timaeus. Eine historisch-kritische Untersuchung* (Beiträge zur Geschichte der Philosophie des Mittelalters. Texte und Untersuchungen, Bd. III. Heft 6, Münster, 1902), p. 89; Jan H. Waszink, *Studien zum Timaeoskommentar des Calcidius. I. Die erste Hälfte des Kommentars (mit Ausnahme der Kapitel über die Weltseele)* (Philosophia Antiqua, 1, Leiden, 1964); Pierre Hadot, 'Calcidius', in *DNP 2* (1997), cols 934-35; Béatrice Bakhouché, *Les textes latins d'astronomie. Un maillon dans la chaîne du savoir* (Bibliothèque d'études

ἑῶα μὲν οὖν ἐστὶν ἀνατολὴ ἄστρου, ἐπειδὴν ἐκφεύγον
τὰς τοῦ ἡλίου ἀγὰς προανατέλλον αὐτοῦ πρώτως
ὄραθῆ, καθάπερ καὶ ἡ τοῦ κυνὸς ἐπιτολή λέγεται·
ἑσπερία δέ, ἐπειδὴν μετὰ τὴν δύσιν τοῦ ἡλίου πρώτως
φανῆ, καθάπερ τὴν σελήνην ταῖς νεομηνίαις φαιμέν
ἀνατέλλειν. παραπλησίως δὲ καὶ δύσεις ἑῶαι μὲν,
ἐπειδὴν ταῖς ἔμπροσθεν ἡμέραις τι προανατέλλον ἡλίου
συνεγγίσαντος αὐτῷ πρώτως ἀφανισθῆ, καθάπερ ἡ
σελήνη· ἑσπερία δέ, ἐπειδὴν ἐπικαταδυομένῳ τινὶ
συνεγγίσας ὁ ἥλιος πρώτως διὰ τὰς ἀγὰς ἀφανὲς αὐτὸ
καταστήσῃ.

Thus, it is the morning rising of a star when it is seen for the first time escaping from the Sun's rays and preceding it, just as one says 'the appearance of Canicula'; the evening [sc. rising] when it appears for the first time after sunset, just as we say that the Moon 'rises' at New Moon;¹⁴ similarly the morning setting, when some [sc. planet]¹⁵ which, having risen before the approaching Sun in preceding days, becomes invisible for the first time, just as the Moon does; the evening [sc. setting] when the Sun reaches a setting one [sc. star or planet] and makes it invisible by its rays for the first time.

Adrastus defines ἑῶα ἀνατολή as the first visible rising of a star or planet in the morning. After being in conjunction with the Sun and hence being invisible, the star or planet has reached a certain distance from the Sun and becomes visible on the eastern horizon in the morning before sunrise

classiques, Louvain/Paris, 1996), pp. 86-89, 292; Frieder Zaminer, 'Calcidius', in *DNP* 2 (1997), col. 935. For a detailed analysis of these texts cf. Denningmann, *Die Doryphorie*, pp. 423-29.

¹⁴ New Moon is used in the sense of 'being visible for the first time' after its conjunction with the Sun. For the different meanings of νεομηνία see Claire Préaux, *La lune dans la pensée grecque* (Académie Royale de Belgique. Mémoires de la classe des lettres, coll. 8/2. Bd. 61/4, Brussels, 1973), pp. 68-70.

¹⁵ Although Adrastus speaks about a star at the beginning of this passage (ἀνατολὴ ἄστρου), we should assume he means an (inner) planet in this case (including the Moon as common in antiquity).

(see **Figure 5**).¹⁶ Adrastus exemplifies this by the heliacal rising of Canicula, which he calls ἡ τοῦ κυνὸς ἐπιτολή (*hē tou kunos epitole*). Here, he uses the noun ἐπιτολή instead of ἀνατολή.¹⁷

Ἑσπέρια ἀνατολή is the first visibility of a planet in the evening after sunset. Whether this first visibility happens on the eastern horizon or on the western horizon is not articulated within the definition, but the example of the New Moon, which is said to ‘rise’, reveals that the ἑσπέρια ἀνατολή occurs on the western horizon, because the Moon moving faster than the Sun through the zodiac becomes visible for the first time on the western horizon after sunset (see **Figure 6**).

Figure 5. First visibility in the morning

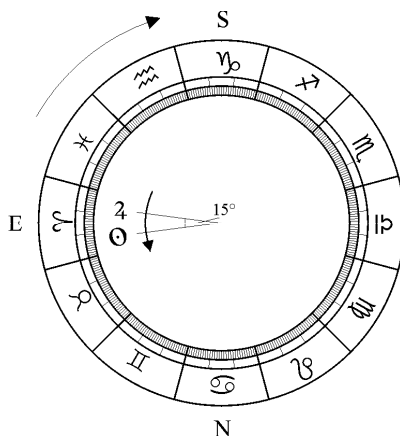
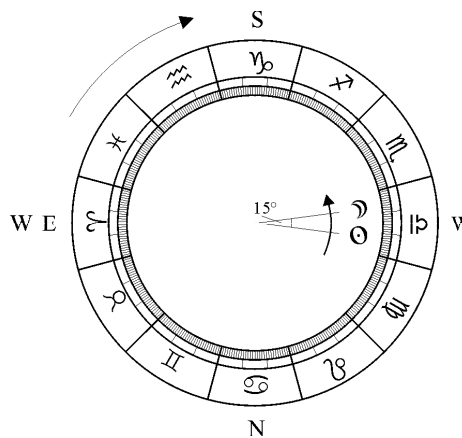


Figure 6. First visibility in the evening



¹⁶ In ancient astrology the approximate value of 15 degrees was commonly regarded as this distance. The earliest evidence for this value in Hellenistic astrology is Ps.-Eudox. *ars* 14.7-10 p. 20-21 Blass. It is already attested in Babylonian testimonies. See Otto Neugebauer, *HAMA*, II, pp. 760-61; Alan C. Bowen and Bernard R. Goldstein, ‘Meton of Athens and Astronomy in the Late Fifth Century B.C.’ in *A Scientific Humanist. Studies in Memory of Abraham Sachs*, Erle Leichty, Maria deJ. Ellis, Pamela Gerardi, eds (Occasional Publications of the Samuel Noah Kramer Fund, 9, Philadelphia, 1988), pp. 39-81, here p. 56.

¹⁷ For ἐπιτολή in the sense of ‘first visibility’ cf. the definition of Ptolemy, cited above, note 9. On the expression ἡ τοῦ κυνὸς ἐπιτολή see Denningmann, *Die Doryphorie*, p. 428 and note 917.

Ἐῶα δύσις is the last visibility (or more precisely the first invisibility)¹⁸ of a rising planet in the morning (see **Figure 7**) and ἔσπερῖα δύσις the last visibility of a setting planet in the evening before its period of invisibility within 15 degrees distance to the Sun (see **Figure 8**).

Figure 7. Last visibility in the morning

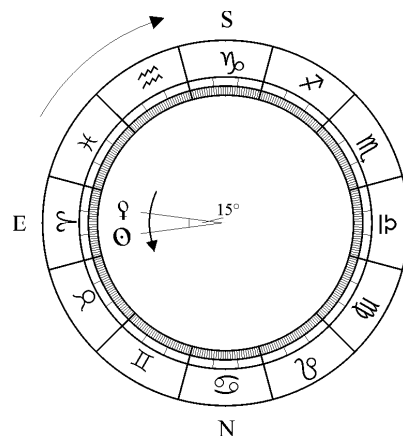
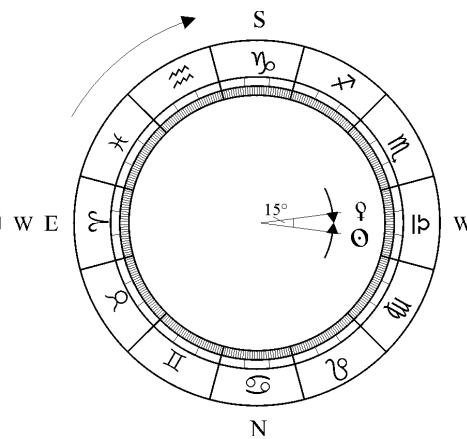


Figure 8. Last visibility in the evening



Ἐσπερῖα ἀνατολή, the ‘first visibility on the western horizon in the evening after sunset’ and ἔῶα δύσις, ‘the last visibility on the eastern horizon in the morning before sunrise’ occur only in the case of the two inner planets, Venus and Mercury, and in the case of the Moon. Being in direct motion they become visible after being in conjunction with the Sun on the western horizon in the evening after sunset. They make their ἔσπερῖα ἀνατολή (see above, **Figure 6**). Ἐῶα δύσις is their last visibility on the eastern horizon in the morning before sunrise (see above, **Figure 7**).

To sum up: ἔῶα ἀνατολή denotes either the morning rising in general or the first visibility in the morning in particular. Ἐσπερῖα ἀνατολή means either the evening rising on the eastern horizon in opposition to the Sun or the first visibility on the western horizon in the evening after sunset with a distance of about 15 degrees from the Sun. Ἐῶα δύσις is either the morning setting on the western horizon in opposition to the Sun or the last visibility on the eastern horizon in the morning with a distance

¹⁸ Although Adrastus explicitly speaks about the ‘first invisibility’ (πρώτως ἀφανισθῆναι; πρώτως [...] ἀφανὲς αὐτὸ καταστήσει) I am using the expression ‘last visibility’ as is common in modern technical language.

of about 15 degrees from the Sun and the term *ἑσπέρια δύσις* signifies either the evening setting in general or the last visibility in the evening in particular.

Comparing the two different meanings of each of the terms in question, it is conspicuous that the terms *ἑσπέρια ἀνατολή* and *ἑσπέρια δύσις* especially may describe completely different positions of planet and Sun. When Jupiter, for instance, is said to make a *ἑσπέρια ἀνατολή*, it is on the eastern horizon in opposition to the Sun, but when Venus makes a *ἑσπέρια ἀνατολή* it is on the western horizon near the Sun (compare **Figure 3** with **Figure 6**). And when Jupiter, for example, is said to make a *ἑσπέρια δύσις*, it is on the western horizon in opposition to the Sun, but when Venus makes a *ἑσπέρια δύσις* it is on the eastern horizon near the Sun (compare **Figure 2** with **Figure 7**).

Periods of visibility and invisibility

In 378 CE the Egyptian astrologer Paul of Alexandria wrote an *Introduction* (Εἰσαγωγικά) which was intended to instruct disciples in the basic fundamentals of astrology. The second edition of this work, which Paul dedicated to his son Cronammon, is extant.¹⁹ In chapter 14 Paul discussed the phases which the planets have in relation to the Sun. It is entitled: Περὶ ὧν ποιῶνται φάσεων οἱ πέντε ἀστέρες πρὸς τὸν Ἥλιον ('On the phases which the five planets have regarding the Sun'). Within this chapter we find the following definition of the terms in question (Paul. Alex. 14 p. 29.6-29.16 Boer):

ἑῶοι δὲ ἀνατολικοὶ οἱ ἀστέρες γίνονται, ὅταν ἀποδιαστῶσι τοῦ Ἥλιου μοίρας ἰε̄ ἐν ταῖς προηγουμέναις μοίραις ἢ καὶ τοῖς προηγουμένοις ζῳδίοις, ἕως ἂν εἰς τὸ δεξιὸν αὐτοῦ τρίγωνον τὴν κίνησιν ποιούμενοι εὐρεθῶσιν, ἑσπέριοι δὲ [sc. ἀνατολικοὶ οἱ ἀστέρες γίνονται], ὅταν ἐν ταῖς ἐπομέναις μοίραις ἢ καὶ ἐν τοῖς ἐπομένοις ζῳδίοις τοῦ Ἥλιου ἀποδιαστῶσι τὰς προειρημένας μοίρας ἰε̄, ἕως ἂν εἰς τὸ εὐώνυμον αὐτοῦ

¹⁹ On Paul of Alexandria see Wilhelm Gundel, 'Paulus' [21], in *RE* XVIII 4 (1949), cols 2376-2386; David Pingree, 'Paul of Alexandria', in *DSB* 10 (1974), p. 419; David Pingree, tr., ed. and comm., *The Yavanajātaka of Sphujidhvaja* (Harvard Oriental Series, 48, 2 vols, Cambridge, MA/London, 1978) [hereafter *The Yavanajātaka*], II, pp. 437-38; James Herschel Holden, 'The Horoscope of Cronammon', *AFA Journal of Research* (1989), vol. 1, pp. 7-10; Wolfgang Hübner, 'Paulos' [2], in *DNP* 9 (2000), cols 429-30.

τρίγωνον [sc. τὴν κίνησιν ποιούμενοι] εὐρεθῶσιν, ἐντὸς δὲ τῶν προειρημένων μοιρῶν ἰε τὴν διάστασιν πρὸς τὸν Ἥλιον ἐσχηκότες ἐν μὲν ταῖς προαναφερομέναις μοίραις τοῦ Ἥλιου παρόντες ἑῶαν δύσιν ποιῶνται, ἐν δὲ ταῖς ἐπαναφερομέναις [sc. μοίραις] ἔσπερίαν.

The planets become ἑῶοι ἀνατολικοί,²⁰ whenever they are distant from the Sun by 15 degrees in the preceding degrees as well as in the preceding signs, until they are found making their movement to the right trine of it. The planets become ἔσπεριοι [sc. ἀνατολικοί], whenever they are in the subsequent degrees as well as in the subsequent signs and are distant from the Sun the previously mentioned 15 degrees, until they are found up to the left trine of it. And when they have a distance from the Sun within the previously mentioned 15 degrees and they are in the degrees rising before the Sun, they make their ἑῶαν δύσιν, but in the [sc. degrees] rising after it, [sc. they make their] ἔσπερίαν δύσιν.

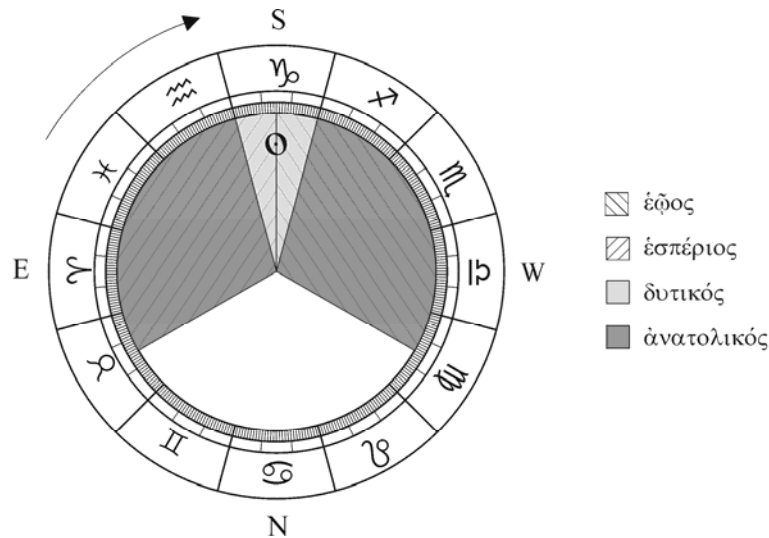
A planet is called ἑῶος ἀνατολικός when it has a distance of at least 15 degrees to, at most, 120 degrees (εἰς τὸ τρίγωνον) to the Sun and is located ahead of the Sun in regard to the daily motion (ἐν ταῖς προηγουμέναις μοίραις ἢ καὶ τοῖς προηγουμένοις ζῳδίοις; δεξιόν;²¹ see **Figure 9**). A planet is ἔσπεριος ἀνατολικός whenever it is within at least 15 degrees to, at most, 120 degrees behind the Sun (see **Figure 9**). The planets which are ἔσπεριοι ἀνατολικοί and those which are ἑῶοι ἀνατολικοί differ only in their position to the Sun. The ἔσπεριοι planets follow the Sun in daily motion, whereas the ἑῶοι planets precede it.

A planet makes a ἑῶα δύσις when it precedes the Sun within a distance of up to 15 degrees (see **Figure 9**), and a ἔσπερία δύσις when it follows the Sun within a distance of up to 15 degrees (see **Figure 9**).

²⁰ For the translation of these technical terms see below, p.202.

²¹ On the expression ‘right’ und ‘left’ see Wolfgang Hübner, *Raum, Zeit und soziales Rollenspiel der vier Kardinalpunkte in der antiken Kataktenhoroskopie* (BzA 194, Munich/Leipzig, 2003), p. 13 and the ancient explanations collected in Denningmann, *Die Doryphorie*, p. 435, n. 931.

Figure 9. Phases of the planets in relation to the Sun



The adjectives *ἔφα* and *ἑσπερίος* denote the position of the planet in regard to the Sun without consideration of the time of day. *Ἐφα* means ‘ahead of the Sun’ in terms of the daily rotation; *ἑσπερίος* means ‘behind the Sun’. Planets within a distance of up to 15 degrees from the Sun are said to make their *δύσις*, and planets that have a distance of 15 to 120 degrees from the Sun are called *ἀνατολικοί*.²² Thus, the main difference between being *ἀνατολικοί* and making a *δύσις* is the visibility or, respectively, invisibility of the planet, which depends upon its distance

²² We do not know for sure why the limit for being *ἀνατολικός* is restricted to 120 degrees. This value may be influenced either by the theory of aspects or by the fact that the three outer planets seem to stop, whenever they are approximately 120 degrees away from the Sun. Cf. the argumentation of Olympiodorus, who wrote a commentary to Paul’s *Introduction*, Olymp. 9, p. 13.15-22 Boer. On Olympiodorus and his commentary see Jean Warnon, ‘Le commentaire attribué à Héliodore sur les Εἰσαγωγικά de Paul d’Alexandrie’, *Travaux de la Faculté de Philosophie et Lettres de l’Université Catholique de Louvain* (1967), vol. 2, pp. 197-217. L[eindert] G. Westerink, ‘Ein astrologisches Kolleg aus dem Jahre 564’, *Byzantinische Zeitschrift* (1971), vol. 34, pp. 6-21.

from the Sun. So even a planet in the west may be ἔϋος and ἀνατολικός, and a planet in the east may be ἐσπέριος and make its δύσις.²³

Since it is plainly evident that the terms have nothing to do with the time of day or horizon, translations such as ‘morning rising’, ‘evening riser’, ‘morning setting’ and ‘evening setting’ should be banished, because they provoke confusions with the above analyzed meanings of the terms. Translations such as ‘period of visibility ahead of the Sun’, ‘period of visibility behind the Sun’, ‘period of invisibility ahead of the Sun’ and ‘period of invisibility behind the Sun’ are more appropriate for expressing the real meaning.

When we compare the different meanings of the terms in question it is striking that the two first represented meanings denote special singular phenomena which occur only once in a sidereal cycle (in the case of the fixed stars) or once in a synodical cycle (in the case of the planets), whereas the terms as defined by Paul of Alexandria describe whole periods. Furthermore, it is notable that the two first examined meanings

²³ The earliest use of the verbs ἀνατέλλειν and δύνειν in the sense of ‘to be in the period of visibility’ or, respectively, ‘invisibility’ is preserved in the epitomes of the astrologer Antiochus of Athens who composed, apparently in the second century CE, at least two astrological treatises which are both lost. Cf. Ant. Epit. II 1 ex Thes. (CCAG 1, p. 145.2-6). Ant. Epit. I 15 ex Isag. (CCAG 8/3, p. 115.1-3). On Antiochus of Athens and the epitomes see David Pingree, ‘Antiochus and Rhetorius’, *Classical Philology* (1977), vol. 72, pp. 203-223; David Pingree, *The Yavanajātaka*, vol. II, pp. 421-22, 439-40; David Pingree, ‘From Alexandria to Baghdād to Byzantium: The Transmission of Astrology’, *International Journal of the Classical Tradition* (2001), vol. 8, pp. 3-37. The Roman astrologer Firmicus Maternus who composed, presumably between 334 and 337 CE, the only astrological handbook written in Latin, used the term *matutinus in ortu* in the sense of ‘being in the period of visibility ahead of the Sun’ (corresponding to ἔϋος ἀνατολικός) and *vespertinus in ortu* in the sense of ‘being in the period of visibility behind the Sun’ (corresponding to ἐσπέριος ἀνατολικός). The adjective *occidualis* seems to be the equivalent to δυτικός, ‘being in the period of invisibility’. Cf. Firm. Math. 2, 8.1 and Denningmann, *Die Doryphorie*, pp. 440-448. On Firmicus Maternus see Franz Boll, ‘Firmicus’, in *RE VI 2* (1909), cols 2365.21-2379.35; David Pingree, *The Yavanajātaka*, vol. II, p. 428; Karl Hoheisel, ‘Firmicus Maternus, Iulius’, in *DNP 4* (1998), cols 523-24; Anna Maria Urso: ‘La letteratura astrologica: gli autori’, in *Letteratura scientifica e tecnica di Grecia e Roma*, Carlo Santini, dir. and coord., eds Ida Mastroiosa and Antonino Zumbo (Rome, 2002), pp. 111-130, here pp. 119-120.

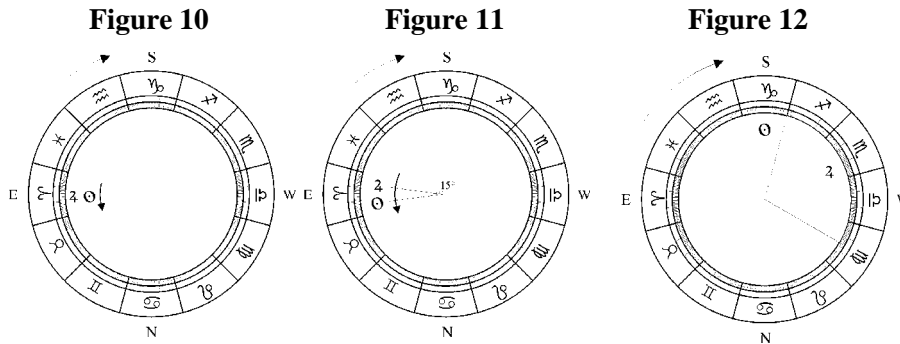
appear chiefly in astronomical texts, whereas the third meaning occurs mainly in astrological texts.²⁴

Synopsis of the Different Meanings

Before we demonstrate the importance of accuracy in translating and interpreting these ambiguous terms, a synopsis will show the different meanings quite plainly.

ἑώρα ἀνατολή means either the

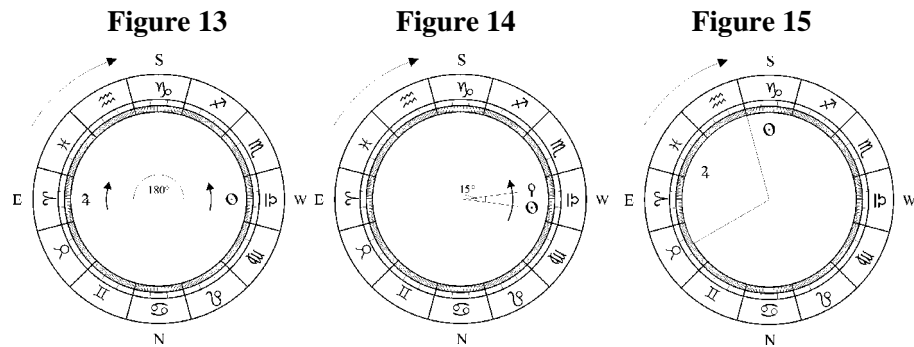
- morning rising (**Figure 10**) or the
- first visibility in the morning (**Figure 11**) or
- the period of visibility in a distance of between 15 and 120 degrees ahead of the Sun (**Figure 12**).



ἑσπερία ἀνατολή is called either

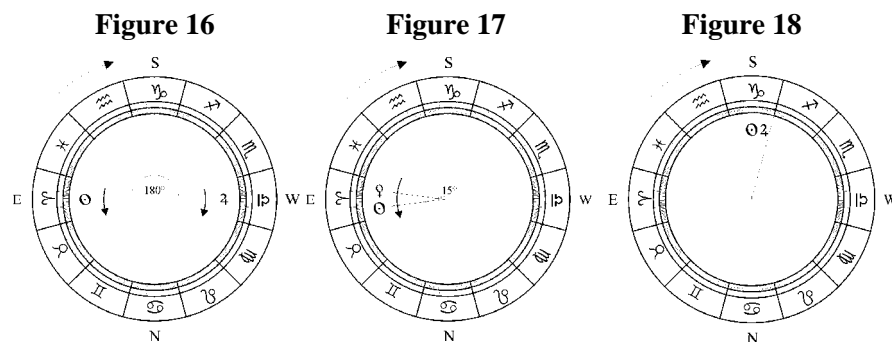
- the evening rising (**Figure 13**) or
- the first visibility of a planet in the west (**Figure 14**) or
- the period of being visible in a distance of between 15 and 120 degrees behind the Sun (**Figure 15**).

²⁴ The ‘astrological’ meaning is possibly derived from Babylonian sources. On this possible derivation and its later modification by commingling with the Greek-letter phenomena, see Susanne Denningmann, *Die Doryphorie*, pp. 450-455.



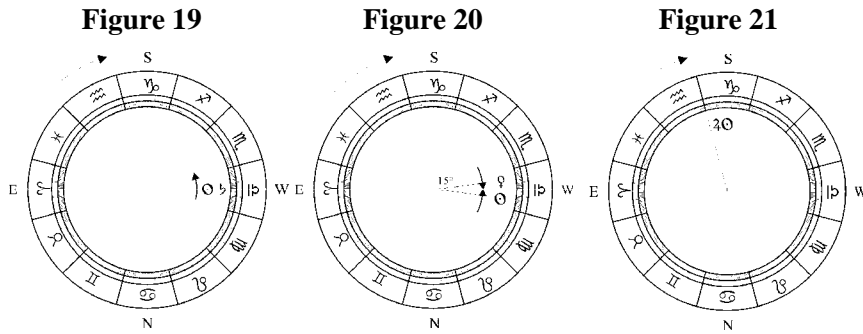
The term $\acute{\epsilon}\omega\alpha$ $\delta\upsilon\sigma\iota\varsigma$ denotes either

- the morning setting (**Figure 16**) or
- the last visibility of a planet on the eastern horizon (**Figure 17**) or
- the period of being invisible within a distance up to 15 degrees ahead of the Sun (**Figure 18**).



And $\acute{\epsilon}\sigma\pi\epsilon\rho\acute{\iota}\alpha$ $\delta\upsilon\sigma\iota\varsigma$ signifies either

- the evening setting (**Figure 19**) or
- the last visibility in the evening (**Figure 20**) or
- the period of being invisible within a distance of 15 degrees behind the Sun (**Figure 21**).



Confusions

In the last part of this paper we shall show some of the confusions caused by the ambiguity of the terms from antiquity to the present day. Our examples will be two ancient texts.

The first is a horoscope preserved in the *Άποτελεσματικά* (*Apotelesmatica*) of Hephaestio of Thebes, an astrologer of the fourth century CE.²⁵ Hephaestio ascribes this horoscope, as well as two others, to the physician and astrologer Antigonus of Nicaea, who lived in the second century CE.²⁶ An epitome of Hephaestio's *Apotelesmatica* contains a second version of this horoscope.²⁷ Otto Neugebauer and Henry B. van Hoesen, who dated this chart to noon on 5 April 40 CE,²⁸ base their

²⁵ On Hephaestio of Thebes and his treatise see David Pingree, *The Yavanajātaka*, II, p. 429; Wolfgang Hübner, 'Manilius' [5], in *DNP* 5 (1998), col. 352.

²⁶ On Antigonus of Nicaea see the forthcoming edition on the fragments of Antigonus of Nicaea by Stephan Heilen, with elaborate commentary: *Hadriani genitura. Die astrologischen Fragmente des Antigonos von Nikaia*. Edition, Übersetzung und Kommentar (Munich/Leipzig, forthcoming [Sammlung wissenschaftlicher Commentare]) [hereafter *Hadriani genitura*].

²⁷ It is Epitome IV in the edition of David Pingree, *Hephaestionis Thebani Apotelesmaticorum Epitomae Quattuor* (2 vols, Leipzig, 1974), vol. II.

²⁸ Otto Neugebauer and H[enry] B[artlett] van Hoesen, *Greek Horoscopes* (hereafter *GH*), (Memoirs of the American Philosophical Society, 48, Philadelphia, 1959) [hereafter *GH*], pp. 79-80. It is L 40 in this collection.

treatment of the horoscope on this epitome, which was published by Joseph Heeg in 1911.²⁹ It is probably the chart of a relative of the emperor Hadrian (Antig. Nic. apud Heph. 2, 18.54 Heilen):³⁰

(54) ἔστω τινὰ ἔχειν τὸν Ἥλιον ἐν Κριῶ περι μοίρας ιθ̄ ὀρίοις Ἑρμοῦ, Σελήνην ἐν Διδύμοις μοίρα ιε̄ ὀρίοις Ἀφροδίτης, Κρόνον <ἐν> Ζυγῶ περι μοίρας κ̄ <ὀρίοις Διός> ἀκρόνυχον, Δία <ἐν> Ὑδροχόῳ μοίρα ζ̄ ὀρίοις Ἑρμοῦ ἐπ' ἀνατολῆς ἑώας, Ἄρην δὲ ἐν Κριῶ περι μοίρας ιε̄ ὀρίοις Ἑρμοῦ, Ἀφροδίτην ὁμοίως <ἐν> Κριῶ περι μοίρας ε̄ ὀρίοις Διός, Ἑρμῆν δὲ ἐν Κριῶ περι μοίρας ζ̄ ὀρίοις Διός, τῶν τριῶν ἔτι ὑπὸ δύσιν ὄντων καὶ ὁ μὲν ὠροσκόπος Καρκίνου μοίρα κδ̄ [...].

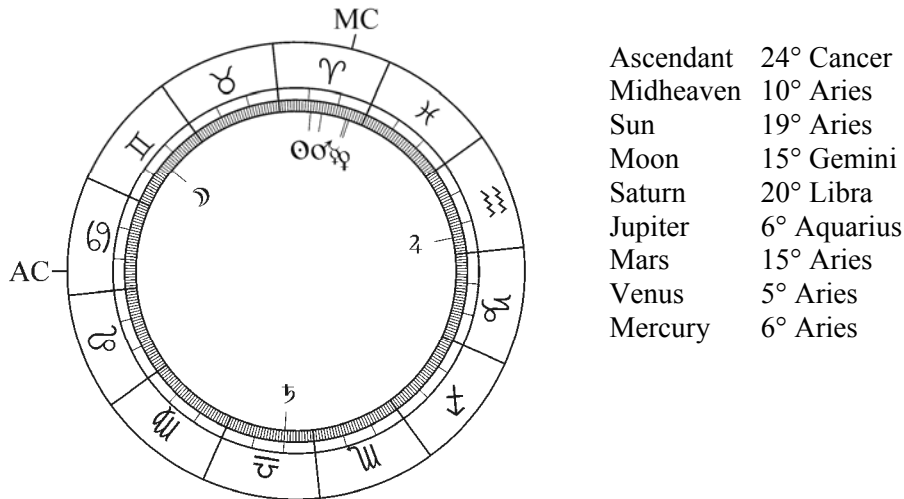
Let us assume that someone has the Sun in Aries around 19 degrees, in the terms of Mercury; the Moon in Gemini in the 15th degree, in the terms of Venus; Saturn in Libra around 20 degrees, acronychal; Jupiter in Aquarius in the 6th degree, in the terms of Mercury ἐπ' ἀνατολῆς ἑώας; Mars in Aries around 15 degrees, in the terms of Mercury, Venus likewise in Aries around 5 degrees, in the terms of Jupiter; and Mercury in Aries around 6 degrees, in the terms of Jupiter, with these three being still ὑπὸ δύσιν and the ascendant in the 24th degree of Cancer [...].

The chart is as follows:

²⁹ *CCAG* 8/2, pp. 84.1-85.10. They did not yet have the edition of Hephaestio by David Pingree, published in 1973.

³⁰ I am grateful to Stephan Heilen for providing me with his yet unpublished edition of this horoscope.

Figure 22. Chart from Antigonus of Nicaea



Antigonus characterises Jupiter as being *ἐπ' ἀνατολῆς ἑώρας*. *ἑώρα ἀνατολή* may mean 'morning rising', in terms of rising in the morning together with the rising Sun. It may also mean 'first visibility in the morning', in terms of being about 15 degrees ahead of the Sun and rising in the east. Neither of these meanings fit with the chart.³¹ Jupiter is not rising at all, either with the Sun or before the Sun. But the third meaning, 'being in its period of visibility ahead of the Sun', makes sense. Jupiter's distance from the Sun is 73 degrees and therefore it is in its period of being visible. Since Jupiter precedes the Sun in terms of daily motion, it is in its period of being visible ahead of the Sun.

More difficult is the part *τῶν τριῶν ἔτι ὑπὸ δύσιν ὄντων* 'with these three being still ὑπὸ δύσιν'. Before we are able to define what *δύσις* means, we have to make sure which three planets are meant. The planets are treated in the following order:

- Sun in the terms of Mercury
- Moon in the terms of Venus

³¹ Nevertheless Robert H. Schmidt translates 'Zeus [...] in a morning rising', see Robert H. Schmidt, trans. and comm., *Hephaistio of Thebes, Apotelesmatics Book II* (Project Hindsight, Greek Track, 15, Cumberland, MD, 1998), p. 62.

- Saturn in the terms of Jupiter
- Jupiter in the terms of Mercury
- Mars in the terms of Mercury
- Venus in the terms of Jupiter
- Mercury in the terms of Jupiter

The text of the epitome is τῶν γὰρ Ἑρμοῦ, Ἀφροδίτης, Διὸς ἔτι πρὸς δύσιν ὄντων³² ‘and the three (planets) Mercury, Venus, Jupiter are (located) towards setting’.³³ The epitomist suggests that the three last mentioned planets Mercury, Venus and Jupiter are meant. Robert Schmidt, who has translated the first two books of the *Apotelesmatica* of Hephaestio, interprets the Greek text τῶν τριῶν ἔτι ὑπὸ δύσιν ὄντων in the same way as the epitomist and translates ‘with these three furthermore being subject to setting’.³⁴ He obviously refers the genitive τῶν τριῶν to the three last-mentioned planets.

Let us see how these planets are placed. Mercury and Venus are in Midheaven with a distance of 4 and 5 degrees respectively to the culminating degree. In terms of daily motion they are preceding the culminating degree. Jupiter, above the horizon, is 12 degrees distant from the descending degree.³⁵ So, one could indeed call Jupiter ‘located towards setting’, but it is unlikely that one would call Mercury and Venus, in the Midheaven, ‘located towards setting’.

Let us analyse what other three planets could be meant. Antigonus treats the planets in the common order starting with the luminaries, the Sun and Moon, followed by the five planets in descending order, i.e. Saturn, Jupiter, Mars, Venus and Mercury. Then he continues τῶν τριῶν ἔτι ὑπὸ δύσιν ὄντων. The genitive τῶν τριῶν refers to the last treated planets Mars, Venus and Mercury. They are all in Midheaven within a distance of 15 degrees to the Sun (Mars 4 degrees; Mercury 13 degrees; Venus 14 degrees). So, they are ‘still (ἔτι) in their period of being

³² Epit. IV 26,44 Heilen (*Hadriani genitura*).

³³ Translated by Otto Neugebauer and Henry B. van Hoesen, *GH*, p. 79.

³⁴ Hephaestio of Thebes, *Apotelesmatics Book II*, transl. and annot., Robert H. Schmidt (Project Hindsight, Greek Track, 15, Cumberland, MD, 1998), p. 62.

³⁵ The ascendant is 24 degrees Cancer. Thus, the descendent must be 24 degrees Capricorn.

invisible'.³⁶ There are at least two more arguments which prove this interpretation. First of all, it was shown above (with Jupiter) that Antigonus uses the term *έφα άνατολή* in the astrological sense of 'being in the period of visibility ahead of the Sun'. So, in all probability he uses the noun *δύσις* in its astrological meaning, too. Secondly, Antigonus deals first with the luminaries and gives the exact degree and the terms in which they are. Then he gives the degree and terms of Saturn and characterises Saturn as being acronychal. The adjective acronychal characterises the position of Saturn in relation to the Sun (it is in opposition).³⁷ Antigonus continues with Jupiter, giving the degree, terms and position in relation to the Sun (*έπ' άνατολής έφας*). He continues with Mars, Venus and Mercury, giving for each one the degree and the terms. Then he adds 'with these three being still in their period of invisibility'. Since the last three planets have the same position to the Sun, Antigonus does not mention this separately, but summarises it. So we see that, for each of the five true planets, the degree, the terms and its position in relation to the Sun is given.

Finally, we shall analyze a scholium to chapter 14 of the *Introduction* of Paul of Alexandria, in which Paul defines the terms in question (Schol. 21 ad Paul. Alex. 14, p. 109.11-24 Boer):³⁸

έπι μέν τών τριών άστέρων [sc. Κρόνου, Διός, Άρεως]
νοητέον τήν έφάν άνατολήν και τήν έσπερίαν δύσιν, τήν
δέ έσπερίαν άνατολήν και έσπερίαν δύσιν και έφάν
άνατολήν και έφάν δύσιν έπι τών δύο νοητέον, Έρμου
και Άφροδίτης. [...]

έπι γοϋν τών τριών άστέρων νοεΐν δεΐ έφάν φάσιν και
έσπερίαν κρύψιν. έφάν γάρ κρύψιν και έσπερίαν φάσιν
έπι τών τριών τούτων οϋκ άν τις εϋροι.

In the case of the three planets [sc. Saturn, Jupiter and Mars] it is necessary to think of the first visibility in the

³⁶ Now even the adverb *έτι* makes sense.

³⁷ On the different meanings of the term *άκρόνυχος* see Denningmann, *Die Doryphorie*, p. 426, n. 911.

³⁸ See above, pp. 198-202.

morning and the last visibility in the evening; the first visibility in the evening, the last visibility in the evening, the first visibility in the morning and the last visibility in the morning you have to know in the case of the two, Mercury and Venus. [...]

Hence, in the case of the three stars, one must think of the first visibility in the morning and the last visibility in the evening. For one does not ever find a last visibility in the morning and a first visibility in the evening in the case of these three stars. [...]

First of all, we shall analyze the first paragraph. The scholiast distinguishes between the outer and the inner planets, which suggests that he is using the terms ἀνατολή and δύσις in a different way than Paul of Alexandria defined them. He ascribes a ἑῴα ἀνατολή and ἑσπερία δύσις to the outer planets, and a ἑσπερία ἀνατολή, a ἑσπερία δύσις, a ἑῴα ἀνατολή and a ἑῴα δύσις to the inner planets. The two inner planets may only have a ἑσπερία ἀνατολή in the sense of ‘first visibility in the evening’, whereas they never can have an evening rising, because they never are in opposition to the Sun. And since they equally cannot have a ἑῴα δύσις in the sense of ‘morning setting’, ἑῴα δύσις must mean ‘last visibility in the morning’.

James Herschel Holden interprets this text in a different way. He translates:³⁹

In the case of the three stars [sc. Saturn, Jupiter and Mars], one must conceive of the morning rising and the evening setting, and the evening rising and the morning setting [*Holden has put a full stop here!*].⁴⁰ And in the case of the two [stars], Mercury and Venus, one must conceive of the morning rising and the evening setting.

He refers τὴν δὲ ἑσπερίαν ἀνατολήν καὶ ἑσπερίαν δύσιν to the outer planets. Then, ἑσπερία δύσις is mentioned twice in the case of the outer

³⁹ James Herschel Holden, trans., *Paul of Alexandria, Introduction to Astrology* (2nd ed., Tempe, AZ, 2003 [1st ed., Tempe, 1986: unpublished manuscript]), p. 54.

⁴⁰ See my critique below.

planets: Therefore, he conjectures *ἑώραν δύσιν* instead of *ἑσπερίαν δύσιν* and explains in a footnote:

The Greek text has hesperian ‘evening’, which is wrong. It should be read hebian ‘morning’. Probably the scholiast got confused and inadvertently wrote down the wrong thing.⁴¹

The structure of the Greek sentence is the main problem. It starts with *ἐπὶ μὲν τῶν τριῶν ἀστέρων νοητέον* and it ends with *ἐπὶ τῶν δύο νοητέον*, *Ἑρμοῦ καὶ Ἀφροδίτης* and in between are listed the different *ἀνατολαί* and *δύσεις*. Holden refers the first four mentioned *ἀνατολαί* and *δύσεις* to the outer planets. But the Greek sentence has a clear structure indicated by the particles *μὲν* and *δὲ*, which show that only the first two mentioned *ἀνατολαί* and *δύσεις* refer to the outer planets (*τὴν ἑώραν ἀνατολὴν καὶ τὴν ἑσπερίαν δύσιν*) and the other four (*τὴν δὲ ἑσπερίαν ἀνατολὴν καὶ ἑσπερίαν δύσιν καὶ ἑώραν ἀνατολὴν καὶ ἑώραν δύσιν*) to the inner planets.

Omitting one sentence defining the word *ἀκρόνυκτος* we come to the second passage. The scholiast declares that the three planets, i.e. Saturn, Jupiter and Mars, have a *ἑώρα φάσις* and a *ἑσπερία κρύψις*, but no *ἑώρα κρύψις* and no *ἑσπερία φάσις*. It is apparent that *φάσις* here means ‘first visibility’ and *κρύψις* ‘last visibility.’⁴² So, *φάσις* is a synonym for *ἀνατολή* and *κρύψις* is a synonym for *δύσις* in the first part of this text. The first sentence of this second passage is nothing more than a repetition of the first sentence of the first passage of this scholium using other technical terms. It probably derives from another writer than the first part. Both scholiasts apparently misunderstood the text of Paul of Alexandria, which is not about the first and last visibilities of the planets, but about their periods of visibility and invisibility in relation to the Sun.

⁴¹ Ibid.

⁴² See the definition of *κρύψις* in Ptolemy’s *Syntaxis*, cited above, note 9.