More Greek Horoscopes from Kellis (Dakhleh Oasis)

Worp, K.A.; de Jong, T.

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§ 1: Introduction:

In this paper we present five new fourth-century A.D. Greek horoscopes found during recent Australian excavations conducted by Dr C.A. Hope at Ismant el-Kharab (ancient Kellis) in the Egyptian Dakhleh Oasis.[1] Two of these horoscopes, referred to below as **2a** and **2b**, are written on wood; the other three horoscopes, referred to below as **3**, **4a** and **4b**, are written on papyrus. Including the previously published horoscope from Kellis from A.D. 373[2] (on wood; referred to below as **1**) a total of six horoscopes has now been uncovered at Kellis. It is striking that the new Kellis horoscopes all have a single provenance, area 'D/8' (= Temple area). As Dr Hope reminds us, this could lead one towards the assumption, that an astrologer lived and worked there. For a recent review of the place of astrology in the cultural context of the Graeco-Roman world and of hellenistic Egypt we refer the reader to T. Barton, *Ancient Astrology*, London 1994.

§ 2: Horoscopes **2a** and **2b**

Kellis object registration # D/8/114 (Temple of Tutu Complex, area D/8, Room 8, Deposits 5 and 6[3]; SCA # 2565). H. 14.9 x W. 10.1 x Th. 0.2-0.3 cm. Preserved are three quarters of the lower half of a wooden board of acacia wood evidently cut into two parts at some moment. In the lower part of the preserved board, restored from four pieces, are two perforations drilled at ca. 1.3 cm from the vertical edge of the board; the diameter of each is 4 mm and they are 1.6 cm apart from each other. It may be assumed that originally a similar set of holes occurred in the board's upper part now sawn off and lost. On the 'verso'[4] part of a horizontal ink line parallel to the upper edge is still visible; probably this line was drawn for guiding a carpenter's saw. The complete board probably belonged to a codex formed by a set of such wooden boards. Of course, the precise number of boards originally forming the codex and the nature of any other texts remains unknown.

Given the fact that in the case of individual wooden boards no argument can be made about the 'recto' being inscribed before the 'verso', which is regularly the case with texts written on individual

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[1] The archaeological excavations of this site have been conducted already since 1986; they form part of the Dakhleh Oasis Project directed by A.J. Mills. We are, again, much indebted to Dr Hope for his kind permission to publish the texts in the following article and for polishing up our English.

[2] T. de Jong & K.A. Worp, *A Greek Horoscope from 373 A.D.*, ZPE 106 (1995) 235-240; a shortened version of this publication appeared in P.Kell. I Gr. 84.

[3] Dr Hope kindly provides us with the following information: "D/8 is a complex of rooms that were inserted into the NW corner of the Main Temple complex, between temenos 1 and the outer enclosure wall ('Enclosure 1' according to description made by the architect Jim Knudstadt). When they were built, temenos 2 was partly dismantled in this area; thus they post-date the building of temenos 2. All material (text, coins, ceramics) shows D/8 to be of the fourth century, and it appears to have served a domestic function- there are hearths, grinding stones, wall cupboards, ovens etc. One cannot tell if all of the rooms were built at the same time, but they were all used in the fourth century, and I imagine mainly in the second half. They could well have been built after the temple had ceased being used for celebrating the cult of Tutu and Tapshay. The wooden board was found in Room 8; three of the pieces from which it is comprised come frome deposit 6 and one from deposit 5. These deposits are sand and straw, and animal droppings, above earth floor. Thus they are in abandonment and post-abandonment deposits. Area D/8 is discussed in BACE 8 (1997) 60-61 and 11 (2000) 57; there is a discussion and plan in W. Clarysse - H. Willems - A. Schoors (eds.), *Egyptian Religion: The Last Thousand Years. Studies dedicated to the memory of Jan Quaegebeur*, II (Leuven 1998), pp. 806-810".

[4] The indications 'front/recto' and 'back/verso' are determined by the position of the holes in the wooden board, serving for the purpose of gathering a number of wooden boards into a single codex; on the 'front' side of any wooden board these holes are drilled at their left hand side, as the 'spine' of the codex would be situated there.

sheets of papyrus, it is impossible to determine whether the text labelled by us as **2a** (= 'front' side of the board) was actually written earlier than the text labelled **2b** (= 'back' side of the board).

As far as the palaeography and the wording of these two texts, each written on one side of the board, are concerned, it should be noted that they show a certain resemblance to horoscope **1**. We observe that

(1) in general the handwriting of these three horoscopes looks rather similar;

(2) the wording of the dating elements in these horoscopes shows a remarkable resemblance in that one finds first an indication of the Egyptian calendar, then a date according to the Greek/Alexandrian calendar. This is the reverse order of these elements in comparable horoscopes from the Nile Valley (see the list of such documents in D. Hagedorn & K.A. Worp ZPE 104 [1994] 243-255).[5]

(3) Finally, one of the new horoscopes on a wooden board, viz. **2a**, shares with horoscope **1** precise planetary positions by way of μοῖραι; in general this is not the rule among the horoscopes published to date.[6]

The various links between horoscope **1** and horoscopes **2a** and **2b** may help to explain why the astronomical data in these three texts do not seem to make sense (for further discussion, cf. at the end of this paper).

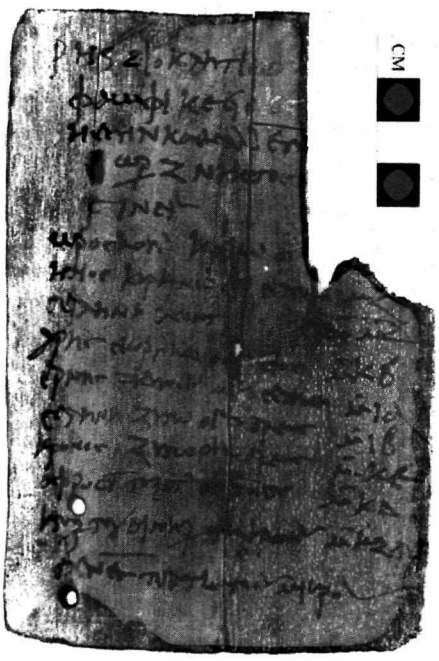
Horoscope **2a** (for its position versus **2b**, cf. above):

1	ρηS/ Διοκλητιανοῦ [*vacat* ?]	
2	Φαῶφι κε εἰς κς [κατ' Αἰγυπτ(ίους)]	
3	ἥ ἐστιν καθ' Ἕλλ(ηνας) Ἐπὶ[φ ις εἰς ιζ]	
4	ὥρ(α) ζ νυκτὸς μ[έσης?]	
5	ς ἰνδικ(τίωνος) [*vacat* ?]	
6	Ὡροσκόπ(ος) Κριῷ οἴκ(φ) [	μ(οῖραι) -]
7	Ἥλιος Καρκίνῳ οἴκ(φ) Σελήνη⟨ς⟩	μ(οῖραι) ζ
8	Σελήνη Λέοντι οἴκ(φ) Ἑρμ(οῦ)	μ(οῖραι) δ
9	Ἄρης Σκορπίωι οἴκ(φ) Διὸς	μ(οῖραι) κβ
10	Ἑρμῆς Διδύμοις οἴκ(φ) Σελήνη⟨ς⟩	μ(οῖραι) ια
11	Σελήνη Ζυγῷ οἴκ(φ) Ἄρεως	μ(οῖραι) ιβ
12	Κρόνος Ζυγῷ οἴκ(φ) Ἄρεως	μ(οῖραι) κε
13	Ἀφροδίτ(η) Τοξότ(ῃ) οἴκ(φ) Διὸς	μ(οῖραι) κδ
14	Κλῆρ(ος) Τύχ(ης) Αἰγόκερ(φ) οἴκ(φ) Κρόνου	μ(οῖραι) κζ
15	Γένεσις Πλουτιανοῦ μικροῦ.	

3 Ἐπείφ 6ff. οι^{κ}, ῑμ̄ Tab. 7,13: or wrote the scribe here only ο^{κ}? 12 κε corr. from κς, or vice versa?

[5] For this order of (1) the Greek/Alexandrian calendar, followed by (2) the Egyptian calendar, see now also BKT IX 102, an introduction to a horoscope, referring (lines 13ff.) to year 27 of Commodus [month lost] ζ εἰς η̄ ὥρα ζ νυκτὸς [| [καθ'] Ἑλληνα[ς . .] κατὰ δὲ τοὺς Α[ἰγυπτίους ---„ and SB XXII 15235, a horoscope from Soknopaiou Nesos referring to the 10th hour of the night of [Παχὼν ιθ εἰς] κ̄ καθ' Ἕλλ[η]νας in year [4] of the emperor Aelius Antoninus = 14/15.v.141^{p}; we calculate that in line 4 of this text one should restore '[Παῦνι κε εἰς κ]ς' as the dating according to the Egyptian calendar. For another horoscope from the Great Oasis featuring the same order of year type indications as in our texts see now O.Douch IV 433 (year 45 of Diocletian) presenting first the Egyptian date (Epeiph 12), followed by the Greek date (Pharmouthi 16). On the other hand, as D. Hagedorn kindly points out to us, a graffito from Aïn Labakha (Khargeh Oasis) published by G. Wagner in ZPE 111 (1996) 108 [= SEG XLVI (1966) 2102 = I.Piyris p. 81f.] mentions also first a date by the Greek/Alexandrian calendar followed by a date which obviously is reckoned by the Egyptian calendar, cf. ll. 6-7: 'Παχὼν καθ' Ἕλληνας | ὃ δ' ἐστιν Ἐφὶφ δ'. As Wagner rightly notes (p. 109), it is remarkable that there is no day in Pachon indicated, but one should assume that the graffito was written in the beginning of that month.

[6] Cf. O. Neugebauer - H.B. van Hoesen, *Greek Horoscopes*, 'Glossary' 196 s.v. μοῖρα; A. Jones, *Astronomical Papyri from Oxyrhynchus* (Philadelphia 1999; = Mem.Amer.Philos.Soc. 233), general index of words, p. 464. It remains unclear why this practice is not repeated in **2b**, written on the back side of the wooden board by presumably the *same* scribe as that of **2a**. Maybe these data were never filled in on the back of the wooden board, due to lack of space *vel sim.*?



Notes:

1, 5 The space on the board after Διοκλητιανοῦ (line 1) and ἰνδικ(τίωνος) (line 5) was probably left blank; it is at least not possible to restore a formula on the basis of parallel texts.

2 Or should we restore a slightly shorter form like Αἰγ(υπτίους)?

4 An indication νὺξ μέση does not seem to occur in any previously published horoscope, but the restoration of μέσης may be justified by the consideration that the 7th hour fell indeed in the middle of the night (counting 12 hours). Cf., however, also the phrasing in D. Baccani's re-edition[7] of the horoscope P.Oxy. XLVI 3298 col. i, lines 3-4: Παχὼν κβ̄ νυκτὸ(ς) εἰς | κγ̄ ὥρᾳ ζ ἐσχ(ά)τ(η), the latter part of which should be taken to mean "alla fine della settima ora". Baccani remarks that the position of νυκτὸς in line 3 is irregular; even so, Baccani's text could induce us to combine in the Kellis horoscope the adjective μέση with the preceding noun ὥρᾳ. For the phrasing 'ὥρᾳ ζ νυκτὸς μέσῃ' this could produce an interpretation 'in the middle of the 7th hour of the night'; then, however, the separation of μέσῃ from the preceding ὥρᾳ would be difficult to explain.

11 It is hardly conceivable that in this line a *new* position of Σελήνη is indicated, as the moon is mentioned already in line 8. In the whole sequence of planetary positions an indication of the position of Jupiter (Ζεύς) is conspicuously lacking, hence we reckon with an error of 'Moon' for 'Jupiter'.

14 After μ(οῖραι) κζ there are still two more characters written. One might perhaps read the first as a symbol for (δεκανός), the second as a φ, but we fail to see what their function would be here. For δεκανός, cf. O. Neugebauer - H. van Hoesen, *op.cit.* [fn. 6], Glossary p. 193, s.v. δεκανός; cf. also their text # 338.19-30, where διμ(ερισμός) is translated with 'decan'. But even if the idea to read '(δεκανός)' were correct, the significance of the φ would remain problematic, as one does not expect a numeral '500' here. An alternative reading of the first character is that of a λ written in ligature with a vertical dash | drawn through the central part of the λ; is this intended to represent 'λ(επτά)' = 'minutes' (for similar much abbreviated attestations of λ(επτά) cf. *Gr.Hor.* # 338.8,10)? In that case it would be remarkable that only here such an indication would be found; moreover, it is an obstacle that the numeral φ = '500' does not make any intelligible sense. In sum: we do not understand what is happening at the end of this line.

Translation:

"Year 108 of Diocletian,
Phaophi 25 to 26 according to the Egyptians,
which equals Epeiph [16 to 17] according to the Greeks, at the 7th hour of the night [in its midst?],
of the 6th indiction.
Horoskopos in Aries, in the house of [N.N., x degrees];
Sun in Cancer, in the House of the Moon, 7 degrees;
Moon in Leo, in the House of Mercury, 4 degrees;
Mars in Scorpio, in the House of Jupiter, 22 degrees;
Mercury in Gemini, in the House of the Moon, 11 degrees;
Moon (? see note) in Libra, in the House of Mars, 12 degrees;
Saturn in Libra, in the House of Mars, 25 degrees;
Venus in Sagittarius, in the House of Jupiter, 24 degrees;
Lot of Fortune in Capricorn, in the House of Saturn, 27 degrees, ... ;
Birth of the young Ploutianus."

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[7] *Oroscopi Greci. Documentazione papirologica* (Messina 1992; = Ricerca Papirologica, 1), pp. 144-156 s.n. 14.

The following chronological elements enable the computation of the date of this text :

(a) Year 108 of the era of Diocletian (line 1), covering the period 1.ix.391 - 1.ix.392, and the 6th indiction (line 5), covering in southern Egypt the period 1.v.392 - 1.v.393 (cf. P.Kell. I 30.1-2n.). In all circumstances, therefore, the date of the horoscope apparently falls between 1.v - 1.ix.392. This should be combined with the month 'Epeiph' in the Greek/Alexandrian calendar (= 25.vi - 24.vii) referred to in line 3.

(b) A date to 'Phaophi 25 according to the Egyptian Calendar' (based upon a year of 365 days) falling in the period A.D. 391-395 was 104 days ahead of the equivalent day in the Greek/Alexandrian calendar (cf. the table given by D. Hagedorn & K.A. Worp in ZPE 104 [1994] 244-45); we calculate that the day numerals lost in line 3 after 'Epeiph' should be supplied as '16 to 17' ('ις εἰς ιζ');

We conclude from 'a' and 'b' that we are dealing with a horoscope purportedly reflecting the astronomical situation in the night of 10/11.vii.392.

Upon inspection of the astronomical details, however, this date '10/11.vii.392' turns out to be very problematic. Below we list the planetary positions of **2a** and in addition planetary positions calculated according to the theory of Ptolemy for the date given in the text (10 July 392, 12 p.m.) using a computer programme written by one of us (for details see section 3).

Astronomical positions calculated for 10 July 392, 12 p.m.:

	Text	Calculated
Horoskopos	[ ] Aries	25 Aries
Sun	7 Cancer	17 Cancer
Moon	4 Leo	9 Virgo
Mercury	11 Gemini	10 Leo
Venus	24 Sagittarius	23 Leo
Mars	22 Scorpio	17 Cancer
Jupiter ?	12 Libra	26 Virgo
Saturn	25 Libra	1 Libra
Pars Fortunae	27 Capricornus	

It is clear from a comparison of the astronomical positions in the text with those calculated that the agreement is poor. In fact, the positions calculated for the date given in the text do not provide an acceptable match for the horoscope. Only the positions of Saturn, Jupiter (?; see note to line 11) and the Sun are roughly reproduced (within about 20 degrees), while the Horoskopos seems to have been correctly computed. We note that **2a** shows an error similar to that found previously in **1** (cf. de Jong - Worp, *loc.cit.*), in that the position of Venus is astronomically impossible (elongation of Venus from the Sun larger than 48 degrees). This illustrates the astronomical ignorance of the author. As in the case of **1**, the method of computation of the Pars Fortunae is unclear (cf. de Jong - Worp, *loc.cit.*). Another inconsistency occurs in the placement of the planets in the astrological houses. The position of Mercury (11 Gemini) in the house of the Moon (house IV) is inconsistent with that of (again) Venus (24 Sagittarius) in the house of Jupiter (house IX). Applying the usual procedure for dating ancient horoscopes (see the discussion of **3** below) we were unable to find any plausible astronomical alternative date in the 4th century A.D.

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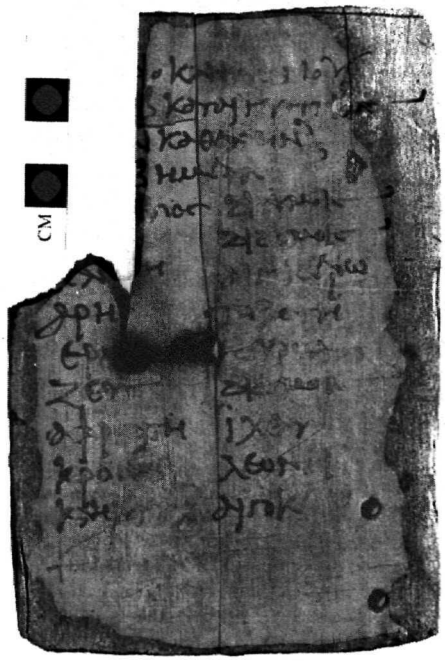
Horoscope 2b:

1	[..S/] Διοκλητιανοῦ		"[Year --] of Diocletian,
2	[.....]β κατ' Αἰγυπτίους		[Month name]2 according to the Egyptians
3	[ἥ ἐστι]ν καθ' Ἕλλην(ας)		[which is] according to the Greeks
4	[.....] β ἡμέρας·		-- at the 2nd hour (?) of the day
5	[Ὡροσκ]όπος	Διδύμοις	Horoskopos in Gemini;
6	[Ἥλιος]	Διδύμοις	Sun in Gemini;

7	Σελήνη	Αἰγόκερ(ῳ)	Moon in Capricorn;
8	Ἄρης	Τοξότῃ	Mars in Sagittarius;
9	Ἑρμ[ῆς]	Ταύρῳ	Mercury in Taurus;
10	Ζεὺς	Διδύμοις	Jupiter in Gemini;
11	Ἀφροδίτη	Ἰχθύσι	Venus in Pisces;
12	Κρόνος	Λέοντι	Saturn in Leo;
13	Κλῆρ(ος) Τύχ(ης)	Αἰγόκερῳ.	Lot of Fortune in Capricorn."
14-16	Three lines of (earlier?) cancelled text.		

11 ϊχθυσι Tab.



Computing the date of **2 b** is complicated because a few essential data are lost, viz.

(1) the numeral of the year of the era of Diocletian (cf. line 1),

(2) the name of the month according to the Egyptian calendar *and* the exact day (cf. line 2; is the 2nd, the 12th or the 22nd day intended?), and

(3) the name of the month according to the Greek/Alexandrian calendar (cf. lines 3-4).

Moreover, it is really difficult to determine what the meaning of the numeral ']β' in line 4 is; the preceding lacuna holds space for approximately only five letters, while we would need: (a) a month name, (b) a day numeral, and (c) an hour of the day. There is hardly space for a combination of all three elements, i.e., if we were to read [. . . ὥρ(α)] β ἡμέρας, only three letters are left for the restoration of both the month *and* the day; one may argue, then, that the name of the month was abbreviated to only two letters + a third letter for a single day numeral, thus producing a restoration like, e.g., '[Με(σορὴ) α, ὥρ(α)]]'. On the other hand, if one prefers restoring a month name written out in full (as is normal) and counting five letters (e.g.: '['Επείφ]'), the numeral 'β' (= 'the 2nd'[8]) after the lacuna would automatically indicate the day in this month. Then, however, one would be left with the single noun 'ἡμέρας' = 'during day time' (cf. the opposite concept of 'νυκτός' = 'during the night'). We do not know of a parallel for this meaning to be found in a horoscope.

The only thing we can say with some degree of confidence about the date of **2b** is that this text, especially in view of the supposed identity of the hand with that of text **2a**, is probably not too distant from the text on the other side, purportedly dating from '10/11.vii.392'.

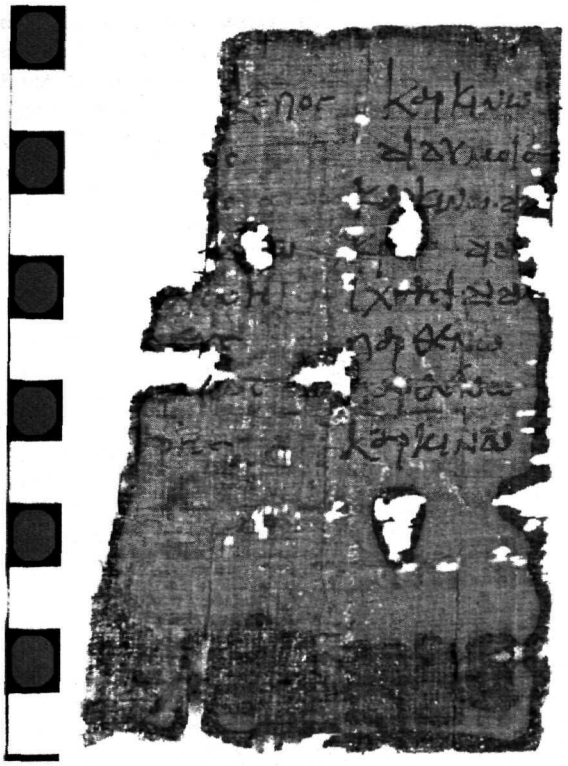
For the same reasons as in the case of **2a**, this text is problematic from an astronomical point of view. Horoscope **2b** only gives positions according to the zodiac sign. It contains again an astronomically impossible position of Venus with an elongation of the Sun of 90 +/- 30 degrees, while at most a difference of 48 degrees is allowed (also according to Ptolemy's theory). In this respect the author shows an admirable consistency. This time the computation of the *Pars Fortunae* is in agreement with

[8] There would hardly be space for 'ι]β' = '12th', or 'κ]β' = '22nd'.

common Greek astrological practice.[9] No astronomical date that matches the positions of **2b** can be found in the 4th century A.D. The only acceptable fit to the positions of the slow-moving planets Saturn and Jupiter and of the Sun falls on 4.vi.388, i.e. rather close in time to the date indicated in **2a**.

§ 3: Horoscope **3**:

From papyrus deposit # P98.1 (Temple of Tutu complex, area D/8, Room 4, Deposit 2: brick collapse from roof and walls in door to room on East, under sand fill[10]). H. 11.5 x W. 7.3 cm. Top margin 1, bottom margin 4.5 cm. Direction of writing parallel with the papyrus fibers. Verso blank.



1	Ὡρο]σκόπος	Καρκίνῳ	"Horoskopos in Cancer;
2	Ἥλι]ος	Διδύμοις	Sun in Gemini;
3	Ἑρμ]ῆς	Καρκίνῳ, Διδύμ(οις)	Mercury in Cancer, Gemini;
4	Ἀφρ]οδί[τ]ω	Κρ[ι]ῷ, Διδύμ(οις)	Venus in Aries, Gemini;
5	Σ]ελήνη	Ἰχθύσι, Διδύμ(οις)	Moon in Pisces, Gemini;
6	] Ζεὺς	Παρθένῳ	Jupiter in Virgo;
7	] Κρόνος	Παρθένῳ	Saturn in Virgo;
8	] Ἄρης	Καρκίνῳ	Mars in Cancer"

4 Ἀφροδίτη 8 The function of the horizontal dash in the second column between lines 7-8 is uncertain.

[9] Various methods to calculate the position of 'Pars Fortunae' (= 'Lot of Fortune') in Greek astrology are discussed by A. Bouché-Leclercq (*L'astrologie grecque*, Paris 1899; repr. Aalen 1979). Text **4a** appears to follow the most common method in which one takes the distance Sun - Moon in degrees and adds it to the Horoskopos.

[10] Dr Hope kindly informs us (see fn. 3) that P98.1 was found during clearing up of collapse between seasons of work, not during excavations as such. The deposit from which it comes extends into Room 14, the most easterly of D/8, and also into Room 4. It is impossible, therefore, to be sure of the room it came from.

Unlike **2a** and **2b**, no indication of any dating elements whatsoever is preserved in this incomplete text. It is, however, conceivable that a date was originally written, but in the part of the papyrus now lost. Moreover, it is also possible that, after all, the top of our document is incomplete and that there was some extra space between a supposed dating formula and the start of the listing of the position of the various planets etc. A peculiar feature of **3** is the addition of a second zodiac sign (Gemini) to the entries for Mercury, Venus and the Moon; we attribute this peculiarity to a scribal error.

To attempt to determine the date of this horoscope we apply the usual procedure of dating ancient horoscopes, which consists of the following three steps:

(1) determine the year from the positions of the slow-moving outer planets Mars, Jupiter and Saturn;

(2) determine the day and the month from the positions of the Moon and the Sun and from the fast-moving inner planets Mercury and Venus. The latter two are constrained by solar system mechanics to be close to the Sun (within 28 and 48 degrees, respectively); and

(3) determine the hour of the day from the rising zodiac sign (the Horoskopos).

Since in steps (1) and (2) a number of different independent constraints must be satisfied simultaneously, the dating process usually converges to a unique identification, even when only the zodiac signs are given. From the zodiac sign of the Horoskopos the hour of the day can be determined with an accuracy of about one hour.

For the astronomical dating of horoscopes one usually compares the horoscopic positions of the planets with those calculated according to modern astronomical theory (cf. *Gr.Hor.* and Jones, *op.cit.* [fn. 6]). Here we use for this purpose planetary positions calculated with a computer programme written by one of us (de Jong, unpublished). This programme calculates planetary positions according to the theory of Ptolemy as described in the Almagest.[11] Tropical longitudes are converted to sidereal longitudes using an algorithm given by Theon of Alexandria (second half 4th century A.D.) as quoted by Jones (*op.cit.*, appendix I, p. 343). Planetary positions calculated with this programme provide remarkably good fits to fragments of ephemerides for the years 348 and 349 A.D. as listed in P.Oxy. 4179 (in Jones, *op.cit.*) and in P.Heidelberg inv. no. 34[12]. These ephemerides were most probably calculated using Ptolemy's Handy Tables, which provided a more convenient way to calculate the positions of the planets for the average astrologer of those days.

We now use the method described above to date horoscope **3**. Step (1) results in 332 A.D. as the only possible year in the fourth century A.D. The constraints provided by step (2) then yield '2 June 332' as the only possible date. The Horoskopos in Cancer fixes the time to 8 a.m. The positional data of **3** and the calculated fit are presented below.

Astronomical positions calculated for 2 June 332 A.D., 8 a.m.:

	Text	Calculated
Horoskopos	Cancer	21 Cancer
Sun	Gemini	11 Gemini
Moon	Pisces, {Gemini}	12 Pisces
Mercury	Cancer, {Gemini}	22 Taurus
Venus	Aries, {Gemini}	26 Aries
Mars	Cancer	11 Cancer
Jupiter	Virgo	3 Virgo
Saturn	Virgo	18 Virgo

The overall quality of the fit is quite good, though the position of Mercury is off by one zodiac sign.

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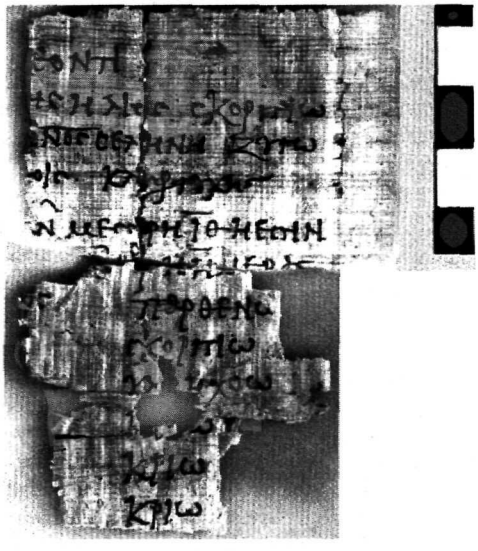
[11] Cf. O. Pedersen, *A Survey of the Almagest*, Odense 1974; G.J. Toomer, *Ptolemy's Almagest* 1984.

[12] Published by O. Neugebauer in Hist.-filol. Medd. Kong. Dankse Vidensk. Selskab 36:4 [1956].

SB 26, 16829

§ 4: Horoscopes **4a** and **4b**:

From papyrus deposit # P00.22 (Temple of Tutu complex, area D/8, Room 4, Deposit 2; possibly the same location as **3**, quo vide). H. 8.5 x W. 6.2 cm. Top margin 0.7, right hand margin 1.3 cm. In line 7 there is an intercolumnium of 1.6 cm. The verso is blank. Remains of a papyrus sheet, reconstructed from three fragments, that contains two fragmentary horoscopes, viz. lines 1-4 and 5-12.



1 Λ]έοντι
2]ης Ἥλιος Σκορπίῳ
3 Κρ]όνος Σελήνη Ζυγῷ
4 Διδύ]μοις Κλῆρ(ος) Τύχης

5 [(Ἔτους) *n* Διοκλητι]ανο(ῦ) Μεσσ[ο]ρὴ ιθ̄ ἥ ἐστιν
6 [κατ' ------, *month*]¯ ὥρ(α) η̄ ἡμέρας
7]ος Παρθένῳ
8 (*Planet*)] Σκορπίῳ
9 "] Ὑδρηχόῳ
10 "] Κριῷ
11 "] Κριῷ
12 "] Κριῷ

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2 Restore Ἄρ]ης or Ἑρμ]ῆς? 5 Μεσορὴ 7 Rest. Ὡροσκόπ]ος, Ἥλι]ος, or Κρόν]ος?

Translation

1	---]	in Leo
2	---] Mercury/Mars,[13] Sun	in Scorpio
3	---] Saturn, Moon	in Libra
4	---]	in Gemini, Lot of Fortune (Pars Fortunae)
5	[Year *n* of Diocleti]an, Mesore 19 which is	
6	[according to the Greeks/Egyptians *month, day*] *n*, the 8th hour of the day;	
7	---]os[14]	in Virgo
8	---]	in Scorpio
9	---]	in Aquarius
10	---]	in Aries
11	---]	in Aries
12	---]	in Aries

We label the two horoscopes **4a** (lines 1-4) and **4b** (lines 5 - 12). In view of what is known about the archaeological context and considering palaeaographical aspects as well we assume that both horoscopes refer to dates in the 4th century A.D. On the basis of the limited amount of information available in the text as far as preserved we shall try to assign dates to them. Fortunately, this turns out to be possible for both texts.

In spite of the fact that only three planets are firmly identified in **4a** we are able to carry out steps '1' (Saturn) and '2' (Sun and Moon) of the dating process (for the method, cf. the introduction to **3**). The position of 'Saturn in Libra' requires the date of the horoscope to fall in the years 303-305, 332-334, 362-364 or 391-393 A.D. To proceed we calculated planetary positions for November 8 ('Sun in mid Scorpio') for all years in each of the above intervals. Of the twelve possible years only November 364 fits. Next we used the position of the Moon in Libra to further restrict the date to 6, 7, or 8 November 364. Finally, the positions of 'Horoskopos in Leo' and 'Pars Fortunae[15] in Gemini' restrict the date to 6 November 364 A.D. at 11 p.m. (Pars Fortunae = Moon - Sun + Horoscopos, see Bouché-Leclercq [fn. 9]).

Astronomical positions calculated for 6 November 364 A.D., 11 p.m.:

	Text	Calculated
[Horoskopos	Leo]	8 Leo
Sun	Scorpio	15 Scorpio
Moon	Libra	2 Libra
[Mercuri]us	Scorpio	13 Scorpio
[Venus	Scorpio]	6 Scorpio
[Mars	Libra]	27 Libra
[Jupiter	Gemini]	19 Gemini
[Sa]turn	Libra	29 Libra
Pars Fortunae[16]	Gemini	25 Gemini

The following reconstruction of the Greek text shows how the fit as calculated can be accomodated onto the papyrus fragment:

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[13] The text allows two planetary assignments, Ἑρμ]ῆς = 'Mercury', or Ἄρ]ης = 'Mars'.

[14] The text allows three planetary assignments, Ὡροσκόπ]ος = 'Horoscopos', Ἥλι]ος, = 'Sun', and Κρόν]ος = 'Saturn'.

[15] Cf. above, fn. 9.

[16] Cf. above, fn. 9.

1	[Ὡροσκόπος Λ]έοντι	The Horoskopos in Leo
2	[Ἀφροδίτη Ἑρμ]ῆς Ἥλιος Σκορπίῳ	Venus, Mercury, the Sun in Scorpio
3	[. . . . . Ἄρης Κρ]όνος Σελήνη Ζυγῷ	--- Mars, Saturn, the Moon in Libra
4	[. . . Ζεὺς Διδύ]μοις Κλῆρ(ος) Τύχης *Vacat*	--- Jupiter in Gemini, Pars Fortunae

We conclude that the palaeographical aspects of this text are consistent with our suggested date. We must admit, however, that we have no solution to offer for the question of what happened at the beginning of lines 3 and 4; our present restorations leave gaps of approximately four letters open for which we have nothing to suggest.

The date of horoscope **4b**:

The problem posed by **4b** is quite different from that encountered for **4a**, because the text gives us some, albeit incomplete, information on the day and the time of birth, while on the other hand only a list of zodiac signs is preserved without any information on planetary occupations. To proceed we make the following observations/assumptions:

(1) the list of zodiac assignments starts out with the Horoskopos; this is consistent with common practice in the 4th century A.D.;

(2) the Sun, Moon and planets are listed in the order of the zodiac signs occupied, a practice which is not uncommon in Greek astrology in the 4th century A.D. (*Gr.Hor.*; Jones *op.cit.* [fn. 6]); the listing may well be incomplete because it starts at Virgo and breaks off at Aries; and

(3) in the 4th century A.D. Mesore 19 in the *Egyptian* calendar corresponds to Julian dates varying from 23 May in 300 A.D. to 28 April in 399 A.D.[17] Such a date implies 'Sun in Taurus' (outside the range of zodiac signs preserved in the text), which is consistent with 'Horoskopos in Virgo' at the 8th hour of the day (about 2 p.m.).

We have run our computer programme for all dates in the 4th century (300-399 A.D) corresponding to Mesore 19 in the Egyptian calendar and found that there is only one date in this century that fits the preserved astronomical data: 14 May 337 A.D. at 1:30 p.m. The planetary positions are listed below.

Astronomical positions calculated for 14 May 337 A.D. at 1:30 p.m.:

	Text	Calculated
Horoskopos	Virgo	16 Virgo
[Saturn]	Scorpio	19 Scorpio
[Jupiter]	Aquarius	22 Aquarius
[Moon]	Aries	22 Aries
[Venus]	Aries	17 Aries
[Mars]	Aries	18 Aries
[Sun	-----]	23 Taurus
[Mercury	-----]	18 Gemini

The Julian date 14 May 337 A.D. corresponds to 'Mesore 19 in the Egyptian calendar' or to 'Pachon 19 in the Greek/Alexandrian calendar' in regnal year 53 of Diocletian (= A.D. 336/337). Therefore, according to our reconstruction the Greek text of **4b** would have read:

5	[(Ἔτους) νγ Διοκλητι]ανο(ῦ) Μεσσ[ο]ρὴ $\overline{\iota\theta}$ ἥ ἐστιν	"Year 53 of Diocletian, Mesore 19 which is
6	[καθ' Ἕλλ(ηνας) Παχὼν ι]$\overline{\theta}$ ὥρ(α) $\overline{\eta}$ ἡμέρας	acc. to the Greeks Pachon 19, the 8th hour of the day;
7	[. . . Ὡροσκόπ]ος Παρθένῳ	Horoskopos in Virgo;

[17] One should note that the kind of calendar to which Mesore 19 refers has not been indicated. Our approach presupposes the same order of datings according to the Egyptian and the Greek calendar as the one found in other horoscopes from Kellis (cf. above, the introduction to **2a,b**).

8	[...Κρόνος]	Σκορπίῳ	Saturn in Scorpio;
9	[...Ζεὺς]	Ὑδρηχόῳ	Jupiter in Aquarius;
10	[...Σελήνη]	Κριῷ	Moon in Aries;
11	[...Ἀφροδίτη]	Κριῷ	Venus in Aries;
12	[...Ἄρης]	Κριῷ	Mars in Aries;
13	[...Ἥλιος	Ταύρῳ	Sun in Taurus;]
14	[...Ἑρμῆς	Διδύμοις	Mercury in Gemini.]"

Again, we conclude that there is no palaeographical obstacle against this astronomical dating. At the same time we have to add that, as in the case of **4a**, we have no solution to offer for the question of what happened precisely at the beginning of lines 7 - 12; while we reckon with the possibility of some indentation (a comparison with the size of the lacunas at the start of lines 5, 6 shows that there is space for about 11 letters) our present restorations in these lines 7 - 12 leave gaps of 3 letters for which we have nothing to suggest.

Final observations:

(1) We now have a total of six horoscopes from Kellis, dated either directly or indirectly. These cover a span of 60 years within the fourth century A.D. (**3**: 332 A.D. — **2a**: 392 A.D.). This situation is in agreement with other documents and coins from the site among which the fourth century A.D. is very well represented. Only future excavations may indicate the nature of any earlier astrological activity at Kellis. Of these six fourth-century horoscopes, five come from the temple complex (**2a**, **2b**, **3**, **4a**, **4b**) and one from room 6 in House 3 (**1**).

(2) We think that the new Kellis horoscopes on wood, **2a** and **2b**, have not been calculated, but were composed for educational purposes. They were, like the previously published horoscope **1**, written down on more durable material and may have been used to illustrate methods of horoscopic practice, presentation and interpretation. In light of palaeographical considerations (see our introduction to **2a** and **2b**) we tend to believe that all three horoscopes on wood may be the product of one single author working over a period of at least two decades.[18] At the same time we do not know how to account for the presence of **1** in House 3, if it were written by the same hand as **2a** and **2b**.

The date referred to in **2a**, '10/11.vii.392' is of interest in itself, because this date is the latest precise date mentioned in any document from Ismant el-Kharab/Kellis known to us. It seems to reflect a moment in history when there was some form of human activity at this site still going on. Unfortunately, however, we do not know the precise moment **2a** was written down. After all, we have only the date of the birth of the young Ploutianos (cf. line 15), but we do not know his precise age when his horoscope was actually compiled: maybe a few years later than the year 392, in – say – 397, or even in 401? Or was a fake date chosen 'prospectively' by an astrologer who had only general demonstration purposes in mind? In that case, however, one would not expect an individual personal name like that of Πλουτιανός after the noun 'γένεσις' = birth (cf. the situation in **1**, line 1). Be that as it may, in the present situation we must limit ourselves to the observation that to date there is no reliable documentary evidence that the site of Kellis was still inhabited during any part of the 5th century (cf. also the remarks made by C.A. Hope in P.Kell. V Copt., p. 116).

[18] Next to four astronomical, resp. astrological Greek ostraka (see O.Bodl. II 2176-2178, O.Stras. 811), we know of only two more Greek astronomical texts on wooden boards from Egypt, viz. the two planetary tables published by O. Neugebauer, *A Greek Planetary Table*, CdE 32 (1957) 269-272 and by O. Neugebauer, P.J. Sijpesteijn & K.A. Worp, *A Greek Planetary Table*, CdE 52 (1977) 301-10; for the latter see the discussion by A. Jones, *The Date of the Astronomical Almanac Tab. Amst. inv. no. 1*, CdE 68 (1993) 178-185. It is probably not without good reason that such planetary tables, which might be consulted quite frequently, were sometimes written on a material more durable than papyrus.

(3) The Kellis horoscopes on papyrus (**3**, **4a**, **4b**) show a degree of accuracy and internal consistency which is typical for the period; see the editions of relevant texts in *Gr.Hor.*, and A. Jones, *op.cit.* (fn. 6). They seem to be products of a genuine astrological practice in Kellis; there is no compelling reason to think that these texts were imported from the Nile Valley into the Dakhleh Oasis. As for the question, why horoscopes **4a** and **4b** are combined on one piece of papyrus, we tend to believe that in view of their chronological order (**4a**: A.D. 364; **4b**: A.D. 337), they form part of a later collection/compilation of horoscopes which came into being at some moment between 364 and the date of the abandonment of the village.

Amsterdam / Utrecht — T. de Jong
Amsterdam — K. A. Worp