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A GREEK HOROSCOPE FROM 373 A.D.

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During the excavations at Ismant-al-Kharab conducted by C.A. Hope as part of the Dakhleh Oasis Project directed by A.J. Mills a.o.¹ a wooden board was found in House '3' which deserves a preliminary separate publication. The original board (now inventoried as T.Kellis inv. A/5/198 +263) is broken into three pieces and Dr Hope informs us that two of them (inventoried together as # A/5/198) were found in room 6, under three meters of sand (level 3), while Inv. # A/5/263 came from room 1, above the floor near the top step of a small stair case, and was covered by two meters of sand. The fragments were found on or above the latest floor of the house and it is probable that the object was left behind by former occupants of the house. We are grateful to Dr Hope for his kind permission to publish this interesting text and for his stimulating contributions to an earlier version of this paper.

The dimensions are H. 33 x B. 10.7 cm. There are two pairs of holes drilled through the wood at the left hand side of the text; apparently this board formed part of a kind of notebook or was at least intended to do so. Thickness of the wood: 4 mm. The margin of 7 cms at the bottom contains various decorations. There are vague traces of some kind of coating of the wood, but much of the text was written directly on the wood itself. The other side of the board contains a Coptic text (to be published separately by I. Gardner and A. Alcock). For internal reasons the Greek text published below was previously labelled 'T.Kellis II.A'.

Plate XI

1	Γένεσι[ς] <i>vacat</i>	"Birth.
2	ΠθϚ/ Διοκλητιανού {Θώθ}	Year 89 of Diocletian, Thoth
3	ἀπορόμενος ἅ κατ'Αἰγυπτίους	Epagomene (?) 1, according to the Egyptians,
4	ἥ ἐστὶν καθ' Ἑλληνας Παχὼν κα,	which is according to the Greeks Pachon 21,
5	ῥρα ια ἡμέρας·	at the 11th hour of the day.
6	ῥοσκοπὸς Ζυγῷ, οἶκ(ος)	Horoscopos in Libra, the House
7	Ἀφοδίτη(ς), ὁρίοις Ἑρμοῦ, μ(οῖραι) κβ	of Venus in the terms of Mercury, 22 degrees;
8	Ἥλιος Ταύρω, οἶκ(ος) Ἀφροδί(της)	the Sun in Taurus, the House of Venus
9	ὁρίοις Ἀρεως μ(οῖραι) η,	in the terms of Mars, 8 degrees;
10	Σελήνη Λέοντι, οἶκ(ος) Ἥλιου	the Moon in Leo, the House of the Sun
11	ὁρίοις Σελήνης μ(οῖραι) ιβ,	in the terms of the Moon, 12 degrees;
12	Ἄρης Σκορπίῳ, οἶκ(ος) Ἀρεως	Mars in Scorpio, the House of Mars
13	ὁρίοις Διὸς μ(οῖραι) θ,	in the terms of Jupiter, 9 degrees;
14	Ζεὺς Καρκίνῳ, [ο]ἶκ(ος) Σελήνη[ς]	Jupiter in Cancer, the House of the Moon
15	ὁρίοις Κρόνου μ(οῖραι) ε,	in the terms of Saturn, 5 (? or 9?) degrees;
16	Ἀφροδίτη Λέοντι, οἶκ(ος) Ἥλιου	Venus in Leo, the House of the Sun
17	ὁρίοις Ἑρμοῦ μ(οῖραι) ι,	in the terms of Mercury, 10 degrees;

¹ For these excavations see the reports by C.A. Hope (Monash University, Melbourne) in *Mediterranean Archaeology* 1 (1988) 160-178; *Journal of the Society for the Study of Egyptian Archaeology* 17 (1987) 157-176; 19 (1989) 1-26; *Bulletin of the Australian Centre for Egyptology* 1-4 (1990-1993), *passim*.

18	Κρόνος Ὑδρηχόφ, οἶκ(ος) Κρόνου	Saturn in Aquarius, the House of Saturn
19	ὀρίοις Διὸς μ(οἶραι) ιδ,	in the terms of Jupiter, 14 degrees;
20	Κλῆρ(ος) Τύχ(ης) Σκορπίφ, οἶκ(ος) Ἄρεως	the Lot of Fortune in Scorpio, the House of Mars
21	ὀρίοις Διὸς μ(οἶραι) ζ,	in the terms of Jupiter, 7 degrees;
22	Ἑρμῆς Διδύμοις, οἶκ(ος) Ἑρμοῦ	Mercury in Gemini, the House of Mercury
23	ὀρίοις Σελήνης μ(οἶραι) []	in the terms of the Moon, [-] degree(s)."

3 Or ἀπαγόμενος, i. ἐπαγομένη? Numeral α ex corr. (λ?), or drawn 2x? 4 κα drawn 2x 15 or θ at end? 22 Ἑρμῆς: the horizontal bar of the final sigma is much prolonged to the right, possibly drawn 2x

This new Greek horoscope² is interesting for several reasons:

- (a) to our knowledge it is the only Greek horoscope written on a wooden board;
- (b) there is a problematic conflict between the dating according to the Alexandrian *and* the Egyptian calendar;
- (c) the astronomical and astrological data given in the text present difficulties of interpretation.

Ad (a): We do not know of any other ancient horoscope written on a wooden board.³ The most common vehicle for carrying such texts is papyrus, but there are also a few instances of ostraka being used for both Greek and Demotic horoscopes. As far as palaeography is concerned, the text has been written by a well-trained writer who draws his cursive characters with ease. One can, therefore, probably rule out that the text was written by a schoolboy to whom one might ascribe the errors as referred to below. We cannot establish where the board was written; maybe this was done in the Oasis itself, but the text may also have been written elsewhere in the Nile Valley and the board (or the codex of which it formed part) may have been simply imported for some private purpose into the Oasis. The writing material suggests that it may have had some kind of more lasting purpose; was it, perhaps, a kind of a demonstration copy, how one should

² For the subject of Greek horoscopes in general see O. Neugebauer and H. Van Hoesen, *Greek Horoscopes*, Philadelphia 1959. (Mem. Am. Philos. Soc., 48); D. Baccani, *Oroscopi Greci, Documentazione papirologica*, Messina 1992 (Ricerca papirologica, 1). See also H.G. Gundel, 'Horoskop' in *Reallexikon für Antike und Christentum*, XVI (Stuttgart 1993) 598-662.

³ A useful survey of the use of wood for various writing purposes and a list of publications of wooden boards known from Graeco-Roman Egypt was published by W.M. Brashear and F.A.J. Hoogendijk in *Enchoria* 17 (1990) 21-54 (add now to the list, e.g., the tablets published in P.Brook. 27-31, and the astronomical T.Amst. inv. 1, published in *CdE* 52 [1977] 301ff. and recently discussed in *CdE* 68 [1993] 178f.; add also *Bodl.Gr.Inscr. inv.* 4, cf. *Pack*² 2710); for the subject in general cf. also E. Lalou, *Les tablettes à écrire de l'Antiquité à l'époque moderne*, Turnhout 1992 (Bibliologia, 12), esp. 127-149, where J.L. Sharpe III discusses the Dakhleh Tablets and gives some codicological considerations. The excavations at Ismant-al-Kharab have yielded many wooden boards and fragments thereof (see, next to Dr. Sharpe's article, also the photos in *JSSEA* [above, n.l.] 17 [1987] pl. XXI-XXIII.a; *JSSEA* 19 [1989] pl. II and *BACE* [above, n.l.] 2 [1991] pl. 8), i.e. House 1 yielded one board, House 2 yielded two complete codices [an Isokrates codex and the so-called 'Harvest (earlier: Farm) Account Book' (see Sharpe, *loc.cit.*) and six boards, while House 3 produced two books (one [inv.A/5/53B] of five boards, with only one board [= two pages] inscribed; see the remarks in *BACE* 2 [1991] 42-43 and the publication by I. Gardner, in *Orientalia* 62 [1993] 36-59) and 32 (partly fragmentarily preserved) boards; from House 4 came 39 (partly fragmentarily preserved) boards. Finally, Area B yielded one board (described *JSSEA* 17 [1987] 167 + Pl. XXIII.a), while Area D produced four boards.

draw up a horoscope, rather than that the various indications given on the text matched with a particular reality at a given time?

Ad (b): Year 89 of the era of Diocletian⁴ (1. 2.) ‘καθ’ Ἑλληνῶν’, i.e. according to the Alexandrian calendar, runs from 29.viii.372 until 28.viii.373 A.D.; Pachon 21 (1. 4) according to the same calendar = 16.v, hence the date of the horoscope *according to the Alexandrian calendar* is **16.v.373**.

On the other hand, year 89 of the Diocletian era (1. 2.) ‘κατ’ Αἰγυπτίους’, i.e. according to the traditional Egyptian calendar,⁵ covers the period Thoth 1 (22.v.) 372 - Epagomene 5 (21.v.) 373. Now, in itself the indication on the board: Θῶθ ἀπογόμενος ᾱ (ll. 2-3) is remarkable; ἀπογόμενος ᾱ strongly reminds us of ἐπαγομένη (sc. ἡμέρα) α, the first of the five epagomenal days which are added traditionally to the month of Mesore (preceding Thoth!)⁶.

Some kind of error in our text seems probable.⁷ If Thoth 1 ‘Egyptian style’ (= 22.v.372) should be the equivalent of Pachon 21 ‘Greek style’ (= 16.v.373), there would be a remarkable conflict between the Egyptian and the Alexandrian calendar in our horoscope. According to usual practice, at any rate, ἐπαγομένη α in year 89 of the Diocletian era would be, then, *according to the Egyptian calendar* the equivalent of **17.v.373** in our calendar. It must be admitted that a radical cancelling of Θῶθ in our text and the assumption of a spelling error ἀπο- for ἐπα- and a gender error -γόμενος for -γομένη are, especially if taken together, rather irritating and that, even if one accepts this, there would be still a discrepancy of 1 day left between 17.v.373 ‘Egyptian style’ and 16.v.373 ‘Alexandrian style’; on balance, however, we regard that as less problematic than a discrepancy of more than a full year, the more so as we have other reasons to assume (see below) that the author of this text was not very competent.

ad (c): For a discussion of the more technical aspects of Horoscope 373,b⁸ we calculated for Pachon 21 Diocl. year 89 (= 16.v.373 A.D.) planetary positions using a computer code developed by one of us (TdJ). This code is based on algorithms given by van Flandern and Pulkkinen⁹. The applicability of these algorithms was extended to epochs before 1600 A.D. by

⁴ Cf. R.S. Bagnall - K.A. Worp, *The Chronological Systems of Byzantine Egypt*, Zutphen 1978, Chapt. 7 (Studia Amstelodamensia ad epigraphicam, ius antiquum et papyrologicam pertinentia, VIII); cf. also L.S.B. MacCoull & K.A. Worp, *The Era of the Martyrs*, in “*Miscellanea Papyrologica in occasione del bicentenario dell’edizione della Charta Borgiana*” (edd. M. Capasso, G. Messeri Savorelli, R. Pintaudi), Firenze 1990, 375-408. (Papyrologica Florentina XIX 2). A list of addenda and corrigenda to this article will be published in *Analecta Papyrologica*.

⁵ For the survival of this calendar into Roman Egypt and its use until ca. A.D. 400 cf. D. Hagedorn - K.A. Worp, *Das Wandeljahr im römischen Ägypten*, ZPE 104 (1994) 243-255; in the period A. D. 371-375 the Egyptian calendar was 99 days ahead of the Alexandrian calendar.

⁶ We do not know of any instance where the Egyptian year is supposed to start with the epagomenal days rather than with Thoth, but cf. the expression Θῶθ ἐπαγομένων + numeral, found only in a few ostraka from Upper Egypt, i.e. O.Sarga 209, 349-354 = SB XVIII 13403, 13531-13536 (we owe these references to the kindness of D. Hagedorn); the editor of these texts does not express an opinion on the remarkable phenomenon.

⁷ Note that in SB XVIII 13531.3 Θῶθ was cancelled.

⁸ This nomenclature follows that introduced by Neugebauer - Van Hoesen (cf. above, fn. 2). Their Horoscope 373 should then be renamed 373,a.

⁹ T.C. Van Flandern - K.F. Pulkkinen, *Low Precision Formulae for Planetary Positions*, *Astrophys. Journal*, Suppl. Ser. 41 (1979) 391ff.

introducing all higher-order time-dependent terms in the secular elements of the sun, moon and planets as given in the Explanatory Supplement of the Astronomical Ephemeris¹⁰ (1961).

Planetary positions calculated with this code usually agree to within 0.1 degrees with those tabulated by Tuckerman¹¹ and in cases where the differences are large they are superior in accuracy to those.

From a comparison of the planetary positions in Horoscope 373,b with those calculated for 16.v.373 A.D. (see below, Table 1) it is clear that the agreement is quite poor. There are two ways to explain this: either the date given in the text for Horoscope 373,b is not the correct one, or the technical astronomical skill of the author was, to say the least, limited.

As we shall argue below, the latter possibility is the more probable one. This conclusion is based on the following considerations:

- a confirmation of the astronomical dabbling of the author on more explicit counts,
- the conclusion that his astrological skill is equally poor,
- the absence of other dates in the 4th century A.D. that would otherwise fit the planetary positions of Horoscope 373,b.

Astronomical dabbling:

The authoritative study of Neugebauer - Van Hoesen (cf. above n. 2) has shown that in horoscopes described in the astrological literature of the first four centuries of our era the positions of the sun, moon and planets are usually correct to within the zodiacal sign. When also the number of degrees is given the positions are often accurate to within a few degrees. The author of the present horoscope certainly does not live up to this tradition. Only the Sun and Saturn have the correct zodiacal sign and for those the agreement in degrees is poor.

Because of its regular motion and its direct relation to the calendar the zodiacal position of the sun can be easily determined from the calendar date with an accuracy of about one degree by any person with elementary knowledge of the motion of the celestial bodies. This is true for our present Gregorian calendar, but was equally true in 373 A.D. for the Alexandrian calendar. Thus the fact that the position of the sun is off by almost 20 degrees is hard to understand. The position given would be the correct one on approximately April 30.

Another point concerns the elongation of Venus. As was well known in antiquity (see Ptolemy IX,7 and X,1¹²) the elongation (the angular distance from the Sun) of the inner planets Mercury and Venus never exceeds 28 and 47 degrees, respectively. The position of Mercury in the sign of Gemini in Horoscope 373,b is not inconsistent with this, but the position of Venus at 94!! degrees elongation of the Sun is way out of range.

Astrological skill:

The position of the κλῆρος Τύχης (the “Lot of Fortune”, *Pars Fortunae* in Latin literature) in Horoscope 373,b is totally inconsistent with any calculational procedure known at the time. The existing algorithms (discussed by Manilius [1st c. A.D.], Ptolemy [2nd c. AD], Vettius Valens [2nd c. A.D.] and Firmicus Maternus [4th c. A.D.]¹³) would lead to 26 Capricorn for a day-birth (as in the case of Horoscope 373,b) or 18 Cancer for a birth at night.

¹⁰ HMS Stationary Office, London 1961.

¹¹ B. Tuckerman, *Planetary, Lunar and Solar Positions A.D. 2 to A.D. 1649*, Philadelphia 1964 (Mem. Am. Philos. Soc., 59).

¹² G.J. Toomer, *Ptolemy's Almagest*, London 1984.

¹³ See A. Bouché-Leclercq, *L'astrologie grecque* (Paris 1899; repr. Aalen 1979) 289-292.

One of the most interesting aspects of Horoscope 373,b is the use of ὅρια (known as *termini* or *finis* in Latin, usually translated as ‘terms’), referring to a division of the 30 degrees of each sign of the Zodiac in 5 or 7 regions of varying length (3 to 7 degrees depending on the system used). Each term is “ruled” by one of the planets. Several different systems were in use. Ptolemy (*Tetrabiblos* I, 20-21¹⁴) discusses three systems, one attributed to the “Egyptians”, one to the “Chaldeans” and one due to himself. In these systems rulership of the terms is divided among the five planets. Another later system due to Vettius Valens (the so-called Heptazone system¹⁵) is more complicated in the sense that in addition to the planets also the Sun and the Moon are introduced as rulers and like in the Chaldean system rulership of the terms of each sign of the Zodiac differs for day- and for night-births.

Horoscope 373,b seems to employ this otherwise rarely used Heptazone system because it includes the moon as ruler (twice). Among the Greek horoscopes of the first four centuries of our era¹⁶ there is only one (L 61,X of Neugebauer - Van Hoesen (above, n. 2)) due to Vettius Valens in which this system is also used. Here again we must conclude that the author was an incapable dilettante or that Horoscope 373,b is a hopelessly garbled copy because only for four out of the nine zodiacal positions in the text the terms make sense: 8 Leo (the position of the Moon) in the terms of the Moon, 9 Scorpio (Mars) in the terms of Jupiter, 14 Aquarius (Saturn) in the terms of Jupiter and 7 Scorpio (Lot of Fortune) in the terms of Jupiter.¹⁷ Even then the fits are for a night-birth contrary to the data of the horoscope which refer to a birth during daytime (Sun above horizon as derived from the position of the Horoscopos and from the time of birth quoted in the text as the 11th hour of the day). For a day-birth only one term, that for Mars in 9 Scorpio would have been correct.

Other dates:

We next discuss the astronomical dating of this horoscope. If we would not have been given the date in the text and did not know the general context of the archaeological excavations during which this horoscope was found,¹⁸ the method of astronomically dating this horoscope would not have resulted in this date. Using the standard method of employing the positions of the slowly moving planets Saturn (orbital period about 28 years), Jupiter (12 years) and Mars (1.9 years) and using the positions of the Sun and Moon to determine the day and month of the best fitting date, a search of all possible dates in the fourth century results in two dates (29/4/342 and 12/5/376, see Table 1). None of these fits, however, is very good, in no case better than the adopted fitting margin of one zodiacal sign (Venus was not included in the fitting process). None of the possible dates provides a fit with an accuracy comparable to that usually found for other known horoscopes in the period A.D. 1-400 (cf. Neugebauer - Van Hoesen [above n. 2]).

¹⁴ Ed. F.E. Robbins, Loeb Classical Library, London 1940.

¹⁵ Bouché-Leclercq (n. 3), p. 213-215.

¹⁶ See the collections by Neugebauer - Van Hoesen and Baccani (above, n.2).

¹⁷ See the Table on p. 214 in Bouché-Leclercq (above, n. 3).

¹⁸ The datable Greek documents found in House 3 stem from the period 293 - 390 A.D.

Unfortunately, the date of this horoscope was printed in ZPE 104 (1994) 252, lower part, two times as ‘372’; it was given correctly as ‘16./17.05.373’ earlier on the same page.

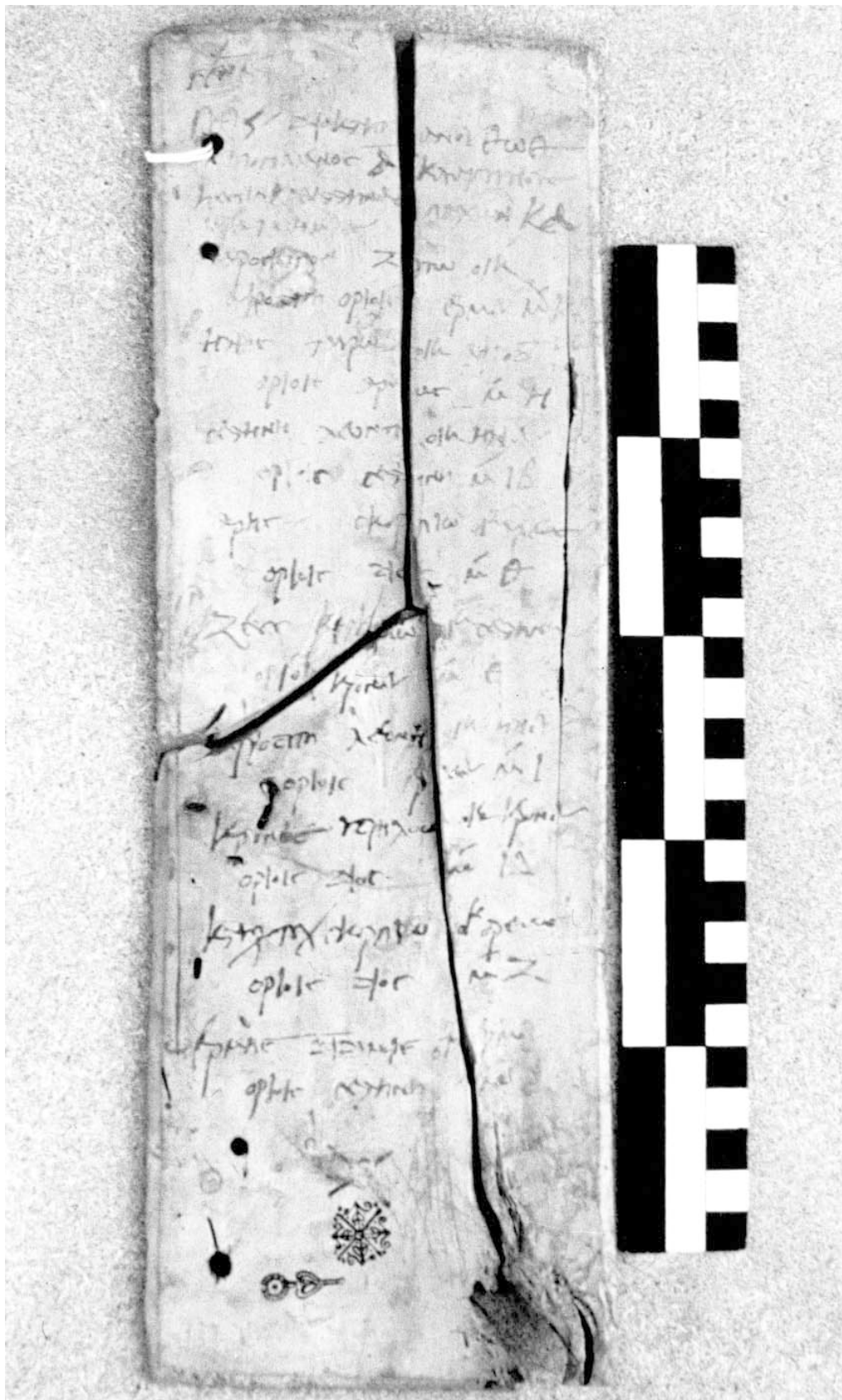
TABLE 1:¹⁹ Planetary positions of Horoscope 373,b compared to positions calculated for the date in the text and for “best fitting” dates in the fourth century.

Horoscope 373,b			16/5/373 4 pm	29/4/342 5 pm	12/5/376 4 pm
Sun	8	Taurus	25 Taurus	9 Taurus	22 Taurus
Moon	12	Leo	4 Virgo	12 Leo	14 Leo
Mercury	--	Gemini	8 Taurus	4 Taurus	16 Gemini
Venus	10	Leo	3 Cancer	16 Aries	13 Gemini
Mars	9	Scorpio	21 Taurus	1 Libra	21 Sagittarius
Jupiter	5/9	Cancer	5 Pisces	8 Cancer	30 Taurus
Saturn	14	Aquarius	9 Aquarius	20 Capricornus	15 Pisces
Horoscopus	22	Libra	22 Libra	20 Libra	19 Libra

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¹⁹ Dates are Julian dates and time is Mean Local Time. Positions are calculated for a location at longitude 30 degrees East of Greenwich and geographical latitude 25 degrees North.



T.Kellis II.a