

Text 1

De Santillana, *Isis* 32, 1940, pp. 256: Now what was Agesilaos doing after 378? He was all involved in the critical struggle with Thebes, with heavy loss of prestige and not much leisure to carry on foreign relations. Between 376 and 371 he is gravely ill [**HRM: lame not comatose**] and vanishes from the scene [**HRM: just vanishes!**], only to reappear in the crisis that leads up to the battle of Leuktra. After that he is hard pressed by the Thebans, has to face the revolt of the Messenians and to defend the very walls of Sparta, and turns his thoughts to Asia Minor only in 366, when the great revolt of the Satraps breaks out. [**HRM: and mono tasking**]

De Santillana, *Isis* 32, 1940, pp. 259-60: Hence it appears that Jaeger's choice is actually the only way at all possible: for he takes as primary sources Sextus Empiricus adv. math. 657, 23 B and D.L. VII 186 (and indeed we can see that such passages as Plin. XXIX 5 and Gal. XI 171 are a muddled third hand in respect to these) and cuts the Gordian knot by assuming with Wilamowitz that there are only two Chrysippoi: one the son of Erineus and the other the contemporary of Praxagoras, who was the master of Aristogenes and died in 277. This fits beautifully with what we know of the main line of medico-philosophic transmission that leads up to Erasistratos and Straton, and leaves us with one necessary conclusion, already foreshadowed by Susemihl and Helm: viz. that Chrysippus the son of Erineus, the pupil of Philistion and the friend of Eunoikos, cannot have been born before 390, and possibly a few years later. *This goes to show that the Egyptian trip cannot have been undertaken earlier than 367 at most*, and that is really where the intuition of Wilamowitz had placed it at first glance. [**HM: In other words, Chrysippos was 23 at the time of the trip, something that none of our sources claim, although D.L. does claim that Eudoxos was 23**]

Text 2: *Vita Aristotelis* 11-12 (Düring):

¹¹non igitur est, sicut menciuntur, quod XL annis moratus est Aristoteles sub Platone tempore Eudoxi. Aristotile enim LXIII annis vivente tres anni tantum restarent a morte Platonis, ablatis XVII annis quibus studuit in trivio et tribus quibus studuit cum Socrate et ablatis XL quibus studuit cum Platone, sicut ipsi aiunt. In tribus autem reliquis annis non solum non fuisset possibile tanta componere, sed neque facile legendo transcurrere, ¹²sicut Philocorus historizavit, et etiam non fuit conveniens.

¹¹Therefore, it is not the case, as they falsely allege, that for forty years Aristotle hung around with Plato in the time of Eudoxos. For given that Aristotle lived 63 years there remain as much as three years from the death of Plato, when 17 years are subtracted for the time he studied in the trivium and the three in which he studied it with Socrates (sic) and with the 40 subtracted in which he studied with Plato, as they say. Then in the three remaining years it would not have been at all be possible to compose so much, but nor easy to rush through in lectures, ¹²as Philocorus accounted, and furthermore it wasn't suitable.

Vita Marciana 11-12 (Düring)

¹¹ οὐκ ἄρα οὖν, ὡς αὐτοὶ συκοφαντοῦντές φασιν, τεσσαρακοντούτης Ἀριστοτέλης φοιτᾷ Πλάτωνι ἐπὶ Εὐδόξου· τοῦ γὰρ Ἀριστοτέλους $\xi\gamma$ ἔτη βιώσαντος τρία ἔτη ἐστὶν ἀπὸ θανάτου Πλάτωνος ἀφηρημένων τῶν κ ἐτῶν ἃ ἐσχόλασε Πλάτωνι· ἐν δὲ τοῖς τρισὶν ἔτεσιν οὐ μόνον οὐκ ἦν τοσαῦτα ἐκθέσθαι ἀλλ' οὐδὲ ῥάδιον ἀναγνῶναι· ¹² οὕτω Φιλόχορος ἰστόρησε·

¹¹Therefore it is not the case, as the liars say it, that in his fortieth year Aristotle takes up with Plato in the time of Eudoxos. For given that Aristotle lived 63 years, there are three years from the death of Plato when 20 years he studied with Plato. In three years not only would it not be possible to publish so much, but it would not be easy to read out so much either. ¹²Philochorus gave this account.

Text 3: Simplicius, *In de caelo* 497.15-22

οὔτε δὲ Καλλίππου φέρεται σύγ-
γραμμα τὴν αἰτίαν τῶν προσθετέων τούτων σφαιρῶν λέγον, οὔτε Ἀριστο-
τέλης αὐτὴν προσέθηκεν, Εὐδημος δὲ συντόμως ἰστόρησε, τίνων φαινομένων
ἔνεκα ταύτας προσθετέας εἶναι τὰς σφαίρας ᾤετο. λέγειν γὰρ αὐτόν φησιν,
ὡς, εἴπερ οἱ μεταξὺ τροπῶν τε καὶ ἰσημεριῶν χρόνοι τοσοῦτον διαφέρουσιν,
497.20 ὅσον Εὐκτῆμονι καὶ Μέτωνι ἐδόκει, οὐχ ἰκανὰς εἶναι τὰς τρεῖς σφαίρας
ἐκατέρω πρὸς τὸ σῶζειν τὰ φαινόμενα διὰ τὴν ἐπιφαινομένην δηλονότι ταῖς
κινήσεσιν αὐτῶν ἀνωμαλίαν.

There isn't any treatise of Kallippos extant which tells the reason why these spheres must be added, nor does Aristotle add the reason, but Eudemos briefly related what were the phenomena on account of which he thought these spheres had to be added. For he says that Kallippos says that if the times between the solstices and the equinoxes differ by as much as Euktemon and Meton thought, the three spheres would not be adequate for each to preserve the phenomena clearly due to the manifest anomaly of their motions.

Text 4: Arist

otle, *Constitution of Athens* 32.1 (trans. Kenyon):

<p>32.1.5 Οἱ μὲν οὖν ἑκατὸν οἱ ὑπὸ τῶν πεντακισχιλίων αἰρεθέντες ταύτην ἀνέγραψαν τὴν πολιτείαν. ἐπικυρωθέντων δὲ τούτων ὑπὸ τοῦ πλήθους, ἐπιψηφίσαντος Ἀριστομάχου, ἡ μὲν βουλή <ή> ἐπὶ Καλλίου πρὶν διαβουλεῦσαι κατελύθη μὴνὸς Θαργηλιῶνος τετράδι ἐπὶ δέκα, οἱ δὲ τετρακόσιοι εἰσήεσαν ἐνάτη φθίνοντος Θαργηλιῶνος· ἔδει δὲ τὴν εἰληχυῖαν τῷ κυάμῳ βουλήν εἰσιέναι δ' ἐπὶ δέκα Σκιροφοριῶνος.</p> <p>32.2.1 ἡ μὲν οὖν ὀλιγαρχία τοῦτον κατέστη τὸν τρόπον, ἐπὶ Καλλίου μὲν ἄρχοντος, ἔτεσιν δ' ὕστερον τῆς τῶν τυράνων ἐκβολῆς μάλιστα ἑκατὸν.</p>	<p>The hundred commissioners appointed by the Five Thousand drew up the constitution as just stated; and after it had been ratified by the people, under the presidency of Aristomachus, the existing Council, that of the year of Callias, was dissolved before it had completed its term of office. It was dissolved on the fourteenth day of the month Thargelion, and the Four Hundred entered into office on the twenty-first; whereas the regular Council, elected by lot, ought to have entered into office on the fourteenth of Scirophorion. Thus was the oligarchy established, in the archonship of Callias, just about a hundred years after the expulsion of the tyrants.</p>
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Texts 5 (trans. Webster)

5a Aristotle, *Meteorology* A 6.343a34-b7

<p>b1 ἀλλὰ μὴν οὐδὲ τοῦτο ἀληθές, ὡς ἐν τῷ πρὸς ἄρκτον τόπῳ γίγνεται κομήτης μόνον, ἅμα καὶ τοῦ ἡλίου ὄντος περὶ θερινὰς τροπὰς· ὁ τε γὰρ μέγας κομήτης ὁ γε- νόμος περὶ τὸν ἐν Ἀχαΐᾳ σεισμὸν καὶ τὴν τοῦ κύματος ἔφοδον ἀπὸ δυσμῶν τῶν ἰσημερινῶν ἀνέσχευεν, καὶ πρὸς νότον ἤδη πολλοὶ γεγόνασιν. ἐπὶ δ' ἄρχοντος Ἀθήνησιν Εὐκλέους τοῦ Μόλωνος ἐγένετο κομήτης ἀστὴρ πρὸς ἄρκτον μὴνὸς Γα- μηλιῶνος περὶ τροπὰς ὄντος τοῦ ἡλίου χειμερινὰς· καίτοι τοσοῦτον ἀνακλασθῆναι καὶ αὐτοὶ τῶν ἀδυνάτων εἶναι φασί.</p> <p>b5</p>	<p>Moreover the statement that a comet only appears in the north, with the sun at the summer solstice, is not true either. (1) The great comet which appeared at the time of the earthquake in Achaea and the tidal wave rose due west; and many have been known to appear in the south. (2) Again in the archonship of Euclees, son of Molon, at Athens there appeared a comet in the north in the month Gamelion, the sun being</p>
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	about the winter solstice. Yet they themselves admit that reflection over so great a space is an impossibility.
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5b Aristotle, *Meteorology* A 6.343b14-26

b15	<p>πρὸς δὲ τούτοις ἅπαντες οἱ καθ' ἡμᾶς ὠμμένοι ἄνευ δύσεως ἠφανίσθησαν ἐν τῷ ὑπὲρ τοῦ ὀρίζοντος τόπῳ ἀπομαρανθέντες κατὰ μικρὸν οὕτως, ὥστε μήτε ἐνὸς ἀστέρος ὑπολειφθῆναι σῶμα μήτε πλειόνων, ἐπεὶ καὶ ὁ μέγας ἀστήρ περὶ οὗ πρότερον ἐμνήσθημεν ἐφάνη μὲν χειμῶνος ἐν πάγοις καὶ αἰθρίαις ἀφ' ἑσπέρας, ἐπὶ Ἀστείου</p>	<p>Besides, all the comets that have been seen in our day have vanished without setting, gradually fading away above the horizon; and they have not left behind them either one or more stars. (1) For instance the great comet we mentioned before appeared to the west in winter in frosty weather when the sky was clear, in the archonship of Asteius. On the first day it set before the sun and was then not seen. On the next day it was seen, being ever so little behind the sun and immediately setting. But its light extended over a third part of the sky like a band¹¹ so that people called it a ‘path’. This comet receded as far as Orion’s belt and there dissolved.</p>
b20	<p>ἄρχοντος, καὶ τῇ μὲν πρώτη οὐκ ὤφθη ὡς προδεδουκῶς τοῦ ἡλίου, τῇ δ' ὑστεραία ὤφθη· ὅσον ἐνδέχεται γὰρ ἐλάχιστον ὑπελείφθη, καὶ εὐθὺς ἔδου· τὸ δὲ φέγγος ἀπέτεινε μέχρι τοῦ τρίτου μέρους τοῦ οὐρανοῦ οἷον ἄλμα· διὸ καὶ ἐκλήθη ὁδός· ἐπανήλθε δὲ μέχρι τῆς ζώνης τοῦ Ὠρίωνος, καὶ ἐνταυθοῖ</p>	
b25	<p>διελύθη.</p>	

5c Aristotle, *Meteorology* A 7 344b31-5a5

b35	<p>ἐπεὶ καὶ ὅτε ὁ ἐν Αἰγὸς ποταμοῖς ἔπεσε λίθος ἐκ τοῦ ἀέρος, ὑπὸ πνεύματος ἀρθεὶς ἐξέπεσε μεθ' ἡμέραν· ἔτυχε δὲ καὶ τότε κομήτης ἀστήρ γενόμενος ἀφ' ἑσπέρας, καὶ περὶ τὸν μέγαν ἀστέρα τὸν κομήτην ξηρὸς ἦν ὁ χειμῶν καὶ βόρειος, καὶ τὸ κύμα δι' ἐναντίωσιν ἐγένετο πνευμάτων· ἐν μὲν γὰρ τῷ κόλπῳ βορέας κατεῖχεν, ἔξω δὲ νότος ἐπνευσε μέγας· ἔτι δ' ἐπ' ἄρχοντος Νικομάχου ἐγένετο ὀλίγας ἡμέρας κομήτης</p>	<p>(3) For instance when the stone at Aegospotami fell out of the air—it had been carried up by a wind and fell down in the daytime— (4) then too a comet happened to have appeared in the west. (1) And at the time of the great comet the winter was dry and north winds prevailed, and the wave was due to an opposition of winds. For in the gulf a north wind blew and outside it</p>
a1	<p></p>	<p></p>

a5 περὶ τὸν ἰσημερινὸν κύκλον, οὐκ ἀφ' ἑσπέρας ποιησάμενος τὴν ἀνατολήν, ἐφ' ᾧ τὸ περὶ Κόρινθον πνεῦμα γενέσθαι συνέπεσεν.	a violent south wind. (4) Again in the archonship of Nicomachus a comet appeared for a few days about the equinoctial circle (this one had not risen in the west), and simultaneously with it there happened the storm at Corinth.
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Texts 6

6a Aristotle, *Meteorology* A 6.343b8-14

b10	<p>κοινὸν δὲ καὶ τούτοις καὶ τοῖς τὴν σύναψιν λέγουσιν πρῶτον μὲν ὅτι καὶ τῶν ἀπλανῶν λαμβάνουσι κόμην τινές. καὶ τοῦτ' οὐ μόνον Αἰγυπτίους πιστεῦσαι δεῖ, καίτοι κάκεινοί φασι, ἀλλὰ καὶ ἡμεῖς ἐφεωράκαμεν· τῶν γὰρ ἐν τῷ ἰσχίῳ τοῦ κυνὸς ἀστὴρ τις ἔσχε κόμην, ἀμαυρὰν μέντοι· ἀτενίζουσιν μὲν γὰρ εἰς αὐτὸν ἀμυδρὸν ἐγίγνετο τὸ φέγγος, παραβλέπουσι δ' ἡρέμα τὴν ὄψιν πλέον.</p>	<p>An objection that tells equally against those who hold this theory and those who say that comets are a conjunction of the planets is, first, the fact that some of the fixed stars too get a tail. For this we must not only accept the authority of the Egyptians who assert it, but we have ourselves observed the fact. For a star in the thigh of the Dog had a tail, though a faint one. If you fixed your sight on it its light was dim, but if you just glanced at it, it appeared brighter.</p>
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6b Aristotle, *Meteorology* A 6.343b28-30

b30	<p>πρὸς δὲ τούτοις καὶ οἱ Αἰγύπτιοί φασι καὶ τῶν πλανήτων καὶ πρὸς αὐτοὺς καὶ πρὸς τοὺς ἀπλανεῖς γίνεσθαι συνόδους, καὶ αὐτοὶ ἐωράκαμεν τὸν ἀστέρα τὸν τοῦ Διὸς τῶν ἐν τοῖς διδύμοις συνελθόντα τινὶ ἤδη καὶ ἀφανίσαντα, ἀλλ' οὐ κομήτην γενόμενον.</p>	<p>Besides, the Egyptians affirm that conjunctions of the planets with one another, and with the fixed stars, take place, and we have ourselves observed Jupiter coinciding with one of the stars in the Twins and hiding it, and yet no comet was formed.usly with it there happened the storm at Corinth.</p>
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6b Aristotle, *De caelo* B 12.292a1-9

a5	<p>καίτοι πορρώτερον τοῦ μέσου καὶ πλησιαίτερον τοῦ πρώτου σώματός εἰσιν αὐτῶν. Δῆλον δὲ τοῦτο περὶ ἐνίων καὶ τῇ ὄψει γέγονεν· τὴν γὰρ σελήνην ἐωράκαμεν διχότομον μὲν οὖσαν, ὑπελθοῦσαν δὲ τῶν ἀστέρων τὸν τοῦ Ἄρεος, καὶ ἀποκρυφέντα μὲν κατὰ τὸ</p>	<p>Yet these planets are farther from the centre and thus nearer to the primary body than they, as observation has itself in some cases revealed. For we have seen the moon, half-full, pass beneath the planet Mars, which vanished</p>
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<p>μέλαν αὐτῆς, ἐξελθόντα δὲ κατὰ τὸ φανὸν καὶ λαμπρὸν. Ὅμοίως δὲ καὶ περὶ τοὺς ἄλλους ἀστέρας λέγουσιν οἱ πάσαι τετηρηκότες ἐκ πλείστων ἐτῶν Αἰγύπτιοι καὶ Βαβυλώνιοι, παρ' ὧν πολλὰς πίστεις ἔχομεν περὶ ἐκάστου τῶν ἄστρον.</p>	<p>on its shadow side and came forth by the bright and shining part. Similar accounts of other stars are given by the Egyptians and Babylonians, whose observations have been kept for very many years past, and from whom much of our evidence about particular stars is derived.</p>
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Text 7: Eudoxos' parameters for the Slow Planets

Z = zodiacal cycles (a number of times a planet returns to the same fixed star)

S = synodic cycles (a number of times a planet returns to the same phase with the sun, e.g., conjunction)

Y = years (a number of times the sun returns to the same fixed star)

Babylonian Goal Year principle: If Z, S, Y are cycles that begin and end together, then $Y = S + Z$

Since the moon is faster than the sun: If Z, S, Y are cycles that begin and end together, then $Z = S + Y$

Eudoxus	Planet	Zodiacal Period	Synodic Period
	Saturn	30 years	close to 13 months
	Jupiter	12 years	close to 13 months
	Mars	2 years	8 months and 20 days (8 2/3 months)

Simplicius, In de caelo 496.7-9: τῷ δὲ τοῦ Ἄρεος ἐν μηνὶ ὀκτῶ καὶ ἡμέραις εἴκοσι, τῷ δὲ τοῦ Διὸς καὶ τῷ τοῦ Κρόνου ἑκατέρῳ ἔγγιστα ἐν μηνὶ τρισκαίδεκα.

Text 8 Some calendars

Definition hollow month = 29 days full month = 30 days

According to Goldstein and Bowen, all Greek calendar makers assume:

1. The number of hollow months < the number of full months in a cycle

The Octaeteris of G&B

8 years = 99 months = 48 hollow months + (48 + 3) full months, so that there are 2922 days per cycle or $365\frac{1}{4}$ days per year

The Metonic cycle

19 years = 235 months = 110 hollow months = 125 full months = 6940 days so that the year is $365\frac{5}{19}$ days

The Callippian cycle

76 years = 940 months = 441 hollow months + 499 full months = 27759 days, so that the year is $365\frac{1}{4}$ days per year

The mean synodic month is approximately 29.53058796 days per month