Originalveröffentlichung in: David Brown (Hrsg.), The Interactions of Ancient Astral Science, Bremen 2018, S. 69-123
Online-Veröffentlichung auf Propylaeum-DOK (2022), DOI: https://doi.org/10.11588/propylaeumdok.00005323

3.a

Egypt as an astronomical-astrological centre between Mesopotamia, Greece, and India

Joachim Quack

1. The place of astronomy-astrology in Egypt in general

Egypt is not normally regarded as a place where astronomy and astrology were highly developed – at least not in modern times. In ancient times, among Greek and Roman authors, it had a good reputation for being, together with Mesopotamia, the place of origin of astronomical and astrological lore.[1] The reason that it fell from favour in modern times is mainly based on what turned up in the archaeological record. There were numerous cuneiform tablets showing fairly elaborate methods of mathematical astronomy. In contrast, Egyptian astronomical texts and images were mainly of a very simple level, more decorative than mathematical. The preserved material seemed so obviously to belie all ancient testimonies to sophisticated astronomy in Egypt that they were regarded as erroneous. The (in)famous statement of O. Neugebauer: "Egypt has no place in a work on the history of mathematical astronomy," can be considered to have been a bit bluntly formulated, but typical of modern scholarly attitudes.[2]

In order to get a meaningful access to the Egyptian way of dealing with astral phenomena,[3] a few general words are obligatory. The first, and most basic, concerns the question of preservation. In fact, Neugebauer's derision of Egyptian astronomy was in no small part based on the fact that "among the enormous mass of Egyptian inscriptions

---

[1] See e.g. the material in Bouché-Leclercq, *L'astrologie grecque* (Paris 1899; repr. Aalen 1979), pp. 51f. n.1.

[2] O. Neugebauer, *A History of Ancient Mathematical Astronomy* (= HAMA) New York/Heidelberg/Berlin 1975), Part Two, p. 559. See e.g. the reviews by A. Spalinger, *OLZ* 87 (1992), cols. 23-26 and R. Wells, *BiOr* 49 (1992), cols. 723-728, both to Leitz, *Astronomie*, who criticise him from the beginning because he disagrees with Neugebauer's negative evaluation of the quality of Egyptian astronomy. A more balanced judgement is proposed by L. Depuydt, Ancient Egyptian Star Clocks and Their Theory, *Bibliotheca Orientalis* 55 (1998), cols. 5-44, there cols. 5-7. See also G. DeYoung, Astronomy in Ancient Egypt, in: H. Selin ed., *Astronomy across Cultures. The History of Non-Western Astronomy* (Dordrecht/Boston/London 2000), pp. 475-508 who suffers from a lack of first-hand control of the sources.

[3] For the basic material, O. Neugebauer & R.A. Parker, *Egyptian Astronomical Texts* (=EAT), 3 volumes (Providence/ London 1960-1969) is still indispensable in spite of its narrow focus on "scientific" usages; the religious and cultural significance is studied in greater detail in A. von Lieven, *Der Himmel über Esna. Eine Fallstudie zur Religiösen Astronomie in Ägypten*, *Ägyptologische Abhandlungen* 64 (Wiesbaden 2000); specifically for funerary compositions, see R. Krauss, *Astronomische Konzepte und Jenseitsvorstellungen in den* Pyramidentexten, *Ägyptologische Abhandlungen* 59 (Wiesbaden 1997); P. Wallin, *Celestial Cycles. Astronomical Concepts of Regeneration in the Ancient Egyptian Coffin Texts*, *Uppsala Studies in Egyptology* 1 (Uppsala 2002).

and papyri from all periods of Egyptian independent history there has not been found a single record of astronomical observation."[4] What was overlooked by Neugebauer (and many others) is the simple fact that in spite of their seeming mass, the Egyptian records are far from being an unbiased sample of the texts actually composed and used. The basic Egyptian writing material, papyrus, is organic, in contrast to the clay tablets of Mesopotamia, and thus by nature perishable. Papyrus is only preserved in Egypt when it is deposited in a desert-like climate, that is, mostly in tombs. Only in a very few cases, mostly of the latest periods, are the levels of settlements high enough to have escaped from the moisture of the annual Nile inundation. We cannot expect to find a fair representation of the daily usage of texts from among those papyri taken to the tombs. In most cases those taken were of a funerary or mortuary nature. Literature, in the sense of Belles-Lettres, was present, but rather rarely. There is no particular reason why anyone would leave behind, in a tomb, any papyri of astrological or astronomical content. Indeed, every single Egyptian papyrus of this nature comes from a settlement area.

The other sorts of Egyptian texts, which are likely to be preserved today, are those of the monumental record, be it private (mainly from tombs) or public (mainly from temples). It is also not likely that anybody would set up monumental inscriptions with precise astronomical observations[5] – although we have at least the case of the astronomical inscription from Tanis,[6] and a lot of examples where astronomical decoration was depicted, embedded in some religious context.

This bias of the preserved texts is also evident in a lot of other genres, beginning with the sheer fact that so far as administrative enterprises, economic businesses and everyday life in Egypt are concerned, our documentation is very small, and mostly limited to a few select cases such as the Ramesside period workman's community of Deir el-Medina (dating to about 1300-1100 BCE). I would guess that the only cases from Egypt where we have a relatively representative sample of what was going on so far as texts are concerned are the Roman period settlements of Tebtunis and Soknopaiou Nesos.[7] Significantly, in both cases, we have preserved a large number of astronomical as well as astrological texts, the astronomical ones for the most part fulfilling the technical side of the astrological practice.[8] I would conclude from such evidence that astronomical and astrological lore was never neglected by the Egyptians.

---

[4] Neugebauer, HAMA, p. 560.

[5] Ptolemy is supposed to have given planetary parameters in an inscription at Canobus (see Neugebauer, HAMA, pp. 901 and 913-917; N.T. Hamilton, N.M. Swerdlow & G.J. Toomer, The Canobic Inscription: Ptolemy's earliest Work. *Acta Historia Scientiarum Naturalium et Medicinalium* 39 (1987), pp. 55-73), but they are preserved only in medieval manuscript copies. A rare example of an actual preserved Greek astronomical inscription is the Keskinto text, see Neugebauer, HAMA, pp. 698-705; A. Jones, "IG" XII,1 913: An Astronomical Inscription from Hellenistic Rhodes, *Zeitschrift für Papyrologie und Epigraphik* 158 (2006), pp. 104–110. For both see Ch.5 of this volume.

[6] J. J. Clère, Un texte astronomique de Tanis, *Kêmi* 10 (1949), pp. 3-27, for the Decans, see especially pp. 6f. and 21-27; Neugebauer & Parker, EAT III, pp. 44-46 Nr. 35, Pl. 23; J. Lull, *La astronomía en el antiguo Egipto* (València 2005), pp. 162-165.

[7] See for both of them S. Lippert & M. Schentuleit eds., *Tebtynis und Soknopaiou Nesos. Leben im römerzeitlichen Fajum* (Wiesbaden 2005).

[8] For Tebtunis, see K. Ryholt, On the Contents of the Tebtunis Temple Library. A Status Report, in: Lippert & Schentuleit, eds., *Tebtynis und Soknopaiou Nesos*, pp. 141-170; there 152f.; V.E. Jørgensen & A. Winkler, Astrological Texts from the Tebtunis Temple Library, lecture given at the IX^{e} Congrès International des

My second remark concerns chronology.[9] The truly sophisticated cuneiform astronomical texts are late; mainly from the Hellenistic and Parthian periods, even if some forerunners are earlier.[10] It would be odd, therefore, to criticise the Egyptians for not having achieved this stage before that time, and yet Neugebauer's analysis, with its emphasis on the periods of self-rule, implies just such an attitude. It is one which is curiously absent from his judgement of Mesopotamian mathematical astronomy where the fact that much of its development happened not during periods of independent rule, but under Achaemenid, Greek and Parthian hegemony, seems not to have bothered him.

This question is also intimately linked to the problem of originality. For the earlier part of the Graeco-Roman period, Egypt is still relatively lacking in terms of preserved astronomical sources. When they do appear in the late Ptolemaic and Roman period, they are normally considered to be derivative of Babylonian or Greek Hellenistic methods,[11] and thus not attesting to any independent intellectual achievement. For those examples written in the Greek language and script, it has even become customary to consider them simply as testimonies of Greek science, thus dissociating them from their geographical origin, which is Egypt. As a first step, then, irrespective of the possibility of Babylonian influence on the development of the attested astronomical calculations and astrological practices, it would be better simply to recognise the fact that Roman-period Egypt was not a backwater in this area, when compared with what was happening simultaneously in Mesopotamia. So far as Ptolemaic Egypt is concerned, the situation is likely to have been similar, although the dearth of sources from this earlier period makes a secure judgement here more difficult.

Finally, we come to the question of application and actual use. Neugebauer seems to have been in search of pure science, and he believed he had found it in the Mesopotamian so-called 'Astronomical Cuneiform Texts' (ACTs), just as he had in Ptolemy's *Syntaxis*. This selective approach is not likely to do justice even to those sources,[12] and it is definitely the incorrect approach to the Egyptian material. Situating this material in its context is the only way to grasp its meaning and significance for Egyptian culture.[13]

Etudes Démotiques, Paris, August 2005. There is no comparable reckoning for Soknopaiou Nesos, but the astronomical text papyrus Vienna D 4876 published by Neugebauer & Parker, EAT III, pp. 243-250 is probably from that site, as well as the astrological treatises mentioned below, notes 174 and 175; and the text published in F. Hoffmann, Astronomische und astrologische Kleinigkeiten I: Pap. Wien D 6005, *Enchoria* 22 (1995), pp. 22-26.

[9] Already stressed by Depuydt, *Bibliotheca Orientalis* 55, pp. 6f.

[10] As argued by D. Brown, *Mesopotamian Planetary Astronomy-Astrology*, *Cuneiform Monographs* 18 (Groningen 2000), pp. 261-263.

[11] Neugebauer, HAMA, p. 565.

[12] For the basic practical, i.e. astrological intention of the Mesopotamian texts, see D. Brown, *Mesopotamian Planetary Astronomy-Astrology* (Groningen 2000); idem, Astronomy – Astrology in Mesopotamia, *Bibliotheca Orientalis* 58 (2001), cols. 41-59. For Ptolemy, we should always keep in mind that he was the very same author who wrote the astrological *Tetrabiblos*. For the link between Greek astronomical and astrological papyri, see A. Jones, The Place of Astronomy in Roman Egypt, *Apeiron* 27/4 (1994), pp. 25-51.

[13] Neugebauer's general trend to de-contextualise the material is obvious, e.g. in his refusal to deal with biographical and socio-cultural questions (Neugebauer, HAMA, pp. 1 and 16). For a more detailed critique, see J. F. Quack, On the concomitancy of the seemingly incommensurable, or why Egyptian astral science has to be analysed within its cultural context, in J. F. Steele ed., *The Circulation of Astronomical Knowledge in the Ancient World* (Leiden/Boston 2016), pp. 230-44.

From the start, I would like to stress that the manifestations of what is considered 'science' nowadays are, in the Egyptian culture, not normally such isolated exercises of the mind. They are part of a world-view deeply embedded with religious concepts. It is evident in this view that natural phenomena were classified with a view to connecting them with gods.[14] This must be recognised when approaching the material on stellar lore. A rich system of chronocrator gods and goddesses connected to hours, days and months was established;[15] and stars and planets were each assigned a tutelary deity. This shows, for example, that the basic ideas of cosmic harmony and a relation between the macrocosm and microcosm was present in Egypt in what can safely be termed local traditions, and that there is no need to invoke foreign, say Mesopotamian, influence in order to explain its presence in astrological treatises of supposedly Egyptian authors such as Nechepso and Petosiris.[16]

Most of the earlier manifestations of astronomical decoration in Egypt are from two areas, the funerary realm and the temple.[17] Although much less numerous in the surviving record for the earlier periods, the temple context is likely to have been primary. There is one basic set of papyrus compositions comprising one expression of the essential knowledge of the Egyptians; and it includes some astral knowledge, e.g. on the Decans, the lunar phases and on the varying length of day and night during the seasons.[18] We also have the *Fundamentals of the Course of the Stars* (nowadays normally known by its modern name the *Book of Nut*), a vast composition describing a great range of the celestial phenomena (including the behaviour of migratory birds) within a framework of religious conceptions.[19] Included are the daily circle of the Sun, the yearly circle of the stars, especially the Decans,[20] the phases of the Moon during a lunar month, perhaps even some basic notions as to the motion of the planets.

In the monumental decoration of temples,[21] astronomical images are concentrated mainly in two areas. Here, mainly on the ceilings, astronomical decoration is typical,

---

[14] A. von Lieven, Das Göttliche in der Natur erkennen. Tiere, Pflanzen und Phänomene der unbelebten Natur als Manifestationen des Göttlichen, *Zeitschrift für Ägyptische Sprache und Altertumskunde* 131 (2004), pp. 156-172, pl. XX-XXI; F. Hoffmann, Das Göttliche in der Natur – Biologie im alten Ägypten, in: *Matthias-Grünewald-Gymnasium Würzburg, Jahresbericht 2004/2005* (Würzburg 2005), pp. 196-204; H.-W. Fischer-Elfert, Weitere Details zur Göttlichkeit der Natur – Fragmente eines späthieratischen Lexikons, *Zeitschrift für Ägyptische Sprache und Altertumskunde* 135 (2008), 115-130.

[15] See especially J. Yoyotte, Une monumentale litanie de granit. Les Sekhmet d'Amenophis III et la conjuration permanente de la Déesse dangereuse, *Bulletin de la Société Française d'Égyptologie* 87-88 (1980), pp. 46-75; Chr. Leitz, *Studien zur ägyptischen Astronomie*, *Ägyptologische Abhandlungen* 49 (Wiesbaden^2 1991), pp. 17-21; D. Mendel, *Die Monatsgöttinnen in Tempeln und im privaten Kult, Rites égyptiens* XI (Turnhout 2005).

[16] As proposed by D. Brown in Ch.5 in this volume.

[17] For the following sections, I refer to my much fuller discussion in Quack, *Dekane*. See n. 20, below.

[18] Manuscripts published in F. Griffith & W.M.F. Petrie, *Two Hieroglyphic Papyri from Tanis* (London 1889); J. Osing, *Hieratische Texte aus Tebtunis I, The Carlsberg Papyri 2, CNI Publications*, 17 (Copenhagen 1998), pp. 219-275; J. Osing & G. Rosati, Papiri geroglifici e ieratici da Tebtynis (Florence 1998), pp. 19-54.

[19] New edition A. von Lieven, *Grundriß des Laufes der Sterne. Das sogenannte Nutbuch. The Carlsberg Papyri 8, CNI Publications* 31 (Copenhagen 2007).

[20] On these stars see J.F. Quack, *Beiträge zu den ägyptischen Dekanen und ihrer Rezeption in der griechisch-römischen Welt*, habilitation thesis Berlin 2002 (in preparation for publication).

[21] Contrary to Evans, *Journal for the History of Astronomy* 44, p. 26, the presence of zodiacal decoration in the temples does not in itself prove that "the traditional functions of the Egyptian temples had recently expanded to include horoscopic astrology".

representing the sky and its phenomena. The general framework is connected with solar-religious concepts; sometimes we also have depictions in this area of the course of the Sun during the twelve seasonal hours of the day.

The second is in the Osirian complexes. The presence of astronomical decoration in these areas seems to be due to certain technical aspects of religious rituals. Nightly vigils were kept as part of the practice of the cult of Osiris, and these were structured on the twelve seasonal hours of the night. For correct observation of the ceremonies, it was necessary to keep track of time, and a stellar clock was in use to this end. This led to astronomical depictions; at first more technical in the form of tables with rising times of Decans during the year, but later mostly in a more decorative pattern (the so-called 'classical sky image'). We have depictions of the phenomena of the starry sky on the underside of coffin lids and on the ceilings of royal and private tombs, which are likely to have derived from the decoration of Osirian complexes, even though the latter are attested only at a later date than the private funerary monuments.[22]

The Egyptian calendar was basically a very neat and simple system of 365 days per year without intercalations, with three seasons each of four months, each of them with 30 days. A month was divided into 3 decades, each of ten days. Five so-called epagomenal days were added at the end of the year. This civil calendar was so practical that it became the instrument of choice of astronomers even after it ceased officially to be in favour for bureaucratic purposes.

Besides this, there was a lunar calendar in use in the temples which was important for some festivals. In many cases, since the Middle Kingdom the service of groups of priests was changed from a regulation by the civil calendar to one by the lunar calendar, probably for the simple reason that lunar festivals meant extra provisions, and thus a service rotation according to the lunar calendar entailed a more equal distribution of the rations.[23] The existence of a lunar calendar[24] entailed at least a basic knowledge of the behaviour of the Moon. The most important preserved text for this is the papyrus Carlsberg 9 from the second century CE which develops a 25-year scheme for the length of the lunar month.[25] Recently, Lippert was able to show that the dates for the

---

[22] A good case in point is the tomb of Senmut containing not only an astronomical ceiling (the earliest still in existence in Egypt) but also a wall decoration program derived from Osirian rituals.

[23] U. Luft, *Die chronologische Fixierung des ägyptischen Mittleren Reiches nach dem Tempelarchiv von Illahun* (Vienna 1992), especially pp. 190f. and 196f.

[24] For the tricky details of the Egyptian lunar calendar, see e.g. R. A. Parker, *The Calendars of Ancient Egypt*, *SAOC* 26 (Chicago 1950); A. Spalinger, Notes on the Ancient Egyptian Calendars, *Orientalia* 64 (1995), pp. 17-32; idem, Review Article: Ancient Egyptian calendars: How Many were there?, *Journal of the American Research Center in Egypt* 39 (2002), pp. 241-250; L. Depuydt, Civil Calendar and Lunar Calendar in Ancient Egypt, *Orientalia Lovaniensia Analecta* 77 (Leuven 1997) with a review by Chr. Leitz, *BiOr* 57 (2000), cols. 75-81; J.A. Belmonte Avilés, Some Open Questions on the Egyptian Calendar: an Astronomer's View, *Trabajos de Egiptología* 2 (2003), pp. 7-56; J.S. Nolan, The Original Lunar Calendar and Cattle counts in Old Kingdom Egypt, in: S. Bickel & A. Loprieno eds., *Basel Egyptology Prize 1. Junior Research in Egyptian History, Archaeology, and Philology, Aegyptiaca Helvetica* 17 (Basel 2003), pp. 75-97. Here, I can only note that I seriously doubt the real existence of the "original lunar calendar" postulated by Parker; a more detailed treatment will appear elsewhere.

[25] Original edition O. Neugebauer & A. Volten, *Untersuchungen zur antiken Astronomie IV. Ein demotischer astronomischer Papyrus (Papyrus Carlsberg 9)*, *Quellen und Studien zur Geschichte der Mathematik B* 4 (Berlin 1938); additional fragments in K.-Th. Zauzich, Drei neue Fragmente zu Pap. Carlsberg 9, *Enchoria* 4 (1974), pp. 157-158, pl. 12; F. Hoffmann, Astronomische und astrologische Kleinigkeiten II: P. Heidelberg

monthly rotation of the temple *phylae* at Soknopaiou Nesos during the Roman period were indeed based on such a scheme, and not on actual observations of the Moon.[26]

Contrary to what can be read in some scholarly statements,[27] Egypt has always had a developed culture of divination.[28] Some basic sort of astral omina can be indirectly inferred as early as the Ramesside period (about 1300-1070 BCE). The most important sources are on the one hand formulations attesting the use of Sirius prognoses for the new year (see below), and on the other a passage in the victory stela of pharaoh Merenptah against the Libyan invaders, where the defeat of the enemies is foretold by people observing the stars and the winds.[29] I have some suspicion that this might refer to an eclipse, since the observation of the wind direction during an eclipse was relevant for attributing the omen to a particular country.[30] Observation of the winds in connection with astrological omina is also evident in the Late Period in the inscription of the astrologer Harkhebi (see below). In an inscription from the ninth century BCE, political turmoil is connected with a lunar eclipse.[31]

Later, when the personal individual application of astrological lore was taken up in the form of horoscopes, the Egyptians readily embraced the new activity, and it even

---

Inv. Dem. 40 und 41, *Enchoria* 24 (1997), pp. 34-37, pl. 1; recent discussion in L. Depuydt, The Demotic Mathematical Astronomical Papyrus Carlsberg 9 Reconsidered, in: W. Clarysse, A. Schoors, & H. Willems eds., *Egyptian Religion, the Last Thousand Years. Studies Dedicated to the Memory of Jan Quaegebeur, Part II. Orientalia Lovaniensia Analecta* 85 (Leuven 1998), pp. 1277-1297. A. Spalinger, Thoth and the Calendars, in: idem ed., *Revolutions in Time: Studies in Ancient Egyptian Calendrics, VA Supplement 6* (San Antonio 1994), pp. 45-60, there, p. 57 n. 15 and p. 59 n. 42 has proposed deriving the mathematical scheme of pCarlsberg 9 from Babylonia, but this seems to be based on little more than the supposition that a mathematical modular system would surpass the abilities of Egyptian astronomy. If the text were derived from Mesopotamia, one would expect it to show a 19-year cycle, not a 25-year cycle.

[26] S. Lippert, Au claire de la lune. The organisation of Cultic Service by Moon Calendar in Socnopaiou Nesos, D. Devauchelle & G. Widmer, eds., *Actes du IX^e congrès international des études démotiques Paris, 31 août - 3 septembre* 2005, BdÉ 147 (Cairo 2009), pp. 183-194.

[27] E.g. J. Assmann, *Ägypten. Eine Sinngeschichte* (Munich/Vienna 1996), pp. 233f.; idem, Der ägyptische Chronotrop. Zeit und Geschichte im alten Ägypten, in: J. Assmann & E.W. Hess-Lüttich eds., *Kult, Kalender und Geschichte. Semiotisierung von Zeit als kulturelle Konstruktion, Kodikas/Code, Ars Semeiotika* 20 (1997), pp. 25-38; idem, Kalendarische und messianische Geschichte. Altägyptische Formen geschichtlicher Semiotik, in: H.D. Kittsteiner ed., *Geschichtszeichen* (Köln/Weimar/Wien 1999), pp. 15-30. Disagreement is already voiced in von Lieven, *AoF* 26, p. 117.

[28] See A. von Lieven, Divination in Ägypten, *AoF* 26 (1999), pp. 77-126, which can already be substantially augmented, most importantly by S. Demichelis, La divination par l'huile à l'époque ramesside, in: Y. Koenig ed., *La magie en Égypte: À la recherche d'une définition* (Paris 2002), pp. 149-165. See further J.F. Quack, A Black Cat from the Right, and a Scarab on your Head. New Sources for Ancient Egyptian Divination, in: K. Szpakowska ed., *Through a Glass Darkly: Magic, Dreams, and Prophecy in Ancient Egypt* (Swansea 2006), pp. 175-187.

[29] See H. Brunner, Zeichendeutung aus Sternen und Winden in Ägypten, in: *Wort und Geschichte. Festschrift für Karl Elliger, AOAT* 18 (Neukirchen/Kevelaer 1973), pp. 25-30, reprinted in: idem, Das hörende Herz. Kleine Schriften zur Religions- und Geistesgeschichte Ägyptens, *Orbis Biblicus et Orientalis* 80 (Freiburg/Göttingen 1988), pp. 224-230; L. Kákosy, Decans in Late-Egyptian Religion, *Oikumene* 3 (1982), pp. 163-191, there p. 188.

[30] E.g. F. Rochberg-Halton, *Aspects of Babylonian Celestial Divination: The Lunar Eclipse Tablets of* Enūma Anu Anlil, *AfO Bh.* 22 (Horn 1988), pp. 57-60; U. Koch-Westenholz, *Mesopotamian Astrology. An Introduction to Babylonian and Assyrian Celestial Divination, CNI Publications* 19 (Copenhagen 1995), p. 98.

[31] For the discussion of the relevant passage, see von Lieven, *AoF* 26, pp. 102f., with references. See also R. Krauss, Die Bubastidenfinsternis im Licht von 150 Jahren Forschungsgeschichte, *MDAIK* 63 (2007), pp. 211-223; A. Thijs, The Lunar Eclipse of Takelot II and the Chronology of the Libyan Period, *ZÄS* 137 (2010), pp. 171-190.

flourished in the traditional centres for astronomical endeavours (and probably much of the earlier divination in general), namely the temples.[32] It seems that temple architecture was in no small way connected symbolically with stellar phenomena, as is indicated in the still-unpublished dialog between the king and Imhotep.[33] A very good case study is the small temple at Narmouthis. Here the priestly novices travelled widely and, among other things, occupied themselves with producing horoscopes,[34] an activity which can be illustrated by numerous Greek and Demotic notes of dates of births for astrological purposes.[35] Also, for Tebtunis we have a great number of theoretical astrological treatises associated with other manuscripts of undoubted temple relevance.[36] Even in the Greek treatises (and their Latin translations), the social and economic realities of Ptolemaic period Egypt, with a focus on the traditional temples, can still be recognised to some degree.[37]

The success of personal astrology (including horoscopes) can be deduced from an archaeological fact. In the Roman period, a lot of tombs and coffin lids are decorated with depictions of the zodiac, often including the planets in the position at the birth of the owner – they are, thus, monumentalised horoscopes.[38] It is remarkable that for priv-

---

[32] Jones, *Apeiron* 27/4, pp. 39-46. See also J. Evans, The Astrologer's Apparatus. A Picture of Professional Practice in Greco-Roman Egypt, *Journal for the History of Astronomy* 35 (2004), pp. 1-44, especially pp. 24-36, who tries to link astrology mainly to the Serapis temples, although this is hardly warranted by the evidence.

[33] A very short preliminary remark on this highly important (and quite substantial) but very difficult text is given in Quack, *Archiv für Religionsgeschichte* 2, p. 19; a bit more in J.F. Quack, Imhotep – der Weise, der zum Gott wurde, in V. Lepper, ed., Persönlichkeiten aus dem Alten Ägypten im Neuen Museum (Petersberg 2014), pp. 43-66, there pp. 54-56.

[34] P. Gallo, *Ostraca Demotici e ieratici dall'archivio bilingue di Narmouthis II* (nn. 34-99) (Pisa 1997), p. XLVI; A. Menchetti, Un aperçu des textes astrologiques de Médinet Madi, G. Widmer & D. Devauchelle eds., *Actes du IX^e congrès international des études démotiques Paris, 31 août - 3 septembre 2005*, *BdÉ* 147 (Cairo 2009), pp. 223-241. Most interesting is e.g. the text of oNarmouthis 37, 15f., which should be read as "if any man comes to you, ask him about the fit of his stars," see J.F. Quack, *Enchoria* 25 (1999), p. 197.

[35] See D. Baccani, Appunti per oroscopi negli ostraca di Medinet Madi, *Analecta Papirologica* 1 (1989), pp. 67-77; eadem, Appunti per oroscopi negli ostraca di Medinet Madi (II), *Analecta Papirologica* 7 (1995), pp. 63-72; M.T. Ross, *Horoscopic Ostraca from Medînet Mâdi* (Dissertation Brown University 2006); *idem*, An Introduction to the Horoscopic Ostraca of Medînet Mâdi, *EVO* 29 (2006), pp. 147-180; *idem*, OMM 1010: un document du règne de Septime Sévère, in G. Widmer & D. Devauchelle, eds., *Actes du IX^e congrès international des études démotiques Paris, 31 août - 3 septembre 2005*, *BdÉ* 147 (Cairo 2009), pp. 299-304; *idem*, Further Horoscopic Ostraca from Medinet Madi, *EVO* 32 (2009), p. 61-95; A. Menchetti/R. Pintaudi, Ostraka greci e bilingui da Narmuthis, *Chronique d'Égypte* 82 (2007), pp. 227-280, there pp. 234-241 and 265-269.

[36] See Ryholt, in: Lippert & Schentuleit eds., *Tebtynis und Soknopaiou Neso*; A. Winkler, On the Astrological Papyri from the Tebtunis Temple Library, in: G. Widmer, D. Devauchelle, eds., *Actes du IXe congrès international des études démotiques Paris, 31 août - 3 septembre 2005, BdÉ* 147 (Kairo 2009), pp. 361-375; idem, Some Astrologers and Their Handbooks in Demotic Egyptian, in J. Steele, ed., *The Circulation of Astronomical Knowledge in the Ancient World* (Leiden/Boston 2016), pp. 245-286.

[37] See F. Cumont, *L'Égypte des astrologues* (Bruxelles 1937) whose conclusions have to be modified somewhat in accordance with the critical review by L. Robert, *Études épigraphiques* (1938), pp. 76-108, especially 76-88. Cautious remarks also in Jones, *Apeiron* 27/4, p. 42.

[38] Most of the objects are published in Neugebauer & Parker, EAT III, pp. 96-102, pl. 51-56; also O. Neugebauer, R. A. Parker & D. Pingree, The Zodiac Ceilings of Petosiris and Petubastis, in: *Denkmäler der Oase Dachla. Aus dem Nachlaß von Ahmed Fakhry*, *Archäologische Veröffentlichungen* 28 (Mainz 1982), pp. 96-101; pl. 36-44; K.P. Kuhlmann, *Materialien zur Archäologie und Geschichte des Raumes von Achmim*, *Sonderschriften des Deutschen Archäologischen Instituts Kairo* 11 (Mainz 1983), p. 74, n. 376; p. 80, pl. 35a.

ate monuments, the recently imported zodiac is much more prominent than the traditional Egyptian Decans and their depiction models. The latter are mainly preserved in the temples, but even there mostly in combination with the zodiac and in fairly new iconographic schemes.[39] All this shows that far from being traditionalist and outmoded, the Egyptians at that time were keen to adapt those foreign models which fitted with their needs and interests.

There is good evidence that a Graeco-Egyptian amalgam dominated, so far as astrology was concerned.[40] Astrological consultation seems to have been one of the major priestly activities at Narmouthis (see above). The astrological notations of the ostraca are partly in Greek, partly in Egyptian, and the mixture of scripts and languages is typical for the corpus of ostraca from this place in general. A case in point is the so-called *Old-Coptic Horoscope*, a text written partly in Greek, partly in the Egyptian language rendered by Greek letters plus some additional signs derived from Demotic.[41] The text makes use of two different sets of the Egyptian Decans, though with some bizarre details. It should be noted that the more technical part with the calculation of the positions of the planets, the 'Places' of the *dodecatropos* ("the twelve ways") and the 'Lots' is written in Greek, while the treatise giving the prognoses starts off in Greek (lines 83-115), but then switches to Egyptian. The author of the text was obviously bilingual, but an Egyptian writing partly in Greek is more likely than a Greek partly writing in Egyptian.[42] The very distribution of the languages is in remarkable accordance with the general trend that horoscopes (as calculations) and astronomical tables are more often attested in the Greek language, whereas astrological treatises are mainly in Egyptian.

Papyrus CtYBR inv. 453+papyrus Carlsberg 133-back is also perhaps instructive,[43] where first the numbers from one to twelve are written in Greek letters (quite certainly for designating the zodiacal signs), and thereafter the Demotic symbols of the zodiacal signs are given. Not only that, but the back of the papyrus contains remnants of another

---

[39] See von Lieven, *Himmel über Esna*, pp. 10 and 148.

[40] D. Baccani, *Oroscopi greci. Documentazione papirologica* (Messina 1992), pp. 49-56 discusses the social background of astrology; stressing the Egyptian temple background, mainly arguing from the Narmouthis ostraca. See also J. Dieleman, Claiming the Stars. Egyptian Priests facing the Sky, in: S. Bickel & A. Loprieno eds., *Basel Egyptological Prize 1. Junior Research in Egyptian History, Archaeology, and Philology, Aegyptiaca Helvetica* 17 (Basel 2003), pp. 277-289.

[41] O. Neugebauer & H. B. van Hoesen, *Greek Horoscopes. Memoirs of the American Philosophical Society* 48 (Philadelphia 1959; reprint 1987), pp. 28-38; J. Černý, P.E. Kahle & R.A. Parker, The Old Coptic Horoscope, *Journal of Egyptian Archaeology* 43 (1957), pp. 86-100; some remarks also in T. Barton, *Power and Knowledge. Astrology, Physiognomics, and Medicine under the Roman Empire* (Ann Arbour 1994, reprint 2002), pp. 86-90. In J.F. Quack, Beiträge zur koptischen Etymologie, in: G. Takács ed., *Egyptian and Semito-Hamitic (Afro-Asiatic) Studies in Memory of Werner Vycichl* (Leiden/Boston 2004), pp. 116-133, there p. 118, I have explained why linguistically this text is to be considered Demotic rather than Coptic. In terms of cultural continuity, it should not be discussed together with the later Coptic sources (which are derivative of Greek and Arabic models).

[42] H. Satzinger, Die altkoptischen Texte als Zeugnisse der Beziehungen zwischen Ägyptern und Griechen in: P. Nagel ed., *Graeco-Coptic. Griechen und Kopten im byzantinischen Ägypten* (Halle 1984), pp. 137-146, there pp. 141f supposes, contrary to my assessment, that the author of the text was an astrologer primarily at home in the Greek language, but also knowing the contemporary Egyptian language.

[43] Unpublished; an image of the Yale part is available on the internet at http://wwwapp.cc.columbia.edu/-ldpd/app/apis/item?mode=item&key=yale.apis.000453420 or at http://beinecke.library.yale.edu/papyrus/-oneSET.asp?pid=453(B).

Demotic text, namely the *Book of Thoth*.[44] The front part gives records of contracts written in Greek. Whoever used this papyrus was thoroughly bilingual.

Even a fairly old astronomical document, the papyrus Paris 1 containing the *Ars Eudoxi* (early second century BCE) reveals evidence of such bilingualism. The Greek astronomical text is accompanied by drawings which clearly show Egyptian influence,[45] and it forms part of a large bilingual papyrus archive, predominantly in Greek, but with some Demotic Egyptian items.[46]

The degree to which the astronomical tables written in Greek were actually in the hands of Egyptian priests can be demonstrated in at least some cases: The important almanac PSI Inv. D 75[47] with additional fragments in Oxford (now Berkeley),[48] Yale[49] and Copenhagen is written in Greek.[50] But on the Verso, it has a Demotic religious text.[51] On the recto where the Greek almanac is written, there is also one line of hieratic, written upside down when compared to the rest of the text, and probably a trial of the pen. The text can be identified as the very beginning of the *Book of the Temple*, a

---

[44] Proposed in J.F. Quack, Die Initiation zum Schreiberberuf im Alten Ägypten, *Studien zur Altägyptischen Kultur* 36 (2007), pp. 249-295, there p. 263, and now proved beyond doubt by the discovery of an additional piece of pCarlsberg 133, which can be joined with a Yale fragment already ascertained to form part of the *Book of Thoth*.

[45] See the published images in Neugebauer, HAMA, volume III, p. 1453 pl. VII and more completely in A. Stückelberger, *Bild und Wort. Das illustrierte Fachbuch in der antiken Naturwissenschaft, Medizin und Technik* (Mainz 1994), pp. 22f.; especially remarkable is the falcon mummy in the Sun.

[46] U. Wilcken, Urkunden *der Ptolemäerzeit (Ältere Funde), Erster Band. Papyri aus Unterägyptern* (Berlin/Leipzig 1927) pp. 104-452; D. Thompson, *Memphis under the Ptolemies* (Princeton 1988), pp. 212-265 (especially pp. 252-254 on the Eudoxus papyrus); J. Ray, *The Reflections of Osiris. Lives from Ancient Egypt* (London 2001), pp. 130-14; B. Legras, *Les reclus grecs du Sarapieion de Memphis. Une enquête sur l'hellénisme égyptienne*, *Studia Hellenistica* 49 (Leuven/Paris/Walpole 2011). The effort of Wilcken (p. 116) to show that the main characters of that archive did not know how to write in Demotic has seriously to be doubted, especially in the light of the Demotic dream texts, for which see E, Bresciani, E. Bedini, L. Paolini & F. Silvano, Una rilettura dei Pap. Dem. Bologna 3173 e 3171, *Egitto e Vicino Oriente* 1 (1978), pp. 95-104 and a new German translation by J.F. Quack, Demotische magische und divinatorische Texte, in: B. Janowski & G. Wilhelm eds., *Texte aus der Umwelt des Alten Testaments, Neue Folge Band 4. Omina, Orakel, Rituale und Beschwörungen* (Gütersloh 2008), pp. 331-385, there pp. 373-375.

[47] Published by M. Manfredi & O. Neugebauer, Greek Planetary Tables from the Time of Claudius, *Zeitschrift für Papyrologie und Epigraphik* 11 (1973), pp. 101-114, pl. 3.

[48] Published by A. Jones, Three Astronomical Tables from Tebtunis, *Zeitschrift für Papyrologie und Epigraphik* 121 (1998), pp. 211-218; there pp. 211-213. The whole of Box 79 has now been transferred from Oxford to Berkeley.

[49] CtYBR 3609, images at http://beinecke.library.yale.edu/papyrus/oneSET.asp?pid=3609(A) and http://beinecke.library.yale.edu/papyrus/oneSET.asp?pid=3609(B), is still unpublished.

[50] Probably also pBerlin 14401 + pCarlsberg 673 + PSI Inv D 19/5 belong to this same manuscript; in their case the Demotic verso containing parts of the *Book of Thoth* has been published by R. Jasnow & K.-Th. Zauzich, *The Ancient Egyptian Book of Thoth. A Demotic discourse on Knowledge and Pendant to the Classical Hermetica* (Wiesbaden 2005), p. 80, pls. 14-15, while the existence of the astronomical text on the recto is only briefly mentioned.

[51] Unpublished, briefly mentioned in the editions. For the Florence fragments, I can confirm from autopsy that they have a copy of the *Song of Horus of the Vineyard* for which see Quack, *Einführung*, pp. 90f. and Ryholt, in: Lippert & Schentuleit eds., *Tebtynis und Soknopaiou Nesos*, pp. 150f. Some of the smaller fragments from Florence, however, have remnants of the *Book of Thoth*, according to personal information from Richard Jasnow.

fundamental Egyptian composition on the ideal temple, its architectural layout and the duties of the priests.[52]

Even a place such as Oxyrhynchus is relevant so far as the intermixture of Egyptian and Greek in matters of astrology goes. From there we have a large number of astronomical texts and horoscopes, as well as a few fragments of theoretical astrological treatises in Greek.[53] Even some of those are, however, probably translations from the Egyptian, or were at least modelled after Egyptian conceptions, such as omina derived from the rising of Sirius (pOxy 4471) or forecasts of the Nile inundation based on Decans (pOxy 4473). There is also the chronocratorial fragment pOxy 465 (see below). Furthermore, there are unpublished Demotic fragments of at least one theoretical astrological treatise from Oxyrhynchus.[54]

The mixture of scripts and languages seems to have left lasting traces. The Greek astronomical tables have a special symbol for 'zero' whose origin has been uncertain up to now.[55] There is a good chance that it actually goes back to the Demotic form of *ỉw.tỉ* "nothing".[56] More important, and more long-lasting, the Demotic abbreviated forms of the zodiacal signs were taken up in Greek manuscripts, and are at the root of our modern symbol forms.[57] The symbols of the planets, by now almost all also attested in the papyri from the Roman period, are mostly derived from abbreviations of the Greek names,[58] although the symbol of Venus might go back to a Demotic form of the sign  which is sometimes used with the phonetic value *ṯwỉ*,[59] and is thus an abbreviation of the Demotic form *pỉ nčr ṯwỉ* for Venus; that for Mars (not yet attested in the Greek papyri) is likely to be based on the Demotic form of  .

---

[52] J.F. Quack, Das Buch vom Tempel und verwandte Texte. Ein Vorbericht, *Archiv für Religionsgeschichte* 2 (2000), pp. 1-20; idem, Organiser le culte idéal. Le Manuel du temple égyptien, *Bulletin de Société Française d'Égyptologie* 160 (2004), pp. 9-25.

[53] Edited by A. Jones, in: M.W. Haslam, A. Jones, F. Maltomini & M.L. West eds., *The Oxyrhynchus Papyri, Volume LXV* (London 1998), pp. 130-151.

[54] J.F. Quack, The Last Stand? What remains Egyptian at Oxyrhynchus, in: K. Ryholt, G. Barjamovic, eds., *Problems of Canonicity and Identity Formation in Ancient Egypt and Mesopotamia*, CNI Publications 43 (Copenhagen 2016), pp. 105-126.

[55] See the discussion in Jones, *Astronomical Papyri*, pp. 61f.

[56] Detailed discussion in F. Hoffmann, Astronomische und astrologische Kleinigkeiten IV: Ein Zeichen für „Null" im P. Carlsberg 32?, *Enchoria* 29 (2004/5), pp. 44-52.

[57] See Neugebauer, *JAOS* 43, pp. 123-125; and A. von Lieven, *AoF* 26, p. 100; the documentation could be enlarged by including the Syriac forms as attested in E.A. W. Budge, *The Book of Medicines* (London 1913, reprint Amsterdam 1976), volume 1, p. 503, volume 2, p. 604 which show especially for Aries and Pisces a form which is even somewhat closer to the Demotic writings. A collation of the actual forms in the manuscript would be useful given that Budge has only published drawings of uncertain authenticity. The Syriac text is certainly derived from a Greek model, but is likely to date back to a time before the oldest preserved Greek codices with zodiacal signs.

[58] Jones, *Astronomical Papyri from Oxyrhynchus*, pp. 62f.

[59] See E. Hornung, *Das Buch von den Pforten des Jenseits nach den Versionen des Neuen Reiches, Teil II. Übersetzung und Kommentar*, *Aegyptiaca Helvetica* 8 (Basel/Genf 1984), p. 38 n. 3; a sign deriving from this hieroglyphic form is sometimes used in Demotic for writing the name of Venus.

2. The hours of the day and the night

One of the simplest astronomical-mathematical techniques is a linear zig-zag function for describing change. This is attested in Egypt, from a fairly early period onwards, for the respective lengths of the day and the night in different months of the year.

Papyrus Cairo *Journal d'Entré* 86637, vs., col. XIV (a manuscript dating to the time of Ramesses II) contains a calendar with indications of the different lengths of day and night in all twelve months of the year. The most extreme ratio (at the solstices) is 18:6 (or 3:1); with a step function of two hours difference per month.[60] Probably an identical schema is attested in the *Tebtunis Onomasticon*, Fragment AB, where only a small part of the text is preserved.[61] Both texts also give the name series of the Egyptian months based on their main respective festivals. The extreme length of the longest day, which would make this list more fitting for Finland than for Egypt, is probably due to the simple fact that in this scheme it was possible to describe the change of day-length in the seasons without ever having to use fractions.

Somewhat more realistic is the schema attested in a hieratic copy of the *Great Geographical Text*.[62] This works with a maximum difference of 16:8 (or 2:1), and a progression of 1⅓ hours per month. The amplitude is still much too large for a realistic description for the latitude of Egypt, but it is a better approximation than the first one mentioned. It makes use of only very basic fractions. It might be of interest to note that the relation of 2:1 is the value still used in the astronomical sections of the *Book of Enoch*.[63] It should be reconsidered whether the Enoch schema really goes back to a Babylonian source, as is generally assumed,[64] or whether it might also go back to an Egyptian one; all the more so since Egyptian sources with this value were still in actual use during the time when the Enoch book was composed.

A more sophisticated schema can be found in a Late Period hieroglyphic inscription from Tanis.[65] This has a title "to know the length of the day compared to the night" preserved. Contrary to the other tables, it has not one entry per month, but two, for the 1st and the 15th day of each month. Many of the numbers, especially the fractions, make use of cursive forms showing that this was probably adapted from a papyrus master copy. According to the language it uses, the model was fairly late, using words more at

---

[60] See Chr. Leitz, *Studien zur altägyptischen Astronomie, Ägyptologische Abhandlungen* 49 (Wiesbaden² 1991), pp. 22f.; idem; Tagewählerei. Das Buch *ḥ3t nḥḥ ph.wỉ ḏt* und verwandte Texte, *Ägyptologische Abhandlungen* 55 (Wiesbaden 1994), p. 451; pl. 44.

[61] Osing, *Hieratische Texte aus Tebtunis I*, pp. 205f, pl. 18 – see n. 18 above.

[62] Osing, *Hieratische Texte aus Tebtunis I*, , pp. 262f.

[63] O. Neugebauer, The 'Astronomical' Chapters of the Ethiopic *Book of Enoch* (72 to 82). Translation and Commentary, in: M. Black, *The Book of Enoch or I Enoch. A New Edition* (Leiden 1984), pp. 386-419, there p. 394; see J. F. Quack, Zwischen Sonne und Mond. Zeitrechnung im Alten Ägypten, in: H. Falk ed., *Vom Herrscher zur Dynastie. Zum Wesen kontinuierlicher Zeitrechnung in Antike und Gegenwart* (Bremen 2000), pp. 27-67, there p. 28 n. 6. For the scheme of Enoch see also M. Albani, *Astronomie und Schöpfungsglaube. Untersuchungen zum astronomischen Henochbuch, WMANT* 68 (Neukirchen-Vluyn 1994), pp. 48-51.

[64] So also in the contribution of Ben-Dov, in Ch.4.a of this volume.

[65] Originally published by J.J. Clère, Un texte astronomique de Tanis, *Kêmi* 10 (1949), pp. 3-27. A detailed study by F. Hoffmann, *Astronomische und astrologische Kleinigkeiten VI: Der internationale Kontext der ägyptischen Astronomie. Die Inschrift zu Tages- und Nachtlängen aus Tanis* which is not yet published was available to me thanks to the generosity of its author.

home in Demotic than in Late Egyptian. Furthermore, the numerical signs are consistent with a Demotic model.

Although the loss of important parts of the inscription hampers interpretation, a recent discussion by Friedhelm Hoffmann has done much to clarify the system, mainly due to an improved interpretation of the numerical signs. In principle, it is based on a linear zig-zag function with a change of ⅔ of an hour per month. However, the resulting values are rounded or truncated in order to be expressed purely by fractions of a half, a third, or a sixth. This results in a ratio of the shortest to the longest day of 14⅔:9⅓, or 3:2. Such a value, while better than the ones discussed up to now, is still a bit too extreme for Egypt and would fit a more northern location better. Because the calculation of the hours is done with fifths, while the result is expressed in sixths, and because the ratio of the longest to the shortest day would be most fitting for a northern latitude of 35°, Hoffmann suspects the influence of Mesopotamian astronomy here, where the ratio of 3:2 is typical from the period of the cuneiform series ^{Mul}Apin onwards (where we also find the system of giving one value for the first, and another for the 15th day of the month). The probable date for this influence, consistent with the astronomical dating based on the correlation between solar year and Egyptian calendar, is the 7th century BCE. Another ratio, namely 14:10 at the solstices seems to be attested as a general observation in an Egyptian text of the 15th century BCE, unfortunately without a full table for all months.[66]

The influx of Egyptian astronomical lore into Mesopotamia is often supposed when it comes to the question of the length of an hour. An ivory prism from Nineveh (BM 123340, which is Neo-Assyrian, and thus older than 612 BCE) and the cuneiform tablet K.2077+3771+11044+BM 54619 (dating to 650 BCE) preserve calculations on the different lengths of the day in different months using a system of 24 hours per day. Since it was typical in Mesopotamia to calculate with 12 double hours,[67] and 24 hours are typically Egyptian, this has often been considered as an example of Egyptian influence on Mesopotamian astral science.[68]

The tablet gives values for the first and the 15th of each month and, in that, resembles the Egyptian inscription from Tanis. The ratio of the longest to the shortest day for both Mesopotamian texts is 2:1 (as is also the case in the earlier Mesopotamian composition ^{Mul}Apin), agreeing with the value of the Egyptian geographical papyrus.

Given the historically attested contacts during the western expansion of the Neo-Assyrian Empire, Egyptian influence would be historically feasible. We should also keep in mind that King Esarhaddon (ruled 681 to 669 BCE) deported a number of

---

[66] See L. Borchardt, *Die Altägyptische Zeitmessung. Die Geschichte der Zeitmessung und der Uhren, Teil B* (Berlin/Leipzig 1920), pp. 60-63; pl. 18; hieroglyphic text also in W. Helck, *Historisch-biographische Texte der 2. Zwischenzeit und neue Texte der 18. Dynastie, Kleine Ägyptische Texte* (Wiesbaden 1975; ^{2}1983), pp. 111f. (with slight divergences from Borchardt).

[67] Cf. F. Rochberg-Halton, Babylonian Seasonal Hours, *Centaurus* 32 (1989), pp. 146-170; short remarks also in W. Horowitz, *Mesopotamian Cosmic Geography, Mesopotamian Civilisations* 8 (Winona Lake 1998), p. 191 n. 60. An important new study is A. von Lieven, The Movement of Time. News from the "clockmaker" Amenemhet, in R. Landgráfová/J. Mynářová, eds., *Rich and Great: Studies in Honour of Anthony J. Spalinger on the Occasion of his 70th Feast of Thot* (Prag 2016), pp. 207-231.

[68] H. Hunger & D. Pingree, *Astral Science in Mesopotamia, HdO* I/44 (Leiden/Boston 1999), pp. 112-116.

leading Egyptian intellectuals and diviners to Mesopotamia.[69] Besides, for the values indicated on the cuneiform tablet, the sender explicitly indicates that those are new ones, not found on any older tablet. Again, the take-up of foreign knowledge seems possible.

Very recently, a series originally written on four ostraca (of which three are still preserved) concerning the hours was published.[70] This mentions, first, some selected days of each month which are probably of some special relevance (or good auspices for some undertakings). Afterwards, a fraction is given 'under' whichever the month in question is. This was interpreted in the edition as an indication by which factor the duration of a seasonal hour changes from day to day. The remarkable point is that here we do not have a linear scheme but a variable one with the smallest value of 1:16 for the months of Paophi (perhaps to be corrected into Hathor) and Pakhons, and the largest one of 1:12,5[71] for Mesore and the Epagomenal days. If we suppose that the Egyptian calendar was used, that would mean that we would have the largest value for the time around summer solstice for a date of about 180-200 CE which is in general agreement with the actual date of the text.

3. Stellar lore and zodiac

Nowadays, it is quite generally accepted that the zodiac as a concept of twelve constellations in the ecliptic, and later twelve abstract parts each of 30 degrees of the ecliptic is a Mesopotamian invention; it probably dates from the early fifth century BCE.[72] The zodiac was taken over to Egypt, but so far as it is concerned as well as for a number of other constellations appearing in Egyptian sources, there remains the important question of whether they reached Egypt directly from Mesopotamia or via Greece.

Perhaps it is best to clarify the chronology first. Normally, the now destroyed zodiac of Esna north is considered to be the oldest attested one in Egypt, dating to about 200 BCE.[73] As a matter of fact, it cannot be that old, since it marks the beginning of the year in Virgo in accordance with the Alexandrian calendar, and a close examination of the cartouches of kings on the monument shows that rulers of the second century CE are

---

[69] H.-U. Onasch, *Die assyrischen Eroberungen Ägyptens, Teil 1: Kommentare und Anmerkungen*, *Ägypten und Altes Testament* 27 (Wiesbaden 1994), pp. 30-32.

[70] F. Naether, M. Ross, Interlude: A Series containing a hemerology with lengths of daylight, *Egitto e Vicino Oriente* 31 (2008), p. 59-90.

[71] The final sign *gs* occurring in oMM 170, l. 7 as well as oMM 844, l. 3 and 4 and forming part of a complex fraction was misread as *n3ỉ* in the edition; a reading which is neither paleographically nor syntactically possible.

[72] B. L. van der Waerden, History of the Zodiac, *AfO* 16 (1952/3), p. 216-230; L. Brack-Bernsen, & H. Hunger, The Babylonian Zodiac: Speculations on its invention and significance, *Centaurus* 41 (1999), pp. 280-292; for the earliest actual attestations see F. Rochberg, *Babylonian Horoscopes*, *Transactions of the American Philosophical Society* 88/1 (Philadelphia 1998). Efforts for an inner-Egyptian derivation of the zodiac (such as G. Daressy, *L'Égypte céleste*, *Bulletin de l'Institut Français d'Archéologie Orientale* 12 (1915), pp. 1-34 or W. Gundel, *Dekane*, pp. 327-340), are now considered failed; see e.g. the review of Gundel by A. Schott, *Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik* 4 (1937), pp. 176-178.

[73] So since Neugebauer & Parker, EAT III, pp. 62-64.

also mentioned.[74] This leaves a Demotic ostracon (Strasbourg D 521) as probably the earliest attestation of the zodiac in Egypt. It offers a calendar concordance between the Egyptian months and the zodiacal signs, and thus it can be dated astronomically to a period around 250 BCE (up to 120 years later), because Scorpius is given as the sign of the first month of the year. Since, palaeographically, the ostracon is likely to be late Ptolemaic or even Roman, it is probably a copy of an older model.[75] Late Ptolemaic, but an original dating from the earlier first century BCE, is papyrus Berlin 13146 and 13147.[76] The verso text concerns the calculation of the solstices and equinoxes. It also indicates the signs of the zodiac, specifically mentioning Libra and Capricorn. This gives additional proof that by this time, using the zodiac was commonplace in Egypt.

The next oldest attested case of the zodiac, and the earliest pictorial one in Egypt, is the 'round zodiac' of Dendera dating probably to the late Ptolemaic period.[77] All other monumental cases are from the Roman period. There is an unpublished papyrus fragment in the Copenhagen collection which coordinates Egyptian dates with the zodiacal signs (Papyrus Carlsberg 769).[78] The list begins with Virgo, whose date is not preserved but, judging from the rest of the text, is likely to begin towards the last days of Mesore. Again, here we have a further text already based on the Alexandrian calendar.

In the decoration of the Graeco-Roman Period temple ceilings in Egypt, there are sometimes elaborate versions combining the traditional Egyptian Decans (albeit normally in a rather recently-developed iconography), the zodiac and some other constellations as well as many figures of less-clear intention, which are likely also to represent celestial phenomena and concepts of some sort. The relevant monuments are the so-called 'round' and 'angular' zodiac at Dendera, the one from the ceiling of an Osirian chapel on the roof of the temple,[79] the other from the ceiling of the hypostyle

---

[74] Closer argumentation in Quack, *Dekane*.

[75] It was dated to the Roman period by its first editor W. Spiegelberg, Ein ägyptisches Verzeichnis der Planeten und Tierkreisbilder, *OLZ* 5 (1902), cols. 6-9. It is most definitely not from the third century BCE.

[76] Edited by O. Neugebauer, R.A. Parker & K.-Th. Zauzich, A Demotic Lunar Eclipse Text of the First Century B.C. *Proceedings of the American Philosophical Society* 125 (1981), pp. 312-327 and R.A. Parker & K.-Th. Zauzich, The Seasons in the First Century B. C., in: D.W. Young ed., *Studies presented to Hans Jakob Polotsky* (East Gloucester, MA 1981), pp. 472-479. Better photographs are given in *Enchoria* 12 (1984), pls. 8-11.

[77] Contrary to E. Aubourg, La date de conception du zodiaque du temple d'Hathor à Dendera, *Bulletin de l'Institut Français d'Archéologie Orientale* 95 (1995), pp. 21-34; E. Aubourg & S. Cauville, « En ce matin du 28 décembre 47 … », in W. Clarysse, A. Schoors, & H. Willems eds., *Egyptian Religion. The Last Thousand Years. Studies Dedicated to the Memory of Jan Quaegebeur, Part II, OLA* 85 (Leuven 1998), pp. 767-772, it is not possible to use the planet positions for a calculation of the date, because they are based on astrological theory. See F. Boll, *Sphaera. Neue griechische Texte und Untersuchungen zur Geschichte der Sternbilder* (Leipzig 1903; ND Hildesheim 1968), pp. 233-235; A. von Lieven, *Der Himmel über Esna. Eine Fallstudie zur Religiösen Astronomie im Alten Ägypten, Ägyptologische Abhandlungen* 64 (Wiesbaden 2000), pp. 157f; W. Hübner, *Körper und Kosmos. Untersuchungen zur Ikonographie der zodiakalen Melothesie, Gratia* 49 (Wiesbaden 2013), p. 45.

[78] I would like to thank Kim Ryholt for allowing me to mention this text.

[79] Neugebauer & Parker, EAT III, pp. 72-74 no. 54, pl. 35. New edition S. Cauville, *Dendara X. Les chapelles osiriennes* (Cairo 1997), pp. 173-176, pl. 60 u. 86; translation and commentary eadem, Dendara, Les chapelles osiriennes. Transcription et traduction, *Bibliothèque d'Étude* 117 (Cairo 1997), pp. 89-91; eadem, Dendara, Les chapelles osiriennes. Commentaire, *Bibliothèque d'Étude* 118 (Cairo 1997), pp. 79f.

hall of that temple,[80] the ceiling of the hypostyle hall of the temple of Esna and the now destroyed ceiling of the hypostyle hall from Esna north, only documented by drawings in the *Description de l'Égypte*.[81]

Important additional information can be deduced from non-Greek constellations transmitted in mediaeval Greek and Latin codices, especially two treatises going under the authorship of Teucer of Babylon.[82] In some cases, clear identifications of the constellations they mention with those depicted in the Egyptian temple ceilings have been possible.[83]

The images of the zodiacal signs are, in principle, recognisable derivations of Mesopotamian forms.[84] Most instructive are the goat-fish (Capricorn) and the shooting centaur with a scorpion's tail (Sagittarius); both are composite beings typical of Mesopotamian iconography and not at home in Egypt. There are, however, also evident signs of how the repertoire was Egyptianised by taking up, where possible, local forms. Gemini is stylised as the Egyptian twin pair of gods Shu and Tefnut. Cancer normally has a form closer to a scarab than to an actual crab. Libra was understood as the 'horizon', and thus quite frequently the youthful Sungod was depicted with it. Aquarius is depicted as a so-called 'Nile-god', or more precisely a fecundity figure.[85] Even the headdress of Sagittarius is stylised to make it look like traditional Egyptian crowns. Tales transmitted by Greek and Roman authors furthermore show how the sign of Aries came to be interpreted in connection with the ram of Ammon.[86] The adaptation of the zodiac within traditional Egyptian religion can also be shown by its presence within an (unfortunately highly fragmentary) discursive text which seems to link stellar phenomena with Egyptian theology; it mentions the Sun, Moon and the five planets as well as the Decans and some zodiacal signs. The manuscript is Roman, but the composition might go back to Ptolemaic times.[87]

One key point was already established long ago by Boll: The figure of the winged centaur for Sagittarius on Babylonian entitlement *narûs* (formerly called *kudurrus*) is fairly similar to its Egyptian depiction, whereas the Greek iconography of Sagittarius is typically without wings,[88] except in some cases where the influence of Egyptian

[80] Neugebauer & Parker, EAT III, pp. 78-80 no. 59-60, pls. 41-42.
[81] Neugebauer & Parker, EAT III, pp. 62-64 no. 47, pl. 29.
[82] For the sources and a discussion see Boll, *Sphaera*; W. Gundel, *Neue astrologische Texte des Hermes Trismegistos. Funde und Forschungen auf dem Gebiet der antiken Astronomie und Astrologie*, *ABAW* NF 12 (München 1936; ND Hildesheim 1978); W. Hübner, *Grade und Gradbezirke des Tierkreises. Der anonyme Traktat de stellis fixis in quibus gradibus oriuntur signorum* (Stuttgart/Leipzig 1995).
[83] A. von Lieven, *Himmel über Esna*, pp. 150-152 and 157 n. 458.
[84] For a detailed discussion of the iconography, see Neugebauer & Parker, EAT III, pp. 206-212.
[85] J. Baines, *Fecundity Figures. Egyptian Personification and the Ideology of a Genre* (Warminster 1985), especially pp. 387-389.
[86] E.g. Hyginus, *Astronomia* II, 20 (excerpting Hermippus); Hyginus, *Fabulae*, CXXXIII; Nigidius Figulus, in: *Scholia ad Germanici Aratea* (Edition A. Breysig, *Germanici Caesaris Aratea cum Scholiis* (Berlin 1867, repr. Hildesheim 1967), p. 80, 8-81, 1); L. Ampelius, *Lib. mem.* 2, 1; Macrobius, *Saturnalia* I, 21, 19; *Mythographus vaticanus secundus*, 80. See A. Le Bœuffle, *Hygin, L'astronomie* (Paris 1983), pp. 59-60 and 168.
[87] Published by J.F. Quack, Fragmente memphitischer Religion und Astronomie in semidemotischer Schrift (pBerlin 14402 + pCarlsberg 651 + PSI Inv. D 23), in: F. Hoffmann & H. J. Thissen eds., *Res severa verum gaudium. Festschrift für Karl-Theodor Zauzich zum 65. Geburtstag am 8. Juni 2004*, *Studia Demotica* 6 (Leuven/Paris/Dudley, MA 2004), pp. 467-496, pl. 37-39.
[88] Boll, *Sphaera*, pp. 181-208.

iconography is clear.[89] Some points can be added by looking at the extra-zodiacal constellations. On the sky image of Dendera, we have the constellations of a large snake and a bird depicted, obviously corresponding to our constellations of Hydra and Corvus, but one element typically present in the Greek and modern group is absent here - namely the crater. This absence is also typical for Mesopotamian sky conceptions, where we have the constellations of the snake and the raven, but nothing corresponding to the crater. One depiction actually shows the lion on the back of the snake, plus a raven picking at its tail, without anything corresponding to the crater of the Greek sphaera.[90] Lastly, another Egyptian stellar depiction for which a Babylonian origin has normally been accepted is a square with water lines situated between the two fishes. This is believed to be the constellation *ikû* "the field".[91]

All this makes a renewed examination of all constellations depicted at Dendera and Esna desirable, a task which, however, cannot be undertaken here.[92] A few remarks must suffice: The antelope or goat (?) placed between Aries and Taurus on the rectangular zodiac of Dendera might be connected with the Mesopotamian constellation of the stag (the eastern part of Andromeda).[93] The bird with a sort of tuft on its head depicted behind Orion on the round zodiac would fit very well with the constellation of the rooster, used in Mesopotamia for Lepus, which is near to Orion. The headless men above Aquarius of the Dendera depictions might be correlated with the cuneiform constellation of the dead man (Delphinus?). The barque under the feet of Sagittarius might be equivalent to the barque of the Mesopotamian texts (ε-Sagittarii).

A most crucial question concerning a possible derivation of the Egyptian zodiacal images directly from Mesopotamia remains to be resolved. It concerns when Aries and Virgo first came to be depicted in Mesopotamia as a sheep and a maiden respectively. The sign of Aries is normally referred to in cuneiform texts as the "hired man", only the latest texts write anything which could be interpreted as sheep (by substituting the Sumerogram LU "sheep" for LÚ "man"). Virgo is usually referred to as "the furrow" in cuneiform texts (although she is depicted as early as the late second millennium BCE as an ear of grain, the symbol of a female goddess).[94] Aries does appears as a sheep on seals of the early Hellenistic Period from Uruk, and one seal impression from the same

---

[89] H. Stern, *Le calendrier de 354. Étude sur son texte et ses illustrations. Institut français d'archéologie de Beyrouth, bibliothèque archéologique et historique* 55 (Paris 1953), pp. 198-202.

[90] E. Weidner, *Gestirn-Darstellungen auf babylonischen Tontafeln* (Wien 1967), pp. 9f.; pls. 5-6 and 9-10.

[91] F. Gössmann, *Planetarium Babylonicum* (Rome 1950), p. 76 (Nr. 193); W. Hartner, The Earliest History of the Constellations in the Near East and the Motif of the Lion-Bull Combat, *JNES* 24 (1965), pp. 1-16, pls. I-XVI; there pp. 12f. Noted without taking position in Neugebauer & Parker, EAT III, p. 212 n. 2.

[92] Chr. Leitz, *Die Sternbilder auf dem rechteckigen und runden Tierkreis von Dendara*, *Studien zur Altägyptischen Kultur* 34 (2006), pp. 285-318 argues for a derivation of most of the images in Dendera from Greek models. He admits, however, that in many cases, the Greek constellations go back to Mesopotamian models. His reason for excluding a direct transmission from Mesopotamia to Egypt is simply that such a situation seems less likely and would be historically implausible for the 1st century BCE. In my opinion, such an argument fails to consider that the Dendera images may be derived by inner-Egyptian transmission from models received at a time when direct contacts between Mesopotamia were more likely.

[93] In the following, I have made use of the lists in Hunger & Pingree, MUL.APIN, p. 138; idem, *Astral Science*, pp. 270-277. Moderate changes in actual identifications of the Mesopotamian constellations would not impinge on my arguments.

[94] For details, see further Brown in Ch.6.

period seems to show Virgo as a maid with a grain stalk.[95] The chronology of these changes in conception, and the reasons behind them, remain poorly understood, but are a key to determining the extent to which the zodiac reached Egypt without Greek intermediary, and of course are equally relevant to the question of the derivation of Greek zodiacal imagery.

4. The order and religious identification of the planets

In pre-Hellenistic times, there is a fairly regular arrangement of the planets in Egyptian astronomical depictions, as well as a consistent theological attribution to each. It begins with Jupiter, Saturn and Mars (in this order), each of which is associated with a particular form of Horus. Separated from them in the depictions by a block of 'triangle Decans' are Mercury, associated with Seth,[96] and Venus, associated with Osiris.[97] This order shows an awareness of the difference between outer and inner planets. Otherwise, it is not obviously patterned on a strict sequence of orbits. Mars is absent in some depictions but this is likely to be due only to an accident of transmission.[98]

The traditional names of the planets in Egypt pose some problems.[99] This is especially true for Jupiter, where the older monuments are divergent. In one of the main traditions (the Senmut family of astronomical depictions, probably also the Seti IC family), it is consistently written *Ḥr-tȝš-tȝ.wỉ* "Horus who bounds the two lands." A subgroup of it, however (Senmut subgroup B), writes *Ḥr-štȝ-tȝ.wỉ* "Horus, the mystery of the two lands." The New Kingdom members of the Seti IA family write *Ḥr-wpš-tȝ.wỉ* "Horus who illuminates the two lands." Late hieroglyphic sources give a writing which is ambiguous and could be understood either as *Ḥr-wpỉ-štȝ* "Horus who opens the

[95] R. Wallenfels, Zodiacal Signs among the Seal Impressions from Hellenistic Uruk, in: Mark Cohen ed., *The Tablet and the Scroll. Near Eastern Studies in Honor of William W. Hallo* (Betheshda 1991), pp. 281-289, esp. pp. 282f. and 285.

[96] For this, see also R. Krauss, *Astronomische Konzepte und Jenseitsvorstellungen in den Pyramidentexten*, *Ägyptologische Abhandlungen* 59 (Wiesbaden 1997), pp. 216-234; 239-253; 261-274; idem, Nähere Mitteilungen über Seth/Merkur und Horusauge/Venus im grossen Tagewählkalender, *Studien zur Altägyptischen Kultur* 27 (1999), pp. 233-24; idem, The Eye of Horus and the Planet Venus: Astronomical and Mythological References, in: J.M. Steele, A. Imhausen eds., *Under One Sky. Astronomy and Mathematics in the Ancient Near East, AOAT* 297 (Münster 2002), pp. 193-208, who has failed to provide any clear-cut evidence for the association of Venus with Horus in the pre-Ptolemaic period. Most plainly, he cites (*Astronomische Konzepte und Jenseitsvorstellungen*, p. 270) a passage from the dramatic text in the *Osireion* where he supposes the eye of Horus to be Venus, whereas the context makes it clear that the reference is to the Moon. See A. von Lieven, *Grundriß des Laufes der Sterne*, p. 179. J. P. Allen also doubts the identification of the eye of Horus with Venus in his review of Krauss, *Astronomische Konzepte*, *JNES* 61 (2002), p. 64. Highly critical of Krauss is D. Lehoux, *Astronomy, Weather, and Calendars in the Ancient World.* Parapegmata *and Related Texts in Classical and Near Eastern Societies* (Cambridge 2007), pp. 135f.

[97] Neugebauer & Parker, EAT III, pp. 175-181.

[98] Neugebauer & Parker, EAT III, p. 179; R. Krauss, Das Kalendarium des Papyrus Ebers und seine chronologische Verwertbarkeit, *Ägypten und Levante* 3 (1992), pp. 75-96, there pp. 93-96; idem, Nochmals die ägyptische Nacht vom 14./15. November 1463 vChr, *Göttinger Miszellen* 146 (1995), pp. 61-70; Quack, *Dekane*, versus Leitz, *Studien zur Astronomie*, pp. 44f., who supposes that this reflects a real invisibility of Mars for the time when the astronomical ceiling in the tomb of Senmut was conceived.

[99] Neugebauer & Parker, EAT III, pp. 177-182.

secret" or as *Ḥr-wpš-t3* "Horus who illuminates the land". The Demotic writings mostly give *Ḥr-p3-šte* and similar forms which might mean "Horus the mystery" but more likely are simply a phonetic rendering of a word which has no transparent meaning in contemporary speech. In some cases, the name is understood non-etymologically as *Ḥr-p3-šwṯ* "Horus the merchant".[100]

Much clearer is the name of Saturn which in the fullest form is *Ḥr-k3-p.t* "Horus bull of the sky"; in the Late Period normally shortened to *Ḥr-k3* or, including the Demotic article, *Ḥr-p3-k3* "Horus the bull".

Mars is, in earlier attestations, often called *Ḥr-3ḫ.tỉ* "Horus of the horizon", which is also a relatively well attested god's name outside of astronomy. Besides this, we have the form *Ḥr-ṭš(r)* "Horus the red one" – the most transparent and logical of all Egyptian planet names.

Venus is normally called either *bn.w* "the phoenix bird", or *bꜥḥ* "the heron bird". Only in the Late Period do we have the form *(p3)-nčr-ṭw3* "morning star".

The name of Mercury, *sbg.w*, due to phonetic developments later also *swg3*, is of totally unknown meaning.

The planets tend to have epithets, especially the outer ones. Jupiter is "the southern star of the sky", Mars the "eastern star", with the additional note "he travels backwards", Saturn is the "eastern", or in some cases "western" star, Venus "the crossing star". Obviously, these epithets do not contain anything which gives essential and permanent characteristics for any single planet; they would be possible for any of them at certain times. Rather, they are indications of actual stages at specific moments. For reasons which we cannot exactly explain, such a depiction with ephemeral captions became codified as the classical sky image in Egypt for a very long time.[101] Of special interest among the captions is that for Mars, which shows an awareness of the retrograde motion of a planet at the time when this image was drawn up. The earliest attestations date from about the 20th century BCE, with there being some possibility of an archetype going back to the third millennium BCE.[102]

An individual note in one sub-type of images of this form from the Ramesside period should also be mentioned. It is given for Mercury and says: "Seth in the evening twilight, a god in the morning twilight."[103] This implies that the identity of Mercury as an evening and morning star was recognised, even though he was evaluated somewhat differently from a religious perspective.

A clear change to the above order and series of identifications is made apparent in the Demotic ostracon Strasbourg D 521, already mentioned. It has the following order and identifications:

Horus the bull (i.e. Saturn): The Star of Re
Horus the red one (i.e. Mars): The star of Miysis
Mercury[104]: The star of Thoth

[100] J. Quack, Eine unetymologische Schreibung für den Namen des Planeten Jupiter, *Enchoria* 21 (1994), pp. 148-9; K. Goebs, „Horus der Kaufmann" als Name des Planeten Jupiter, *Enchoria* 22 (1995), pp. 218-21.
[101] For the conception of the classical sky image, see Quack, *Dekane*.
[102] Detailed argumentation in Quack, *Dekane*.
[103] Neugebauer & Parker, EAT III, p. 180.
[104] The Egyptian name (*sbk3/swg3*) of this planet is of unknown meaning.

The morning god (i.e. Venus): Horus, son of Isis
Horus the mysterious one (i.e. Jupiter): The star of Amun

The order seems to have been determined primarily on the basis of astrological considerations, secondarily by astronomical ones. The neutral (or, changing) Mercury stands between the malefic planets on the one side, and the benevolent planets on the other, and the more distant planets, Jupiter and Saturn, are on the respective outer limits of the groups.

The basic names of the planets are mostly traditional (except "the morning god" for Venus),[105] but the attribution to specific gods is mainly new. The changes from the earlier Egyptian tradition are considerable. The new attribution of Mercury might be explicable as an internal development, given that Thoth also replaces Seth in other situations in the Late Period,[106] but it is more likely due to foreign influence.

The religious identifications show obvious parallels with the Mesopotamian as well as the Greek conceptions of the planets. Some details make it more plausible that it was based on direct Mesopotamian, rather than Greek influence. The description of Saturn as "planet of the Sun", for example, is quite normal in Mesopotamian astrology;[107] although it can also be found in some Greek texts, probably influenced by the Mesopotamian example.[108] The Egyptian god Miysis, son of Bastet and lord of the pestilence-bringing demons, is a better correspondence to the Babylonian pestilence-bringing Nergal[109] than to the Greek Ares, of more specifically bellicose nature (for which e.g. the Egyptian Monthu would be a better parallel). Thoth for Mercury could equally well be understood to be the equivalent of Babylonian Nabû or Greek Hermes. Also, Amun could correspond to Marduk as well as to Zeus. The equivalence of Horus, son of Isis, with Venus is problematic either way. A parallel with the (sometime-)bisexual Mesopotamian Ištar seems a little more likely than with the frankly feminine Greek Aphrodite. If these equations hold true, then the first phase of a deep-seated remodelling of the Egyptian conceptions of the religious nature of the planets was due to Mesopotamian, and not to Greek influence.

Reflections of these religious attributions might be seen in the depictions of the planets on the west side of the ceiling of the pronaos of the temple of Hathor at

---

[105] This is not safely attested as a name of the planet before the Hellenistic period; see Neugebauer & Parker, EAT III, pp. 180f. Krauss, *Astronomische Konzepte*, pp. 216-234, tries to interpret the earlier attestations of "morning god" as Venus, but none of them is conclusive and the astronomical depictions always use other expressions.

[106] E. Otto, Thoth als Stellvertreter des Seth, *Orientalia* 7 (1938), pp. 69-79; J. Kahl, Religiöse Sprachsensibilität in den Pyramidentexten und Sargtexten am Beispiel des Namens des Gottes Seth, in: S. Bickel/B. Mathieu eds., *D'un monde à l'autre, Textes des Pyramides et Textes des Sarcophages*, *Bibliothèque d'Études* 139 (Kairo 2004), pp. 219-246, there pp. 233f. Motte, in: *Études coptes* 4, pp. 89f., seems to suppose that it was exclusively due to this Egyptian development. In the case of the bracelet which he invokes, however, Thoth is exclusively relevant as the replacement for Seth concerning the deities of the epagomenal days; there is no connection of these five gods to the planets.

[107] U. Koch-Westenholz, *Mesopotamian Astrology. An Introduction to Babylonian and Assyrian Celestial Divination, CNI Publications* 19 (Copenhagen 1995), pp. 122-124; D. Brown, *Mesopotamian Planetary Astronomy-Astrology, Cuneiform Monographs* 18 (Groningen 2000), pp. 68-70.

[108] Gundel, in: *Paulys Real-Encyclopädie der classischen Altertumswissenschaft* XX, 2, col. 2032.

[109] Koch-Westenholz, *Mesopotamian Astrology*, pp. 128f.; Brown, *Mesopotamian Planetary Astronomy-Astrology*, pp. 70-72.

Dendera.[110] There, the planets in their day-Houses are all depicted as birds, but with varying heads. Saturn has the head of a bull, corresponding to his traditional Egyptian name "Horus, bull of the sky". Jupiter has the head of a falcon with two cow's horns and a disc between them.[111] Mars has the head of a falcon with the Upper Egyptian crown. Mercury is depicted with the head of an ape,[112] showing a connection with Thoth who is typically associated with an ape. The head of Venus is damaged and difficult to recognise.

The same order of Saturn, Mars, Mercury, Venus, and Jupiter appears in the *Pistis Sophia* Book IV, chapter 136-137,[113] a Coptic translation of a Greek Gnostic treatise, with some Egyptian background, a relatively large part of which is devoted to astrological questions.[114]

The planetary associations given in the text are worth looking at, because they contain a bit more than the usual Greek gods. The text first gives a set of mostly strange names, and then identifies them with the Greek planetary gods. Saturn is the "the great invisible one", Mars is Ipsanta khoun khain khoukheokh, Mercury is Khainkhoookh, Venus is Pistis Sophia, the daughter of Barbelo, Jupiter is "the small Sabaoth, the good one". Furthermore, there are said to be "incorruptible" names. Saturn is Orimuth, Mars Mounikhounaphor, Mercury Tarpetanouph, Venus Khosi, and Jupiter Khonbal. These are mainly Gnostic interpretations, and the strange names are difficult to analyse in any language. They might be garbled Egyptian words, but it is difficult to establish any clear-cut equivalents,[115] and in any case the origins are not likely to have been present in the mind of the author and the lectors of the text. Besides, there is also a passage where Venus is "Boubasti" whereas Jupiter remains "the small Sabaoth the good one".[116] This attribution for Venus has a patent Egyptian background, given that Boubasti is nothing else than a rendering of the Egyptian goddess Bastet, who, as a goddess of love, is a fairly convincing equivalent of the Greek Aphrodite.

---

[110] Discussion and photograph in Neugebauer & Parker, EAT III, pp. 178-181; pl. 42, lower part.

[111] This iconography has similarities to a relatively strange group of Roman period depictions in relief and sculpture, see J.F. Quack, in: *Ägypten Griechenland Rom. Abwehr und Berührung* (Frankfurt/Tübingen/Berlin 2005), p. 717. If the connection with Jupiter holds true, the interpretation I gave there will have to be corrected.

[112] Interpreted by Neugebauer & Parker, EAT III, p. 180 as a frog, but the photograph is quite clearly in favour of interpreting the animal as an ape, probably a baboon.

[113] Original text in C. Schmidt, *Pistis Sophia neu herausgegeben* (Copenhagen 1925), pp. 356f.; German translation in C. Schmidt, *Koptisch-Gnostische Schriften, Erster Band. Die Pistis Sophia, die beiden Bücher Jeu, unbekanntes altgnostisches Werk, 3. Auflage bearbeitet im Auftrag der Kommission für Spätantike Religionsgeschichte der deutschen Akademie der Wissenschaften zu Berlin von Walter Till* (Berlin 1962), pp. 234f.

[114] A. von Lieven, Gnosis and Astrology. 'Book IV' of the Pistis Sophia, in: J. M. Steele & A. Imhausen eds., *Under One Sky. Astronomy and Mathematics in the Ancient Near East, AOAT* 297 (Münster 2002), pp. 223-236; J. van der Vliet, Fate, Magic and Astrology in *Pistis Sophia*, Chaps 15-21, in: A. Hilhorst & G.H. van Kooten eds., *The Wisdom of Egypt. Jewish, Early Christian, and Gnostic Essays in Honour of Gerard P. Luttikhuizen* (Leiden/Boston 2005), pp. 519-536.

[115] I would propose analysing Khainkhoookh as corruption of Bainkhoookh, a well-know magical name going back ultimately to Egyptian *bȝ n kk.w* "soul of the god of primeval darkness", see J.F. Quack, Dekane und Gliedervergottung. Altägyptische Traditionen im Apokryphon Johannis, *Jahrbuch für Antike und Christentum* 38 (1995), pp. 97-122, there p. 118 with n. 138f.; see also Quack, *Jahrbuch für Antike und Christentum* 38, p. 117 for a possible derivation of Orimouth from Egyptian "Horus the justified". If emended to tarpetnanouph, the name of Mercury might mean "she who has done what is beautiful" (*tȝ ỉ:irị pȝ ntỉ nȝ-ᶜn=f*).

[116] Schmidt, *Pistis Sophia*, pp. 361-366; *Koptisch-gnostische Schriften*, pp. 238-241.

The usual order in Demotic astronomical and astrological texts, be they planetary tables or horoscopes, is the order from the slowest to the fastest planet - or otherwise expressed, from the one with the highest orbit to the one with the lowest, namely Saturn, Jupiter, Mars, Venus, and Mercury. This is the so-called Chaldaean order,[117] though its Babylonian origin is debatable. Perhaps it would be better to call it the astronomical order without implications as to its origin, given that it is not the traditional order of the earlier cuneiform texts.[118]

The question of the order of the planets should be studied in connection with the issue of classical transmission.[119] According to Achilles (first century CE) (*Isagoge*, chapter 16), the Egyptian sequence is Saturn, Jupiter, Mars, Mercury, Venus, Sun, Moon, whereas the Greek one is Saturn, Jupiter, Mars, Sun, Mercury, Venus, Moon. Obviously, the only difference concerns whether the Sun and Moon are integrated into the sequence or placed separately besides the five true planets. Even though the historicity of these attributions has been doubted,[120] we can at least note that it corresponds to a general Egyptian tradition of referring to the two luminaries and the five 'living' stars; i.e. of keeping the true planets distinct from the Sun and Moon. Furthermore, the sequences of the horoscopes normally follow that order. Thus, what Achilles says is likely to have been Graeco-Roman Egyptian practice regardless of its ultimate origin. Macrobius (CE 395-423) implies that a slight variant of this order, with Mercury and Venus changing position, is Egyptian, in *In Somn. Cic.*, I, 19 where he does not give the complete sequence, but only the inner section for which there is disagreement between different traditions.[121]

Indirect evidence comes probably from the Hermetic composition *Kore Kosmou* transmitted as an excerpt with the Late Antique author Stobaeos (latter half of fifth century CE). There we have the sequence Sun, Moon, Saturn, Jupiter, Mars, Venus, and Mercury.[122] In this case, Sun and Moon are put in front of the planetary sequence instead of after it, but the principle is the same, i.e. the 'Chaldaean' order is used, but with the extraction of the two luminaries from the rest of the sequence. The text is still sufficiently Egyptian in its background to be adduced as potentially useful testimony.

Actually, regardless of its origin, this arrangement seems to have gained some favour with astrologers, because it is also the one which Ptolemy (fl. CE 130-75), *Tetrabiblos*, I, 4, Vettius Valens (fl. CE 152-162 CE) *Anthologiae*, I, 1, and Hephaistion (fl. c. CE 415), *Apotelesmatika*, I, 2 use when describing the powers of the planets.

---

[117] Neugebauer & Parker, EAT III, p. 175.

[118] Neugebauer & Parker, EAT III, p. 203 consider it to be Greek.

[119] Compare Neugebauer, HAMA, pp. 690-693; see also Bouché.Leclercq, *Astrologie grecque*, pp. 64f., n. 1.

[120] Neugebauer, HAMA, p. 692.

[121] N. Armisen-Marchetti, *Macrobe, Commentaire au songe de Scipion* (Paris 2003), pp. 103f. and 187f.

[122] A.D. Nock & A. J. Festugière, *Hermès trismégiste. Corpus Hermeticum, tome IV. Extraits de Stobée (XXIII-XXIX), Fragments divers* (Paris 1954; reprint 2002), pp. 8f.; notes 96-102; A.J. Festugière, *Hermès trismégiste. Corpus Hermeticum, tome III. Fragments Extraits de Stobée (I-XXII)* (Paris 1954; repr. 2002), pp. CXCIV-CXCVIII (there pp. CXCVIIf. with parallels for the order in other texts). Motte, in: *Études coptes* IV takes this order to be based on the *thema mundi*, but, for a real correspondence to that, the sequence would have to be substantially different, because the *thema mundi* supposes an order Moon, Sun, Mercury, Venus, Mars, Jupiter, Saturn, which is not known to me as an order of the planets in any actual astrological text.

To be discussed by an Egyptologist are those names of the planets indicated by Achilles, *Isagoge* 17 as being Egyptian.[123] We have here Saturn: Star of Nemesis; Jupiter: Star of Osiris; Mars: Star of Heracles;[124] Mercury: Star of Apollo. While this obviously deviates from the standard and shows an Egyptian flavour by naming Osiris, the link with the preserved Egyptian documents is far from easy. The association of Saturn with Nemesis should be fairly correct for Roman period Egypt, since Nemesis, or rather the Egyptian form Petbe "the retribution" is identified with Cronos.[125] More complicated is the situation for Jupiter. Maybe the old designation *Ḥr wpš-t3.wỉ/wpỉ št3.w* for the planet was confused with *Ḥr wpỉ š^{c}.t t3.wỉ*, a typical epithet of Osiris.[126] The equivalence of Mars and Heracles is also given by several authors as a possible alternative without ethnic attribution.[127] It is indicated as specifically 'Chaldaean' by Epigenes of Byzantium (Hellenistic, exact date uncertain) in a scholion to Apollonius of Rhodes (c. 240-170 BCE) III, 1377, as well as by Varro (116-27 BCE) in Macrobius (CE 395-423), *Saturnalia* III, 12, 16. The designation of Mercury as star of Apollo (which is given by several other authors as a possibility without ethnic attribution),[128] could point to an underlying Egyptian association with Horus. That would mean that Horus has taken the place of his rival Seth, a process which can also sometimes be observed in earlier Egyptian astronomical depictions, specifically for the tutelary deities of the Decans.[129] There is, however, a possibility that in reality this goes back to the interpretation of Babylonian Nabû as Apollo, which was usual in Syria.[130]

According to the chronographer Malalas (c. CE 491-578), there was a specific set of planet designations coined by the historian Manetho (c. 305-240 BCE).[131] It does not seem to be used elsewhere. A set of names based mainly on luminosity is rather frequently used in Hellenistic times. This set was presented as being 'Egyptian' (in opposition to the Greek names based on the gods) by Firmicus (fl. c. CE 335), *Mathesis* II, 2, whereas John Lydus (c. CE 550), *De Mensibus*, II, 4-12 indicated the Chaldaean followers of Zoroaster and Hystaspes as well as the Egyptians to be its originators.[132]

An interesting tradition is preserved by Vettius Valens, *Anthologiae* VI, 3, 7, who gives Ἄρτην as the name of Mars with the Egyptians. From this form in the accusative a nominative *Ἄρτης can probably be reconstructed. This is a plausible rendering of the Egyptian designation *Ḥr-ṯš(r)* "Horus the red one" for Mars[133] and shows the extent

---

[123] Compare in general F. Cumont, Les nomes des planètes et l'astrologie chez les Grecs, *L'antiquité classique* 4 (1935), pp. 5-43.

[124] Venus is omitted in the text; Gundel, in: *Paulys Real-Encyclopädie der classischen Altertumswissenschaft* XX, 2, col. 2027 proposes Isis without giving a justification, but probably based on Pliny, *NH* II, 37, where Isis is given as a possible name of the planet Venus.

[125] W.M. Brashear, *Magica Varia* (Bruxelles 1991), pp. 24 and 33-35.

[126] For that one, see Chr. Leitz ed., *Lexikon der ägyptischen Götter und Götterbezeichnungen*, Band II, *Orientalia Lovaniensia Analecta* 111 (Leuven/Paris/Dudley, MA), p. 355.

[127] Cumont, *L'antiquité classique* 4, p. 15 n. 1.

[128] Enumeration in Cumont, *L'antiquité classique* 4, p. 16 n. 6.

[129] Neugebauer & Parker, EAT III, pp. 153-156; Quack, *Dekane*.

[130] So Cumont, *L'antiquité classique* 4, p. 16.

[131] Cumont, *L'antiquité classique* 4, p. 25.

[132] Cumont, *L'antiquité classique* 4, p. 41.

[133] For the different renderings, as attested mainly by some personal names, see J.K. Winnicki, Hartysis und Ares (Planet Mars) als Personennamen im griechisch-römischen Ägypten, *Egitto e Vicino Oriente* 17 (1994), pp. 321-325; we have forms such as Artysis and Artes attested in the documentary papyri.

to which Egyptian models were really used in the astrological treatises. Egyptian planet names are also indicated by John Lydus, *De Mensibus*, book IV (ed. Wünsch 92, 3). He gives Ἐρτωσί as a name of Mars, which is a variant form of what Vettius Valens transmits. Although the direct definition given for this name "life-formation of every birth and every substance and every matter and structured life-force" is fanciful, a remark shortly afterwards that the Egyptians called the planet Pyroeis (ed. Wünsch 92, 24) is more to the point. Finally, it should be discussed whether an Egyptian planet name might indeed be hiding behind the form σεχές which Hesiych considered to have derived from the Babylonian word for the Star of Mercury.[134] It might instead be derived from the Demotic form *s(w)gȝ*.

An order based on the sequence of the weekdays (with some errors in transmission) is given in an astrological lapidary transmitted under the name of Damigeron and Evax, and attested in the Latin translation of a Greek original.[135] This text is likely to be the product of an Alexandrian tradition mixing Greek and Egyptian concepts. It describes magical images to be engraved on ring-stones. Mostly, it describes only the images, but the god behind them can be recognised fairly easily. The religious associations we find here are: Sun: scarab (Re); Moon: Isis(?) with cow-horns;[136] Mars is lost; Jupiter: goat (Amun); Venus: Venus;[137] Mercury: dog-ape (Thoth); Saturn: crocodile-headed god (Sobek). The last case follows an Egyptian tradition of equating Sobek with Geb, who in turn was thought of as the equivalent to Cronos. All things considered, this composition gives Egyptian gods, or the animals connected to them, but the basic concepts follow the Hellenistic norm. Compared to the situation made evident by the Demotic ostracon, here is evidence of a more deeply-seated reformulation of the religious significance of the planets.

Traces of such a reformulation under Greek influence can equally be found in the depictions of some planets on the late astronomical ceilings of the temple of Esna (second century CE). There, we have a degenerate form of a Greek helmet on the head of Mars, and Jupiter brandishing knives in what might be an adaptation of the lightning bolt.[138]

On the public monuments (i.e. mostly temples), planets are normally shown either in their astrologically determined Houses, or in their equally astrologically determined *hypsomāta*.[139] Private objects (mostly coffin lids or tomb ceilings) usually display the planets and constellations at the moment of the birth of the owner. There is less difference between those two decoration concepts than it seems at first, because the position of the planets in their Houses is actually nothing other than their position at the moment

---

[134] Possible Babylonian origin discussed by A. Scherer, *Gestirnnamen bei den indogermanischen Völkern* (Heidelberg 1953), pp. 92f.

[135] J.F. Quack, Zum ersten astrologischen Lapidar im Steinbuch des Damigeron und Evax, *Philologus* 145 (2001), pp. 337-344. Edition of the text in R. Halleux & J. Schamp, *Les lapidaires grecs. Lapidaire orphique, kérygmes lapidaires d'Orphée, Socrate et Denys, Lapidaire nautique, Damigéron – Evax* (Paris 1985; ²2003), pp. 232f.

[136] In the manuscript, probably under the influence of Christianity, simply "that one who has cow's horns".

[137] Probably the Egyptian goddess of love, Hathor, was intended.

[138] Von Lieven, *Himmel über Esna*, p. 158.

[139] Neugebauer, *JAOS* 63, p. 122 n. 21; Neugebauer & Parker, EAT III 203f.; von Lieven, *Himmel über Esna*, pp. 157f.

of the birth of the world.[140] Public monuments, being connected with the world as a whole and not merely with a specific person, obviously chose that positioning.

This brings us to another basic astrological tenet for which a discussion of the different backgrounds is useful. Traditional astrology has two conceptually different fixed locations where a planet exercises most power. The first one is the *hypsoma*, the place of its Exaltation. It is defined as a specific zodiacal sign, in later Greek and Latin tradition even given with a precision of a single degree.[141] Its opposite is the *tapeinoma*, the place of rejection, always exactly on the opposite side of the zodiac.[142] The system of the Houses concerns attributing each of the zodiacal signs to a planet. Since there are 12 signs for 7 planets, this will result in some asymmetry. The normal solution is to give the Sun (Leo) only a House of the day, and the Moon (Cancer) only a House of the night, and one day-House and one night-House to each of the planets. Starting with the planet closest to the Sun (Mercury), the planets are each attributed to one sign each in their sequence, filling up the positions from Virgo (Mercury) to Capricorn (Saturn), and then going back again in a mirror image from Aquarius (Saturn) to Gemini (Mercury). See Ch.6 §7.3, below.

This House system is closely intertwined with the idea of the *thema mundi* because the Houses are where the planets were supposed to have been at the moment of the birth of the world. Since the *thema mundi* operates with a date within Cancer, at the moment of the heliacal rising of Sirius, it is highly likely to have been an Egyptian conception in its present form, making use of the traditional Egyptian New Year's Day, but filling it with a new astrological symbolism. The *hypsoma*, on the other hand, is attested as a conception in cuneiform texts.[143] Thus, it is likely that these two different concepts of maximum power of the planets are respectively due to those two civilisations that were traditionally considered to have given the main impetus to astrology.

The *thema mundi* spread fairly widely from its Egyptian origins; it is not only attested in Greek and Latin astrological authors but also in a section of the Iranian *Bundahišn*, where an Indian intermediary is obvious, especially since two lunar mansions are given with names derived from their Indian designations.[144] Typical for the *Bundahišn* as well as for the Arabic remodelling of this concept, is that the positions of the planets are shifted from their Houses to their *hypsomāta*. Such an arrangement can safely be assumed to be a secondary development, because it creates serious problems for the position of Mercury whose *hypsoma* in Virgo 15 has a distance from the *hypsoma* of the Sun (Aries 19) which by far surpasses the maximum elongation of Mercury from the Sun; thus the actual elaborations of the *thema mundi* with the planets

---

[140] For a full treatment of the *thema mundi*, see Quack, *Dekane*; see also E. Raffaelli, *L'oroscopo del mondo. Il tema di nascita del mondo e del primo uomo secondo l'astrologia zoroastriana* (Milano 2001).

[141] For the actual values, see Bouché-Leclerq, *Astrologie*, p. 195; F. Boll, C. Bezold & W. Gundel, *Sternglaube und Sterndeutung. Die Geschichte und das Wesen der Astrologie* (Leipzig/Berlin[4] 1931; reprinted Darmstadt 1966), p. 59.

[142] A convenient table of the *hypsoma* and *tapeinoma* of each planet can be found in F. Boll, C. Bezold & W. Gundel, *Sternglaube und Sterndeutung*, p. 59.

[143] Hunger & Pingree, *Astral Science*, pp. 28f.; for a different opinion see J. Koch, Die Planeten-Hypsomata in einem babylonischen Sternkatalog, *JNES* 58 (1999), pp. 19-31; idem, Neues von den babylonischen Planeten-Hypsomata, *WdO* 31 (2000/2001), pp. 46-71; idem, *WdO* 31 (2000/2001), p. 231.

[144] The supposed contacts with the *Yavanajātaka*, however, do not seem pertinent to me. See further Chs. 7 and 7.a, here.

in the *hypsomāta* tend to use a less powerful position of Mercury in order to make the scheme astronomically viable.

5. Theoretical astrology (treatises)

The number of Demotic astrological treatises[145] is remarkably large, but up to now has been little known of because most of the important manuscripts are still unpublished, and they have rarely been the favourite choice of editors.[146] I should begin with giving an overview on the material which is largely based on my notes of unpublished manuscripts.

The first category of astrological texts includes those concerned with universal (judicial) astrology - predictions for the king and the country. They might announce things such as military success of one kingdom against the other, the death of rulers, the positive or negative things happening to their children and their courtiers, drought or high Nile inundations and other meteorological phenomena (e.g. wind or rain), good or bad economic prospects, even the prospect of wild beast, birds, crocodiles etc. Among these, by far the most typical, are predictions based on the heliacal rising of Sirius.

One published specimen with the preserved title *nꜣ sḫn.w n spṯ.t* "*The Prognoses of Sirius*" is the Demotic papyrus Cairo CG 31222,[147] dating to Roman Imperial times (about 2nd century CE). The preserved part treats the position of the planets in different zodiacal signs at the time of the heliacal rising of Sirius. There are at least a dozen additional unpublished manuscripts of this type in Copenhagen, Ann Arbor, Florence and Oxford. Most of them, as far as it can still be ascertained, are based on the position of the Moon and the planets in the zodiac, but at least one of them uses brightness (and perhaps also colour) as a criterion. The whole topic of Sirius prognoses has a long history in Egypt. There are indirect attestations that as early as the later second millennium BCE, the appearance of Sirius on the day of a planet's heliacal rising had an ominous significance.[148]

There are several Greek fragments on papyri, which most probably stand in the tradition of such Egyptian texts. A fairly extensive section of the astrological author Hephaistion (*Apotelesmatica* 1, 23) gives the Ancient Egyptians as the relevant source and seems, indeed, to be based on earlier Egyptian models. The colour and brightness of the star is of importance, as well as the positions of the planets. In addition, thunder during the first seven days after the heliacal rising of Sirius is supposed to have a

---

[145] For Demotic astronomical and astrological texts, see the general overview in F. Hoffmann, *Ägypten. Kultur und Lebenswelt in griechisch-römischer Zeit. Eine Darstellung nach den demotischen Quellen* (Berlin 2000), pp. 119-125. See also the (incomplete) enumeration of demotic astrological texts in M. Ross, A Survey of Demotic Astrological texts, in: Ch.Burnett & D.G. Greenbaum, eds., *The Winding Courses of the Stars: Essays in Ancient Astrology*, *Culture and Cosmos* 11 (2007), pp. 1-25.

[146] E.g. W.J. Tait, *Papyri from Tebtunis in Egyptian and Greek* (London 1977) has edited not a single fragment of astrological content, although personal inspection has shown that there were several in the batch of papyri from which he chose specimens for his edition.

[147] G. R. Hughes, A Demotic Astrological Text, *JNES* 10 (1950), pp. 256-264.

[148] See in general Quack, *Dekane*.

meaning. Several treatises on prognoses of the year using dates around the heliacal rising of Sirius are likely to go back ultimately to such Egyptian models. They are transmitted not only in Greek, but also in Syriac and Arabic.[149]

Somewhat similar texts might be contained in the unpublished Demotic papyri BM 10660 and 10661,[150] in which it is not possible to recognise clearly the cause of the given prognoses,[151] and which are only accessible in the form of preliminary reports. For pBM 10660, dates in the Egyptian calendar seem the most relevant indicator, but what might happen on those dates is not clear from the preserved parts. Papyrus BM 10661 mentions the Sun, the Moon, and Mercury, so it might be similar to papyrus BM 10651 (see below). From my own notes, it seems as if wind phenomena and notable phases of the lunar cycle on certain days are also relevant, e.g. "if wind at noon[152] happens, the ruler of Media will die within 312 days," or "if the sixth lunar day happens in them, the ruler of Media will die."[153] Papyrus BM 10660 is clearly written in a Ptolemaic hand, and probably not late Ptolemaic, so it might date to the second century BCE.

Another unpublished text is papyrus BM 10651. It is written in hieratic script but in Demotic language. Palaeographically, the hand can be dated to the Roman period, but its strict reliance on the Decans without mentioning the zodiac pleads in favour of a rather earlier date for the archetype. It is organised in periods of ten days, each defined by the Egyptian Decan for the date in question. The first indication concerns strength and direction of the wind, sometimes also with notes on stones. Predictions based on solar and lunar eclipses in the decade in question come afterwards. Alimentary regulations are added, as well as restrictions concerning the use of certain medicines. Finally, we have some prognoses based on the behaviour of Mercury, unfortunately rather poorly preserved.

The geographical scope of all these Demotic texts is limited to some core players. Assyria, Babylon, Persia (Media), Crete, Libya and Nubia are mentioned. This seems to be the world at about the middle of the first millennium BCE.

The best know Demotic astrological text, nowadays in Vienna,[154] is at the same time one of the least typical. Palaeographically, it can be dated to about the later first century

---

[149] For an overview, see Quack, *Dekane*.

[150] C. Andrews, Unpublished Demotic Texts in the British Museum, in: J. Johnson, ed., *Life in a Multi-Cultural Society: Egypt from Cambyses to Constantine and Beyond*, *SAOC* 51 (Chicago 1992), pp. 9-14, esp. p. 13f.; eadem, Unpublished Demotic Papyri in the British Museum, in: *Acta Demotic. Acts of Fifth International Conference for Demotists Pisa, 4th-8th September 1993*, *EVO* 17 (1994), pp. 29-37, esp. pp. 29-32. Her readings and interpretations can be improved in some places.

[151] Andrews, in *Life in a Multicultural Society*, p. 14, eadem, *Egitto e Vicino Oriente* 17, pp. 29f., has proposed connecting pBM 10660 with the *Oracle of the Potter*. This is not very likely because all mentions of a potter in the text are within the apodosis of an omen. The connection is also doubted by Zauzich, in G. Vittmann, *Zeitschrift für Ägyptische Sprache und Altertumskunde* 125, p. 72 n. 93.

[152] The expression *č3w (n) mry* might perhaps rather mean "wind in day-time", depending on whether *mry* has a wider or narrower application. This sentence was quoted by Andrews, *Egitto e Vicino Oriente* 17, p. 31, but erroneously taking *mry* as a verb of unknown meaning.

[153] This sentence was quoted by Andrews, *Egitto e Vicino Oriente* 17, p. 31, but misreading *6.nt* as *ḥny* "disturbance".

[154] Edited by R.A. Parker, *A Vienna Demotic Papyrus on Eclipse- and Lunar-Omina* (Providence 1959). Some useful corrections can be found in the review by R.J. Williams, *JNES* 25 (1966), pp. 68f.

CE.[155] It contains two different compositions. The first one treats solar as well as lunar omina derived from eclipses. Given that it contains a concordance of Near Eastern month names and Egyptian months, it has generally been supposed to be based on a Near Eastern model[156] - the question can only be whether directly on a cuneiform one or via an Aramaic intermediary. The text deals with four different countries besides Egypt. They are probably Crete, Hebrew-land, Amurru and Assyria. The text also divides the hours of the day into three subdivisions, attributing each to a different country. The sky is divided into three parts equally distributed among the countries; perhaps reflecting the Babylonian concept of the ways of Anu, Ellil and Ea. Also, each month belongs to a different country. In this way, the effects of the eclipses can be politically interpreted. This could be an adaptation of the Babylonian methods, with slightly different countries used. In one place, there is a reference to "new writings", which is likely to refer to the model from which the Egyptian text was taken. There might even be a - mostly destroyed - mention of king Nechepsos (see below)[157]. Given the correspondence between Egyptian and Near Eastern months, the archetype is likely to date to the time from about 625-482. Thus, the composition should date from the late seventh or sixth century BCE.

The second composition also treats phenomena of the Moon (perhaps also of the Sun, but it is likely that only the Moon is meant).[158] It is illustrated by drawings. Mainly they concern the colours of the disc and occultations of stars. It can with some probability be dated to the early Demotic period, because of grammatical peculiarities.[159] Thus, it would be more or less contemporaneous with the first composition. In this second composition, however, there are no such obviously Near Eastern elements as in the first one, and for that reason the editor was more hesitant than in the other case to see a Babylonian origin, even though he pleaded in favour of it.[160] He based this idea mainly on an argument *ex silentio*. Never before in Egypt were there omina based on the Moon, while they were commonplace in Babylonia. At the same time he had to admit that nowhere in the preserved parts of the lunar section of *Enūma Anu Ellil* do we have really exact parallels to the wording of the Egyptian text - and the re-edition of the relevant cuneiform texts by Rochberg-Halton has done nothing to change this situation.[161]

---

[155] See Quack, *Enchoria* 26, p. 85 n. 10 as well as M.A. Stadler, *Isis, das göttliche Kind und die Weltordnung. Neue religiöse Texte aus dem Fayum nach dem Papyrus Wien D. 12006 Recto*, *MPER NS* 28 (Wien 2004), pp. 28f. The date in the late second or third century CE given in the original edition is certainly too late.

[156] Detailed argumentation in Parker, *Vienna Papyrus*, pp. 29-34. The only one to reject a Near Eastern model was E. Reymond, Demotic Literary Works of Graeco-Roman Date in the Rainer Collection of Papyri in Vienna, in: *Festschrift zum 100-jährigen Bestehen der Papyrussammlung der Österreichischen Nationalbibliothek Papyrus Erzherzog Rainer* (Vienna 1983), pp. 42-60, there p. 52.

[157] In all earlier studies the name was restored as Dareius, but recently Günter Vittmann has brilliantly proposed the new restoration which is well in keeping with the orthography of the manuscript.

[158] M. Smith, Did Psammetichus I die abroad, *Orientalia Lovaniensia Periodica* 22 (1991), pp. 101-109, there p. 106. See also Bohleke, *Studien zur Altägyptischen Kultur* 23, pp. 27f. n. 87 who makes an effort to connect some indications with Sunspots.

[159] J.F. Quack, Eine spezielle Bildung des Konditionalis und ihre Bedeutung für die Datierung von Texten, *Enchoria* 26 (2000), pp. 84-87.

[160] Parker, *Vienna Papyrus*, pp. 53f.

[161] F. Rochberg-Halton, *Aspects of Babylonian Celestial Divination: The Lunar Eclipse Tablets of Enūma Anu Enlil*, *Archiv für Orientforschung Beiheft* 22 (Horn 1988), there pp. 30 and 34 on the Egyptian text.

Perhaps this is a good occasion to discuss a complex issue related to general astrological prognostics. Bezold and Boll supposed that some Greek astrological texts go back to Babylonian precursors.[162] These texts themselves appear under the assumed authorship of individuals or groups such as Melampus, the Egyptians, Hermes Trismegistos, or Nechepso and Petosiris; besides some well-known later figures, such as Labeo (probably 3rd century CE). From their content, they all fall into the domain of general astrology. There is a tonitruale, a brontologion, a lunarion, a keraunologion, a seismologion. The modern commentators noted similarities in topic and general phraseology, sometimes even terminology, and for at least some sections they posited close verbal correspondences between single sentences of the Greek and the cuneiform texts. They had to admit, however, that there was not a single text where whole sequences of phrases could be paralleled in a way which would make direct adaptation plausible, except perhaps one single example in a lunarion transmitted by John Lydus and in a variant form by Melampus, plus a seismologion transmitted under the names of Hermes or Orpheus. Even for the latter one, they had to admit that the Greek text was much more extensive than the cuneiform one, and that the Mesopotamian composition included prognoses for the intercalary month which were absent from the Greek composition, so it could not have been derived from it directly. Still, they supposed that they had provided proof of the dependence of Greek astrology on cuneiform predecessors.

Even though the general process of transmission does not seem unlikely, it is difficult to prove any specific dependency, especially since this type of literature is normally transmitted in a very free, unfixed way. The attribution to Hermes Trismegistos is, of course, to be treated with caution; such an author can easily be made up. Still, an Egyptian model for such sorts of texts might seem a bit more likely nowadays than it was before. There is evidence that as early as the Ramesside period (c. 1300-1070 BCE), there were treatises with omina from earthquakes and thunder for each day of the year.[163] The Demotic material presented above also shows that such general astrological texts were available in the Egyptian language as well as in the cuneiform material. The actual wording and background (geographical and political) of the brontologion of Hermes, in particular, clearly points to an Egyptian composition dating to around the Ptolemaic era (certainly not later, since it was used by Fonteius).[164]

Among the individual astrological compositions (genethlialogy), we can also differentiate several types. One treats generalities, e.g. the character of the different signs, or the Terms attributed to the different planets in each zodiacal sign. It is likely that such texts are only the introductory part of larger compositions, but bad preservation of the manuscripts makes it difficult to ascertain this. In general, the characterisation of the signs, the Houses and the system of the *hypsomāta* and *tapeinomāta* of the planets are according to the standard schemata known from the Greek and Latin treatises, but there

---

[162] C. Bezold, F. Boll, *Reflexe astrologischer Keilinschriften bei griechischen Schriftstellern, Sitzungsberichte der Heidelberger Akademie der Wissenschaften* 1911, 7 (Heidelberg 1911). See now J.M. Turfa, *Divining the Etruscan Word. The* Brontoscopic Calendar *and Religious Practice* (Cambridge 2012).

[163] A. Roccati, Lessico meteorologico, in: *Studien zu Sprache und Religion Ägyptens zu Ehren von Wolfhart Westendorf* (Göttingen 1984), pp. 343-354, there pp. 347-354.

[164] Fraser, *Ptolemaic Alexandria* (Oxford 1972), volume I, pp. 437f.; volume II, pp. 633f. notes 507-509.

are some details of clearly Egyptian manufacture such as the association of Aquarius with the god Osiris.

Up to now only one papyrus with such generalities has been published, namely a table of Terms now at the Beineke library, Yale university.[165] There are at least two more unpublished manuscripts with such tables. Their values are of specific interest because the theoretical treatises on astrology transmitted in manuscripts have given us some different traditions about them.[166] Of prime importance is Ptolemy, *Tetrabiblos*, I, 24. He explains two known sets, one Chaldaean, the other Egyptian. He himself prefers a third solution which he claims to have found in an ancient, partly unreadable book. The 'Egyptian' one is that which dominated in the treatises, as well as the actual horoscopes. What we have in the published Demotic papyrus curiously deviates from everything known up till now; it will have to be compared with the still unpublished further Demotic examples of this type.

Papyrus Cairo 50143 has remnants of what seems to be a combination of such basics with actual forecasts.[167] It indicates Mercury as "sixth god" and gives the zodiacal signs of his triplicity. The number given would point to a sequence of the planets where the two luminaries were included in the sequence; thus Mercury is sixth, and the Moon would be the seventh. Formulations such as: "[...] good property; he will happen in [...]" (x+1, x+2) show how predictions were intermingled within this section.

A poorly preserved astrological text in pCarlsberg 4 recto might treat special situations of the planets, e.g. close conjunctions with the Moon or rising in the East and their effects for prognoses, but the text is too fragmentary to base much on it.

As for specific forecasts, one form is the zodiologion, or to name it more correctly, Decanologion, because the Demotic compositions of this type all make forecasts not simply according to the birth-sign, but according to the specific Decan. At least in one case, the relevant position seems not to be the one of the Sun in the Decan but rather the Moon. None of those have been published to date, but at least for one there is a preliminary report.[168] Even though the manuscript dates to the Roman period, the social situation rather points to a composition dating back to Hellenistic times or even to the last indigenous Egyptian dynasties.[169] The Demotic Decanologia are an obvious forerunner to the Decanal sections in Greek language of Hephaistion, *Apotelesmatica* I, 1. This includes even such specific details as the interstice between two zodiacal

---

[165] L. Depuydt, A Demotic Table of Terms, *Enchoria* 21 (1994), pp. 1-9, pl. 1; B. Bohleke, In Terms of Fate: A Survey of the Indigenous Egyptian Contribution to Ancient Astrology in Light of Papyrus CtYBR inv. 1132(B), *Studien zur Altägyptischen Kultur* 23 (1996), pp. 11-46, pl. 1.

[166] Bouché-Leclercq, *L'astrologie grecque*, pp. 206-15; detailed discussion of the different systems in Pingree, *Yavanajātaka*, volume 2, pp. 211-216; more briefly St. Heilen, Astrological Remarks on the New Horoscopes from Kellis, *Zeitschrift für Papyrologie und Epigraphik* 146 (2004), pp. 131-36, there pp. 131-3.

[167] W. Spiegelberg, *Catalogue général des antiquités égyptiennes du Musée du Caire. Die demotischen Denkmäler III. Demotische Inschriften und Papyri (Fortsetzung). 50023-50165* (Berlin 1932), pp. 105f. ; pl. 59; see also Bohleke, *Studien zur Altägyptischen Kultur* 23, p. 29 (contrary to his indications, there are not 2 but 4 lines; and remnants of a second column as well). Additional unpublished fragments of the manuscript are in Copenhagen.

[168] See M. Chauveau, Un traité d'astrologie en écriture démotique, *Cahiers de recherches de l'Institut de Papyrologie et d'Egyptologie de Lille* 14 (1992), pp. 101-105.

[169] Chauveau, *Cahiers de recherches de l'Institut de Papyrologie et d'Egyptologie de Lille* 14, pp. 104f.

signs, which is specifically mentioned in one of the Demotic papyri as well as in Hephaistion.

The Decans are generally recognised to be an item of astonishing longevity that was contributed by the Egyptians to astrology in general.[170] Their direct usage in genethlialogy as attested by Hephaistion (and copied from him by Kamateros (12th-13th century CE)) is a relatively rare phenomenon; mostly the Decans are either relegated to questions of medicine (iatromathematics) or magic; or mainly described in their iconography. The most successful model in terms of iconography of the Decans was the one taken over from Egypt (probably via a Greek intermediary source) by Varāhamihira in Sanskrit (see Ch.8.d), and from him by Abū Maʿšar in Arabic in the eight century CE (as well as Latin and Greek translations), which spread by the intermediary of the magical manual *Picatrix* far and wide into late medieval and early modern Europe. At the same time, it was also the one to keep the least number of original Egyptian elements.[171] It is still not clear how a further development with a transfer from India to Japan (via Tibet and China?) came about.[172] Another long-range connection between Egypt and East Asia is also likely in the case of the animals of the *Dodekaoros* "twelve hours"[173] and since for the Japanese Decan images the animal part seems to be primary, it is not unlikely that those two ideas were transmitted together.

Further to this, there are Demotic Egyptian texts operating with the position of the planets in either the zodiacal signs - in this case without differentiating according to Decan - or the 12 Places of the so-called *dodecatropos*. Two manuscripts of the latter type have been published, although with rather varying quality. The first is pBerlin 8345, dating as a manuscript probably to the first or early second century CE.[174] The basic organisation is according to the planets whose influences in the Places of the *dodecatropos* are enumerated. The preserved parts cover Venus and Mercury in the different Places (not all preserved); similar sections for the outer planets are likely to have preceded this.

Much less reliable is the edition of the second astrological treatise, papyrus Vienna D 6614, also of the Roman period, which was not even recognised as such in its first edition.[175] The internal organisation of the text is a bit different; it seems to use the

---

[170] For them, see W. Gundel, *Dekane und Dekansternbilder. Ein Beitrag zur Geschichte der Sternbilder der Kulturvölker, Studien der Bibliothek Warburg 19* (London 1936; reprint Darmstadt 1969); now re-evaluated by Quack, *Dekane*.

[171] For the less successful, but more Egyptian iconography attested, e.g. in Hermetic treatises, see A. von Lieven, Die dritte Reihe der Dekane oder Tradition und Innovation in der spätägyptischen Religion, *Archiv für Religionsgeschichte* 2 (2000), pp. 21-36

[172] See the contribution of Yano, in this volume, Ch.9.a.

[173] See the contribution of von Lieven, in this volume, Ch.3.b.

[174] Photography published (without detailed commentary or translation) in W. Spiegelberg, *Demotische Papyrus aus den königlichen Museen zu Berlin* (Leipzig 1902), pl. 97; good translation and philological discussion by G.R. Hughes, An Astrologer's Handbook in Demotic Egyptian, in: L. Lesko ed., *Egyptological Studies in Honor of Richard A. Parker* (Hanover/London 1986), pp. 53-69; for one detail, see J.F. Quack, Weitere Korrekturvorschläge, vorwiegend zu demotischen literarischen Texten, *Enchoria* 25 (1999), pp. 39-47, there p. 41. German translation in J.F. Quack, Demotische magische und divinatorische Texte, in: B. Janowski ed., *TUAT* NF 4, pp. 368-370. There is an unpublished fragment of this manuscript at Heidelberg.

[175] E.A. Reymond, *From the Contents of the Libraries of the Suchos Temples in the Fayyum, Part II. From Ancient Egyptian Hermetic Writings* (Vienna 1977), pp. 143-157, pl. VI; identified as an astrological text by M. Smith in Hughes, *Studies Parker*, p. 69; several important improvements in reading by M. Smith,

Places as basic units and to indicate the influences of Sun, Moon and the five planets (in this order) for each of them.

The remaining astrological treatises of this kind (mostly form Tebtunis) are still unpublished, and at the same time very numerous.[176] Their future edition will multiply the basis for discussion of all these questions. One point, however, should already be obvious. In phraseology and terminology, the Demotic astrological treatises are very close to the Greek and Latin ones; much closer than e.g. the cuneiform '*Proto-Horoscopes*'. Most importantly, this concerns the *dodecatropos* which is of fundamental importance for Hellenistic and later astrology but completely unknown in cuneiform texts. Evidently, decisive steps towards shaping ancient astrology into what we know as typical came about on Egyptian soil, and it is reflected in Demotic as well as Greek texts.[177]

6. The question of the *Salmeschiniaka*

There is one treatise which has left only a few traces in later citations, but is often assumed to have been fundamental for the inception of astrology, namely the so-called *Salmeschiniaka*. It is mentioned by Chaeremon (fl. CE 50), Hephaistion (fl. c. CE 415), Porphyry (c. CE 232-305) and Iamblichus (c. CE 245-325). Often, it is assumed to be based on Mesopotamian ideas, or at least to contain some of them; even for the title, some scholars have proposed Babylonian etymologies.[178] This is, however, not very likely, given that all ancient testimonies associate the composition with Egyptian doctrines.

From the actual (only three!) attestations, it can be ascertained that the *Salmeschiniaka* contained material supposed to form part of 'Hermetic literature', i.e. traditional Egyptian compositions (Iamblichus, *De Mysteriis*, VIII, 4), that it indicated the names of the Decans and *horoscopoi*[179] and mighty leaders (Porphyry, *Epistula ad*

Lexicographical Notes on Demotic Texts II, *Enchoria* 13 (1985), pp. 111-114; a proposal for the reading of the title by J.F. Quack, Die Spur des Magiers Petese, *Chronique d'Égypte* 77 (2002), pp. 76-92, there pp. 90f. Additional unpublished fragments of the same manuscript are at Aberdeen (inv. 191). See also M.A. Stadler, Archaeology of Discourse: The Scribal Tradition in the Roman Fayyum and the House of Life at Dime, in M. Capasso, P. Davoli, eds., *Soknopaios. The Temple and Worship. Proceedings of the First Round Table of the Centro di Studi Papirologici of Università del Salento Lecce, October 9th 2013* (Lecce 2015), pp. 187-232, there p. 217 (who has overlooked my proposal).

[176] See A. Winkler, On the Astrological Papyri from the Tebtunis Temple Library, G. Widmer, D, Devauchelle, eds., *Actes du IX^e congrès international des études démotiques Paris, 31 août - 3 septembre* 2005, *BdÉ* 147 (Cairo 2009), pp. 361-375.

[177] See also the discussion by D.G. Greenbaum & M.T. Ross, The Role of Egypt in the Development of the Horoscope, L. Bareš, F. Coppens & K. Smoláriková, eds., *Egypt in Transition. Social and Religious Development of Egypt in the First Millennium BCE* (Prague, 2010), pp. 146-182.

[178] C. Bezold, F. Boll, Eine neue babylonisch-griechische Parallele (zu Berossos), in: L. Scherman, C. Bezold eds., Aufsätze zur *Kultur- und Sprachgeschichte vornehmlich des Orients, Ernst Kuhn gewidmet* (München/Breslau 1916), pp. 226-235, there p. 229; R. Eisler, salmesayanakai. Das astrologische Bilderbuch *Ṣalmē šakannakē*, *OLZ* 38 (1935), cols. 665-667.

[179] Those two different categories probably correspond to two different sets of Decan names (the Seti IB family and the Tanis family).

Anebonem, II, 12), and that it was earlier than the writings of Nechepso, who is supposed to have taken over some teachings from it, especially concerning the position of the Decans at birth (Antigonos *apud* Hephaistion II, 18, 74-76).

Matters have been confounded by an almost general agreement that papyrus Oxyrhynchus 465 actually contains a fragment of that composition. A careful examination shows that the Greek papyrus in question is most probably the translation of an Egyptian text about chronocrator deities[180] (or at least strongly influenced by their iconography) and has nothing which makes a connection with the *Salmeschiniaka* in any way evident or plausible.[181] There are also apparently no Babylonian elements in it. Even a name Neby given in the text is not a rendering of the Babylonian god Nabû but of a Demotic Egyptian expression *nb ʒḥ* "lord of fight". In other words this composition is but one more case of Egyptian lore translated into Greek (or freely adapted to it). Mesopotamian influence cannot be supposed either for this papyrus or for the *Salmeschiniaka* in general. That the *Salmeschiniaka* itself was based on Egyptian traditions is likely, however, given that it operates with the Decans, but the sources do not permit a really close analysis.

7. Practical astrology (horoscopes)

To date, quite a few Demotic horoscopes have been published.[182] The earliest one (the first item in an ostracon from the Ashmolean Museum) can probably be dated to year 8 of Cleopatra VII (44 BCE), probably to the 7th hour of the day.[183] This is connected with another entry on the same ostracon for a situation on March 4, 38 BCE. Positions for the planets are given with a precision of 1 degree, in one case even to half a degree. The details are still highly problematic, and the reading and interpretation of the text as given in the *editio princeps* is doubtful on several points.

Ostracon Glasgow Hunterian Museum 1925.96 was recently published, and is to be dated to 7 CE on astronomical evidence (it is dated to the reign of Augustus, but the year date is lost in a lacuna).[184] In this case, the order of planets is Saturn, Jupiter, Venus, Mars, [Mercury]. For unknown reasons, perhaps no more than scribal negligence, Venus has been placed before instead of after Mars. The positions are accurate only to the nearest zodiacal sign. In addition to the usual information, the fifth and the

---

[180] There are, e.g. obvious connections, even including an Egyptian name phonetically transcribed in Greek, which link this text with the tradition of the hippopotamus goddesses of the months studied by Mendel, *Monatsgöttinnen*.

[181] See Quack, *Dekane*.

[182] O. Neugebauer, Demotic Horoscopes, *Journal of the American Oriental Society* 63 (1943), pp. 115-128.

[183] Edited in O. Neugebauer, R.A. Parker, Two Demotic Horoscopes, *Journal of Egyptian Archaeology* 54 (1968), pp. 231-235, pl. XXXVI. While the editors read the year as hieratic  and do not propose an interpretation, it is obviously the Demotic form of *8.t*. In l.2, what the editors have taken as  should rather be read as *(pȝ čȝi) 7.t n hrw* "seventh (hour) of the day"; afterwards read not *sln*s but rather *ḳrns*. In line 4, the strange sign given a position in Libra 4 is perhaps the Ascendant.

[184] J.F. Quack, Ein astrologisches Ostrakon der frühen Kaiserzeit (oGlasgow D 1925.96), *Enchoria* 31 (2008/9) pp. 104-112, pl. 9. I would like to thank Prof. Dr. Ursula Kaplony-Heckel for drawing my attention to the text and presenting me with a photograph.

tenth Places of the *dodecatropos* are also given, as well as the Moon's phase (full Moon), and for almost all parameters a short following note is added: "it is good".

Ostracon Medinet Habu 3377 is dated to Augustus, year 43 (13 CE). It indicates the date (in the Alexandrian calendar) and the hour. The positions of the planets are given to the nearest zodiacal signs, and only for the Moon down to the nearest degree. This ostracon, and some others perhaps written by the same scribe, are noteworthy because they indicate first the position of Sun and Moon, but then follows a sequence of the Places of the *dodecatropos*, first the four *centra*, then three *apoklimata*, two Places neighbouring the *medium caeli*,[185] and the second Place.

Other ostraca of this type are ostracon Strasbourg (dated to Tiberius, year 4 = 17 CE); oThompson 1 + oStrasbourg (dated to 18 CE), and oStrasbourg D 270 (dated to CE 35); probably also oThompson 2 (fragmentary, dating not possible). Of this group, oThompson 1 + oStrasbourg is the most remarkable, giving after the twelve Places of the *dodecatropos* another sequence with rival designations for the second to twelfth Places. The difference concerns firstly the sequence: In the first order we have the Places in the order 1, 7, 10, 4, 9, 6, 12, 7, 11. This combines a hierarchy with a system of different Aspects (opposition, *trigona* - where the planets are each 120° distant), and given that it uses two different designations for the seventh Place, it really defines only 8 Places, not twelve.[186] The second system of the *dodecatropos* is much simpler, proceeding in a straightforward sequence. Equally marked are the differences in terminology. Whereas the first system uses names strictly adhering to astronomical behaviour, as far as they can be philologically understood (e.g. "setting"), the second system uses expressions mostly modelled on "Place of ..." or "Lot of ...", always giving direct information on which complex of life would be under the particular influence of each specific Place. This second set, of which there are some variants found in different documents (it is also the one used in the theoretical treatises) has close correspondences to those terms in use in almost all of the old world,[187] even including China.[188] At the moment I see no way to decide whether it is ultimately Greek or Egyptian, but given how deeply it is embedded in Demotic astrology, the latter alternative appears currently to be more likely.

Ostracon Berlin 6152 dates to year 3 of Nero and can be dated on the basis of direct indications (in accordance with astronomical reality) to February 27th, 57 CE.[189] It

---

[185] Concerning the difficult terminology used in those ostraca, M. Ross, All's DUR that ends *twr*, in: M. Ross ed., *From the Banks of the Euphrates. Studies in Honor of Alice Louise Slotsky* (Winona Lake 2008), pp. 245-255 has recently discussed whether the enigmatic word *twr* used in them could be related to the sign DUR used in cuneiform astrological texts. See further in Ch.6 §7.2 *sub* TU 14 here.

[186] I wonder whether such a system might account for those hints in Manilius to a so-called *octatropos* "eight-turning" being a rival to the *dodecatropos*. See now W. Hübner, Die Dodekatropos des Manilius (Manil. 2, 856-970), *AWLM* 1995, 6 (Stuttgart 1995).

[187] See von Lieven, *AoF* 26, pp. 123f.

[188] J. Needham, *Science and Civilisation in China, Volume 2. History of Scientific Thought* (Cambridge 1956), p. 352; Ho Peng Yoke, *Chinese Mathematical Astrology. Reaching out to the Stars* (London/New York 2003), pp. 74-82, according to whom this system was taken over from the West to China in the eight to ninth centuries CE.

[189] Neugebauer & Parker, *JEA* 54, pp. 234f.

seems to use a correlation of the Alexandrian and the Egyptian calendars,[190] and it indicates the hour (5th hour of night). The positions of all seven planets and the Ascendant are given in regard to zodiacal sign (no degrees are mentioned).

Ostracon Brooklyn Museum 12768 1774 has been published recently.[191] The text gives a date (year 4(?) of Nero, Epiph 8(?)), probably according to the 'Greek' i.e. Alexandrian calendar,[192] an equivalence in the Egyptian calendar,[193] the hour of the day (12th hour of daytime), the positions of Sun (Cancer), Moon (Sagittarius),[194] Saturn (Taurus), Jupiter (Cancer), Mars (Libra), Venus (Leo?) and Mercury (Cancer) according to zodiacal signs. If the position of Venus is Virgo (it is quite unreadable on the published photograph) this would be relatively correct for July 20 or 21, 58 CE (which would be Epiph 26 or 27 in the Alexandrian calendar), but with Jupiter and Mercury at least a few degrees off the mark.

Ostracon Medinet Madi 1060 and 1154 are merely notes on planet positions in the zodiacal signs, no dates are given.[195] Several more ostraca from Medinet Madi with birth notes and horoscopes were published recently in the dissertation of Mica Ross.[196] As far as it can be seen from direct indications and calculations, they date from the second century CE (mainly the latter part of it). In one case, (oMM 842), the date is followed by a short prognosis: "for 160 days, he will do iniquity against [...]".[197] This same ostracon seems to calculate the time of conception.[198] Another (oMM 374) makes use of the lunar node.[199] Ostracon MM 134 calculates using the Lot of Fortune.[200] The whole corpus is characterised by a mixed 'polyglot' system where Greek and Demotic go hand in hand.

Ostracon Leiden 333 is, unfortunately, quite fragmentary.[201] The preserved parts give the position of the Places of the *Dodecatropos* in the zodiac, and some notes about the planets which are difficult to understand. ODK-NMB Nr. 2 contains notes with

---

[190] Given the formulation *ntỉ ỉrỉ* "which makes" at the beginning of line 3, which is typically used for correlating different dates, it is likely that the second half of line 2 (practically unreadable on the photograph), read *ỉbṭ ỉ3w* "old month" by the editors, in reality contains the date in the Alexandrian calendar. A collation of the original on March 7, 2011 (made possible by the support of Dr. Verena Lepper) has indeed revealed that the text should be read as *sw 3 r 4* "day 3-4".

[191] G.R. Hughes, *Catalogue of Demotic Texts in the Brooklyn Museum, with Contributions by Brian PP. Muhs and Steve Vinson, Oriental Institute Communications* 29 (Chicago: Oriental Institute 2005), p. 55, plate 33c.

[192] In line 4, where the editor reads *r pỉ wyn* "the light being ...", a more probable reading is *n nỉ wyn[n]* "of the Greeks".

[193] Line 4f. is probably to be read *ntỉ ỉrỉ sw 12(?) n pỉ rmč kmy* "which makes day 12(?) of the Egyptian".

[194] Where the editor reads *ḥ^{c}* "the Ascendant" in line 7, the correct reading is obviously *ỉ^{c}ḥ* "Moon".

[195] R.A. Parker, A Horoscopic Text in Triplicate, in: H.-J. Thissen & K.-Th. Zauzich, *Grammata Demotika. Festschrift für Erich Lüddeckens zum 15. Juni 1983* (Sommerhausen 1988), pp. 141-143, pl. 23.

[196] M.T. Ross, *Horoscopic Ostraca from Medînet Mâdi* (Dissertation Brown University 2006).

[197] Ross, *Horoscopic Ostraca*, pp. 95-99, where the expression *mṭ(.t)-ḫftỉ* is misread as *md ll*. For the writing, see J.F. Quack, Review of A. Menchetti, *Ostraka Demotici e bilingui da Narmuthis*, *Enchoria* 30 (2006/2007), pp. 174-81, there p. 178.

[198] Ross, *Horoscopic Ostraca*, pp. 98f.

[199] Ross, *Horoscopic Ostraca*, p. 82.

[200] Ross, *Horoscopic Ostraca*, p. 115.

[201] Original edition by M.A.A. Nur el-Din, *The Demotic Ostraca in the National Museum of Antiquities at Leiden* (Leiden1974), pp. 264-265. See also J.F. Quack, Eine unetymologische Schreibung für den Namen des Planeten Jupiter, *Enchoria* 21 (1994), pp. 148-149; K. Goebs, „Horus der Kaufmann" als Name des Planeten Jupiter, *Enchoria* 22 (1995), pp. 218-221.

dates and zodiacal signs. It is difficult to read and of unclear purpose.[202] A few unpublished horoscopes, all from the Roman period, are also among the Demotic Ostraca from Elephantine.[203]

8. Almanacs, sign-entry tables etc.

There is a fairly substantial corpus of astronomical tables from Egypt in Greek and Demotic. It should be pointed out that the difference in language and script is much more essential for the modern editors than it was for the ancient users. Personally, I seriously doubt that much can be made of the difference as regards ethnicity - and ethnicity in Graeco-Roman Egypt is a much-discussed and far from easy subject anyway.[204] While the use of Demotic is more likely for Egyptians than for Greeks, there is no inherent reason why Egyptians should not also have made use of the Greek language for such texts. Besides, the very nature of these tables means that there is a much reduced inventory of words and signs, so problems of reading and understanding were not likely to be tied to the choice of writing. Perhaps it should be considered relevant that while astronomical tables on papyri (and horoscopes, often on ostraca) are much more numerous in Greek than in Demotic, the number of astrological treatises seems substantially greater in Demotic than in Greek.

Among the Demotic Egyptian texts, there is at least one which is not a table in itself but a procedure text on how to construct such a table.[205] Greek influence on a Demotic text is evident in at least one case. There is a list of eclipses in Demotic for the parts of first century BCE (84-73 BCE),[206] but the dates are reckoned according to the fourth Callippic period, a Greek calendar scheme.

A special discussion seems appropriate for the Demotic planetary tables. There are two important published ones.[207] The first one is papyrus Berlin 8279 (now with a small additional fragment pBerlin 23547).[208] It contains dates for the entry into zodiacal signs for the five planets from the years 14-41 of Augustus. Neugebauer once supposed that

---

[202] D. Devauchelle, Cinq Ostraca démotiques de Karnak, in: *Cahiers de Karnak VIII 1982-1985* (Paris 1987), pp. 137f., pl. 1.

[203] To be published by F. Hoffmann whom I would like to thank for sharing this information with me.

[204] See e.g. C. La'da, Ethnicity, Occupation and Tax-Status in Ptolemaic Egypt, *Egitto e vicino oriente* 17 (1994), pp. 183-89; idem, Encounters with ancient Egypt: the Hellenistic Greek experience, in: R. Matthews & C. Roemer eds., *Ancient Perspectives on Egypt. Encounters with ancient Egypt* (London 2003), pp. 157-169.

[205] Papyrus Florence "44" (not a correct actual inventory number), Neugebauer & Parker, EAT III., pp. 250-252; pl. 80A. In spite of the abominable quality of the published photograph, I will try an additional reading proposal: Line 3, beginning, read *[nti] ḫpr n ỉp* "[which] happens as number of". Recently, a demotic astronomic procedure text, including rules for calculating Venus, has come to light at Tebtunis (information given by Ivan Guermeur).

[206] Publication by O. Neugebauer, R.A. Parker & K.-Th. Zauzich, A Demotic Lunar Eclipse Text of the First Century B.C. *Proceedings of the American Philosophical Society* 125 (1981), pp. 312-327; identification of the era in Jones, *Astronomical Papyri from Oxyrhynchus*, p. 14.

[207] Published and discussed in Neugebauer & Parker, EAT III, pp. 225-240.

[208] Published by F. Hoffmann, Astronomische und astrologische Kleinigkeiten III: P. Berlin P 23547, *Enchoria* 25 (1999), pp. 24-26, pl. 17.

it had been copied from a hieratic original, but I remain unconvinced by his arguments.[209]

The second are the so-called *Stobart Tables*, containing entry dates of the planets in the signs of the zodiac for the years 4-10 of Vespasian, year 9 of Trajan to year 3 of Hadrian, and years 11-17 of Hadrian. Besides, there are fragments of tables for the day-to-day motion of Mercury, for lunar motion, for the sidereal period of Saturn, and some of unclear purpose.[210]

From my personal knowledge, I can add the fragments of a Demotic primary table (from Tebtunis, now at Oxford) for the Moon for the years 21-27 (of Antoninus Pius; CE 157-163).[211] The text uses sexagesimal (base 60) notation, and the abbreviated symbols for the zodiacal signs, normally just one Demotic group for each sign. Given that Antoninus Pius died in his 24th year, the list is likely to have been drawn up in advance.

At Copenhagen, there is also a lunar ephemeris (papyrus Carlsberg 638) giving the position of the Moon in the zodiac for each day with a precision of one degree.[212] An ostracon at Berlin (O. Berlin P 30539) has calculations of the exact date of lunar conjunctions.[213] The dates are given in the text with a precision of one hour (without fractions), modern calculations show them to be slightly less accurate than the tables in Ptolemy's Almagest, but still giving correct times within a margin of 2 hours.

Van der Waerden has proposed that these tables (especially papyrus Berlin 8279 and the *Stobart Tables*) were based on Babylonian methods of System A or A' (see Ch.2, here); and that those same schemata were taken over by Indian astronomers.[214] As a matter of fact, he quite often bases his assumption of Babylonian influence not on direct Babylonian sources but on Indian ones which he supposes derive from them. He mainly used the section on Venus and Mars, because for Jupiter and Saturn there was not enough data for firm conclusions, and Mercury seemed too complex and difficult.

His earlier proposal was criticised by Neugebauer and Parker.[215] They noted especially that van der Waerden did not have enough source material from Babylonia

---

[209] O. Neugebauer, Egyptian Planetary Tables, *Transactions of the American Philosophical Society NS* 32/2 (1942), pp. 205-250, there p. 247. His argument that a mistake between the numerals 10 and 20 is more likely in hieratic than in Demotic texts is not valid because the specific ligature for 20 was no longer in use by the Ptolemaic period, see U. Verhoeven, Untersuchungen zur späthieratischen Buchschrift, *Orientalia Lovaniensia Analecta* 99 (Leuven 2001), pp. 212f. Bohleke, *Studien zur Altägyptischen Kultur* 23, p. 24 has discussed Neugebauer's theory of a hieratic original assuming it were a pharaonic ('Old Egyptian') composition free of astrological influences, but the actual dates indicated in the text can exclude such a hypothesis.

[210] Published in Neugebauer & Parker, EAT III, pp. 240-252 and 254f.

[211] It is not impossible that pOslo 1336 (which also comes from Tebtunis and is concerned with the Moon) forms part of the same manuscript; at least the hand seems very similar.

[212] F. Hoffmann, A. Jones, Astronomische und astrologische Kleinigkeiten V: Die Mondephemeride des P. Carlsberg 638, Enchoria 30 (2006/2007), p. 10-20.

[213] F. Hoffmann, Astronomische und astrologische Kleinigkeiten VI: Neunmonddaten aus dem, Jahre 184/185 n.Chr., in H. Knuf, Chr. Leitz & D. von Recklinghausen, eds., *Honi soit qui mal y pense. Studien zum pharaonischen, griechisch-römischen und spätantiken Ägypten zu Ehren von Heinz-Josef Thissen*, OLA 194, Leuven, Paris, Walpole, MA 2010: pp. 233-236.

[214] B. L. van der Waerden, Babylonische Methoden in ägyptischen Planetentafeln, *Vierteljahrsschrift der naturforschenden Gesellschaft in Zürich* 105 (1960), pp. 97-144; B.L. van der Waerden, Aegyptische Planetenrechnung, *Centaurus* 16 (1971), pp. 65-91; idem, *Die Astronomie der Griechen* (Darmstadt 1988), pp. 204-218.

[215] Neugebauer & Parker, EAT III, pp. 236-240.

for those sections on which he concentrated, and that he had mainly selected the region of uniform motion of Venus where even modern planetary tables would give quite similar dates for the sign-entries, whereas the retrograde phases and the dates near them were excluded. Thus, only the most uniform and uncharacteristic parts of the planet's movement were submitted to close analysis. Thereafter, van der Waerden tried to clarify his position. He restricted himself to the *Stobart Tables*. He showed that the Venus positions were calculated with a method which used step-function with linear constant velocity of the planet for a certain arc, and then a higher velocity for the next; a mathematical model analogous to the Babylonian ones of System A, and not a spherical model like those developed by Ptolemy.

Neugebauer finally thought it possible in general that the tables, be they Greek or Demotic, use methods developed in Alexandria which adapted Babylonia procedures to the requirements of Hellenistic astrology.[216] More recently Pingree accepted that it is likely that there were subdivisions of the synodic arcs in the Egyptian tables developed in a way similar to those in the cuneiform texts.[217] Abraham has sought to find the exact parameters used for Mars in the *Stobart Tables*.[218] He notes good agreement, but it has to be pointed out that he used values which are numerically different from those attested in actual Babylonian tablets, and has to correct the transmitted numbers in the Demotic tables several times in order to achieve best agreement with his hypothesis. Most recently, Rochberg accepts the presence of a Babylonian System A scheme for Mars in the *Stobart Tables*.[219]

By now, the growing number of Greek papyrus fragments from Egypt using mathematical methods similar to the Babylonian astronomical cuneiform texts have made it relatively convincing that the Demotic tables as well were indeed based on similar arithmetic procedures.[220] Also, the fundamental similarity of some parameters and schemes in the sixth century CE Indian *Pañcasiddhāntikā* to the Babylonian System A schema is widely accepted.[221] For details see Ch.8.c.

There remains one fundamental question: Were the Indian parameters borrowed directly from Mesopotamia, or did they come via Egypt together with other astrological lore? I am not sure that proof is possible at the actual state of publication and research, but I would tend to prefer the indirect way, with the Babylonian procedures first entering Egypt, being used and adapted there, and only afterwards being transmitted to India, probably during Roman imperial times. There is at least circumstantial evidence in favour of such a route: No Indian procedures of similar complexity are attested at earlier times, and the supposed early influences of Babylonian astronomy upon India

---

[216] O. Neugebauer, HAMA (Berlin 1975), p. 790.

[217] Hunger & Pingree, *Astral Science*, p. 247.

[218] G. Abraham, The Motion of Mars in Egyptian Planetary Tables, *Archive for History of Exact Sciences* 30 (1984), pp. 1-6.

[219] F. Rochberg, *The Heavenly Writing. Divination, Horoscopy, and Astronomy in Mesopotamian Culture* (Cambridge 2004), pp. 240f.

[220] A. Jones, *Astronomical Papyri from Oxyrhynchus* (Philadelphia 1999); idem, More astronomical papyri from Tebtunis, *Zeitschrift für Papyrologie und Epigraphik* 134 (2001), pp. 211-220; idem, Babylonian Lunar Theory in Roman Egypt: Two New Texts, in: J.M. Steele, A. Imhausen, eds., *Under One Sky. Astronomy and Mathematics in the Ancient Near East*, *AOAT* 297 (Münster 2002), pp. 167-174.

[221] O. Neugebauer & D. Pingree, *The Pañcasiddhāntikā of Varāhamihira* (Copenhagen 1971), part II, pp. 109-128.

are probably to be discarded.[222] The route from Egypt to India was demonstrably used during the Roman imperial period for conveying astral lore.[223] Recent excavations at Berenike on the Red Sea coast have even brought up ostraca in Greek, Demotic Egyptian, and Indian (Tamil) languages side by side in one city.[224]

9. Specifics

A passage in a Late Period biographical inscription has long been supposed to be evidence of the taking over of a certain Mesopotamian astrological technique to Egypt (the *hypsoma*). It is the autobiographical inscription of Harkhebi.[225] The crucial passage is:

> The prince, count and single friend who is knowledgeable in the god's words who sees everything observable in the sky and on earth,[226] with open eyes who looks at the stars without going awry with them, who recognises risings and settings at their times, as well as the gods who proclaim the future - he has purified himself for them in their days of coming forth when *3ḫ* alongside *bnw* is above them(?).

This clearly shows the actual importance of astrological observations. The most important point however is the translation of *3ḫ r gs bnw*. By understanding *bnw* as a designation for the planet Venus, and *3ḫ* as the Decan *3ḫ.wỉ*, a precise astrological interpretation was thought possible. Beginning with Neugebauer and Parker[227] the passage was supposed to refer to the position of *bnw* (Venus) beside the Decan *3ḫ*. Within the zodiac, *3ḫ* was connected with Pisces, and in Pisces lies the *hypsoma* of

---

[222] See the relevant chapters in section 8 of this volume.

[223] See e.g. D. Pingree, *The Yavanajātaka of Sphujidhvaja* (Cambridge, MA/London 1978), idem, *From Babylon to Bikaner*, pp. 33-38 who has shown that the Indian astrological tradition derives from Graeco-Egyptian compositions.

[224] S. E. Sidebotham & W. Z. Wendrich, Berenike: Archaeological Fieldwork at a Ptolemaic-Roman Port on the Red Sea Coast of Egypt (1994-1998), *Sahara* 10 (1998), pp. 85-96; idem, Berenike: Archaeological Fieldwork at a Ptolemaic-Roman Port on the Read Sea Coast of Egypt 1999-2001, *Sahara* 13 (2001), pp. 23-50.

[225] Original edition A. Kamal, Rapport sur quelques localités de la Basse-Égypte, *Annales du Service des Antiquités Égyptiennes* 7 (1906), pp. 232-240, there pp. 239f. (printed hieroglyphic text, no translation); newly edited by G. Daressy, La statue d'un astronome, *Annales du Service des Antiquités Égyptiennes* 16 (1916), pp. 1-5 (printed hieroglyphs, translation); discussed by Neugebauer & Parker, EAT III, pp. 214f.; Ph. Derchain, Harkhébis, le psylle-astrologue, *Chronique d'Égypte* 64 (1989), pp. 74-89; J. Dieleman, Claiming the Stars. Egyptian Priests facing the Sky, in: S. Bickel & A. Loprieno eds., Basel *Egyptological Prize 1. Junior Research in Egyptian History, Archaeology,and Philology, AH* 17 (Basel 2003), pp. 277-289, there pp. 280-282 and 285f.; J. Lull, En torno a la figura del sacerdote-astrónomo egipcio, *Boletín de la asociacion española de Egiptología* 14 (2004), pp. 63-78, there pp. 68-73; idem, *Astronomía*, pp. 54-59; Lehoux, *Astronomy, Weather, and Calendars*, pp. 119-123; some details in K. Jansen-Winkeln, Beiträge zu den Privatinschriften der Spätzeit, *Zeitschrift für Ägyptische Sprache und Altertumskunde* 125 (1998), pp. 1-13, esp. pp. 9f. A rather unreadable photograph in J.-L. Fissolo, Les astronomes égyptiens, *Égypte Afrique & Orient* 21 (2001), pp. 15-24, there p. 22.

[226] This phrase is a direct quotation from the instruction of the priest of Sakhmet in the *Book of the Temple*.

[227] Daressy, *Annales du Service des Antiquités Égyptiennes* 16, p. 3 translates "sur l'influence manifeste que Venus a sur la terre".

Venus.[228] Derchain thinks the passage refers specifically to a heliacal rising of Venus and thereby calculates possible dates, from which he concludes that the text should be dated to the first century BCE.[229] Globally, it is regarded as testimony to the infiltration of Babylonian astrological concepts into Egypt.

There are, however, serious philological problems with this view. Most probably the translation is wrong; and the position of the *hypsoma* does not really fit with the Decan, so I would advise abandoning the passage's supposed link to Babylonia.[230] More interesting is, actually, another section of the text where winds are referred to in connection with omina from the stars, which is at least an attested Mesopotamian concept although hardly exclusive to Mesopotamia (see above).[231] The date of the inscription cannot be ascertained by astronomical calculations; only an analysis of the style of the statue or the palaeography of the text can achieve progress.

10. Traditions of Greeks learning Astral Science in Egypt

The Greek and Roman authors were quite convinced that in astral matters, their cultures had learned a lot from Mesopotamia and Egypt. For some specific cases, more often in connection with Egypt, they even referred to famous scholars having studied abroad. However, these supposed Egyptian connections have not fared well with modern scholarship. To give only one famous vote: "The often repeated stories about Eudoxus learning astronomy from Egyptian priests, or about his observatories in Egypt, are not worth refuting."[232]

Such an appraisal does not seem to be based on a global evaluation of the sources' reliability - otherwise the Mesopotamian connections should also have been doubted. Rather, the seeming discrepancies between the good reputation the astronomical lore of Egypt had amongst the ancients, and the quality of the astronomical science found in the preserved record, have played a leading role, combined with the fact that Claudius Ptolemaios (Ptolemy) did not use a single Egyptian astronomical observation in his work.[233] However, it does not seem irrelevant at least to indicate the relevant source material, and the matter is taken up again by Brown in Ch.5.

A tradition exists for a figure as early as Pythagoras that he came to Egypt, studied the notes of the priests and thus learned much astronomical lore (Valerius Maximus,

---

[228] Neugebauer & Parker, EAT III, p. 214.

[229] Derchain, *Chronique d'Égypte* 64, pp. 87f.

[230] More detailed argumentation in Quack, *Dekane*.

[231] With H. Brunner, in: *Festschrift Elliger, Alter Orient und Altes Testament 18*, p. 29 = idem, in: Das hörende Herz, p. 228 and Lehoux, *Astronomy, Weather, and Calendars*, p. 121 n. 21 against Ph. Derchain, *Chronique d'Égypte* 64, p. 79 and K. Jansen-Winkeln, *Zeitschrift für Ägyptische Sprache und Altertumskunde* 125, p. 10 the sign  is to be read simply as *čꜣ.w* "wind". For *šm* see R. K. Ritner, *The Mechanics of Ancient Egyptian Magical Practice*, *Studies in Ancient Oriental Cultures* 54 (Chicago 1993), pp. 36f. n. 167.

[232] Neugebauer, HAMA, p. 676 n. 10. Similarly, M. Lefkowitz, Visits to Egypt in the Biographical Tradition, in: M. Erler & St. Schorn eds., *Die griechische Biographie in hellenistischer Zeit. Akten des internationalen Kongresses vom 26.-29. Juli 2006 in Würzburg*, *Beiträge zur Altertumskunde* 245 (Berlin/New York 2007), pp. 101-113 dismisses the tradition of Eudoxus' visit to Egypt without any substantial argumentation.

[233] The last fact was noted by Neugebauer, HAMA, pp. 562 n. 14.

Facta et dicta memorabilia VIII, 7, 2, written c. CE 30).[234] This must be considered as part of a long tradition that Pythagoras went to Egypt in order to study with the Egyptian priests. Its reality has been discussed with varying results, but most modern commentators take it to be at least possible.[235]

For Eudoxus (c. 400-347 BCE), there are numerous stories that he studied astronomy with Egyptian priests.[236] For example, Seneca the Younger (c. 3 BCE to CE 65), *Naturales quaestiones* VII, III, 2 indicates that he brought Egyptian descriptions of planetary movement to Greece;[237] also Diodorus Siculus (before 30 BCE) *Universal History* I, 98, 4 says that according to Egyptian tradition, Eudoxus has brought much of their astronomical knowledge to the Greeks.[238] Strabo (63/64 BCE to c. CE 24) *Geographica* 17,1 (806) reports that Plato and Eudoxus studied with the Egyptian priests at Heliopolis (where their habitations were still shown in his time),[239] and mainly because they had wanted to learn of the astronomical lore of the Egyptians. Even though Strabo thinks that the 'barbarians' hid most of their knowledge from Plato and Eudoxus, he gives the true length of the year down to the fractions above 365 days as something learned at that occasion, and he stresses that up to his own time the Greek astronomers[240] were still learning from Egyptian and Chaldaean doctrines.

Eudoxus is also supposed to have composed - or perhaps only translated from the Egyptian - the so-called 'dog's dialogues'.[241] About those, Neugebauer writes: "the title has inspired a long sequence of learned (often funny) conjectures".[242] His own proposal that they might have gotten their name from the Dog-Star, i.e. Sirius, and its calendaric interest, should probably be counted among the funnier ones.

Besides Eudoxus, the astronomer Conon (c. 280 to c. 220 BCE) is also reputed to have studied in Egypt (Seneca, *Naturales Quaestiones* VII, III, 3). He is supposed to have specifically worked on eclipses. An Egyptian background is not unlikely for

---

[234] J. Briscoe, *Valerii Maximi facta et dicta memorabilia, Vol. II. Libri VII-IX* (Stuttgart/Leipzig 1998), pp. 522; Th. Hopfner, *Fontes historiae religionis aegyptiacae* (Bonn 1922-1925), p. 781.

[235] P. Kingsley, From Pythagoras to the Turba Philosophorum: Egypt and Pythagorean Tradition, *Journal of the Warburg and Courtauld Institutes* 57 (1994), pp. 1-13; Chr. Riedweg, *Pythagoras. Leben · Lehre· Nachwirkung* (Munich 2002), pp. 20f. and 76-78. See further J.F. Quack, Die Rolle der Hieroglyphenschrift in der Theorie vom griechischen Vokalalphabet, in: W. Ernst & F. Kittler eds., *Die Geburt des Vokalalphabets aus dem Geist der Poesie. Schrift, Zahl und Ton im Medienverbund* (Munich 2006), pp. 75-98, there pp. 86-88; Fragmente eines änigmatischen Weisheitstextes (Ex pOxy. 79/103). Mit Bemerkungen zu den pythagoräischen Akousmata und der spätägyptischen Weisheitstradition, in: D. Devauchelle & G. Widmer eds., *Actes du du IXe Congrès International des Études Démotiques Paris*, in press.

[236] F. Lasserre, *Die Fragmente des Eudoxos von Knidos* (Berlin 1966), pp. 4-10, there pp. 139-141 on Eudoxus' visit to Egypt in general.

[237] P. Oltramare, *Sénèque, questions naturelles, tomes II (Livres IV-VIII)* (Paris 1929), p. 303; H. M. Hine, *L. Annaei Senecae naturalum quaestionum libros* (Stuttgart/Leipzig 1996), p. 285.

[238] F. Chamoux, P. Bertrac & Y. Vernière, *Diodore de Sicile, bibliothèque historique. Introduction générale, Livre I* (Paris 1993), pp. 180f.

[239] Their stay together in Egypt was dismissed as absurd fiction by K. Trampedach, *Platon, die Akademie und die zeitgenössische Politik, Hermes Einzelschriften* 66 (Stuttgart 1994), p. 59; more optimistic is S. Dušanić, Plato's Academy and Timotheus' Policy, *Chiron* 10 (1980), pp. 111-144, there p. 134, n. 152.

[240] Strabo actually uses the term "astrologers" but from the tenor of the section, it is clear that he is concerned with knowledge nowadays labelled as astronomical, not astrological in a divinatory sense.

[241] Summary of Egyptological proposals for that in J.F. Quack, *Einführung in die altägyptische Literaturgeschichte III. Die demotischen und gräko-ägyptische Literatur* (Münster 2005), pp. 139f.

[242] Neugebauer, HAMA, p. 676 n. 7.

Chaeremon, by origin an Egyptian priest, who is supposed to have written on comets according to Origen, *Contra Celsum* I, 59 (written c. CE 248).[243]

Already a comparatively early witness like Aristotle indicates that the astronomical observations of the Egyptians and Babylonians took place over long periods of years and gave much valuable information to the Greeks (*De Caelo* II, 12, written c. 350 BCE). It is not unlikely that he has Eudoxus' works in mind. Equally, the *Epinomis* 986E-987A (also written c. 350 BCE) indicates the importance of Egyptian and Syriac observations. This text, probably written by a pupil of Plato, is also likely to have specifically Eudoxus' research in mind.

Another testimony should be at least briefly invoked although it poses very special problems. Diodorus Siculus, *Universal History* V, 57, 1-4 tells a curious story that people from Rhodes sailed to Egypt and founded there the city of Heliopolis. From there the Egyptians are supposed to have learned the laws of astrology, only later, after a flood came among the Greeks and most perished, and all written records were destroyed as well, the Egyptians seized the occasion to appropriate for themselves the knowledge of astrology. Because of the ignorance of the Greeks, the belief prevailed that the Egyptians were the first to effect the discovery of the stars. This story is a rather obvious fiction created by a Rhodian author (probably Zeno) with the aim of heightening the renown of his home,[244] and the literary motives are evidently borrowed from Plato's Atlantis story (which is cited immediately afterwards). Still, there might be one interesting point to be noted: Rhodes is about the only place in Greece where the Sun-god has the rank of the main civic god, while this is typical for Egypt. Besides, by its obvious intention to invert common conceptions about historic dependency in astronomical/astrological knowledge, the passage can be counted as an all-the-more telling testimony for the widespread belief that the Greeks received it from Egypt.

Sometimes, an argument is brought forth that the references to 'Egyptians' as sources for astronomical knowledge in reality refer to Greeks because the names of planets given as coined by them are in reality Greek names.[245] By the same logic, however, we would also have to identify the Chaldaeans as Greeks because the supposedly Chaldaean names of the planets transmitted in classical sources are no less Greek.[246] We can conclude no more than that the authors indicating those names have (directly or indirectly) had recourse to texts in the Greek language but claim Egyptian (or Chaldaean) authorship.

Recent research has increasingly brought the possibility into focus that the Greeks derived their astronomical parameters not so much directly from Babylonia (and then handing them over to the Egyptians), but that the real sequence was the adaptation of Babylonian values by the Egyptians, and the Greeks in turn learning them from the Egyptians. This makes all the more sense, given that Greeks were in much closer

---

[243] P. W. van der Horst, *Chaeremon. Egyptian Priest and Stoic Philosopher. The Fragments Collected and Translated with Explanatory Notes*, *EPRO* 101 (Leiden 1984, ²1987), p. 12f.

[244] H.-U. Wiemer, *Rhodische Traditionen in der hellenistischen Historiographie*, *Frankfurter althistorische Beiträge* 7 (Frankfurt 2001), p. 210.

[245] Neugebauer, HAMA 2, p. 562; von der Waerden, *Ägypter und Chaldäer*, p. 29 only concludes from it that the book of the 'Egyptians' was written in the Greek language.

[246] Phonetic renderings of the real Mesopotamian names seem preserved only in Hesychius (fifth century CE, probably going back to Berossos), see Schnabel, *Berossos*, p. 260; Cumont, *L'antiquité classique* 4, pp. 19f.

contact with Egypt and had much closer exposure to astral divination and predictive astronomy than they had in Mesopotamia.[247] Such a model is of considerable help in harmonising the ancient traditions about Egypt being a source of astronomical knowledge for the Greeks and the proven connections between Greek and Mesopotamian astronomical practices and parameters. What influences of Greek and Mesopotamia astronomy there were in India are not unlikely to have been based on the transfer from Roman Egypt to India in connection with the Red Sea trade.

11. Nechepsos and Petosiris and the beginnings of substantial astrological treatises in the Greek language

There has been some discussion as to how astrological lore reached Greece. Ancient authors were normally a bit divided; most of them gave Egypt and Babylonia equally as places of origin.[248] Modern scholarship has been much more inclined to take only the Babylonian references seriously, whereas all Egyptian connections were downplayed. Models were developed to explain how Egypt incorporated astrology into its own traditions and stylised itself as originator of it.[249] As noted, this has obviously happened under the influence of the results of modern excavation. Babylonian astrology was well attested already by the end of the 19th century, whereas for Egyptian it seemed difficult to make out any reality corresponding to the testimonies of the classical authors (although the facts about the mostly unpublished Demotic Egyptian astrological treatises given above should dispel by now any doubts as to the plausibility of the ancient traditions of Egypt being a source of astrological knowledge).

Sometimes, it is assumed that three main sources, the Magusean writings running under the name of Zoroaster, the school of Berossos and his followers, as well as the Egyptians behind the works of Hermes and Nechepso-Petosiris are responsible for introducing Mesopotamian celestial omens into Hellenic civilisation.[250] Such a conception seems dubious on several grounds. Although there are some traditions of Zoroaster as a great astrologer, they are relatively late (and growing stronger with later authors), and hardly likely to be based on real early treatises, nor attributable to the Magusean community, which was so much *en vogue* among earlier scholars.[251] Berossos (c. 350 to 270 BCE) is, of course, also credited with having taught 'astrological' doctrines by early writers, but looking at what the actual preserved fragments say on such matters,[252]

---

[247] Jones, *Apeiron* 27/4, pp. 47f.; idem, The Legacy of Ancient Near Eastern Astronomy, *The Canadian Society for Mesopotamian Studies Bulletin* 39 (September 2004), pp. 15-20, esp. p. 20.

[248] See e.g. Bouché-Leclercq, *L'astrologie grecque*, pp. 51f. n. 1. One can note with some surprise that according to him the majority of the witnesses gave priority to Mesopotamia, while in his enumeration of specific passages, authors with reference to Egypt are considerably more numerous.

[249] Dieleman, in: Bickel & Loprieno eds., *Basel Egyptological Junior Prise 1*.

[250] Thus D. Pingree, *The Yavanajātaka of Sphujidhvaja* (Cambridge, MA/London 1978), volume II, p. 445.

[251] Especially J. Bidez & F. Cumont, *Les mages hellénisés. Zoroastre, Ostanès et Hystaspe d'après la tradition grecque* (Paris 1938). For a detailed analysis and refutation see J.F. Quack, Les mages égyptianisés? Remarks on some surprising points in supposedly magusean writings, *JNES* 65 (2006), pp. 267-282.

[252] See the editions by P. Schnabel, *Berossos und die babylonisch-hellenistische Literatur* (Leipzig 1923, repr. Hildesheim 1968); F. Jacoby, *Die Fragmente der griechischen Historiker, Dritter Teil. Geschichte von*

besides his transmissions of Mesopotamian historical traditions, he is credited with writing about planets and the Moon, but no specifically astrological teachings in a modern sense can be fixed to him - and given the meandering of the terminology in antiquity, where astrology is often used in the sense which we have nowadays reserved for astronomy,[253] he could well be designated as having written on astrology by antique authors without ever having developed astrological doctrines in our sense.

As a matter of fact, whenever it comes down to clearly astrological doctrines, we might have attributions to the 'Chaldaeans' or 'Babylonians' in general, but no clear-cut names come up, contrary to the astronomical theories where names like Sudines, Naburianos and Kidenas with a clearly Mesopotamian background are attested.[254] Even with the general ethnic terms, real attributions of specific astrological teachings are surprisingly rare. Among the purely astrological authors,[255] Hephaistion never indicates the Babylonians or Chaldaeans as sources,[256] and Vettius Valens only rarely, and then for questions mostly connected with astronomical parameters or planet names rather than with genuinely astrological theories.[257] Equally telling are the indications in Firmicus Maternus. He cites the Babylonians in the general introduction (I, *prooemium*, 6), for considering the location of Exaltation of a planet to be its House (II, 3, 4 and 6), and for using the *dodecatemoirion* "twelve times part" (III, 13, 14), and he seems to use "Chaldaean" twice with the meaning of "astrologer" in general (VIII 17, 11 and VIII, 25, 19). In all three works, references to the Egyptians, Nechepso and Petosiris are quite frequent. Such a picture tallies very well with the evidence, when considered correctly. Obviously there are elements like the zodiacal circle, a fundamental instrument of astrology, which quite certainly have a Mesopotamian background. Also the Exaltations of the planets and the *dodecatemoiria* have already been pointed out,[258] which are the very points for which the Greek and Roman astrological authors cite Mesopotamian authorities. The list of details of Mesopotamian origin can probably be expanded.[259] Nevertheless, even the latest Mesopotamian astrological texts seem quite different from the mainstream Hellenistic-Roman treatises which lack many specific elements of how astrology was done in Mesopotamia at that time. By contrast, the demotic Egyptian ones are quite similar to the Greek and Roman ones, independently of the fact that they obviously took over several basic premises from Mesopotamia.

Städten und Völkern (Horographie und Ethnographie) C. Autoren über einzelne Länder Nr. 608a-856 (Erster Band. Ägypten—Geten N. 608a-708 (Leiden 1958), pp. 364-397 (he attributes all the astronomical material to a (Pseudo)-Berossos separated from the historian).

[253] Compare W. Hübner, Die Begriffe „Astrologie" und „Astronomie" in der Antike, *Abhandlungen der Geistes- und Sozialwissenschaftlichen Klasse, Akademie der Wissenschaften und der Literatur Mainz*, 1989, 7 (Stuttgart 1990).

[254] Gundel & Gundel, *Astrologumena*, pp. 40-51.

[255] Ptolemy gives hardly any references to earlier sources in his *Apotelesmatica*, thus he cannot be used for this enquiry. Still, in I, 3, he mentions the Egyptians as authorities in iatromathematical affairs; and in I, 21 he mentions the Egyptian as well as the Chaldaean terms, finding the Egyptian order comparatively better, before producing a third version supposedly found in an ancient book.

[256] See the index in D. Pingree, *Hephaistio Tebanus Apotelesmatica*, Vol. 1 (Leipzig 1973), p. 334.

[257] See the index in D. Pingree, *Vettii Valentis Antiocheni anthologiarum libri novem* (Leipzig 1986), pp. 456f.

[258] F. Rochberg-Halton, Elements of the Babylonian Contribution to Hellenistic Astrology, *JAOS* 108 (1988), pp. 51-62; Pingree, *From Babylon*, pp. 27f.

[259] For details see Brown Ch.6 in this volume.

That plainly leaves the texts of self-claimed Egyptian background as the main purveyors of actual astrological doctrines to the classical world, and it can be reasonably doubted that they had nothing else but 'Mesopotamian celestial omens'[260] to offer.

Of fundamental importance are the figures of Nechepso(s) and Petosiris.[261] Spiegelberg had once proposed to identify the astrologer Petosiris with a high priest of that name dating to the late fourth century BCE whose tomb was discovered in the Necropolis of Tuna el-Gebel near Hermopolis.[262] Nowadays, it is generally recognised that there is not the slightest positive evidence in favour of this hypothesis,[263] although some formulations such as "there is a priest Petosiris (fourth century B.C.) ... He, of course has nothing to do with the several works whose fragments were collected by E. Riess ..., beyond contributing his name"[264] are certainly infelicitous as they insinuate that the pseudepigraphic attribution was made with the intention of choosing this specific Petosiris, not any other one. Schmid also erroneously supposes that the specific Petosiris from Hermopolis was the historic model for the pseudepigraphic attribution.[265] The name Petosiris ("the one whom Osiris has given")[266] is a very common one in Egypt during the Late Period,[267] so it would be highly unwise to tie down the astrological traditions to any specific one.[268] It was even cited by Aristophanes

---

[260] Thus Pingree, *Yavanajātaka*, p. 445.

[261] W. Kroll, Aus der Geschichte der Astrologie, Neue Jahrbücher für das klassische Altertum, Geschichte und Deutsche Literatur 7 (1901), pp. 559-577, esp. pp. 573-577; W. Gundel & H.G. Gundel, *Astrologumena. Die astrologische Literatur in der Antike und ihre Geschichte, Sudhofs Archiv Beiheft* 6 (Stuttgart 1966), pp. 27-36; P.M. Fraser, *Ptolemaic Alexandria* Volume I, pp. 436-437, Volume II, pp. 630-633 notes 489-506; D. Pingree, *The Yavanajātaka of Sphujidhvaja* (Cambridge, MA/London 1978), volume 2, pp. 436f.; idem, in: Ch. C. Gillispie ed., *Dictionary of Scientific Biography*, volume 10, *S.G. Narashin – W. Piso* (New York 1974), pp. 547-549; T. Barton, *Ancient Astrology* (London/New York 1994), pp. 26-28; J. Schwartz, Héphestion de Thèbes, in: *Institut français d'archéologie orientale du Caire. Livre du centenaire* 1880-1980, *Mémoires publiés par les membres de l'Institut Français d'Archéologie Orientale du Caire* 104 (Cairo 1980), pp. 311-321; P. T. Keyser, On Cometary Theory and Typology from Nechepso through Apuleius to Servius, *Mnemosyne* 47 (1994), pp. 625-651, esp. pp. 641f.; J.-L. Fournet, Un fragment de Néchepso, in: R. de Smet, H. Mellaerts & C. Saeren, *Papyri in Honorem Johannis Bingen Octogenarii (P. Bingen), Stud. Var. Bru.* 5 (Leuven 2000), pp. 61-71. See lastly K. Frommhold, *Bedeutung und Berechnung der Empfängnis in der Astrologie der Antike* (Münster 2004) on the 'rule of Petosiris' concerning lunar positions for conception and birth and the important new discussion in St. Heilen, *›Hadriani genitura‹ – Die astrologischen Fragmente des Antigonos von Nikaia* (Berlin/Boston 2015), pp. 39-52 and 539-562.

[262] W. Spiegelberg, Eine neue Spur des Astrologen Petosiris, *Sitzungsberichte der Heidelberger Akademie der Wissenschaften* (Heidelberg 1922).

[263] Neugebauer & Parker, EAT III, p. 216. However, Motte, in: *Études coptes* IV, p. 97 n. 48 still writes: "Ce Pétosiris est peut-être le même que l'astrologue".

[264] D. Pingree, *Yavanajātaka*, volume 2, pp. 436f.; equally, Gundel & Gundel, *Astrologumena*, p. 31 suppose that this specific Petosiris was considered at least in later times to be the author of the *Astrologumena* going under the name of Petosiris.

[265] A. Schmid, *Augustus und die Macht der Sterne. Antike Astrologie und die Etablierung der Monarchie in Rom* (Köln/Weimar/Wien 2005), p. 187.

[266] The translation "Gift of Osiris" given by Pingree, in *Dictionary of Scientific Biography* 10, p. 547 is inexact, to say the least.

[267] In E. Lüddeckens & H.-J. Thissen eds., *Demotisches Namenbuch, Band I* (Wiesbaden 1980-200), p. 298 there are no less than 59 attestations (mostly referring to different persons), and that book does not even aim at completeness.

[268] Neugebauer & Parker, EAT III, p. 216 wisely point out that there is another Petosiris whose tomb was discovered at Atfih and had an astronomical ceiling. Of course, there is not really any more reason to identify

Fr. 257 simply as an example of an Egyptian word. In spite of what is often written, there does not seem to be direct proof that the astrological authority was actually a priest.[269]

Also to be separated (but see below) from Petosiris is a certain Petese mentioned in a Greek papyrus (P. Rylands 63) as someone who teaches Plato stellar lore.[270] Although otherwise not connected with astrology, he can plausibly be identified as a wise man attested in Demotic Egyptian and in Greek texts.[271]

The thorny problems have not been made easier by a modern tendency to ascribe to Nechepso(s) and Petosiris much that is simply attributed to 'the Egyptians' in the ancient sources.[272] The growing number of Demotic Egyptian astrological treatises should make it obvious by now that there was a rich and diverse inner-Egyptian tradition, thus references to 'Egyptian' authorities in Greek astrological texts cannot automatically be understood to imply Nechepso(s) and Petosiris as authors. Furthermore, the unity of Nechepso(s)-Petosiris has to be called into question. We cannot simply assume that there was one single work running under the authorship of both together. For both these questions, a careful re-examination of all actual references to them is necessary.

Nowadays, the astrological work of Nechepso and Petosiris is generally supposed to have been written around 150 BCE.[273] This is based on an effort to recognise specific allusions to historical facts among the universal astrological fragments. The tricky part is that among them, many are not really attributed to Nechepso(s) and/or Petosiris by the ancient authors, only assumed to relate to them by modern editors and commentators. E.g., the important fragments on eclipses, comets, and the rising of Sirius (Hephaistion I, 21-23 = Nechepso-Petosiris Fragms. 6, 7 and 12) are exclusively related to (ancient) Egyptians in general, not to any specific name.[274] The attribution of fragment 6 and 7 to Nechepso and Petosiris is based on a similarity with a passage (Fragm. 8) which John Lydus excerpted from Campestris who is said to follow the writings of Petosiris,[275] and that of fragment 12 is in turn based on the idea (derived from the preceding identification) that if Hephaistion writes "the Egyptians", he really

---

him with the famous astrologer than the one from Hermopolis (perhaps even less, because that astronomical decoration is so traditional as to be seriously out of tone with the teachings of the astrologer Petosiris), but it nicely shows the fragility of the argumentation. D.G. Greenbaum & M.T. Ross, The Role of Egypt in the Development of the Horoscope, L. Bareš, F. Coppens & K. Smoláriková, eds., *Egypt in Transition. Social and Religious Development of Egypt in the First Millennium BCE* (Prague, 2010), pp. 146-182, there pp. 176f have noticed the presence of a Petosiris in cuneiform sources, but given the evidence adduced here, he is unlikely to have any connections with the Petosiris of the astrological tradition.

[269] Manilius, I, 47 speaks of priests among those who developed astrology, but there is no guarantee that this refers to Petosiris.

[270] Gundel & Gundel, *Astrologumena*, p. 31 erroneously suppose an identity of the two figures.

[271] J.F. Quack, Die Spur des Magiers Petese, *Chronique d'Égypte* 77 (2002), pp. 76-92; K. Ryholt, The Carlsberg Papyri 6. The Petese Stories II (P. Petese II), CNI Publications 29 (Copenhagen 2006), pp. 13-15.

[272] Thus B. van der Waerden, *Die „Ägypter" und die „Chaldäer", Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Mathematisch-naturwissenschaftliche Klasse* 1972, 5 (Berlin/Heidelberg/New York 1972).

[273] Kroll, *Neue Jahrbücher*, pp. 573-577; Fraser, *Ptolemaic Alexandria*, pp. 436f.

[274] Already Pingree, in: *Dictionary of Scientific Biography* 10, p. 548 mentions the problematic nature of many fragments without, however, drawing any consequences for the question of dating.

[275] Riess, *Philologus Supplement* 6, p. 343.

means Nechepso and Petosiris.[276] Similarly, the fragments on comets (Fragms. 9, 10 and 11) transmitted by Lydus, Hephaistion and Servius (c. CE 420) are not of certain attribution. Their ascription to Nechepso is based on the fact that Servius introduces the section as having come from Avienus, who in turn indicates that either in Campestris or Petosiris more detailed teachings can found, and that Servius' excerpt seems to have been based on the Greek text transmitted by Lydus.[277] Furthermore, it cannot even be excluded that those historical reminiscences were based on reports by historians, and are thus without value for dating the astrological author.[278] Similarly, the Sirius omina are given for a date of Epiphi 25, which is merely the conventional date for the rising of Sirius (July 19/20) in the Alexandrian calendar,[279] thus the fragment cannot have reached its actual form before the time of Augustus.[280] This means that either the traditional attribution to Nechepso and Petosiris is wrong,[281] or the traditional date of Nechepso and Petosiris is wrong, or the text was tampered with in the Roman period in order to bring it in line with the calendar then in use.

Nechepso(s) is sometimes explicitly designated as a king (thus Vettius Valens, IX, 1, 2; Firmicus Maternus, *Mathesis* IV, 22, 2 (using the word *imperator*); Hephaistion II, 18, 72; Galen (CE 129-200), *De simplicium medicamentorum temperamentis ac facultatibus*, X, 18 (ed. Kühn X, p. 207); Thessalos/Harpocration, I, *prooemium*, 27. For that reason, the numerous references to "the king" in general given by Vettius Valens are also likely to refer to him. Equally, when Manilius (fl. early first century CE), *Astronomica*, 1, 41 speaks of "royal souls" (*regalis animos*), he is likely referring to Nechepso(s),[282] whereas it is less certain that his *sacerdotes* 1, 47 are meant to refer to Petosiris.

Actually, at least in the Manethonian tradition there is an Egyptian king Nechepso(s) mentioned as one of the kings of Saïs preceding Psammetichus I, or in a different redaction also as the name of king Necho II.[283] He is likely to be the one to whom, at least pseudepigraphically, the astrological texts were ascribed. Besides this, it should be noted that the horoscope preserved in pLouvre 2342 bis gives his name in the form Necheus.[284] This is of course a perfectly valid phonetic rendering of king Necho, and

---

276 Riess, *Philologus Supplement* 6, p. 355.

277 Riess, *Philologus Supplement* 6, p. 349.

278 Schwartz, *Livre du centenaire*, pp. 319-21; T. Bartyn, *Ancient Astrology* (London/New York 1994), p. 27.

279 For the rising date of Sirius, see U. Luft, article "Sothisperiode", in: *Lexikon der Ägyptologie* V (Wiesbaden 1984), col. 117-1124.

280 Noted also by Schwartz, in: *Livre du centenaire*, p. 312 n. 6, who supposes because of this that the paragraph is due to Hephaistion himself.

281 This seems to be the opinion of Jones, in: *The Oxyrhynchus Papyri* LXV, p. 132.

282 Thus already supposed by Boll, *Sphaera*, p. 373; W. Kroll, *Nechepso*, in: *Paulys Real-Encyclopädie der classischen Altertumswissenschaft* XVI/2 (Stuttgart1935), col. 2160-2167, there col. 2165. C.P. Gould, *Manilius, Astronomica* (Cambridge, MA/London 1997), p. 8, n. a) supposes that this refers to Belus and Zoroaster. This seems to go back to the passages collected in the apparatus of A.E. Housman, *Marcus Manilius, Astronomicon I* (London 1903-1913), p. 5, which mention Zoroaster or Belus as the inventor of astrology. R. Scarcia, E. Flores & S. Feraboli, *Manilio, Il poema degli astri (Astronomica)*, Volume 1. Libri I-II (1996), pp. 196f., at least speak of Chaldaean and Egyptian authorities. Given that among the Chaldaean authorities mentioned in earlier sources no one is a king, a reference to Nechepso should be obvious.

283 See Jacobi, *Fragm. gr. Hist* III C, pp. 48f.; only the Latin translation of the chronicle of Eusebius has the form Nechepso for Necho II.

284 Text in Neugebauer & van Hoesen, *Greek Horoscopes*, p. 42.

underscores the possibility that the received form Nechepso is nothing other than the name of pharaoh Necho with an additional epithet.[285] For the exact analysis of this epithet, different proposals have been made, thus Ray proposed *pȝ sr* "the ram",[286] Krauss *pȝ nsw* "the king".[287] The latter theory is quite unlikely for linguistic reasons,[288] and the first theory has few semantic merits. Redford has proposed to understand the word rather as *pȝ sȝw(w)* "the Saïte one".[289] This is phonetically impossible, since the Coptic form ᴮⲥⲁⲓ points to an original stressed vowel *i* or *u* in the name of the city, and with the change in syllabic structure due to the addition of a nisbe ending, the result should be **sīye* or **sēye* for "the Saïte one".

Recently, a new basis for discussion has been created by the discovery of a Necho with an epithet written like *pȝ šš* "the hartebeast" in an astrological composition as well as a narrative fragment. With some probability the same form, but without the definite article, is also to be identified on a fragment of a menit (a counter-weight to a collar/necklace used in the Egyptian cult). Most likely, this form of the epithet is due to a phonetic development and subsequent reinterpretation of an original *pȝ šsȝ* "the wise one".[290] Ryholt proposes to identify this king with Necho II, rather than Necho I. The Demotic rendering would also show that the name-form Nechepsos with final *s* as attested in the Manethonian tradition is superior to the one without *s* prevalent in the astrological texts.

As noted above, Günter Vittmann has also plausibly proposed that a much destroyed king's name in the Vienna text of eclipse- und lunar omina should be restored as Nechepsos, not Dareius as supposed previously. Equally, one magical charm for gaining favour is described as being the feat of a king with a mostly destroyed name, which might also be restored as Nechepsos (pMag. LL 11, 26), even if there the typical determinative of the animal-hide is not written.[291] This provides more background in Egyptian language texts concerning Nechepsos as an authority.

Most of the time, Nechepso(s) or Petosiris are cited individually and separately. This rather gives the impression that different works were running under the name of only one of them. The only certain fragment of the text itself (or an extract thereof) on a papyrus from the Roman period indicates that it comes from the 15th book of Nechepso - without mentioning Petosiris.[292] The astrological physician Thessalos (or in another version Harpocration) speaks of finding an iatromathematical book by

---

[285] The form Necheus was wrongly emended to Nechepso by Riess, *Philologus Supplement* 6, p. 331.

[286] J. Ray, Pharao Nechepso, *Journal of Egyptian Archaeology* 60 (1974), pp. 255-256.

[287] R. Krauss, Necho II. alias Nechepso, *Göttinger Miszellen* 42 (1981), pp. 49-69. Doubted by W. Brunsch, Noch einmal zu νεχεψω, *Biblische Notizen* 15 (1981), pp. 7-8.

[288] In Late-Egyptian and Demotic, the word *nsw* "king" does not usually take the article, and in Demotic it is not normally used outside of composites like *sȝ-nsw* "prince", *ḥm.t-nsw* "king's wife" or (rarely) with a directly following name of a king. Besides, not even the vocalisation inspires confidence - it should be *nes*, not *so*. See the remarks by G. Fecht, in: *GM* 42, p. 53.

[289] D. B. Redford, A Note on II Kings, 17, 4, in: *Journal of the Society for the Study of Egyptian Antiquities* 11 (1981), pp. 75-76

[290] K. Ryholt, New light on the legendary king Nechepsos of Egypt, in: *Journal of Egyptian Archaeology* 97 (2011), pp. 61-72; J.F. Quack, K. Ryholt, Petese interpreting astrology by Imhotep for king Nechepsos, in: K. Ryholt ed., *The Carlsberg Papyri 11. Demotic Literary texts from Tebtunis and beyond*, in press.

[291] At least, setting such a charm at an indigenous Egyptian court would be more plausible than attributing it to foreign rule.

[292] Fournet, in: *Papyri in Honorem Bingen*, p. 61-71.

Nechepso - similarly without mentioning Petosiris.[293] In general, the fragments of more specifically medical content are always attributed to Nechepso, never to Petosiris (Fragms. 27-32 and 35-36, Riess).

Of special interest are the indications of Vettius Valens, who cites Nechepso probably more often than any other astrologer, even if most of the time only by naming him simply "the king", and rarely giving his name. In II, 3, he cited teachings that Nechepso has expounded in a mysterious way in the 13th book concerning the Lot of Fortune; and he is also cited in III, 14, 2 for such teachings. Afterwards he says (only in II, 3) that Petosiris taught similarly in the "definitions" (*horoi*), whereas other astrologers disagreed. Even if this shows the relative closeness of the teachings of Nechepso and Petosiris, such an indication only makes sense if Vettius knew of two different texts, one under the authorship of Nechepso, the other under that of Petosiris. In the *prooemium* of book IX (and probably also in IX, 2, 8), Valens cites Nechepso and in the 13th book again, this time without any mention of Petosiris.

In II, 27, Vettius writes that neither the king nor Petosiris mentioned some things in their memoranda (i.e. plural - *Hypomnemata*!) This leads us to the same conclusion. More interesting is III, 7, where he says that the king showed something to Petosiris, if the text is emended correctly.[294] In the other direction, Petosiris is supposed to have instructed the king in many things according to IX, 11, 2. Less clear seems to be VII, 6, where Vettius indicates first (VII, 6, 1) that the king and Petosiris mentioned a specific teaching in riddles. Within the body of that chapter (VII, 6, 10; 193; 203; 208), verbal citations are attributed exclusively to the king, however one position is exclusively attributed to Petosiris (VII, 6, 35). While the first passage would indeed fit to one co-authored book, the others tend more in the direction of different works.

Even more telling is VIII, 5, 20, where Valens indicates that there are divergences between the king, Petosiris, Critodemos and others, clearly implying that Nechepso and Petosiris had different opinions in some places. In IX, 4, 3, accordances between the text of Valens, the king and most others are noted. In III, 8, Vettius cites the king for a teaching of the critical factor (*klimacter*), which is to be calculated by using the distance between the rising of Seth (probably a garbled form of Sothis) and the birth in question, without mentioning Petosiris. Similarly, in V, 4 only the king gets credit for teachings about prognoses connected with the Moon. In IX, 12, 9 and IX, 17, 1, only the king is mentioned as author. The famous verses from a *prooemium* are also attributed exclusively to the authorship of Nechepso (VI, 1, 9). By contrast Petosiris is given as sole authority for various teachings (II, 39, 4; II, 41, 2; IX, 2, 7 – from his *Horoi*). Finally, the followers of Petosiris (οἱ περὶ Πετόσιριν) are mentioned once (*Additamenta* 2, 5 = Hephaistion III, 10).

Besides those two authorities, Vettius Valens sometimes also cites "the Egyptians" globally; so far as a distribution pattern went, the Egyptians, Chaldaeans and Greeks were in agreement (IV, 30, 21), similarly when it came to the name of Mars (VI, 3, 7,

---

[293] H.-V. Friedrich, *Thessalos von Thralles griechisch und lateinisch* (Meisenheim am Glan 1968), pp. 47f. and 55-57.

[294] Both manuscripts actually write "the king Petosiris". The correction was proposed by Kroll, in: *Paulys Realencyclopädie der classischen Altertumswissenschaft* XVI, 2, col. 2160 since this would be the only passage making Petosiris into a king.

see above), to the *dodecatropos* (IX, 3, 1-5; there in connection with Asclepius), and to one system of astral geography (appendix III).

The two authorities are mentioned less often by Hephaistion. He speaks of the ancient followers of Nechepso and Petosiris (II, 11, 25), sometimes with an additional naming of Antigonos and Nikaios (II, 18, 21). In other cases, the ancient Egyptians and followers of Petosiris (without indicating Nechepso) are mentioned (II, 1, 2. 9), or simply the followers of Petosiris (III, 10, 5). Ptolemy is supposed to have expounded things from the writings of Petosiris (II, 22, 8). King Nechepso alone is indicated as having proferred a doctrine in a universal book in which he took over teachings of the *Salmeschiniaka* (II, 18, 72-77). Nechepso alone is also mentioned as having been used by Dorotheus (c. CE 75) in *Carmen Astrologicum* II, 21, 26.

Besides these examples, Hephaistion frequently gives the "Egyptians" as authorities, as specialists in iatromathematics (I, 1, 8, a direct citation from Ptolemy), on astral geography (I, 1, 7. 9), on omina on eclipses and comets (I, 21-22), on the omina from the rising of Sirius (I, 23), on looking at the sign before the horoscope (II, 10, 14) concerning non-raised children. He gives them as authorities on the *Salmeschiniaka* (II, 18, 76), on divisions of 10 years and nine months (II, 28) ("some of the ancient Egyptians"), on prescriptions concerned with the induction of statues (III, 7, 13), and on days on which dreams are valuable indicators (III, 24, 2). Even though he once says: "the ancient Egyptians, the followers of Petosiris," (II, 1, 2) otherwise his text does not lead logically to ascribing to Nechepso and/or Petosiris that which is attributed simply to the Egyptians. Rather he seems to distinguish between them.

One indication of Firmicus Maternus, however, might imply a joint work. Concerning the *thema mundi*, he ascribes it to Petosiris and Nechepso, using the plural *tradiderunt* "they transmitted" (III, *prooem.* 4). Another passage listing early astrological authority also gives Petosiris and Nechepso among others (Abraham, Orpheus and Critodemos), but it does not make clear whether they collaborated (IV *prooem.* 5). Concerning the *Sphaera barbarica*, Firmicus claims that even Petosiris and Nechepso could not find what he is going to expound (VIII, 5, 1).[295]

Another passage, however, is much less in favour of joint authorship. Concerning the Decans, Firmicus names only Nechepso for iatromathematical methods based on the Decans (IV, 22, 2). Equally, he is mentioned in another unfortunately garbled passage on iatromathematics (VIII, 4, 14). Petosiris is mentioned alone as having lightly alluded to the doctrine of full and empty parts within the zodiac, which were connected with Decanal lore (IV, 22, 20).[296] Equally for the ninetieth part, Firmicus criticises the all too veiled treatment by Petosiris (VIII, 2, 1).

In his history of astrology, the so-called 'Astrologer of 379' mentions Hermes, Nechao, Kerasphoros, Petosiris, Nechepso, etc. (*CCAG* V, 1, 204, 19-21). This is remarkable as the only case where Nechao (the normal rendering of the Egyptian king's

[295] This claim is nowadays normally regarded as unjustified, see Boll, *Sphaera*, pp. 374-376. However, the rising of Sothis can very well have been mentioned in an astrological text of Egyptian background without treating the *Sphaera barbarica* as such, and the fragment in Hephaistion I, 21, 29 mentioning the constellation of Eilethyia is only ascribed to the "ancient Egyptians", not really to Nechepso and Petosiris.

[296] Teachings about the full and empty degrees are likely be based on actual Egyptian ideas, see Quack, *Dekane*.

name) and Nechepso are given as separate entities. Contrary to a proposal by Gautier,[297] I doubt that it is reasonable to find the name of Petosiris by an emendation in the transmitted text (Osiris) of a letter by Michael Italicus.

Finally, there is a Latin passage in *Cod. Laur. Vict.* pl. 38/24 fol 174v, which is stylised as a letter of Petosiris to king Nechepso concerning divination from the number-values of letters in relation to the days of the lunar month. A similar Greek letter (*Vind Phil. gr.* 108 fol. 163; *CCAG* VI, 2) is attested by the table of contents, while lost in the actual manuscript. There are also several other numerological works set out as letters of Petosiris to king Nechepso (*Riess Fragm.* 37-42).[298]

Even though this is a relatively spurious work, it might point the way towards explaining the fact that mostly the two authorities are kept separate, sometimes even with diverging points of view, but in a few cases put together, or indicated as having exchanged ideas about a certain point. It might be possible that the original work was stylised as an exchange of letters, where first one, then the other gave his opinions on astrological points. Such a literary device would be very much in the style of the Hellenistic period, when Romances in letter-form were frequent. There is even one unpublished Demotic astrological text (pCarlsberg 689) which seems to have been stylised as a letter from one authority to the other.

Nevertheless, the most recent discoveries of Kim Ryholt open upon another option. He was able to reconstruct introductory passages of Demotic astrological treatises, where a sage Petese is presenting astrological books he has discovered to the king Nechepsos. Given that in Demotic writing, the names Petosiris and Petese look quite similar, a confusion of the forms would not be impossible. Thus, we would have two different but interacting characters, one a king, the other a priest and sage, and the original name of the sage distorted in the later tradition.

Also necessary is to check whether there is really such an obvious Babylonian background to their writings, as it is often assumed nowadays.[299] Several indications give rise to doubts on this question. It has to be pointed out that there is a very close connection between the Sirius prognoses in Hephaistion, I, 23, a text with Sirius prognoses in a Greek papyrus from Oxyrhynchus, and the Demotic Egyptian treatise of pCairo CG 31222, all three probably going back to a common model.[300] The model is almost certainly Egyptian - there are no attested Mesopotamian omina derived specifically from the rising of Sirius, whereas Sirius had enormous religious importance in Egypt, and I have already mentioned evidence pointing to the existence of Sirius omina at least from the New Kingdom onwards.

---

[297] P. Gautier, Michel Italicus, lettres et discourses, *Archives de l'Orient chrétien* 14 (Paris 1972), pp. 160-163, there pp. 162f.

[298] Edition of one text in E. Wickersheimer, Figures médico-astrologiques des IX^{e}, X^{e} et XI^{e} siècles, *Janus* 19 (1914), pp. 157-177, there pp. 164-167; see now Th. G. Tolles, The Latin Tradition of the *Epistula Petosiridis*, *Manuscripta* 26 (1982), pp. 50-60; B. Obrist, *La cosmologie médiévale. Textes et images I. Les fondements antiques, Micrologus' Library* 11 (Florence 2004), pp. 159-161.

[299] E.g. Pingree, *From Astral Omens to Astrology. From Babylon to Bīkāner* (Rome 1997), p. 19 who seems to consider the fragments associated with the name Petosiris to be Greek translations of Mesopotamian texts.

[300] A. Jones, in: M.W. Haslam, A. Jones, F. Maltomini, M.L. West and others, *The Oxyrhynchus Papyri LXV* (London 1998), pp. 130-133 (pOxy 4471).

For the individual astrology, the probability of immediate Babylonian influence is even slighter, given that there is not very much in Babylonian astrology, even in its latest periods, which can really be understood as a direct precursor of the typical elements of Graeco-Roman astrology.

Of perhaps even greater importance for the early development of astrology are the references to Asclepius as an author of astrological texts, given that at least four Demotic astrological treatises are actually assigned to the authorship of Imhotep,[301] none other than the Egyptian prototype to Greek Asclepius. Further to this, Firmicus III, 1 indicates that Aesculapius, himself instructed by the divinities Mercury (i.e. Thoth) and Anubis, provided the model that Petosiris and Nechepso followed concerning the *thema mundi*.

The number of astrological treatises attributed to him by the Greek and Latin authors seems, however, to be limited. We have the *Sacred Book of Hermes to Asclepius* (a mainly iatromathematical composition), an equally medical *Book by Hermes to Asclepius on the Plants of the Seven Stars* (also running under other authorship),[302] a so-called 'myriogenesis' on the effects of each individual degree of the zodiac, said to have been taught to him by Hermes (attested by Firmicus, *Mathesis* V, 1, 36). According to Firmicus (*Mathesis* III, 1, 1) he was taught the *thema mundi* by Hermes, and was a pupil of Hermes in general (IV, *prooemium*, 5); according to pMichigan 149, he composed the doctrine of the *octatropos*. Vettius Valens IX, 3, 5 also credits him with teachings on the *dodecatropos* and the *octatropos*. In Papyrus Louvre 2342, he is equated with Imouthou, the son of Hephaistos. The form Imouthou can phonetically be analysed as a rendering of Egyptian *ỉyỉ-m-ḥtp wr* "Imhotep the Great,"[303] and indeed in Demotic Egyptian astrological texts he is consistently called *ỉyỉ-m-ḥtp wr sꜣ Pṯḥ* "Imhotep the Great, son of Ptah".

As far as it can still be checked, the contents of the works claiming Asclepius as an authority do have a genuine Egyptian background. The 'sacred book' transmits the names of the Egyptian Decans according to the Seti IB family, accompanied by an iconography paralleled in other treatises as well as on archaeological objects.[304] The garbling of some of the names is likely to be a product of later transmission, not of the original text.[305] Even the more serious displacement of many names in the second half of the zodiac might be due to a copyist's error, working with a circular schema and having difficulties with copying the overturned parts.

The *thema mundi* has a clear Egyptian background since it was originally based on the situation at the heliacal rising of Sirius. As for the 'myriogenesis', we do not possess enough material as to what it was about to be sure. The *dodecatropos* is abundantly

---

[301] One of them, namely CtYBR 422 back can be found on the internet at http://beinecke.library.yale.edu/papyrus/oneSET.asp?pid=422(B)%20qua.

[302] Gundel & Gundel, *Astrologumena*, p. 19.

[303] Gundel & Gundel, *Astrologumena*, p. 26 seem to take the ending *ou* erroneously as a Greek genitive and so proclaim Asclepius to have been the son of Imhotep. See also D. Wildung, Imhotep und Amenhotep. Gottwerdung im alten Ägypten, *Münchener Ägyptologische Studien* 36 (München/Berlin 1969), pp. 92f., whose conclusion that Asclepius and Imhotep were regarded as ultimately different does not seem warranted by the wording of the text; it was already criticised by R. Ritner, *JNES* 43 (1984), p. 354.

[304] It was studied in detail by A. von Lieven, Die dritte Reihe der Dekane oder Tradition und Innovation in der spätägyptischen Religion, *Archiv für Religionsgeschichte* 2 (2000), pp. 21-36 and Quack, *Dekane*.

[305] For the details, see Quack, *Dekane*.

attested in Demotic Egyptian astrological treatises while unattested in Mesopotamia. Thus, even at this limited level we can say that the link between attested Demotic Egyptian astrological treatises based on the authority of Imhotep the Great, son of Ptah, and Greek and Latin references to Asclepios as astrological authority is fairly sound.

12. Traces of specifically Egyptian astrological lore in Coptic sources?

Some proposals have been made to derive astrological elements in Coptic Gnostic texts from Egyptian precursors.[306] The main problem is obviously that most, probably even all of the treatises in question are translated from the Greek,[307] so there is not likely to be a chain of direct transmission in the Egyptian language. Still, given that many of them were probably produced in Alexandria, it is not unlikely that the general astrological background informing them contained material of Egyptian extraction. Here, only a few of the more specifically astrological concepts will be discussed.

Generally, it should be stressed that the Gnostic movement is nothing specifically Egyptian even though it was present there. However, whatever astronomical/astrological influence there is in Gnostic writings (and there is quite a bit), it is likely to have derived from a general awareness of cosmic structures that was wide-spread in Roman imperial times, and there is not much in it which is of any obviously Egyptian derivation. In general, the Gnostic texts are violently opposed to the rule of the (planetary) archons (as they are generally to things of the material world), but they accept the common tenet that the astral powers control the destiny of men and seek deliverance from that.[308] Consequently, Gnostic interpretations of the planets and their role are not infrequent.[309]

Astrological considerations are of importance in the Hermetic treatise *The Eighth reveals the Ninth* preserved in NH VI, 52-63.[310] At the end of the text, it is recommended by Hermes that the book should be set up on a stela of turquoise in hieroglyphic script in the temple of Diospolis, guarded by the Hermopolitan Ogdoad, when the speaker (Hermes) is in Virgo 15 together with the Sun in a specific situation that has given rise to discussions and emendations. The position of Hermes in Virgo is obvious enough - it is his day-House according to the astrological doctrine of the Houses (connected with

---

[306] L. Motte, L'astrologie égyptienne dans quelques traités de Nag Hammadi, in: *Études coptes IV. Quatrième journée d'études Strassbourg 26-27 Mai 1988, Cahiers de la bibliothèque copte 8* (Leuven 1995), pp. 85-102.

[307] This is discussed in detail in the editions of the different treatises.

[308] For astrological conceptions in Gnostic texts, see Gundel & Gundel, *Astrologumena*, pp. 318-325; see also K. von Stuckrad, *Das Ringen um die Astrologie. Jüdische und christliche Beiträge zum antiken Zeitverständnis, RGVV 49* (Berlin/New York 2000), pp. 624-695 who has failed to consider the difference between the positive evaluation of astrology and the mere acceptance of its tenets.

[309] See e.g. A.-J. Welburn, The Identity of the Archons in the "Apocryphon Johannis", *Vigiliae Christanae* 32 (1978), pp. 241-254; B. Witte, *Das Ophitendiagramm nach Origenes'* Contra Celsum *VI 22-33, Arbeiten zum spätantiken und koptischen Ägypten 6* (Altenberge 1993), esp. pp. 118 and 124f.

[310] Editions, translations and commentary in J.-P. Mahé, *Hermès en Haute-Égypte. Les textes hermétiques de Nag Hammadi et leurs parallèles grecs et latins, tome 1* (Québec 1978) and D. Parrot, ed., *Nag Hammadi Codices V, 2-5 and VI with Papyrus Berolinensis 8502, 1 and 4* (Leiden 1979), pp. 341-373.

the *thema mundi*) as well as the sign in which his Exaltation (Virgo 15; exactly the position given in the text) is placed, so this would be the moment when Hermes has truly maximum power.

More problematic is another indication which is given as ϩN ⲛ̄ⲑ̄ⲥ̄ ⲟⲩⲉⲓⲉ ⲙ̄ⲡⲉϩⲟⲟⲩ (NH VI 62, 18f.). The preposition "in" and the final expression "of the day" are clear, but the middle part seems strange. The form ⲟⲩⲉⲓⲉ is the feminine form of the number "one", but the noun ϭⲟⲥ "half" is masculine in Coptic, and we can not even be sure if ⲟ̄ⲥ̄ really is the *status constructus* of that word, since syntactically there is no reason here to use such a form. Still, some scholars have simply translated the expression as "in the first half of the day".[311] Others even proposed to recognise ⲟ̄ⲥ̄ as an abbreviation for ⲕⲣⲓⲟⲥ, trying to read Aries here.[312] Motte has proposed an Egyptian background in the formulation ϩN ⲛ̄ⲑ̄ⲥ̄ ⲟⲩⲉⲓⲉ ⲙ̄ⲡⲉϩⲟⲟⲩ. He would like to identify ⲟⲩⲉⲓⲉ with the Egyptian word *wȝ* "barque" and to translate this as "in the half of the barque by day", and by understanding the "half of the barque" to mean a constellation mentioned by Teucer as *paranatellon* of the Lion.[313] This is, however phonetically impossibly, the word *wȝ* having become *wō* in the Late Period.[314] Besides, Motte's idea that the Sun is at the beginning of the sign of Leo would create serious astronomical problems. Given that Mercury is placed at Virgo 15, the maximal elongation of Mercury to the Sun would only allow a position of c. Leo 23 for the Sun, so there would never be an occasion to set up this stela, if Motte were right.

What would theoretically be expected in this context is an indication of the hour, given that we have a word (ⲟⲩⲉⲓⲉ) which for all in the world looks like the feminine form of the numeral "one", followed by "of the day". Thus, it would be nice to read ⲛ̄ⲑ̄ⲥ̄ as a mistake or a specific dialect form for ⲡⲕ "(exact) hour"[315] which is actually constructed with the feminine form of the numerals. Altogether, the translation should thus be "when I (Hermes) am in Virgo together with the Sun in the first hour of the day when fifteen degrees have passed me". Obviously, the liminal period of the Sunrise and the first hour of the day is often considered an especially propitious hour for magical undertakings.

Of the Gnostic texts from Nag Hammadi, the one most at home in technical astrology is certainly the (unfortunately quite fragmentary) treatise *Marsanes*, which generally shows a high level of scholarly knowledge (e.g. in phonetics).[316] The author is aware of the seven planets, the twelve zodiacal signs, the 36 Decans (called *horoscopoi*) and the 360 individual degrees (NH X 41*-42*). Especially the knowledge of

---

[311] Thus Dirkse, Brashler & Parrot, in: Parrot ed., Nag *Hammadi V, 2-5 and VI*, p. 369; Mahé, *Hermès en Haut Égypte, tome I*, pp. 84f., (emending to the masculine form oua).

[312] L.S. Keizer, *The Eight reveals the Ninth* (Seaside, CA 1974), pp. 87-93 and 102.

[313] Motte, in: *Études coptes* IV, pp. 93-95.

[314] J.F. Quack, Beiträge zur koptischen Etymologie, in: G. Takács, ed., *Egyptian and Semito-Hamitic (Afro-Asiatic) Studies in Memory of Werner Vycichl* (Leiden/Boston 2004), pp. 116-133, there pp. 124f.

[315] For the Coptic word, its etymology and original form see Quack, in: Takács, ed., *Gs. Vycichl*, p. 128, and now in more detail Ph. Collombert, À propos de *p3 ḏd(-wnw.t)*, "heure", en égyptien tardif, in Haikal, Fayza ed., *Mélanges offerts à Ola el-Aguizy* (Cairo 2015), pp. 85-99.

[316] B. A. Pearson ed., *Nag Hammadi Codices IX and X, NHS* 15 (Leiden 1981), pp. 211-352; W. P. Funk, P.-H. Poirier & J. D. Turner, *Marsanès (NH X), BCNH, Section "Textes"* 27 (Québec/Louvain 2000); W.P. Funk, in: H.-M. Schenke, H.-G. Bethge & U.U. Kaiser, eds., *Nag Hammadi Deutsch, 2. Band: NHC V,2-XIII,1, BG 1 und 4* (Berlin/New York 2003), pp. 713-733.

the Decans and the terminology *horoscopoi* make a Hermetic background somewhat likely. However, the terminology used is based on Greek words, not on indigenous Egyptian ones, thus it is likely to derive from treatises in Greek language. I mentioned above the treatise *Pistis Sophia* (not from the Nag Hammadi find) concerning its arrangement and names of the planets.

Coptic magical texts sometimes make use of astronomical conceptions. However, their repertoire seems to be based on the biblical sources, not on contemporary astrological doctrines.[317] The only possible exceptions are some texts of Gnostic colouring, which use demonic aspects of the planets and the Decans,[318] but even these use a terminology (*dekanos* or phonetic derivations thereof) which shows that they are rooted in sources in Greek, not in the Egyptian language.

Fairly substantial religious interpretations of basic astronomical-astrological entities can also be found in the Coptic version of the *Kephalaia of Mani*, especially chapter 69 and 70.[319] They show awareness of the twelve zodiacal signs with their individual names (all in Greek!) and the five planets (equally with Greek names), the triplicities (168, 19-169, 8), and they propose an astrological melothesy, or rather several somewhat different systems. All this is interpreted within the general framework of Manichaean religion. Historical considerations about Mani make it unlikely that he was under any specific Egyptian influence, and there is nothing in those sections to make specific Egyptian doctrines probable – it is simply the accepted astrological *vulgata* of that time. One of the systems of melothesy even has specific contacts with Indian doctrines. According to *Kephalaia* 174, 15-175, 4, the body from the head to the hips is divided in sections and the first six signs rule in descending order over those of the right part, the other six signs in ascending order over those of the left part.[320] In a somewhat similar style, we have a scheme first attested in the *Yavanajātaka* 27, 5-8,[321] but later taken over by Varāhamihira in his *Bṛhajjātaka* 5, 24-26 and by other Indian astrologers.[322] There, we have a correlation of body parts and Decans according not to the zodiacal signs but the Places of the *dodecatropos*. The first Decan of each Place rules over a part of the head, the second over a part of the trunk, and the third over a part of the hips and legs. The horoscope has a somewhat separate role; the rest is arranged symmetrically with five Places standing for the right part (in descending order), one for the centre, and the final five Places for the left parts in ascending order.

---

317 V. Stegemann, Über Astronomisches in den koptischen Zaubertexten, *Orientalia* 4 (1935), pp. 391-410.

318 For Coptic magical texts using the Decans see Quack, *Dekane*.

319 For those, see S. Demaria, I capitoli LXIX e LXX dei Kephalaia copti manichei. Traduzione e commento, *Archeologia Storia della Civilità Egiziana e del Vicino Oriente Antico* 3 (Imola 1998); eadem, Some Remarks on the Sea Giant in the Coptic Kephalaia, in: R. E. Emmerick, W. Sundermann & P. Zieme, eds., *Studia Manichaica IV. Internationaler Kongreß zum Manichäismus Berlin, 14.-18. Juli 1997, Berlin-Brandenburgische Akademie der Wissenschaften, Berichte und Abhandlungen Sonderband* 4 (Berlin 2000), pp. 154-160; A. Khosroyew, Zu einer astronomischen Realie in den Kephalaia, in the same volume pp. 342-65.

320 Short commentary in Demaria, Capitoli LXIX e LXX, p. 66; A. Panaino, Visione della volta celeste e astrologia nel manicheismo, in: L. Cirillo & A. van Tongerloo eds., *Manichean Studies* III. *Atti del terzo congresso internazionale di studi "Manicheismo e oriente cristiano antico" Arcavata di Rende – Amantea 31 augusto – 5 settembre 1993* (Leuven/Naples 1997), pp. 249-295, there pp. 292f. See also von Stuckrad, *Ringen um die Astrologie*, pp. 744f.

321 Pingree, *Yavanajātaka*, volume 2, p. 70.

322 Gundel, *Dekane*, pp. 282ff.; Pingree, *Yavanajātaka*, volume 2, p. 326.

In spite of some obvious differences, both schemes have some structures in common which distinguish them from the more standard systems of melothesy. Given that Mani actually travelled within India,[323] it would not be implausible that he actually learned the principles there.

Summing up, while in some cases Coptic texts reveal astronomical and astrological concepts at home in Egyptian tradition, this only pertains to those that are also attested in Greek or Latin language, and there is no positive indication that any of them was transmitted directly from Demotic Egyptian sources to Coptic ones without a Greek intermediary.

[323] C. E. Römer, *Manis frühe Missionsreisen nach der Kölner Manibiographie. Textkritischer Kommentar und Erläuterungen zu p. 121-p. 192 des Kölner Mani-Kodex, Abhandlungen der Nordrhein-Westfälischen Akademie der Wissenschaften*, Sonderreihe Pap. Col. 24 (Opladen 1994), pp. 132-152 with further references.