HELLENISTIC ASTROLOGY AS A CASE STUDY OF 'CULTURAL TRANSLATION'

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ABSTRACT

This dissertation approaches Hellenistic astrology as a case study for 'Cultural translation' in the Greco-Roman world. 'Cultural translation' denotes here the transition of ideas and knowledge from one culture to another, making them available in the recipient culture by the ‘translation’ in its broader sense, using recipient’s own already familiar intellectual and cultural concepts. The spread of Greek culture and the adoption of non-Greek elements into it during the Hellenistic times resulted in new hybrid Hellenistic culture based at Alexandria. Around the middle of the 2nd century BC astrology in its Hellenized form appeared there as a fully developed set of doctrines that Classical authors argued to have been the discoveries of the Chaldeans. Astrology, however, was not taken over from Babylonia *per se*, but was an assimilation and invention at the same time. This has led some scholars to argue that Hellenistic astrology was an invention in its own right and its philosophical rational and doctrine of interpretation are Hellenistic Greek in origin. This dissertation, therefore, aims to discover what was 'Hellenistic' about Hellenistic astrology, to what extent it was a derivation from its Babylonian predecessor and through that to determine the role of the 'Oriental wisdom' in the Greco-Roman society.

CONTENTS

ABBREVIATIONS

BNJ	Worthington, I (ed.), 2007-date, *Brill's New Jacoby* , online: Brill (http://www.brillonline.nl)
CCAG	Cumont, F., Boll, F., Kroll, W. et al. (eds), 1898-. *Catalogus Codicum Astrologorum Graecorum*, 1-12, Brussels.
FGrH	Jacoby, F. *Die Fragmente der griechischen Historiker*, Berlin 1926-1930, Leiden 1954-1958, online: Brill (http://www.brillonline.nl)
HAMA	Neugebauer, O. 1975. *The History of Ancient Mathematical Astronomy*, 1-3, Berlin and New York.
JHS	*Journal of Hellenic Studies*
JNES	*Journal of Near Eastern Studies*
LSJ	Liddell, H.G., Scott, R., Jones, H.S and McKenzie, R. 1925. *A Greek-English Lexicon*, 9th ed. Oxford.

INTRODUCTION

In the Hellenistic period, as Rome became the most direct threat to the Greeks, replacing the former Persian empire, Greek interest in the cultural and intellectual aspects of Rome and the Romans declined and focused on the Eastern civilizations.[1] Greek curiosity about Oriental wisdom was nothing either new or revolutionary and the cross-cultural relations between Greece and its eastern neighbours during the pre-Hellenistic period have by now been well examined.[2] Although Greece was at first considered to have been rather isolated from the Orient and from Zeller (1856) onwards Greek philosophy was for a long time held to have been self-generated despite the gradually accumulating contrary evidence, comparisons between Hittite, Akkadian, Ugaritic and Syrian material and Pre-Socratic Greek philosophic ideas have successfully demonstrated that the latter had their origins or were at least influenced by the former.[3] Alexander the Great's conquests from Greece to Afghanistan and Egypt merely renewed and strengthened these already established contacts. The situation was, nevertheless, a great deal different than before. Alexander's death resulted in the creation of large kingdoms controlled by Greek monarchies.[4] Greek culture spread in these areas but at the same time Greek and non-Greek elements became intrinsically fused, producing a new hybrid Hellenistic culture based at Alexandria. Johnson has noted that 'among the most far-reaching of the achievements of

[1] Momigliano 1990: 2, 18.

[2] See for example Hegyi 1982 on the relations between Greece and the Orient between the 9th and 6th centuries BC, Burkert 1992 on Near Eastern influences in Greece during the Archaic period, West 1971 and Burkert 1962 & 2004 on Oriental influences on Greek philosophy, and West 1997 on west Asiatic elements in Greek poetry and myths.

[3] Burkert 2004: 51.

[4] Seleucids in the Middle East, Ptolemies in Egypt, Antigonids in Macedonia, Attalids in Anatolia; and later also Greco-Bactrian, Indo-Greek and Pontus kingdoms.

Alexandria was its ability to take the received wisdom of the Hellenistic world and synthesise it into new ideas'.[5] Thus next to the classic sciences arose what are nowadays called pseudo-sciences, most notably astrology in its various forms.

This dissertation approaches Hellenistic astrology as a case study for 'cultural translation' in the Hellenistic world. The term 'Cultural translation' is used in various disciplines, including cultural studies, political science, literary studies, anthropology, in somewhat divergent meanings, basically denoting the mediation processes between different cultural practices, the 'translation' of one culture or its elements within another. As D'hulst has pointed out it is used as a metaphor and 'we cannot be sure that it is underpinned by a common theory, nor that it is being approached in comparable ways within the disciplines concerned'.[6] For example, Harish Trivedi sees 'cultural translation' as the 'translation' of the culture of the migrants to the society to which they have travelled.[7] I, therefore, propose to look at 'cultural translation' from the point of view of the transition of ideas and knowledge from one culture to another. I have specifically chosen to use the word 'translation' here, instead of for example transmission or transition, since foreign ideas were made available to the recipient culture by ‘translation’ in its broader sense, using the recipient’s own already familiar intellectual and cultural concepts. In addition, as Momigliano has pointed out, 'Greek remained the only language of civilization for every Greek-speaking man'.[8] Hence, the Greeks' lack of proficiency in the relevant languages made them heavily dependent on the translations of foreigners themselves, just as Trivedi's migrants are responsible for the translation of their culture into modern western society. Momigliano, however, argues that 'the natives ... had a shrewd idea of what the Greeks wanted to hear and spoke accordingly ... when

[5] Johnson 2000: 143.

[6] D'hulst 2008: 221.

[7] Trivedi 2007: 6.

[8] Momigliano 1990: 8.

there was no urgency, utopia and idealization abounded'.[9] Thus 'translation' in the Hellenistic context was not a translation *per se*, but became a mixture of assimilation and invention, resulting in the intriguing phenomenon of 'mistranslation'.

Tracing the 'mistranslations' could be one of the best tools for examining the history and processes of cross-cultural influences in the Hellenistic world. Hence, the study of the connections of Hellenistic astrology with, and possible derivation from, Babylonian astral omens can be used to investigate the transition and 'translation' of eastern culture into the western world. However, the aim of this dissertation is not explicitly to study the contacts between the two civilizations but to show Greek responses to, and representation of, Chaldean wisdom. It can thus be further used to examine the cultural expansion of Hellenistic tradition and how its social realities influenced cultural discourse.

All this is done by moving, rather unconventionally, back in time. The first chapter seeks to establish a solid understanding of the most important doctrines, methods, and underlying rationale of Hellenistic astrology by analyzing astrological works written during the first two centuries AD: the *Tetrabiblos* of Claudius Ptolemy, *Anthologiae* of Vettius Valens, *Astronomica* of Marcus Manilius and *Carmen Astrologicum* of Dorotheus of Sidon. Unfortunately, no complete astrological text from the Hellenistic period has survived. Hence, chapter two, on the rise of Hellenistic astrology (first two centuries BC), depends solely on the fragments of earlier astrological authors in later compilations. This chapter aims to give an account of how astrology and its origins were portrayed in Greek and Roman literature as stemming from Chaldea. Chapter three finally examines the relationship between Babylonian celestial prognostication (with the main focus on the period between 600 and 300 BC) and Hellenistic astrology and tries to establish to what extent the claims made about the Chaldean origin of horoscopic astrology were true.

[9] *Ibid.*

David Pingree has remarked that roughly corresponding to the three stages in the evolution of Mesopotamian astral omens and mathematical astronomy were three periods of transmission of these sciences, in their contemporary form, to other cultures, where they were usually modified so as better to suit the need of the recipient civilization.[10] The last chapter thus also seeks to determine what then were the needs of Greek civilization and the resulting modifications. In addition, several appendices have been attached to the dissertation on a memory-stick.[11]

[10] Pingree 1982: 614.

[11] Appendix 1 includes documents describing the principles of astrology; Appendix 2 an idea-map of Ptolemy's *Tetrabiblos* and relevant documents; Appendix 3 fragments of Nechepso and Petosiris, Appendix 4 a timeline of Stoic philosophers, astrological writers and other relevant authors.

CHAPTER 1

ASTROLOGICAL LITERATURE, AD 0-200

The aim of this first chapter is to give the reader a solid understanding of what constituted Hellenistic astrology. What were its fundamental practices and its underlying philosophical justifications? It furthermore seeks to establish the agendas and methods of the four authors who will be examined in this chapter and to see how it reflects the expected mentality of their audiences.

1.1 PTOLEMY

The main reference work on astrology in ancient and medieval times, the *Tetrabiblos*[12] of Claudius Ptolemy, is in many ways the obvious starting point in the study of Hellenistic astrology.[13] Being systematic, well-structured and fairly easy to comprehend, it sums up the state of astrological knowledge in the second century AD.

1.1.1 Structure and content

In order to get a good overview of the contents and the structure of the *Tetrabiblos* and to make the comparison of the doctrines and methods described in it with other astrological texts more convenient, I have constructed an interactive idea-map. The full version of this map can be found under Appendix 2.[14] Its general appearance with highlighted sectors denoting the contents of the

[12] Ptolemy's book is known in Greek both as *Apotelematika* and *Tetrabiblos* and in Latin as *Quadripartitum.*

[13] E.g. *CCAG* 5 (*Codicum Romanum*) alone has more than 40 fragments mentioning Ptolemy. Hephaistion of Thebes derived the material for his second book largely from the *Tetrabiblos.*

[14] The map has been constructed by using the *Cytoscape* programme. Appendix 2 includes the PDF version of the map and an extra document with explanations of the terms and abbreviations used. See the 'Manual'

four books can be seen in illustration 1. A zoomed-in section is shown in illustration 2.

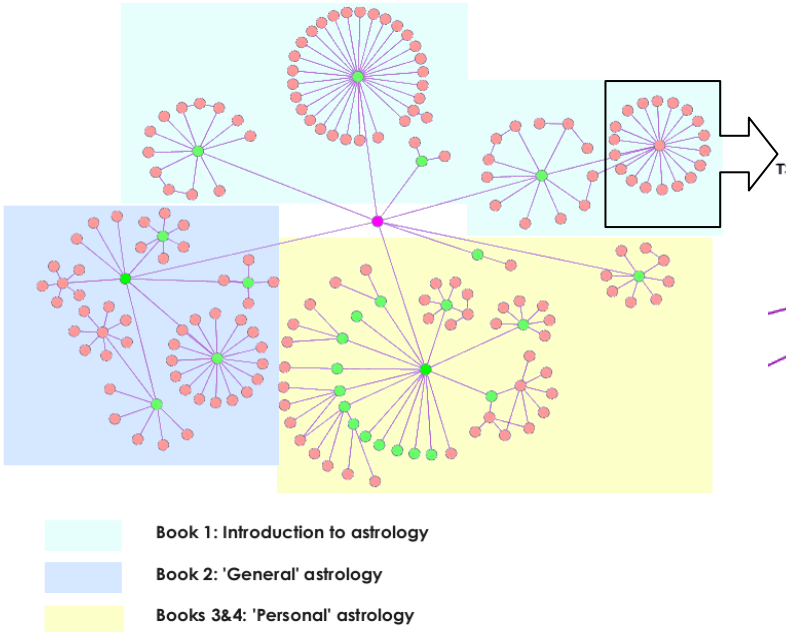

Illustration 1

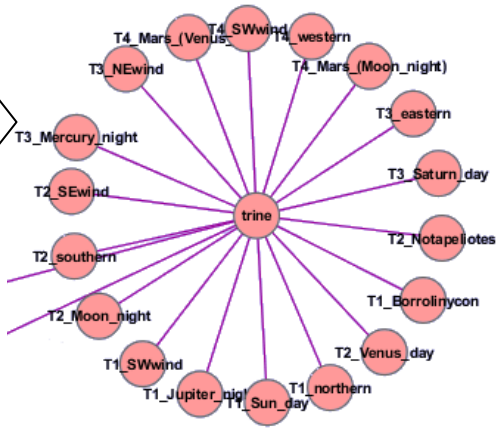

Illustration 2

The *Tetrabiblos*, as its traditional name implies, consists of four books. The philosophical standpoint of the author is laid out first. This is followed by rather concise explanations of the most important[15] physical and geometrical principles of astrology, including: the divisions of planets, stars and signs into different categories; the aspects of the Sun and the signs (opposition, trine etc.); houses and exaltations; terms, places and degrees; faces, chariots and the like. Detailed descriptions of these principles can be found under Appendix 1.

Book 2 is dedicated to what can be termed 'general' astrology, i.e. the astrology that relates to the whole races, countries, and cities (cf. Books 3 and 4 deal with 'personal' astrology). Ptolemy describes how the regions of the world and the characteristics of their inhabitants are influenced

document in the 'Appendix 2' folder for more detailed information on how to use these two documents.

[15] Or rather what Ptolemy regards as the most important doctrines. As the next chapter will demonstrate, Ptolemy has omitted some methods that can frequently be found in other astrological authors.

by the heavenly bodies.[16] He then moves on to explaining how to make particular predictions using eclipses, how to determine the time, length and place of the event(s) predicted, the class and number of those affected (e.g. humans, animals, majority or minority of the population) and whether the predicted event is productive or destructive. He also discusses the colours of the eclipses, the appearing of the comets and the new moon of the year. Finally, Ptolemy devotes three chapters to the forecasting of weather, using the zodiac signs, new and full moons in relation to the quarters and the atmospheric signs.

Books 3 and 4 deal with genethialogical (i.e. personal) astrology. To predict the future of an individual it is necessary to find the horoscopic point[17] and the three related points (DESC, MC, IMC).[18] Hence, the methods for finding these have been explained first. Genethialogical science is then subdivided into four parts: 'one division concerns solely the events preceding the birth (1)... one deals with the events both before and after the birth (2)... one with the accounts of the very time of the birth (3)... and finally one treats the post-natal matters' (4).[19] The remaining part of book 3 consists of chapters concerning the details of these four divisions: the parents (1), brothers and sisters (2), the gender of the native, twins, monsters and babies who do not survive or are exposed (3), the length of life, the character of the person (bodily form and soul separately) and the health-problems the native might have (4). Book 4 is entirely concerned with 'external accidentals', such as material fortune, marriage, and children.

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[16] See Riley 1988: 74-77 for a thorough discussion on the two slightly conflicting systems that Ptolemy uses. See Appendix 1 'chorography' for a map of Ptolemy's chorographic system that relates specific countries to specific zodiac signs. Cf. maps of Manilius' and Dorotheus' systems.

[17] I.e. the degree of the zodiac rising above the eastern horizon at a given moment, e.g. the moment of conception or birth, or in catarchic astrology the moment of commencing the questioned activity.

[18] See 'Birth Chart' and 'Ascendant' under Appendix 1.

[19] *Tetr.* 3.3. I am referring to the book and chapter number in the edition of F.E.Robbins (1940), which are somewhat different from those in the earlier edition of F.Boll and A.Boer. Some authors (e.g. Riley) prefer to use the latter and alternatively give the page number in Robbins' edition.

1.1.2 Philosophy

The *Tetrabiblos* starts with a discussion on if and to what extent astrological predictions are possible and necessary. This reflects the rich eclecticism or syncretism that characterizes astrological cosmology: the rationale of Hellenistic astrology was not based on one school but embraced elements from different philosophical movements, most notably from the Stoics, the Peripatetics and the Neoplatonists. Out of these three, modern scholarship has assumed the influence of Stoicism on philosophical explanations and wider acceptance of astrology (due to the support that some Stoic philosophers allegedly offered to astrology) to have played the most decisive role. If and to what extent Stoics actually supported astrology has been debated. Cicero claims that Diogenes of Babylon (230-150 BC) gave support to astrology but Panaetius (185-109 BC) rejected it. Posidonius, Panaetius' pupil, was allegedly 'greatly devoted to astrology', or at least so Augustine writes in *De Civitate Dei* 5.2. Posidonius above all has been credited with the popularisation of astral divination. Cumont argues that:

> More of a theologian than a philosopher, in mind more learned than critical, he [Posidonius] made all human knowledge conspire to the building up of a great system, the coping of which was enthusiastic adoration of the God who permeates the Universal organism. In this vast syncretism all superstitions, popular or sacerdotal, soothsayings, divination, magic, find their place and the justification; above all it was due to him that astrology entered into a coherent explanation of the world acceptable to the most enlightened intellects, and that it was solidly based on a general theory of nature, from which it was to remain henceforth inseparable.[20]

Whether this was the case or not, Stoic belief in determinism was indeed a fundamental prerequisite for belief in astrology. Stoics had two material principles: (1) that which acts (τὸ ποιοῦν) or the active principle and (2) that which is acted upon (τὸ πάσχον) or the passive principle. The first can be conceived as God, but not God in the traditional sense. Cicero writes in *De Natura Deorum* 1.36 that Zeno, the founder of Stoicism, banished Jupiter, Juno and others

[20] Cumont 1912: 48.

from the company of gods, 'arguing that they were merely names given symbolically to mute and inanimate forces' and 'thought that God was to be found in the law of nature, which is powerful to enforce what is right and to forbid transgressions'. He identified the aether with God and took the view that the divine power is to be found in a principle of reason which pervades the whole nature. Further, according to Cicero, Cleanthes, Zeno's successor as the head of the Stoa, gave the name of God 'to the mind and spirit which animates the whole of nature' and actually held the aether itself to be the supreme godhead.[21] And for Chrysippus in turn, 'the divine power was to be found in reason, and in mind and in consciousness, which pervades the whole universe' and 'the universe itself is God, an emanation of the divine mind'.[22] Thus, Stoics argued that the active principle came from the aether, a divine fire which pervades everything. This divine fire evolved into the idea of 'breath' or *pneuma.*[23] The active principle was believed to be totally blended with the second principle –matter - which is passive and inert.[24] In other words, Stoics attributed the movement of matter to the active principle that is the aether (or God or reason or *pneuma*). This permeates the whole cosmos and ties all the things in it together, making them interdependent. The proof for the existence of such sympathy was seen in the influences that extra-terrestrial phenomena exert on the earth, e.g. the moon causing tides. Sextus Empiricus presents this important Stoic argument for the unity of the cosmos as a single body:

> For in accordance with the waxings and the wanings of the moon many sea and land animals wane and wax, and ebb-tides and flood-tides occur in some parts of the sea. And in the same way, too, in accordance with certain rising and setting of the stars alterations in the surrounding atmosphere and all varieties of change in the air take place, sometimes for the better, but sometimes fraught with pestilence.[25]

[21] Cicero *De Nat.Deo.* 1.37.

[22] *Ibid.* 1.39.

[23] Sellars 2006: 90.

[24] Sellars 2006: 89.

[25] *M* IX 79 (1.79 in *Against the Physicists*, trans. R.G. Bury [The Loeb Classical Library] (London and Cambridge, MA 1936).)

Sambursky notes that this causal description of physical phenomena in the cosmic scale evolved into a conviction that the 'same laws prevail everywhere in a cosmos permeated and ruled by one unifying *pneuma*.'[26] The Stoics, however, had to find proof for this theory of universal causality. So they were led to incorporate the vast field of divination into the body of evidence in favour of their doctrine.[27] Long says that this concept of cosmic sympathy 'was to become the first axiom of philosophical astrology and was constantly cited by Manilius.'[28]

Moreover, the Stoics argued that the cosmos was a finitely extended living spherical being, a conscious being[29] – rational, animate and intelligent.[30] But as all living beings have a limited lifespan, so does the cosmos. Thus according to the Stoic theory cosmos is born from the aether and will again resolve in it at the moment of total conflagration,[31] giving rise to a new cosmos. The life of the new cosmos will always be identical to its predecessor's. Stoics argued that as the cosmos is governed by reason, it has the best possible organization, which is repeated in its each life-cycle. 'Thus,' as Sellars puts it, 'there is eternal occurrence of the same events'.[32] It follows that all events are fated. However, not all Stoics, especially not Panaetius, accepted this view.[33]

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[26] Sambursky 1959: 42.

[27] Sambursky 1959: 65-66.

[28] Long 2006: 130. See chapter 1.3.1 for discussion on the philosophical standpoint of Manilius.

[29] This doctrine lies on assumption that unconscious cosmos cannot give rise to conscious beings. An argument which itself lies on the microcosm-macrocosm assumption, i.e. that the lesser thing is always shaped after the superior thing, e.g. that a man is a model of cosmos.

[30] Sellars 2006: 86-99.

[31] This happens after the passing of the Great Year when both luminaries and all five planets return to the same position that they had at the beginning of cosmogony. Seneca (*Nat.Quest.* 3.28.7-3.29) attributed the doctrine of deluge and ecpyroses to Berossus (see chapter 2.1.2). The fact that the theory of cosmic cataclysms originated from Babylonia has been generally rejected for a long time due to the lack of any confirming evidence in Babylonian literature. However, van der Sluijs (2005) has recently suggested that the Neo-Babylonian text *Erra and Išum* may possibly prove otherwise.

[32] Sellars 2006: 99.

[33] Sellars 2006: 94, 99.

Ptolemy, likewise, did not accept the Stoic theory of causality on the whole but applied the Stoic belief that movements of the aether directly affect the sublunary elements with which it is in contact on the Aristotelian theory of the five elements.[34] He used the peripatetic doctrine that 'a certain power emanating from the eternal ethereal substance is dispersed through and permeates the whole region about the earth and water and the plants and animals therein[35] and thus causes everything in the cosmos to influence each other. His scientific approach is based on the physical - the four humours (heat-cold, wet-dry), i.e. the opposition of the qualities of the planets - and geometrical (e.g. the aspects) principles.[36] Usual examples in support of astrological theory are used.[37] Compare the following with the passage from Sextus Empiricus cited above:

> For the Sun... is always in some way affecting everything on the earth... The Moon, too... bestows her effluence most abundantly upon mundane things, for most of them, animate or inanimate, are sympathetic to her and change in company with her; the rivers increase and diminish their streams with her light, the seas turn their tides with the rising and setting, and plants and animals in whole or in some part wax and wane with her. Moreover, the passages of the fixed stars and the planets through sky often signify hot, windy, and snowy conditions...[38]

Ptolemy also paid attention to the arguments directed against astrology. Similarly to our own times, astrology did not find unconditional acceptance in the Greco-Roman world. The philosophical grounds of astrology and the deterministic world-view that it presumed created debates between philosophers. Most notably Posidonius and Cicero took up polemics for or against astrology.[39] This is to be expected, especially considering that 'hard astrology' (i.e. belief in the movements of the heavenly bodies to be the sole causes of all terrestrial events) created

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[34] Long 2006: 140.

[35] *Tetr.* 1.2.

[36] Riley 1988: 69.

[37] *Tetr.* 1.2.

[38] *Ibid.*

[39] A good overview of the arguments used for and against astrology can be found in Long's paper 'Astrology: arguments pro and contra' (Long 2006).

strong objections by freeing men of any moral responsibility (at least in theory). Ptolemy favoured a 'softer' approach to astral determinism, introducing the idea of the hierarchy of causes, the lesser causes always yielding to the greater or stronger. He thus argued that 'some things, because their effective causes are numerous and powerful are inevitable, while others, for the opposite reason, may be averted'.[40] In other words, some events (of less powerful causes) can be averted or rendered less severe when remedies, in accordance with nature and fate, are applied.[41] This 'softer' approach to astrology did not entirely dismiss the stars as direct causes, but claimed that the endless number of variables allowed for man to have control over some areas of his life by using the stars as his guide. This is distinctly different from Manilius' assertion that every little detail of every single action that takes place on earth is brought about by the movement of the stars. Interestingly, however, those Stoics who supported astrology would probably have favoured the 'softer' approach since according to Sambursky, 'Stoics realized that in every given instance one has to reckon with a multiplicity of causes, since the complex texture of natural phenomena reduces the conception of one single body acting upon another to a mere abstraction.'[42] Chrysippus used this distinction to argue that human actions can in fact make a contribution to the outcome of the events in a deterministic cosmos – an argument similar to that of Ptolemy.[43] Most astrologers, however, with the exception of Ptolemy, who 'approached astrology with a sophisticated philosophical grounding such as few actual practitioners of astrology could have possessed' held the heavenly bodies to be the direct causes of terrestrial events.[44] Despite the fact that the Stoics probably never supported Hellenistic astrology to the extent that has been attributed to them by modern scholars, their theory of cosmic sympathy was successfully

[40] *Tetr.* 1.3

[41] See chapter 3.4 for comparison with the Babylonian approach to astral determinism.

[42] Sambursky 1959: 54.

[43] Sellars 2006: 104.

[44] Jones 2003: 340, fn.18.

exploited by astrologers.[45]

1.1.3 Agenda and method

Little is known about Ptolemy's life. Born around AD 100,[46] he was an inhabitant of Alexandria and descended from Greek or Hellenized forebears.[47] Toomer has said that:

> Living in Alexandria must have been a great advantage to Ptolemy in his work. Although much declined from its former greatness as a centre of learning, the city still maintained a scholarly tradition and must at the least have provided him with essential reference material from its libraries.[48]

Ptolemy, in addition to gaining from the mathematical, astronomical and other achievements made in Alexandria during the Ptolemaic era,[49] also had access to, and utilized, Babylonian astronomical data.

For Ptolemy, astrology seems to have been above all a tool to buttress his general doctrines of Aristotelian natural philosophy, only a part of the whole. The *Tetrabiblos* was preceded by the *Almagest*[50] (written around AD 150), a manual of ancient mathematical astronomy, which equipped its reader with the knowledge needed to calculate the motions of the heavenly bodies and the dates of the various phenomena associated with them. Ptolemy's most important achievement in it was extending the geometric cinematic model of solar and lunar motion to the five planets, producing what is now known as the Ptolemaic and geocentric model of the universe.

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[45] Astrology was considered to be a *τέχνη*, an art based on rational foundation and accessible to every intelligent being, not only those blessed with the gift of prophecy (Sambursky 1959: 66; see also Plato *Phaedr.* 244 c.)

[46] Not much is known about the life of Ptolemy but the dates of his observations in the *Almagest*, a date in one of his manuscripts and the statement of his scholiast that he flourished under Hadrian and lived until the reign of Marcus Aurelius suggest that he was born c. AD 100 and died around AD 170 (Toomer 1975:186).

[47] Toomer 1975: 187.

[48] *Ibid.*

[49] See chapter 3.3.

[50] Known in Greek as *ἡ μεγάλη σύνταξις* or *ἡ μεγίστη σύνταξις,* transformed into 'al-majistī' by Arabic translators and from that into 'almagesti' or 'almagestum' by medieval Latin translators (Toomer 1975: 187).

That the *Almagest* was intended from the start to be accompanied by a book on astrological influences is shown by disproportionate space and effort devoted to the calculation of rising times, a very important topic for the ancient astrologers but not so much for the astronomers.[51] Moreover, the lack of tables and explanations concerning how to calculate vital points and astronomical values in the *Tetrabiblos* could be the result of Ptolemy's assumption that his readers had access to the *Almagest (*and/or *Handy Tables*[52]) where most of the necessary calculation had already been explained and presented in convenient tables.[53] In addition to the *Almagest*, Ptolemy produced treatises on mathematics, geography, optics and music.

As we have seen, Ptolemy's approach to his material, in accordance with his approach to all the other subjects he engaged in, was highly scientific and excluded the 'arbitrary'. His assiduous attempts to make the astrological systems fit logical and plausible explanations occasionally ran into difficulties. For instance, the traditional assignment of Saturn into the diurnal and Mars into the nocturnal sect of the planets does not accord with the system he is using.[54] Consequently the explanation that he puts forward is all too obviously his own artificial construction. His need for a concrete system, not a 'tradition', is even more explicit in the two last chapters of Book 1 dealing with the disposition of terms.[55] Ptolemy introduces two different systems, called by him the Egyptian system and the Chaldean system.[56] Not being content with the lack of consistency and logic behind either of the two, he introduces his own system, attributing it to an ancient manuscript he allegedly found. This reflects the contemporary tendency of appealing to

[51] Toomer 1975: 189.

[52] Ptolemy supplied all the tables required for astronomical calculations first in the *Almagest* and then republished them with some modifications in a work entitled the *Handy Tables*.

[53] Riley 1987: 243-5.

[54] *Tetr.* 1.7.

[55] I.e. small divisions of the zodiac, one zodiac sign being divided into five terms. For more detailed information see Appendix 1 'Terms'.

[56] *Tetr.* 1.20-21.

predecessors to give credibility to writings and the general pretence to the high antiquity of one's ideas. There was a continuing demand for older books in the Hellenistic era. As we shall later see, many (half-) mythological as well as historically known characters and especially schools of thought were liable to pseudoepigraphic attributions.

In addition to what seems to be Ptolemy's only original contribution to astrology, Riley has pointed out that 'there is a core of specific doctrines and methods, not to mention an entire area of forecasting, common to other astrologers, which is not included in the *Tetrabiblos*'.[57] These will be more closely examined in the next section of this chapter. At the moment it is sufficient to say that these omissions serve to prove that Ptolemy was a theoretical astrologer, not a practising one. Indeed, it is notable, that after reading the *Tetrabiblos* and having learnt all the geometrical and mathematical models used to analyse the state of the heavens at any given moment, it remains virtually impossible to cast a real horoscope based on this information. Ptolemy meticulously deals with technical details but largely neglects the naturally dubious but nevertheless essential interpretative side of astrology. He never really introduces his reader to the traditional or 'mythical' attributes of the planets; he just mentions them when necessary. In fact, up until the third chapter of the second book he explains planetary influences solely in terms of the four humours.[58] Similarly, where others present almost complete lists of detailed outcomes of the possible aspects that planets and signs can have on each other, Ptolemy is content with rather brief and incomplete summaries. All this contributes to an understanding that the *Tetrabiblos*, despite being hailed as the ultimate astrological book on Hellenistic astrology, does not really reflect the true nature of astrology or its full state in the second century AD. What it does reflect, however, and very fortunately so, is a certain scientific style of writing and thought, similar to Aristotle, Euclid and Archimedes, and the desire to make an 'ancient' and 'puzzling' wisdom fit the Greek

[57] Riley 1987: 236

[58] Cf. 'Characteristics of the signs according to Vettius Valens' under Appendix 1.

scientific formula.

Hence, in the sense of understanding the basic astrological systems that underlie the interpretation of a nativity, Ptolemy is an excellent starting point – systematic, well structured, and fairly easy to follow and understand. But for comprehending the intricate inner workings of more practical astrology, he is, unfortunately, of rather less value.

1.2 VETTIUS VALENS

More insight into the world of practising astrologers can be gained from Vettius Valens' *Anthologiae* – the longest, but also the most obscure, ancient astrological text that has survived. Neugebauer has attempted to reconstruct the timeline of its writing, based on the more than 125 horoscopes cited in the work and concluded that Valens must have written the bulk of the text between AD 152 and 162, i.e. roughly around the same time as Ptolemy wrote the *Tetrabiblos*.[59] It must be noted, however, that many changes and supplements were inserted in earlier books by Valens himself and in some cases perhaps by a later redactor.[60]

Both the *Tetrabiblos* and the *Anthologiae* were, furthermore, written in Alexandria, Egypt. That allows one to expect that both authors to some extent used the same primary sources. Taking this

[59] Approximate dates of books according to Neugebauer (1954): Books 1-2: early 150's or before (I 5 on the Midheaven is a later insertion); Book 3: 1-13 – early 150's, 14-16 – an insertion from 169/170; Book 4: 1-10 – 156, 11-30 – slightly later than 156 (dif. System of chronocators than the one used in 4.1-10); Book 5: 157/158; Book 6: a late book, perhaps from around 170; Book 7: 1-4 – 173, 5 – 164/5; Book 8: 167; Book 9: fragmentary, with sections of various dates assignable to earlier chapters.

[60] The *Anthologiae* has not come down to us in its original form but as has happened to many books of practical usage has undergone interpolation (Boer?: 1872-3). The editions of Kroll and Pingree are both based on Byzantine Greek manuscripts. Pingree, however, has included some passages of the Eastern tradition of the *Anthologiae* into the appendices of his edition. Both the Byzantine and the Arab version appear to point back to a fifth-century Greek manuscript (Riley n.d.: 21-2).

into account, the differences between the two treatises must be carefully examined in order to form a more accurate and comprehensive picture of early Hellenistic astrology.

1.2.1 Structure and content

The *Anthologiae* is divided into nine books and covers all the important individual teachings of Hellenistic astrology. The structure of the work differs from that of the *Tetrabiblos*: it is organized according to the categories of questions that might be asked, with heavy stress on the distribution of the chronocratorships and the related topic of critical years.[61]

Books 1-3 form a general introduction to astrology. Much of books 1 and 2 contain standard astrological doctrines and can be paralleled with Ptolemy, Manilius and others. Valens starts by describing the planets and the zodiacal signs. In comparison with Ptolemy, who at the beginning primarily describes the seven planets based on their physical characteristics (i.e. hot, cold, dry, moist); Valens straightaway brings in their mythological aspects as well.[62] Furthermore, the iatromathematical connections are made clear right at the beginning. In terms of the zodiacal signs, Valens gives a rather thorough description of each sign,[63] presenting alongside its characteristics also the number and quality of the stars that constitute the constellation and a list of countries that are under its influence, i.e. the chorography (not for all signs though). The system of the 60 boundaries or terms (ὅρια) that he introduces in the third chapter is the same that Ptolemy describes as the Egyptian system (in opposition to Chaldean system and his own system). He then introduces the horoscope, the midheaven, the ascension of the signs, the seeing and hearing signs (Cf. Ptol. *Tetr.* 1.15) etc.

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[61] Riley 1987: 248.

[62] For example, for Ptolemy Saturn, being the most distant planet from the Sun, is cold and dry, hence sterile. Valens does not look for logical characteristics or reasons behind them: he simply states, e.g., what people born under Saturn are like, what a given planet causes and signifies.

[63] See 'Characteristics of signs according to Valens' under Appendix 1.

The remaining six books were written after AD 156 and are concerned with the calculation of length of life and the critical year and with determining the planetary ruler of any given period.[64] A preliminary sketch of chronocratorships is given in book 3 but a different and more detailed method appears in book 4.

There are, as pointed out before, a number of doctrines and methods used by Valens and other astrologers, which are not included in the *Tetrabiblos* because of their lack of scientific reasoning. These include first the 'Elections' or 'Initiatives' (καταρχαί) and 'Interrogations' (ἐρωτήσεις) - a branch of astrology that investigates the influence of momentary or temporary configuration of the stars on the beginning of some activity.[65] Also omitted are the 'Lots' (κλήροι), i.e. specific degree positions of the zodiac. These are calculated by using simple counting methods for the distance between relevant planets and the Ascendant. The Lot of Fortune (κλῆρος τυχῆς) is commonly used by all ancient astrologers, including Ptolemy, but other Lots (e.g., the Lot of Daimon, the Lot of Father, the Lot of Mother) are less common. Ptolemy's avoidance of such methods results in more complicated evaluations of the configurations of the stars with significant positions in the zodiac.[66] Riley has pointed out that Ptolemy requires almost six pages to discuss such procedures and possibilities, compared to a brief paragraph in Dorotheus.[67] Another method, used to free the astrologer from analysing the complicated compositions of houses, exaltations, terms and decans - called the 'Places' (τόποι) - is also largely missing from the *Tetrabiblos*. ‘Places’, known in modern astrology as ‘mundane houses’, are twelve 30° parts of the zodiac forming a rotating circle. Each ‘Place’ is associated with a certain sphere of life.[68] In addition to

[64] Riley n.d.: 6.

[65] Riley 1987: 237-8.

[66] Riley 1987: 240.

[67] *Ibid.*

[68] See Appendix 1 'Places'.

these three branches of astrological prediction, Valens uses numerological methods.[69]

1.2.2 Agenda and method

Comparison of Vettius Valens and Ptolemy allows us to draw some important conclusions about the mind-set of 'theoretical researchers' like Ptolemy, and that of practising astrologers of the same period. Despite mostly using the same or similar technical methods of astrology, the differences between the approaches of these two authors are extensive. Ptolemy's scientific and systematic approach finds no analogue in Valens. Further, Ptolemy considers both general and genethlialogical astrology, whereas Valens is primarily concerned only with the latter, i.e. with the character and lifespan of individual men.

The approach of Valens, in opposition to Ptolemy's strictly theoretical one, is in most cases severely empirical. Hence, Valens uses real horoscopes as examples and test-cases. Ptolemy, on the other hand, never mentions an individual's horoscope. This leads to an important distinction, namely, the target audience. The *Tetrabiblos* is aimed at the educated upper classes of the Roman Empire, whereas Valens' book is obviously written to be read only by the professional audience. The understanding that the *Anthologiae* was meant as a handbook of practical astrology is further reinforced by Valens repeatedly addressing a pupil named Marcus[70] and warning all his readers to use their astrological knowledge with caution and not to disclose it to any undeserving parties.

One further very important distinction remains. Unlike in the *Tetrabiblos*, direct references to, and citations from, Valens' precursors, often accompanied by his personal opinion about them and/or their work, are frequent in the *Anthologiae*, making it an important source for earlier astrological and astronomical literature. The main purpose of the composition (as the name *Anthologiae* itself

[69] I.e. the periods of the stars and rising times of the signs, which are based on astronomical calculations can be used as numbers, hence 19 years of the sun may also be 19 months, 19 days or 19 hours.

[70] E.g. 281.3, 316.4 and 344.16.

suggests) was to render into intelligible language the teachings of the 'ancients'.

1.3 MANILIUS

One of the earliest full astrological texts that has survived is a poem entitled *Astronomica* by a Roman poet Manilius. The composition was begun during the reign of Augustus (i.e. before AD 14). Book 4, however, suggests that Tiberius had risen to the throne by the time Manilius finished his work.[71] The *Astronomica* followed the tradition of rendering Greek science and mythology into Roman literature.[72] It is a difficult composition: the text is unusually corrupt, the subject matter highly specialized, and the Latin style bizarre and bewildering - not least due to Manilius' audacious plan to render diagrams, tables, and maps into hexameter form.[73]

1.3.1 Structure and content

The *Astronomica* consists of five books, each starting with a proem in which the author's philosophy and agenda can be best observed. Book 1 explains the origins and the nature of the universe, its structure and the celestial bodies therein. Books 2 to 5 introduce basic astrological terms and methods, most of which can again be paralleled with the *Tetrabiblos*. This clearly demonstrates how the basic concepts of horoscopic astrology were laid out by the early first century AD and little, save more detail, was added later. Nevertheless, that did not stop Manilius from using the literary *topos* of claiming absolute originality for himself on the subject matter.[74] Like Ptolemy, Manilius mentions no sources.

[71] Goold 1977: xii.

[72] Lowe 2004: 143.

[73] Goold 1977: vii.

[74] See *Astronomica* 1.5-6, 1.113-4, 2.57-60, 3.1-3.

1.3.2 Philosophy

As was argued before, the ideas behind astrology were mainly Stoic in essence. Manilius seems to use many Stoic doctrines to decorate his philosophical environment. Like the Stoics, Manilius saw God as being the providential ruling force in Nature.[75] He writes in 1.247-54:

> This fabric which forms the body of the boundless universe, together with its members composed of nature's divers elements, air and fire, earth and level sea, is ruled by the force of a divine spirit; by sacred dispensation the deity brings harmony and governs with hidden purpose, arranging mutual bonds between all parts, so that each may furnish and receive another's strength and that the whole may stand fast in kinship despite its variety of forms.[76]

However, in closer examinations it is evident that as was the case with Ptolemy, Manilius has likewise modified some of the principal doctrines. Although the Stoic concept of universal sympathy was an important part of philosophical astrology and is constantly stated in the *Astronomica*, Manilius put more emphasis on the God as the all-controlling, all-connecting and all-determining power. This all-permeating God has made the laws that the whole universe follows - nothing in the world is random and everything happens according to the predetermined pattern, i.e. the established rule of fate, 'the plan of the God most high'. Thus he says in 2.80-5:

> ... This God and all-controlling reason, then, derives earthly beings from the signs of heaven; though the stars are remote at a far distance, he compels recognition of their influences, in that they give to the peoples of the world their lives and destinies and to each man his own character.[77]

and 4.14-5 reads:

> Fate rules the world, all things stand fixed by its immutable laws, and the long ages are assigned a predestined course of events...

Here the distinction between hard astrology and soft astrology appears in its most vivid form.

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[75] Sellars 2006: 91

[76] See also 2.60-83.

[77] See also 3.48-55; 4.888-90.

According to hard astrologists like Manilius, everything has been immutably pre-written in the stars. They support hard determinism and consider stars to be the causes of all that happens on earth. Soft astrology, on the other hand, does not hold the movements in the firmament as the causes of the events on earth, but mere signals of things to come. Of course the two versions are not mutually exclusive and can form a complicated synthesis. The question of hard versus soft astrology is an important one when thinking about what mentality the authors expected their audience to have. In the case of Manilius this expectation is perhaps most vividly manifest in his argument that God can dwell in man and astrology is the quest for the God.

1.3.3 Agenda and method

As was argued in the case of Ptolemy, for Manilius too astrology was a tool, a means to an end, not the objective itself. What then was his objective? Literary grandeur? A political statement?

Manilius has a preference for certain themes, including the immanence and supremacy of reason and heaven's call to man to elevate himself to godhead.[78] Reason is emphasized as something that distinguishes man from the beasts[79] and connects man with the God. He says in 2.105-8:

> Who after this can doubt that a link exists between heaven and man, to whom, in its desire for earth to rise to the stars, gifts outstanding did nature give and the power of speech and breadth of understanding and a wing-swift mind, and into whom alone indeed has God come down and dwells, and seeks himself in man's seeking of him?[80]

Manilius was definitely writing for the *literati* of the imperial court[81] and his desire to find god in man could be argued to reflect their intellectual posturing and their search for grandeur. 2.137-44 indicate that the poem was aimed at the superior readers who were 'fated' to receive this sacred

[78] Goold 1977: xv. See for example 2.105-135.

[79] E.g. 1.95-112.

[80] See also 2.115-6, 4.866-935.

[81] Tester 1987: 30.

knowledge. Manilius wrote during the reigns of Augustus and Tiberius, i.e. at the times of the deification of Julius Caesar and Augustus. Wray has argued that Manilius 'explicitly portrays the imperial rule of Augustus as cosmically ordained by the same fate that rules the motions of the stars in the heavens and governs every aspect of human life on earth.'[82] However, even if so, Manilius' could reflect the mentality of the Roman élite in a more general level. It seems that Manilius saw not only the emperors as the recipients of the godhead, but also himself and other 'chosen ones'. The poem ends (5.740- 45):

> There are luminaries of princely rank and stars which come close to this highest eminence; there are all the grades and privileges of superior orders. But outnumbering all these is the populace which revolves about heaven's dome: had nature given it powers consonant with its legions, the very empyrean would be helpless before its fires, and the whole universe would become embroiled in the flames of a blazing sky.

This suggests a defence of social order by claiming that 'the natural order of the celestial population provides a sacred template, which the terrestrial one happens to imitate'.[83] Thus Manilius created a projection of the political structure into the skies that must have pleased the contemporary Roman élite. But most of all, he stresses that the divine cosmos is revealing itself to him in particular and his mission sets him apart from the common crowd.[84]

1.4 DOROTHEUS OF SIDON

Dorotheus of Sidon wrote an astrological work, nowadays known under the names *Pentateuch* or *Carmen Astrologicum,* in the middle of the first century AD. Seven horoscopes in his text date from between AD 7 and 43; hence Barton has suggested that Dorotheus was probably writing

[82] Wray 2002. http://fathom.lib.uchicago.edu/1/777777122543/

[83] Lowe 2004: 145.

[84] Volk 2003: 628. See 2.105-48.

between AD 25 and 75.[85] His work, like Manilius' *Astronomica*, was written in verse. There are two main traditions of this apparently very influential work that have come down to us. Numerous fragments of Dorotheus have survived in later Greek astrological authors. Hephaistion of Thebes (5th century AD) says that he derived the material for his second book largely from Ptolemy and Dorotheus and the third book wholly from the latter's fifth book on horary astrology.[86] Dorotheus was also one of Firmicus Maternus' sources.[87] Nearly 300 additional fragments can be found in CCAG Vol.VI (1903: 67, 91-113). Only these fragments of Dorotheus' original text were available until 1976, when David Pingree translated into English an Arabic version of the *Pentateuch* and conveniently added to the translation a complete collection of Greek and Latin fragments.[88] The Arabic version by al-Tabari,[89] written some time around AD 800, was based on a third-century Pahlavi (Persian) translation, the Persian having been revised, with additions from India, in the late fourth or early fifth century AD.[90] Two horoscopes, from 20 October, 281 and 26 February, 381, have been added, as well as a couple of additions from Vettius Valens and references to Hermes and Qīţeinūs al-Sadwālī.[91] There are evidently also quite a number of sections missing from the Arabic version. This is proved by the quite extensive fragments of another Arabic translation that was made by Māshā´allāh in the 770s which includes citations that correspond to those found in Hephaistion but not in al-Tabari.[92]

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[85] Barton 1994: 57.

[86] Tester 1987: 80; Barton 1994: 81-2.

[87] Barton 1994: 114.

[88] Pingree, D. 1976. *Dorothei Sidonii Carmen astrologicum: interpretationem arabicam in linguam anglicam versam una cum Dorothei fragmentis et graecis et latinis*. Leipzig.

[89] Abû Hafs 'Umar ibn Farrukhân Tabarî, i.e. Omar Tiberiades, as he is known in the Western world.

[90] Tester 1987: 156; Pingree 1997: 46.

[91] Barton 1994: 114-5; Pingree 1997: 46. Valens' *Anthologiae* was translated into Pahlavi independently – Pingree 1997: 47-8.

[92] Pingree 1997: 46.

1.4.1 Structure and content

The *Carmen Astrologicum* consists of five books. It is the only surviving work on ancient astrology that includes illustrations. Book 1 ('From the stars on the judgements concerning nativities: on the upbringing and condition [of the native]') includes chapters on longitude and latitude and triplicities of signs and their lords, the exaltation of the planets, Places, masculine and feminine 'hours', Lots of father, mother and brothers, divisions of planets and signs and various methods to determine the aspects of the early life of the native. Book 2 is dedicated to marriage and children and, besides the Lot of marriage and wedding, also gives information about the trines and their planetary aspects, the quartile aspect, opposition, the arrival of planets in the Places and others' houses. Book 3 is entitled '... the haylāj and the kadhkudāh, which are the governor and the indicator of the time of the years of life', and Book 4 'On the transfer of years'. Book 5 concerns the Initiatives/Interrogations (καταρχαί)[93] and thus offers the methods of answering various questions that the native might have. This last book offers a unique glimpse on what astrology offered to an ordinary person. It includes chapters on building and demolishing buildings, buying and selling things, land, slaves and animals, 'the courtship of a woman, and what occurs between a wife and her husband when she quarrels and scolds and departs from her house publicly', when to extract a dead child from a pregnant woman's belly, partnership, and journeys. The general questions of clients can easily be deduced from these. Some chapters, such as those on freeing slaves and buying ships, apply only to the richer clients, but generally all stations in life are taken into account.[94] Long chapters on slaves and marriage are especially insightful.

[93] The rendering of 'καταρχαί' into English is complicated. Basically, *katarchai*, as the name suggests (LSJ 'καταρχή'), is the method of determining the course of events, illnesses, voyages etc. by looking at the state of heavens when these events etc. begin. Therefore they have been translated as Initiatives, elections, Interrogations or Inceptions. There also seems to be a little confusion with 'ἐρωτήσεις'. I will therefore use the term *katarchai* itself to describe this method of forecasting.

[94] Barton 1994: 175.

Dorotheus is the first known author to have written of the *katarchai*, which were one of the most important activities of a practising astrologer[95] and, as was pointed out in the chapter on Vettius Valens, are not mentioned in the *Tetrabiblos*. Tester has said that:

> While genethlialogy seems to have grown from a rational astronomical basis, under the influence of Stoic philosophy, the part of astrology that deals with *katarchai* has its origins in magic and superstition, and always preserves the 'family face' as it were.[96]

That the practice itself was a lot older than Dorotheus is shown by a passage from Lucan on Nigidius Figulus[97] who, according to Lucan, was 'in advance of even the Egyptians in his knowledge of astrology'.[98] This passage (1.651f) describes the state of heaven and its implications at the outbreak of the Civil War. R.J. Getty has reconstructed the position of the planets in the sky on the 28th of November 50 BC, i.e. the time when Figulus made his observation and argued that not Lucan, but Figulus himself deliberately misrepresented astronomical facts in his astrological prediction 'in order to make them conform with its [i.e. curious and elaborate superstition of astrology] own self-imposed rules for determining the future'.[99] However, leaving the astronomical and astrological accuracy of the text aside, it successfully demonstrates that the method of using the position of the stars at the beginning of an event to predict its course was in use by the middle of the first century BC.

Further, likewise to Valens and contrary to Ptolemy, Dorotheus makes ample use of the Lots, starting with the Lot of Father iat 1.13 and the Lot of Mother at 1.14. Quite early in the first book, Dorotheus also introduces Places (i.e. the *dodecatropos*). Although his system corresponds to what we find in other authors, he values Places more hierarchically, producing an order from more

[95] Tester 1987: 88.

[96] *Ibid.*

[97] Lucan 1.639ff.

[98] Lucan 1.640-2.

[99] Getty 1941: 22.

to less powerful.[100]

As the summary of the contents of Dorotheus' books demonstrates, he covers both the horary as well as the natal astrology and thus 'offers the earliest full-blown treatise' on astrology.[101] Unlike Manilius and Ptolemy, Dorotheus gets straight to the business of forecasting, avoiding long introductions to the basics of astrology and the question of its credibility. Like Valens, he is a practising astrologer. As can be somewhat expected from an astrological textbook, Dorotheus is not concerned with the philosophical apologia.

1.4.2 Agenda and method

The *Pentateuch* is thus an astrological textbook, aimed at disciples who seek to learn the art of forecasting. Just as Valens addresses his teachings to Marcus, Dorotheus mentions one Hermes. The Arabic text starts with an assertion:

> This is the first book of Dorotheus the Egyptian, on the judgements concerning nativities. He chose it and selected it and picked it from the books which were before him, and he wrote it for his son Hermes. [102]

A few lines down one reads:

> I have travelled, oh my son, in many cities, and have seen the wondrous things which are in Egypt and in Babylon, which is in the direction of the Euphrates. I collected the best of their sayings from the first [authorities] who were before me like the bees which gather [honey] from trees and all kinds of plants; for from it there is the honey of medicine.[103]

Presenting Dorotheus as 'the Egyptian' is a reference to the Hermetic tradition [104] and in accordance with the assumption that like Ptolemy and Valens, Dorotheus resided in the Mecca of

[100] Good Places: 1, 10, 11, 5, 7, 4, 9, bad Places: 3, 2, 8, 'worst of the worst' Places: 6, 12 (*Carmen Astrol.* 1.5).

[101] Barton 1994: 57.

[102] *Carmen Astrol.* 1 pr. 1-2.

[103] *Carmen Astrol.* 1 pr. 4-5.

[104] *Ibid.*

Hellenistic astrology – Alexandria. Both the travelling and the claim to have consulted ancient authorities immediately allow one to draw further parallels with Valens. The travelling and long search for astrological knowledge in Egypt and Babylonia, two places traditionally associated with the birth of astral divination in the ancient world, seem to be an important *topos* in astrological literature. The next chapter will take a deeper look at this *topos*.

CHAPTER 2

EMERGENCE OF HELLENISTIC ASTROLOGY

Now that we have established the state of astrological knowledge in the first two centuries AD and demonstrated how the core astrological doctrines were fully developed by that time, we must look at the origins of these doctrines. Chapter Two will examine when, where, and by whom Hellenistic astrology was developed.

Since no original material from Hellenistic astrologers who were active before the turn of the millennium has survived, we have to rely on the references and citations made by later authors. Here, in the absence of any of these in Ptolemy, Manilius and Dorotheus, Vettius Valens is an invaluable source. Later authors, especially Firmicus Maternus and Hephaistion of Thebes also provide us with numerous references and direct quotations. Based on the references, early astrological works can be grouped into three main categories:[105]

1. Pseudoepigraphies that go under the names of gods, heroes, kings, high-priests, philosophers etc.

2. Texts of historically known authors.

3. Anonymous texts and fragments.

The most important of these will now be examined in due order.

[105] Gundel & Gundel 1966: 4.

2.1 PSEUDOEPIGRAPHIES

2.1.1 Nechepso and Petosiris

Undeniably the most frequently mentioned source is Nechepso (Νεχεψῶ) and Petosiris (Πετόσιρις), often referred to together as 'the ancients' (οἱ παλαιοί), or Nechepso separately as 'the king' (ὁ βασιλεύς). They are the pseudonyms[106] of the author(s) of a reference book on astrology written in Egypt, entitled *Astrologumena* (Ἀστρολογούμενα) and dated to around 150-120 BC. This was written in very obscure iambic senarii and included at least 13 books.[107] Valens mentions the Book 13 of Nechepso in connection with the Lot of Fortune (58.14-17). However, the same chapter also refers to Petosiris and his book entitled *Definitions* (58.22-23).[108] The remaining fragments of the books and treatises attributed to Nechepso and/or Petosiris were collected together by E. Riess in *Nechepsonis et Petosiridis fragmenta magica* (1891).[109] These can be divided into four groups:

1. Those using astral omens as developed by the Egyptians in the Achaemenid and Ptolemaic periods from Mesopotamian prototypes to give general indications. This type of fragment comes largely from authors of late antiquity (Hephaistion of Thebes, Proclus, John Lydus) and represents radical reworkings of the original texts.[110] A long passage from Hephaistion

[106] Nechepso was the name of a king in the 26th dynasty (7th cen. BC) and Petosiris of the high priest of Thoth and a royal secretary whose tomb at Tuna el-Gebel, west of Hermopolis, has been dated to around 320 BC. Petosiris, meaning 'the gift of Osiris', was, however, a fairly popular name. As there is virtually nothing known of the king Nechepso, the reasons behind choosing his name as a pseudonym also remain unknown. Spelling of the name varies in different sources: *Necheus, Nechao, Necho, Notopso.* Thus, we cannot be sure if the author(s) of the works had these two individuals in mind or some others (Gundel 1966: 28; Pingree 1974: 547).

[107] Vett.Val. 58.16, 316.5.

[108] See also 319.19.

[109] See Appendix 3 for the list of fragments.

[110] Pingree 1974: 547.

1.21 allows one to draw connections with Babylonian astral omen texts.[111] Another passage in Hephaistion (1.23), if it is a genuine quotation, could be the earliest evidence known to us of a theory of astral influence. However, there is a chance that it was altered by Hephaistion.[112]

2. Those derived from a revelation text in which Nechepso the King, guided by Petosiris, sees a vision that grants him a knowledge of horoscopic truth. These include all the passages from Vettius Valens, plus some from Firmicus Maternus. The principal astrological doctrines discussed in this work are the computation of the length of life, the calculation of the Lot of Fortune, the determination of good and bad times during the native's life, dangerous or climacteric times, and various aspects of the native's life: travel, injury, children and death.

3. A treatise on astrological botany for medical purposes and another on decanic medicine.

4. Treatises on numerology. These are of two sorts, both explained in a letter of Petosiris to King Nechepso. One form uses only the numerical equivalents of the Greek letters of the enquirer's name; the second also the day of the lunar month and the 'Circle of Petosiris'.[113]

In addition, Keyser has argued that a passage from Servius suggests there must have been a treatise or at least a passage in a book dedicated to cometary prognosis based on the heavenly region of appearance.[114] The text of Servius (*ad Aen.* 10.272) lists six 'types' or 'appearances' of comets: *Hippius, ξιφίας, lampas, cometes, disceus,* and *Typhon,* that allegedly come from 'Avienus' and after which the commentator refers the reader to Campestrus and Petosiris. Keyser

[111] *Ibid.*

[112] Pingree 1974: 548.

[113] *Ibid.*

[114] Keyser 1994: 625.

has demonstrated that this list does not actually come from Auienus, neither is it drawn from a tradition on which Pliny, Manilius and Seneca[115] have based their corresponding lists. Analysing the geographical entities that Servius Auctus gives predictions for,[116] Keyser found that the source from which he draws must come from around 145-35 BC, which is in accordance with the dating of Petosiris.[117] It is likely, that the direct source from which Servius Auctus quotes was Apuleius,[118] who in turn could have quoted Campestris whom Servius refers to as a source for more detailed information.[119]

That, however, raises a question whether the books of the ancients were direct sources for Manilius and Ptolemy or whether they too used intermediaries, since the lists of comets are different in the two authors. The latter seems likely, considering that later authors cannot often tell the difference between Nechepso and Petosiris.

David Pingree has said that the significance of the fragments of Nechepso-Petosiris

> is their illumination of – although in a very fragmentary form – two important processes of Ptolemaic science: the development of the astral omens that the Egyptians of the Achaemenid period had derived from Mesopotamia, and the

[115] Aristotelian tradition, transmitted to Manilius and Pliny probably by Poseidonios and an unknown author and to Seneca by Epigenes and Artemidoros, the latter could have been influenced by Poseidonios as well. (Keyser 1994: 640).

[116] Geographial areas mentioned are Persia, Syria, Africa, Egypt, Italy, Spain, Libya, and Ethiopia. 'As the predictions are political, the regions for which they are made must be as well. This indicates a Greek original at a time when or a place where Gallia, Macedonia, Hellas, Asia, and Kyrene could be overlooked.' According to Keyser, this indicates a date around 145-35 BC when 'there were two Spains, to which from Italia transalpine Gallia was merely an otherwise neglected corridor, Macedonia and Hellas had recently been broken up into petty provinces, Africa had been formed from Numidia and Carthage, Asia was still a disunity of multiple, independent principalities, and Kyrene was again united to Egypt under Ptolemy VII' (Keyser 1994: 641-2).

[117] See chapter 2.3 for a discussion on dating Nechepso and Petosiris.

[118] The name 'Apuleius' is provided by John Lydus who follows the same typology of comets. Keyser argues that Apuleius could have easily been corrupted to 'Auienus'. (Keyser 1994: 644).

[119] Keyser 1994: 644-7.

> invention of a new science of astrology based on Greek astronomy and physics in conjunction with Hellenistic mysticism and Egypto-Babylonian divination from astral omens.[120]

This brings us to the question of if, and to what extent, astrology was derived from Mesopotamia. The majority of Greek and Roman sources attributes the discovery of astrology to the Chaldeans. Interestingly, none of the surviving astrological works gives a hint as to who exactly could be held responsible for introducing astrology into the West but there appears to be a strong historical tradition giving credit for this act to none other than Abraham.

2.1.2 Abraham

Vettius Valens mentions Abraham (Ἄβραμος) as an astrological authority in 2.28 and 2.29 regarding travelling, referring to him as 'the most wonderful Abraham'.[121] Riley[122] has argued that 2.29 (Περὶ ἀποδημίας) is a summary of Abraham and that his terminology differs from the terminology of Valens. This chapter has allowed him further to deduce that Abraham used a system of chronocratorships that Valens later adopted. Valens names as his source for Abraham one Hermippus.[123] Furthermore, Firmicus Maternus considers Abraham an authority on the positions of the Sun and the Moon and also writes that Abraham has 'shown by similar calculations', suggesting that his astrological calculations were written down in some form.[124]

Abraham is mentioned altogether by 11 Greco-Roman authors from a wide range of literary genres, including the collection of Greek magical papyri.[125] Earlier mentions occur mainly in the historical or geographical works, whereas later references can be found in astrological or

[120] Pingree 1974: 488.

[121] *Vett.Val.* 91.26.

[122] Riley n.d.: 8.

[123] It remains inconclusive which Hermippus Valens has in mind. Possibly Hermippus of Beirut (2nd century AD) who was the pupil of Philo of Byblos whom Eusebius cites in connection with Abraham at *Ev.Praep.* 9.19.

[124] Siker 1988: 196.

[125] Siker 1988: 189-190.

philosophical writings.[126] He was seen as the forefather of both the Arabian kings and the Jewish nation but in the Greco-Roman world was probably primarily associated with his astrological expertise.[127] Some traditions concerning Abraham have been recorded by Eusebius in the *Evangelica Praeparatio*. According to Josephus, via Eusebius, Abraham was first mentioned by Berossus, not by name but in these terms:

> In the tenth generation after the flood there was among the Chaldeans a righteous and great man, experienced also in heavenly things.[128]

Abraham is indeed said to have come from Ur Kaśdim or 'Ur of the Chaldees'.[129] If Eusebius and Josephus are right then the earliest reference dates back to around 290 BC. The *Babyloniaca* of Berossus, a book on Chaldean history in three volumes, is said to have introduced astrology to the Greek world, so the close association between Abraham and astrology might originate from there. Josephus writes about Berossus in the following terms:

> My witness here is Berossus, a Chaldean by birth, but known to those who spend their time in learning, since he himself wrote for the Greek market on astrology and on the philosophical opinions of the Chaldeans.[130]

Berossus was exactly the intermediary that Trivedi[131] talks about – a foreigner, living in Greek society (allegedly on the island of Cos), and writing to the Greeks about his native Chaldean culture in Greek language.

However, returning to Abraham, according to Nicolaus of Damascus[132] he ventured from Chaldea

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[126] Siker 1988: 191-2.

[127] Siker 1988: 194.

[128] *Ev.Praep.* 9.16.

[129] *Genesis* 11:27-8, 11:31, 15:7.

[130] *Against Apion* 1.129ff. See 'Beros(s)os von Babylon (680)' in *FGrH* for more fragments.

[131] See Introduction, fn.7.

[132] Greek historian and philosopher, born c.64 BC.

to Egypt, where he 'associated with the most learned of the Egyptians'.[133] Moreover, Josephus says that Abraham taught the Egyptians arithmetic and astronomy:

> For before Abraham's arrival the Egyptians were ignorant of these subjects; for they passed from the Chaldees into Egypt, and thence came also to the Greeks.

Alexander Polyhistor[134] adds the 'Chaldaic art', i.e. astrology, to that list.[135] Writings attributing the introduction of various sciences to the Chaldeans or Egyptians are numerous. Proclus says that geometry too was first discovered among the Egyptians.[136]

Artabanus in his *Jewish History* says that the person who Abraham taught astrology was none other than the Pharaoh himself.[137] Thus, there seems to have been a strong tradition relating how a Chaldean man came to Egypt and introduced knowledge about astral influences. In Egypt the sacred art of astrology was studied and developed by the priests and the king. The historical accuracy of such accounts is naturally highly questionable but the important point is the fact that it found its way into the official historical records and this suggests that it was a widely accepted story. However, the presence of specific astrological doctrines associated with Abraham indicates that there might have been some pseudoepigraphical works written under his name. In addition to Abraham, other mythological names are connected to different astrological doctrines.

Zoroaster is cited in *Anthologiae* 9.4 ('Teaching concerning the successful and unsuccessful days and life in relation to the Moon').[138] Zoroastrian influence on Greek thought dates back to late archaic period.[139] Plato and Eudoxus acquired a reputation as having been connected with the

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[133] *Ev.Praep.* 9.16.

[134] Greek scholar, 1st cen. BC.

[135] *Ev.Praep.* 9.17.

[136] *On Euclid* 411-485.

[137] *Ev.Praep.* 9.18.

[138] *Vett.Val.* 323.18.

[139] West 1971: 203, 213-8, 239-42.

teachings of the Magi and later, as Momigliano has argued, 'new-fangled speculations gained prestige from the academic and peripatetic admiration for the wisdom of Zoroaster and, no doubt, mixed Platonic ideas with those alleged to be Oriental'.[140] Greek total confusion of Chaldean priests with the Magi and Zoroaster indicates that 'Oriental ideas' were mostly generalities and that they lacked true insight. Nevertheless, advanced theories were carelessly attributed to the Chaldeans, Persians, Egyptians etc. Likewise, the name of Zoroaster became the centre of attraction for any sort of speculation about astrology but nobody really cared to know 'what he had been or what he had written or truly inspired'.[141] Forgeries written under his name, just like all others under the names of various mythological figures, were most probably the work of the imagination of the Greeks themselves or Hellenized foreigners.[142] The mystic knowledge of both the Chaldean priests and the Zoroastrial magi, as well as for example the Indian Brahmans and Gymnosophists, was part of a general conception of the 'East' as a place where the priestly authorities were the guardians of special knowledge.[143]

Further examples of pseudoepigraphies include 'divine Orpheus' who is quoted in the preface of *Anthologiae* 9.[144] Orion and his unnamed book are cited in the end of 3.2 for the doctrine of the four angles and the beneficial and not so beneficial parts of the zodiac.[145] Orion is also mentioned in E.Maass, *Comm.in Aratum* 47, as writing on eclipses and the seven *klimata*.[146]

[140] Momigliano 1990: 144.

[141] Momigliano 1990: 143-149, at 147.

[142] *Ibid.*

[143] Parker 2008: 251-307.

[144] *Vett.Val.* 317.19.

[145] *Vett.Val.* 128.26.

[146] Riley n.d.: 10.

2.1.3 Asclepius and Hermetic astrology

In addition to the Orient, astrology is closely associated with Egypt and Hermetic tradition. Asclepius (Ἀσκληπιὸς) is cited in *Vett.Val.* 321.7 in connection with the 12 Places described above, as the complier of the first eight divisions. Riley notes that *De Horoscopo* of Asclepius is known and there are two other references that attribute the system of Places to him. However, he suggests the name could be taken as a general reference to Hermetic astrology, rather than to an individual.[147]

A passage in Ps.Manetho indeed connects Hermes, Asclepius and astrology:

> Ἐξ αδύτων ἱερων βίβλιων, βασιλεῦ Πτολεμαῖε, καὶ κρυφίμων στηλῶν... ἅς ἤρατο πάνσοφος Ἑρμης, σύμβουλον πινυτῆς σοφίης Ἀσκληπιὸν εὑρών...[148]
>
> From the shrines of holy books, King Ptolemy, and the hidden *stelai*... which all-wise Hermes loved, finding Asclepius as his advisor in shrewd wisdom...

Moreover, a certain Hermeias is cited in the heading of 4.27 - Ἄλλως ἐκ τοῦ Σεύθου[149] περὶ ἐνιαυτῶν· ἐκ τοῦ Ἑρμείου σχολὴ τὴν ἄφεσιν ποιοῦσα ἀπὸ Ἡλίου ἢ Σελήνης ἢ ὡροσκόπου ἢ κλήρου τύχης - and directly quoted in 4.29 (195.17). Schmidt has interpreted 'τοῦ Ἑρμείου' as the 'Hermetic material'.[150] Clement of Alexandria talks of astrological books of Hermes in *Stromata* 6.4. Of these books, which are four in number,

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[147] Riley n.d.: 47.

[148] Ps.Manetho, Book 5. F 1.9 in Riess 1892: 331.

[149] The meaning of 'Sothic' is also unclear. A fragment of Nechepso and Petosiris in *Anecd. Oxon*. 3.171 mentions a certain Sousothis. Gundel (1966: 39) has suggested that Sousothis probably means Sesostris but could perhaps be a variant of Sothis (Σεύθου)?

[150] Schmidt in his translation of the contents page of *Anthologiae*, available at http://www.starmedia.ne.jp/bookcont/valens.html (accessed May 2010). On the other hand, Riley (n.d.: 47) has pointed out that a geometrician Hermeias is a participant in Plutarch's Q*uaes.convivialium 9*.2, 738, thus the identity of this Hermeias remains obscure.

> one is about the order of the fixed stars that are visible, and another about the conjunctions and luminous appearances of the sun and moon; and the rest respecting their risings.[151]

There are 42 books altogether, 36 of which, containing the whole philosophy of the Egyptians, must be learned by heart by certain individuals described in Clement's text. The rest of the six books are medical and can be connected to the iatromathematical beliefs. These alleged 42 books of Hermes should not be confused with the later *Corpus Hermeticum*.[152] Thus again, alongside the tradition of Babylonian origin of astrology, there was one of sacred Egyptian books of astrology and rites. Whether these books once really existed is of secondary importance.

2.2 HISTORICAL AUTHORS

In addition to the works and authors of questionable authenticity are texts of historically known individuals. Most famous is perhaps Thrasyllus, also an Alexandrian by birth, cited only once in the *Anthologiae* as the discoverer of a method for forecasting length of life[153] but known from Tacitus[154] and Suetonius[155] as the court astrologer of the Emperor Tiberius. The most cited source next to Nechepso and Petosiris, however, is Critodemos (Κριτόδημος), mentioned by Vettius Valens no less than 12 times, mainly in connection with doctrines concerning length of life and the starting point of the vital quadrant. However, a fragment of an unknown epitomist,[156] which gives the summary of the contents of his book *Vision* (Ὅρασις), allows us to suggest that Valens

[151] English translation from http://www.ccel.org/ccel/schaff/anf02.vi.iv.vi.iv.html.

[152] Gundel 1966: 12.

[153] *Vett.Val.* 338.19.

[154] Tac. *Ann.* 6.20.3-22.3.

[155] Suet. *Tib.* 14.

[156] CCAG VIII 3, 101, 1 ff.

might have taken more from Critodemus than he explicitly acknowledges.[157] Valens mentions only the *Vision*, which he criticises for its obscurity and artificiality of style,[158] but Hephaistion also attributes to him a work entitled *Table* (Πίναξ).[159] Being one of the earliest known astrological authors, his date is of great interest, especially as it raises some serious problems that we still have in establishing the chronology of early Hellenistic astrology. Earlier scholars, e.g. Gundel, have dated Critodemos as far back as 3rd cen. BC.[160] Since Critodemus is also cited by the Elder Pliny, Neugebauer has argued that he must be at least a contemporary of Pliny, i.e. active in the first century AD. However, analysing the horoscopes from the chapters of A*nthologiae* that contain references to him, he found that they can all be dated to the decades around 100 AD, i.e. after Pliny. This is, as he says, 'in flagrant contradiction to the date before Pliny' and the stylistic characters of the *Visions*.[161]

2.3 DATING

Dating Nechepso and Petosiris and the overall emergence of astrology in its Hellenistic form has also raised debates in the past, but a date roughly around 150-120 BC has now been generally agreed. That Hellenistic astrology emerged in Egypt is not in doubt. In Egypt, Peripatetic influence on the first Ptolemaic kings brought about royal patronage for scientists, leading to the establishment of the Mouseion and the famous library of Alexandria. Scientific advances made there were most notable in the fields of medicine, mathematics, mechanics and astronomy[162] but included too the so-called pseudo-sciences such as astrology. It can be seen that this was indeed

[157] Riley x: 9; Gundel 1966: 107.

[158] *Vett.Val.* 142.13 and 316.16.

[159] Heph. *Apotelesmatica* 114.21.

[160] Gundel 1966: 106.

[161] Neugebauer 1987: 186.

[162] Fraser 1972: 336.

the case, not merely from the fact that the vast majority of early Hellenistic astrologers can be connected to Alexandria, but also by the following arguments that concern the matter of dating.

The modern 7-day week is based on astrological considerations and probably evolved sometime during the 2nd century BC in Alexandria. The first indirect evidence for the astrological week comes from Tibullus,[163] in the first half of the first century BC, who mentions the day of Saturn as an evil sign.[164] The Saturday of the planetary week was considered an unlucky and cursed day for it stood under the domination of austere and ominous Saturn.[165] The first direct evidence is from Cassius Dio who gives two competing explanations for its arrangement[166] and says that 'the custom... of referring the days to the seven stars called planets was instituted by the Egyptians'.[167] A familiarity with three elements was required to create the astrological week: the 24-hour day, the 'Chaldean order'[168] of the seven planets, and the doctrine of the chronocrators. As the Chaldean order evolved only in the 2nd century BC, the week could not have been invented before that.[169] It is thus likely that astrological week was invented by the Greeks in Egypt during the Ptolemaic period.[170]

Secondly, we must return to the Stoics and the early opposition to astrology. Cicero writes in his account of 'Chaldean genethlialogy' (*Div.* 2.89):

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[163] Latin poet and writer of elegies. c. 54-19 BC.

[164] Tibullus I.3 lines 18-19. 'Aut ego sum causatus aves aut omnia dira,/ Saturni sacram me tenuisse diem.'

[165] Gandz 1948-49: 215-6.

[166] i.e. the 'planetary leap' or the 'star polygon' theory and the 'regents of the hour' theory. See 'Week' under Appendix 1 for the detailed description of these.

[167] Cassius Dio 37.17.3-19.3.

[168] 'Chaldean order' is the order of the seven planets, based on their distance from the earth, that became standard from the second century BC onwards and was used as a default order in Hellenistic astrology. It runs: Moon, Mercury, Venus, Sun, Mars, Jupiter, Saturn. See Appendix 1 'Zodiac and Planets' for alternative orders.

[169] Zerubavel 1989: 14.

[170] Richards 1999: 271.

> They say that the starry circle, which the Greeks call zodiac, contains a power such that each single part of that circle moves and changes the sky in a different way according to the positions of all the stars in these and the neighbouring regions at any time; and they say that that power is modified by the planets, either when they enter that very part of the circle containing someone's birth, or that part which possesses some familiarity (*coniunctum*) or harmony (*consentiens*) with the birth sign – they call these triangles and squares.[171] For since with the time of year and seasons such great changes of the sky take place at the approach and withdrawal of the stars (i.e. planets), and since the sun's power brings about the effects which we see, they think it is not only plausible but also true that howsoever the atmosphere is modified so that the births of children are animated and shaped, and by this force their mentalities, habits, mind, body, action, fortune in life and experience are fashioned.

Cicero's subsequent critical comments on astrology point out the problems with twins, relative distance of the planets, the relativity of the earthly locations, weather, genetics and parental influence, medicine and training, geographical variations etc.[172] All these arguments were, according to Cicero, originally made by Panaetius and Carneades. They all do, however, suffer from lack of technical detail and this has led Long to suggest that neither Cicero nor his sources have much in depth knowledge about the subject. Moreover, Jones draws parallels between Cicero's example of astrological prediction in *De Fato* 8.15 - 'if someone was born with the Dog star rising, that man will not die at sea' - and the Babylonian birth omens and infers that the 'astrology' that Cicero talks about must have been closer to the Babylonian than Hellenistic astrology.[173] The dates of Carneades and Panaetius, c. 213-128 BC and c. 185-110 BC respectively, allow us to therefore suggest that astral divination in its technically more advanced form had not yet reached Greece and Rome by the second half of the second century BC but there must have been developments that raised interest in it in Greek intellectual circles. Further, if such interest

[171] Cicero confuses this technical point. In Hellenistic astrology, the triangles are indeed harmonious and beneficent, but the squares are considered to be disharmonious and maleficent. See Appendix 1 'trine' and 'quartile' for more detailed information.

[172] Full survey of these arguments can be found in Long 2006: 135-141. I therefore refrain from describing them in more detail.

[173] Jones 2003: 339.

allegedly suddenly increased in the writings of Posidonius,[174] this suggests that more detailed knowledge of Hellenistic astrology had reached the West around 100 BC. That is in accordance with the dating of the emergence of horoscopic astrology in Egypt around 150-120 BC. The Hellenistic form of horoscopic astrology seems then to have been first and foremost the invention of two men, Nechepso and Petosiris. The next question that arises, concerns the extent to which this invention was an original Hellenistic accomplishment and how much was inherited or taken over from Mesopotamian precursors.

[174] See pp. 11-12.

CHAPTER 3

ORIGINS OF HELLENISTIC ASTROLOGY

There is a general impression then from the Greek sources that astrology originated from Babylonia.[175] Francesca Rochberg has pointed out, however, that 'in the Hellenistic period 'Oriental wisdom' took on almost fashionable status, and Babylonian (Chaldean), Egyptian, and Persian (Zoroastrian) traditions – both real and imaginary - became confused within the Greek context'.[176] Thus for some time now, scholars have questioned to what extent the claim about the origins of Greek astrology is true and if it was not just Hellenistic astrologers' attempt to give more credibility to their art. It has been argued that since most theories, methods, and the underlying philosophical rationale of Hellenistic astrology do not resemble those of Babylonian celestial omens, they are distinctively Hellenistic Greek in origin.[177] However, textual sources for Hellenistic astrology stem largely from the latter half of the Hellenistic period and therefore reflect the astrology in its most elaborate Greco-Roman form, furthest removed from contacts with Babylonian celestial divination,[178] making research into the origins of early Hellenistic astrology rather complicated but not impossible.

This chapter will first give a short overview of Babylonian astrology and will then subsequently compare it to its Hellenistic counterpart, trying to determine whether it gave simply an original impetus for the latter to develop or whether it was a direct borrowing. Moreover, it will question how Babylonian horoscopy was tweaked to fit the needs of the Greco-Roman mentality. In other

[175] Further examples include Theophrastus, fr. in Proclus on Plato's *Timaeus* 285f; Cicero, *On Divination* 2.97; Diodorus 2.29.2, 31.3-4.

[176] Rochberg-Halton 1984: 115.

[177] Rochberg-Halton 1984: 115.

[178] Rochberg-Halton 1984: 116.

words, what was 'Hellenistic' about Hellenistic astrology?

Hellenistic astrology was dependent upon three main components: (a) the existence of the zodiac with twelve signs of thirty degrees, (b) mathematical and astronomical models that allow the positions of the celestial bodies to be determined with adequate precision and (c) a deterministic world-view. Thus, when we look at the emergence of Hellenistic astrology it is also necessary to look at its philosophical rationale as well as at the emergence of Greek mathematical astronomy.[179]

3.1 BABYLONIAN ASTROLOGY

The exact origin of belief in celestial omens in Mesopotamia is uncertain. The Sumerians definitely watched the sky and named some of the constellations and planets[180] but no omens in Sumerian are preserved and there is 'no trace of any real astrology in Sumerian sources' as Koch-Westenholz puts it.[181] There are, however, some bilingual Sumerian-Akkadian astrological omen texts which apparently are all late translations and, like many references in Greek texts to Babylonian astrology, 'only attest to astrology's pretense to high antiquity'.[182] The Old Babylonian sources for astrology are few and only concern lunar eclipses. Four tablets are known so far and although they do not yet use the standard formulary found in later text, they are clearly the

[179] The distinction of the terms 'astronomy' and 'astrology' is a wholly modern one, followed here for the sake of convenience: by the former are meant the mathematical concepts needed for the accurate measurments and calculations necessary for the horoscopic version of the latter to develop. In Greek texts, the terms *astronomia* and *astrologia* appear interchangeably.

[180] See tables 1 and 2.

[181] Koch-Westenholz 1995: 33-4, also Hunger and Pingree 1999: 6-7.

[182] Koch-Westenholz 1995: 34.

prototypes of the later series *Enūma Anu Enlil (EAE)*.[183] Some astrological texts have been found in Boghazköi, modern Turkey. They are written in Hittite, Akkadian and Hurrian and most likely reflect Babylonian originals of varying dates, ranging from Old Babylonian to c. 1300 BC.[184] This fragmentary material also hints at a possibly much earlier date for a primitive version of the *EAE*.[185] Celestial omen texts have also been found in Mari, Emar, Ugarit, Alalah, Qatna, Nuzi and Susa.

Astrological texts from the Middle Babylonian period are again very meagre, probably due to the paucity of contemporary sources from Babylonia itself, but the little surviving evidence suggests that primitive astrology had gained some importance. We know of astrological reports from the court of Marduk-nadin-ahhe during the second dynasty of Isin[186] and of the curses and symbolic decorations on the *kudurru* stones which probably represent the deities in their celestial aspects.[187] There is also a text from Nippur[188] that contains meteorological omens and could be an astrological report.[189] All this proves that the elaboration of the EAE omens had already begun in the 2nd half of the 2nd millennium BC.[190]

The *EAE*, i.e. astral omen texts organized into a series of tablets, dates to the later half of the Neo-

[183] Hunger and Pingree 1999: 7.

[184] Koch-Westenholz 1995: 45.

[185] Pingree 1973-74: 118.

[186] An Assyrian letter from May 657 (*LAS* 110+300 [BM 99030]) reads: 'In a report by Ea-mušallim, sent to king Marduk-nadin-ahhe (1099-1082) is written: 'If a sign occurs in the sky that cannot be cancelled (and) if it happens to you that rains become scanty, make the king undertake a campaign against the enemy: he will be victorious whatever (country) he will go to, (and) his days will become long.' (Parpola 2007: 377.) Neumann and Parpola suggest that the celestial portent alludes to the 1090 BC solar eclipse. (Neumann and Parpola 1987: 178.)

[187] Koch-Westenholz 1995: 41 n.3.

[188] PBS 2/2 No.123.

[189] Koch-Westenholz 1995: 42 n.1.

[190] Hunger and Pingree 1999: 12.

Assyrian and the beginning of the Neo-Babylonian periods and forms the bulk of the evidence we have for Babylonian celestial divination.[191] In addition, we have the hemerologies of Assurbanipal's library and the correspondence (letters and reports) between Assyrian and Babylonian scholars and the kings Esarhaddon and Assurbanipal, with numerous references to the *EAE*. The predictions are exclusively judical, i.e. relate only to the royal court and the nation.[192] The *omina* of the *EAE* can be divided into four categories: (a) the lunar omens (*Sin*), (b) the solar omens (*Šamaš*), (c) the weather omens (*Adad*) and (d) omens from the stars and the planets (*Ištar*). Babylonian omens have an empirical basis, i.e. knowledge about the signs is based on experience: once it is observed that a sign is followed by a certain event, the same sign is considered to signal the same event if it ever appears again.[193] Almost all omens are formulated in conditional clauses, consisting of a protasis and an apodosis: 'If x happens, then y happens'.

Early scholars of Hellenistic astrology looked at Babylonian astrology in the context of the *EAE* and, though believing that the original impetus for Hellenistic astrology could have come from Babylonia, failed to see many direct derivations and tended to overemphasize the individual character of Hellenistic astrology when compared with the judical omens of Babylonia. Aaboe has admitted that until the publication of Babylonian personal horoscopes by Abraham Sachs in 1952 it was indeed 'possible to build a persuasive case for a Hellenistic origin of personal astrology'.[194] Cuneiform evidence for Babylonian personal astrology was scarce until then. Hence the six published horoscopes, dated to 410 BC, 263 BC, 258 BC, 235 BC, 230 BC, and 142 BC,[195] completely changed the picture and proved that the period of greatest value for a study of the

[191] Each of the available cuneiform tablets, however, has its own peculiarities, thus indicating that a standard version of the *EAE* was never attained.

[192] Pingree 1973-74: 118.

[193] Hunger and Pingree 1999: 5.

[194] Aaboe 1991: 281.

[195] Even the latest of the six horosopes dates roughly a century earlier than the first known Greek horoscopes which date to the first century BC (Neugebauer and van Hoesen 1987: v. See also Rochberg 1998.)

No.	Transcription	Translation	Tablet
1)	mu-48 še ge_6 .[...	Year 48 (of the Seleucid era, month) Adar, night of the [23rd(?)],	
2)	lú-TUR *a-lid*	the child was born.	
3)	u_4-bi *šamáš ina* 13.30 LU	That day the sun was in 13:30° Aries,	
4)	*sin ina* 10 gu	the moon in 10° Aquarius,	
5)	babbar *ina* sag a	Jupiter at the beginning of Leo,	
6)	*dili-pát* ki *šamáš*	Venus with the sun,	
7)	gu_4 *ki šamáš*	Mercury with the sun,	
8)	genna *ina* kušú	Saturn in Cancer,	
9)	an *ina* til kušú	Mars at the end of Cancer.	
10)	[ma]š-maš ḫun *ù* gu é...-*šú*	[Ge]mini(?), Aries, and Aquarius: the house(?) of his...	
11)	[gu_4?] izi apin *ù* du_6 é? ŠI-ṢU-*šú*	[(Months) II(?)], V, VIII, and VII(?): the house(?) of his.....	
12)	[.....] , gu *a-lid aa? pi šu ul lu?* [	[.....]... was born	
13)	... ...] UD? *na? na? an nu*		
14)	[... ...] *im* zi? *li* [....	[.....].....	
15)	[... ...] *ab? bi ib i*-TAR *zi? li?* [...		
16)	[... ... ..]. UD *i*-TAR en *gi? ir*... ... meš		
17)	... .. .].. *i*-TAR *ra-'a-mu ù?* ...	[... .. .]..... love(?)	
18)	[... ... ...] ... KI-*šú i*-TAR ...?	[.....].....	
19)	[...] i ... *di?* ... *i-te-ep-šú*	[.....]..... they made.	
20)	níg-ŠID lá-*ṭi bir?-rat* igi" ki-*šú*	He will be lacking in wealth, ...	
21)	*i*-TAR *ù* ki *ir la? ban?* [...]	.....	
22)	*a-kal-šú a-na bi-ru-ù ul i-*..[.]	His food(?) will not [suffice(?)] for (his) hunger(?).	
23)	níg-ŠID *šá ina* tur-*šú* tuk-*ši ul* UD?	The wealth which he had in his youth(?) will not [remain(?)].	
24)	mu-36-kám níg-ŠID tuk-*ši*	The 36th year (or 36 years) he will have wealth.	
25)	u_4-meš gíd-da	(His) days will be long (in number).	
26)	dam-*su šá pa-na-as-su* ukù-meš	His wife, whom people will seduce(?) in his presence, will.....(or: His wife, in whose presence people will overpower him – she will bring (it) about(?).)	
27)	*i-le-'u-šú ši-i ù-še-me*		
28)	[... .]..-meš *u* SAL-meš tuk-*ši* á-tuk igi-*ir?*	He will have .....s and women. He will see(?) profit.	
29)	*[i]na bi-nit* kaskal-meš *a-na muḫ-hi* níg-ŠID	Between (=among?) the roads (=commercial trips?) "upon" wealth	
30)	[.].. *šá* KAL	he(?) will(?)	

Example of a Babylonian horoscope. Tablet MLC 1870, published and translated by Abraham Sachs, 1952.

Babylonian contribution to Hellenistic astrology should be the period between 600 and 300 BC during which important changes in Babylonian celestial sciences took place. The expansions of the applications of celestial omens came in concordance with developments in the observation of celestial bodies and gains in astronomical knowledge.[196] According to Koch-Westenholz, 'the planets and stars came to be seen as meaningful in themselves, imparting their characteristic qualities by their sheer physical presence at decisive moments of an individual's life, notably his birth.'[197] Thus far, personal predictions had only existed in physiognomic omens - they were collected together at the end of second millennium BC in the *Śumma alamdimmu.* But now astrology too became more concerned with the individual rather than the state or the king. These horoscopes represent the first application of celestial prognostication to the individual, and bear close relation to nativity omens, which were also attested for the first time in late Babylonia.[198] In addition, the year-beginnings came to be used to determine the nature of the coming year, and specific relationships between the zodiacal signs and the planets and various terrestrial objects were developed.[199] Perhaps most importantly, the zodiac of twelve times thirty degrees was first introduced. The question of when this happened has raised some debates in the past but it has now been accepted that the system of twelve equal signs was invented in Babylonia during the 5th century BC.[200]

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[196] E.g. the development of the 19-year intercalation cycle around 500 BC, in use by 383 BC. The first serious attempts to devise mathematical programs for predicting lunar and planetary phenomena culminated c. 300 BC in the astronomical tables of Seleucid and Parthian periods.

[197] Koch-Westenholz 1995: 52.

[198] Beaulieu and Rochberg 1996: 89.

[199] Pingree 1982: 614.

[200] Bouché-Leclercq (1899: 57-61) insisted that the zodiac signs came from Babylonia but that the circle itself was an invention of the Greeks. Boll (1903: 193-4) argued that the zodiac or parts of it (namely Aries and Sagittarius) could have been introduced to the Greeks by Cleostratus. The exact role of Cleostratus and the question of who invented the zodiac was debated between Fotheringham and Webb over series of articles published between 1919 and 1928. Fotheringham argued that knowledge of the zodiac was derived from

Another horoscope dated to the Seleucid period was identified in the Yale Babylonian collection (tablet NCBT 1231) in 1989 and published in 1996 by Beaulieu and Rochberg. The horoscope belongs to a man named Anu-Bēl-ušunu, probably from Uruk, born on the 29th of December 248 BC. NCBT 1231 differs from other early horoscopes as the only astronomical data recorded are the zodiacal longitudes of the moon, the sun and the five planets (i.e. it excludes the usual material such as the nearest cardinal point of the year) and includes 'predictions' in the form of omen apodoses following a few of the planetary position entries (in comparison with the example above in which the predictions come after all the astronomical data has been given).[201] Thus it reflects the integration of personal predictions which parallel to a great extent the nativity omen apodoses with astronomical data.[202] Then Rochberg (1998) published all the known Babylonian horoscopes to date, 32 texts in total.

All this shows that for centuries before the Hellenistic period, Babylonians had become accustomed to the association of personal as well as judical predictions with ominous events. Sachs has said that:

> this point, which is trivial to cuneiformists, must be emphasized here because, in reconstructing the origins of horoscopic astrology, some authors – using only information about the astrological omen book EAE with its judical predictions – have set up (and then made deductions from) an oversimplified contrast between Greek individualism and the alleged complete lack of it in ancient

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Babylonia, Webb disagreed with the theory of large-scale Babylonian influence. Finally, van der Waerden (1952-3: 224-5) presented enough evidence to conclude that the zodiacal belt indeed developed in Babylonia and 'before 420 BC the system of the 12 zodiacal signs was established with complete clarity and precision'. This view was further supported by Sachs (1952: 52) and Rochberg (1984: 121). BM36746 (discussed in more detail later) also provides some evidence on the development of the zodiac since the trine system that it uses presupposes the zodiac of twelve signs of equal length (Pingree and Hunger 1999: 17). BM36746 most probably dates to some time after 400 BC (Rochberg-Halton 1984: 118).

[201] Beaulieu and Rochberg 1996: 91.

[202] Beaulieu and Rochberg 1996: 94.

Mesopotamia.'[203]

The following sections of this chapter will try to determine more specific Babylonian elements in the Greek celestial sciences.

3.2 BABYLONIAN ELEMENTS IN HELLENISTIC ASTROLOGY

All elements of Hellenistic astrology traceable back to Babylonia are of great historical interest. Let us start with the basics, though. Both the names of the planets and the zodiacal signs in Greek and Latin are direct derivations from their Babylonian counterparts. Table 1 is designed to show that the Greek gods have been assigned to the planets according to the *Interpretatio Graeca*, the identification of foreign (in this case Babylonian) gods with the local Greek deities. Table 2 compares Babylonian and Greek zodiacal constellations. The four cardinal points, which are among the most ancient constellations, are marked with an asterisk (*).

CEL. OBJECT	MOON	MARS	MERCURY	JUPITER	VENUS	SATURN	SUN
SUMERIAN	Nanna	Gugalanna	Enki[204]	Enlil	Inanna	Ninurta	Utu
BABYLONIAN	Sin	Nergal	Nabu/Nebu[205]	Marduk	Ishtar	Ninurta	Shamash
GREEK	Selene	Ares	Hermes	Zeus	Aphrodite	Cronos	Helios
Influence[206]		*War*	*Trade*	*Power*	*Fecundity*	*Agriculture*	

Table 1: planetary gods

[203] Sachs 1952: 52.

[204] Enki – god of water but also of crafts and mischief.

[205] Nebo (or Nabo) - Babylonian god of wisdom and writing.

[206] Based on Richards 1999: 280, table 21.2.

LATIN	ENGLISH	SUMERO-BABYLONIAN	
		Transcription[207]	**Translation**
Aries	The Ram	MUL $LU_{ḪUN.GA}$	The Agrarian Worker
Taurus*	The Bull	$MUL_{GU_4.AN.NA}$	The Steer of Heaven
Gemini	The Twins	$MUL_{MAŠ.TAB.BA.GAL.GAL}$	The Great Twins
Cancer	The Crab	$MUL_{AL.LUL}$	The Crayfish
Leo*	The Lion	$MUL_{UR.GU.LA}$	The Lion
Virgo	The Virgin	$MUL_{AB.SIN}$	The Seed-Furrow
Libra	The Scales	*zibanītum*	The Scales
Scorpio*	The Scorpion	$MUL_{GIR.TAB}$	The Scorpion
Sagittarius	Centaur the Archer	$MUL_{PA.BIL.SAG}$	*Nedu* 'soldier'
Capricorn*	The Sea-Goat ('Goat-horned')	$MUL_{SUḪUR.MAŠ}$	The Goat-fish
Aquarius	The Water-bearer	$MUL_{GU.LA}$	The Great One
Pisces	Fish	$MUL_{KUN.MEŠ}$ / DU.NU.NU	The Tails / fish-tail

Table 2: Zodiacal constellations

[207] Given are the MUL.APIN names. See Rochberg-Halton 1984: 119 for the development of the names of zodiacal constellations.

In 1984, Francesca Rochberg-Halton published a cuneiform text (BM 36746), a collection of twelve lunar eclipse omens which she dated to around 400 BC and argued to 'exhibit for the first time in cuneiform literature forerunners to a number of astrological theories known before only from Hellenistic Greek sources, and further paralleled in third century Indian astrology' and thus to form an important transitional source from the lunar eclipse omens of the *EAE* to the astrology of later Greco-Roman period.[208] In particular, BM 36746 is one of the few cuneiform texts that combine eclipse omens with zodiacal signs and planetary positions. Further, unlike *EAE* omens which make use of only zodiacal constellations, BM 36746 uses zodiacal signs specifically.[209] In *EAE* lunar eclipses are rarely combined with solar, planetary or stellar signs, but considered mostly from the aspects of date, time, duration, appearance (magnitude, colour etc.) and associated phenomena (wind, weather, earthquakes, stars and planets visible etc.). Thus, in form, this text is closer to later Hellenistic, as opposed to traditional Babylonian, astrology.[210] Nevertheless, Rochberg argued that 'despite the fact that the omens in BM 36746 are not attested as such in EAE, each constituent element of the omens can be traced to the traditions of the codified celestial omen series'.[211]

The pattern of the omens is as follows:

> if a lunar eclipse occurs in zodiacal sign$_1$ and the night watch comes to an end and the wind (north, south, east, west) blows, Jupiter (or Venus) is (or: is not) present and Saturn or Mars stand in zodiacal sign$_2$ and zodiacal sign$_3$ respectively.

Each prediction applies to one of the four traditional lands. Namely, the movement of the shadow across the lunar disc was the most important element for the decision concerning which country would be affected. The disc was divided into four quadrants, each associated with a country name

[208] Rochberg-Halton 1984: 118-120.

[209] Rochberg-Halton 1984: 124.

[210] Rochberg-Halton 1984: 120.

[211] Rochberg-Halton 1984: 128.

(Akkad, Subartu, Elam,9 or Amurru[212]) and the country represented by the quadrant which was first darkened was expected to suffer the evil announced. The omens in BM36746 are arranged into four groups of three zodiacal signs each, based on the position or sign of the eclipsed moon in the zodiac and the position of a (malefic) planet, either Saturn or Mars, which can be paralleled with the theory of the trine aspect[213] (trigons, triplicities) in Greek astrology. Furthermore, the association of each of the four triplicities with one of the four winds which are synonymous with the cardinal points which in turn are associated with the schematic regions or the quadrants of the lunar disc indicate the country affected by the ill portent can be connected with Hellenistic chorography.[214] There is further evidence that the system of triplicities was first applied to the twelve months in the 7th century BC[215] and after that simply transferred to the twelve zodiacal signs.[216] So, all in all, as Rochberg says:

> this text, therefore, not only establishes substantive connections between aspects of late Hellenistic astrological methods and those of post-EAE celestial omens, but even more importantly, it shows that the basis of some of these methods was already inherent in the traditions of Babylonian celestial omens.[217]

Moreover, the tablets from Uruk of the Seleucid period published by Weidner illustrate the origin in Mesopotamia of certain concepts that became commonplace of Hellenistic and later astrology, including the exaltation of the planets, the association of terrestrial objects such as trees, plants, and stones with celestial bodies, presumably for the practice of iatromathematics, and the division

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[212] Not based on any political entities of the time when *Enūma Anu Enlil* was written. In the interpretation of the times, Akkad is equated with Babylonia, Subartu with Assyria, and Amurru with any country in the west (Hunger and Pingree 1999: 16).

[213] See Appendix 1 'trine'.

[214] Rochberg-Halton 1984: 127.

[215] See Rochberg-Halton 1984: 128 n.50 for the excerpt of a tablet from EAE. Also Virolleaud 1905-12, 2nd Supp. 19: 9-20; Koch-Westenholz 1995: 244-77.

[216] For the examples of equivalence of months and signs see Reiner 1995: 115 n.522.

[217] Rochberg-Halton 1984: 129.

of zodiacal sign into twelve equal dodecatemoria.[218] These tablets were analysed in more depth by Rochberg-Halton 1988.

Firstly, the system of planetary exaltations. The concept of the *bīt/a□ar níṣírtí* i.e. the 'house' or 'place of secret', is attested already in the 7th century BC. The earliest evidence for the *ašar níṣírtí* of the planets is in the inscriptions of Esarhaddon[219] and in a contemporary Babylonian star list from Sippar.[220] According to Hellenistic astrology the exaltations are located in the zodiacal signs in which the planets have their most potent influence. Esarhaddon's inscription confirms the meaning of the planetary omen, when located in the *ašar níṣírtí*, as particularly favourable. Following table demonstrates that the locations of exaltations in Hellenistic astrology are based on the Babylonian *ašar níṣírtí.*[221]

PLANET	***ašar níṣírtí***[222]	**HYPSOMA, i.e. EXALTATIONS**
Sun	Aries	(19°) Aries
Moon	Pleiades (Taurus)	(3°) Taurus
Jupiter	Cancer	(15°) Cancer
Venus	Pisces/Leo	(27°) Pisces
Saturn	Libra	(21°) Libra
Mercury	Virgo	(15°) Virgo
Mars	Capricorn	(28°) Capricorn

Table 3: *ašar níṣírtí* and exaltations

[218] Pingree 1982: 621.

[219] Ass. A 8 39-ii 8.

[220] Rochberg-Halton 1988: 53-57; Koch-Westenholz 1995: 52.

[221] Ptolemy gives an account for the signs of exaltations in *Tetr.* I.19 but it appears to be his own attempt to find some logic behind these seemingly random points.

[222] Koch-Westenholz 1995: 135.

Secondly, the *dodecatemoria*, which is the subdivision of a thirty degree sign into twelve two and a half degree segments, each assigned to a planet. The earliest textual evidence for such 'micro-zodiac' comes from Seleucid period and a graphic representation may be seen in a number of tablets from Uruk.[223] The twelve parts are further associated with a city, some plants, trees, and stones, written in corresponding register below those of the dodecatemoria. Some of the same associations of celestial with terrestrial elements can be found in Hellenistic Greek astrology.[224]

In addition, the parallels between Babylonian omens and Hellenistic popular astrology pertaining to earthquakes and thunder are striking.[225] Eclipse and comets as main omens, supplemented by wind-directions, shooting stars, halos, thunder, lightning, and rain in Hephaistion of Thebes and John Lydus bear further close affinities with omens in *EAE*.[226] The remarkably accurate transmission of *Enuma elish* down to about 500 AD, as recorded by Damascius, also testifies to the tenacity of Babylonian tradition.[227]

3.3 ASTRONOMY AND MATHEMATICS

This section on Babylonian elements in Greek astronomy and mathematics serves two purposes. First, astronomy had an enormous influence on astrology and sufficient similarities are evident to confirm the spread of Babylonian astral omens concomitantly with astronomy.[228] Secondly, tracing which astronomical and mathematical tools were used by Hellenistic astrologers is part of the question of what was Hellenistic about Hellenistic astrology.

[223] Rochberg-Halton 1988: 58.

[224] Rochberg-Halton 1988: 58.

[225] See Bezold and Boll 1911: 45ff.

[226] Bezold and Boll 1911: 51.

[227] Koch-Westenholz 1995: 53.

[228] Pingree 1982: 625.

The decipherment and meticulous study of the cuneiform sources have revealed that while the achievements of those Greeks who devised cinematic astronomy was great, it nevertheless depended on the adoption of certain key Babylonian parameters.[229] David Pingree has suggested that the earliest transfer of scientific knowledge between Babylonia and Greece could have taken place already during the Neo-Assyrian period (934-609 BC), when it is possible that the Ionians learned of the *gnomon* and probably some scheme of the shadow-lengths.[230] During the Achaemenid period the Metonic cycle[231] was imported into Greece and the zodiac and the use of its sexagesimal parts also found its way into the Greek astronomy.[232] Neugebauer has argued that Babylonian influence is best visible in contributing basic empirical material for Greek trigonometric theories and in a direct continuation of arithmetical methods. Hipparchus was familiar with at least the empirical foundations of the Babylonian theory of ephemerides (Berossus could again have been the intermediary) and a direct development of the Babylonian arithmetical methods can be observed in Greek papyri and astrological literature.[233] Ephemerides are tables of values that tabulate the moments and positions of the sequences of isolated astronomical phenomena (e.g. the new moon, the stationary points of a planet) in their natural order. They date back to the second millennium BC. The attention paid by Babylonian astrologers to specific events is in marked contrast to Greek attempts to determine the longitude of the celestial bodies as a continuous function of time.[234] The ephemerides use two slightly differing types of arithmetic models: System A and System B. According to Neugebauer, the first 'uses

[229] Brown 2007: 468.

[230] Pingree 1982: 616.

[231] The Metonic cycle is a fairly accurate short intercalation cycle called after Meton who is supposed to have proposed it in Athens in 431 BC. This cycle was, however, an achievent of Babylonian astronomy and formed the basis of the Babylonian civil calendar from 482 BC onwards (Pingree 1982: 619). West (1971: 283), however, holds the Greek version to be an independent development.

[232] Pingree 1982: 619.

[233] Neugebauer 1952: 142-3, 151.

[234] Neugebauer 1975:373.

synodic arcs which have constant values on fixed arcs of ecliptic, changing these values discontinuously at the boundaries of these arcs', whereas the second 'operates with synodic arcs which form alternatingly increasing and decreasing arithmetical progressions such that their values lie on a linear zig-zag function when plotted against equidistant points which count the number *n* of consecutive occurrences'.[235] In simpler words: System A is based on step functions while System B uses linear zig-zag functions. The two systems also disagree on where to place the vernal equinox. The vernal equinox in System A is located at 10° Aries, in System B at 8° Aries. System A, as opposed to the more common system B was allegedly used by Berossus, Epigenes and Petosiris.[236]

The Babylonian zig-zag function,[237] using geometrical progressions at the extremes, for determining the length of time between sunset and moonset in the first half of the month and that between sunset and moonrise in the second half was used by Vettius Valens. In addition, two modified schemes can be found in Pliny[238] of which one is related to a scheme ascribed to Zoroaster[239] in the *Geoponica*.[240] Valens, overall, is an important source not only for earlier astrologers but also for early astronomy. A useful reference is made to Hypsikles, a Hellenistic astronomer and mathematician who lived in Alexandria around 175 BC.[241] To him is attributed a work on the rising-times of constellations, entitled *Anaphorikos*. This is the first known Greek work in which the ecliptic is divided into 360 degrees. Futhermore, it presents an interesting intermediate piece between Babylonian and Hellenistic astronomy since Hypsicles is not yet using

[235] *Ibid.*

[236] Neugebauer 1950: 2.

[237] E.g., *EAE*, Tablet 14.

[238] *Hist.Naturalis* 2.58, 18.324.

[239] Zoroaster is referred to in *Vett.Val.* 9.4, concerning successful and unsuccessful days and life in relation to the Moon.

[240] Pingree 1982: 622, 629 n.62.

[241] The date is based on his composition of Book 14 of 'Euclid''s Elements.

the trigonometric tools of the Ptolemaic period. Instead, he is using spikes linear functions, i.e. the same functions that Babylonians used to calculate their ephemerides. The absence of geometrical concepts characterizes a large part of Babylonian mathematics and astronomy. Babylonians used purely arithmetic methods, no geometrical pictures or models.[242]

All in all, the mathematical and astronomical models necessary for Hellenistic astrology to develop were with great probability essentially Babylonian products.

3.4 PHILOSOPHY

We have already seen how two elements that the Hellenistic astrology presupposes – the 12 x 30° zodiac and sufficient knowledge of mathematical astronomy – were present in Babylonia during the first half of the first millennium. The third – a determinist world view – will now be examined. This section will thus compare the rationale behind Babylonian and Hellenistic astrology, the latter having already been laid out in Chapter One. David Pingree has argued that astrology in its Hellenistic and modern form 'presupposes a geocentric and finite universe'.[243] It therefore cannot antedate the Hellenistic period as it is dependent upon the Aristotelian theory of seven concentric planetary spheres, the sphere of the fixed stars and the sublunar realm of the static earth.[244] As Chapter One demonstrated, the philosophy behind Hellenistic astrology was primarily based on Stoic and Peripatetic doctrines. From that point of view, astrology cannot originate from Babylonia and the early proto-horoscopes discovered by Sachs are not really horoscopes in the Hellenistic or modern sense. I would not, however, define astrology so strictly. Essentially it is prognostication on the basis of celestial events.

[242] Rochberg-Halton 1984: 129.

[243] Pingree url1: 118.

[244] Rochberg-Halton 1984: 116.

Hunger and Pingree write that in ancient Mesopotamia:

> ... the gods send the signs; but what these signs announce is not unavoidable fate. A sign in a Babylonian text is not an absolute cause of a coming event, but a warning. By appropriate actions one can prevent the predicted event from happening. The idea of determinism is not inherent in this concept of sign.[245]

By 'appropriate actions' are meant the rites were called nam-búr-bi[246] in Sumerian and *namburbû* in Akkadian and which were believed to have been devised by the god Ea.[247]

Tablet K2848, published by Oppenheim in 1974, illustrates this point as well as the interrelatedness of the sky and earth in Babylonian cosmology:

> 38 The signs on the earth just as those in the sky give us signals.
>
> 39 Sky and earth both produce portents.
>
> 40 Though appearing separately, they are not separate (because) sky and earth are related.
>
> 41 A sign that portends evil in the sky is (also) evil on earth.
>
> 42 One that portends evil on earth is evil in the sky.

This text probably comes from the time of the last Sargonid kings, i.e towards the end of the seventh century BC, and in the words of Oppenheim, 'witnesses the vigour which created a plethora of new forms and methods of divination'.[248]

Rochberg sees a strong opposition between these Babylonian celestial signs (provided by a deity) and Greek mechanical theory of physical causality described in chapter 1.1.2.[249] Other underlying philosophical explanations for astrology also appear to be Hellenistic (with the possible exception

[245] Hunger and Pingree 1999: 5.

[246] Meaning 'its (i.e. the announced evil's) loosening'.

[247] Hunger and Pingree 1999:6.

[248] Oppenheim 1974: 203-4.

[249] Rochberg-Halton 1984: 117.

of the theory of the Great Year and the recurring world ages (see n.31). There is no cuneiform evidence that Greek microcosm-macrocosm analogy had a Babylonian parallel.[250] The analogy implies that man's soul is a reflection of the cosmic soul and thus provides the rationale for direct stellar influence on society and the individual. It can be traced back to Democritus (c.460-400 BC) and Diogenes of Apollonia (5th century BC) but could be older.[251] The philosophical rationale thus seems to have been based on Greek ideas.

[250] Rochberg-Halton 1984: 117.

[251] Guthrie 1965: 471.

CONCLUSION

It is to be expected that different cultures should be mutually influenced when they come into contact with each other. Any contact always involves some degree of translation. This translation does not merely work at the level of language and linguistics; in the broader sense of the term, it also incorporates the communication of ideas and knowledge which are rendered understandable, or 'translated', to the recipient culture by using their own intellectual and cultural concepts. It is, for example, senseless to explain to someone who has never come to contact with the conveniences of the modern world what *Facebook* is or how an *iPod* works using English technical jargon - or alternatively to try teaching twelve-year-olds, or in fact a modern person of any age, the intricate workings of Hellenistic astrology in, say, forty-five minutes! Although they are most probably familiar with the concept of astrology, know the names of planets and which sign of the zodiac they were born under, the majority of contemporary people lack the understanding of even the basic principles on which the predictions are based. Hence, even the most assiduous attempts to explain the rationale behind Hellenistic astrology and its basic technical methods will almost inevitably result in major generalizations and at least minor flaws in their newly-gained knowledge. This dissertation was designed to discover what happens if these flaws or 'mistranslations' in what can be termed 'alien knowledge' appear in the wider cross-cultural context of Hellenistic society.

Already in the first written texts on astrology that have survived, astrology appears as a standardized set of principal doctrines.[252] The most important of these include the division of the

[252] This does not mean that astrology did not change and evolve further over time. Methods for the calculation of, for example, length of life were constantly re-examined and developed. I am only enlisting the main technical and geometrical principles that were used as the basis for more complicated methods.

planets, stars and signs into different categories, the four cardinal points (especially the ascendant/horoscopus), the geometrical aspects (opposition, trine, quartile and sextile), houses, exaltations and depressions, smaller divisions of the zodiac (e.g. terms, dodecatemoria), the Lots and the Places. Since Ptolemy introduces his readers only to the first two of the four broad categories into which astrology in its Hellenistic form can be divided, namely (a) geneathological and (b) general astrology, he excluded the last two to a large extent. Vettius Valens and Dorotheus of Sidon add to the list (c) catarchic astrology, i.e. the determination of whether or not a particular moment is suitable for the undertaking of a particular act based on the state of heavens at that very moment, and (d) the interrogatory astrology, i.e. the answering of specific questions on the basis of the situation of the heavens at the time of the query.

The invention of such astrology is held to have been dependent upon the existence the twelve by thirty degree zodiac, the mathematical and astronomical models that allow the positions of the celestial bodies to be determined with adequate precision, and the determinist world-view. Abraham Sachs has demonstrated that it can scarcely be doubted that 'the belief that celestial events can be used systematically to predict the future (judical celestial omina), the belief that predictions can be made for individual's future (physiognomic omina), and the existence of the zodiac - were to be found par excellence in Babylonia by the 5th century BC.'[253] The horoscopes that he published prove that important changes took place in Babylonian celestial sciences between 600 and 300 BC which led to the formation of early horoscopy. Further parallels between Babylonian astrological texts and Hellenistic methods were pointed out in Chapter Three that allow one to conclude with considerable certainty that Hellenistic astrology (both in its universal and genethialogical form[254]) had its origin in Babylonia. It undeniably stemmed from a more or less active transfer of knowledge between Mesopotamia and Hellenistic world. Although this fact

[253] Sachs 1052: 51.

[254] See chapter 1.4.1 for catarchic astrology.

has now been established, the medium and ways in which this cross-cultural penetration took place remain rather obscure. It is not known exactly when and how the Babylonian tradition was transmitted, but it is natural to assume that contact was established during the time of the Persian Empire. A demotic papyrus which has been dated to the end of second or early third century AD has been shown by Parker to have been based on an original of around 500 BC and constitutes the earliest evidence for the spread of Mesopotamian lunar omens to Egypt.[255] Echoes of classical Babylonian omen astrology may not only be found in Egyptian, Greek, and Latin writings, but also in Indian astrology and even in Aramaic literature of the Byzantine period.[256] Pingree has mentioned a number of texts in various languages which contain 'a curious mixture of astral omens of ultimately Babylonian origin with Hellenistic and Roman astrology', the detailed analysis of which could provide us with more insight into the spread of astrological ideas.[257]

On the other hand, Hellenistic astrology was not taken over from Babylonia *per se*. Some modern scholars are in agreement that Hellenistic astrology was an invention on its own right, arguing that 'despite the presence of 'Babylonian' elements, the philosophical rationale of Greek astrology, and its doctrine of interpretation, are all Hellenistic Greek in origin and explicable only in terms of Greek tradition itself'.[258] Indeed, not very much more than a relatively crude horoscopic astrology can have emerged from Babylonia, and cuneiform evidence confirms the transmission of only a very few doctrines, discussed in Chapter Three, of Babylonian celestial omen astrology to the Greeks.[259] The philosophical rationale, based mainly on Stoic and Peripatetic doctrines, seems to be completely Greek in essence.

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[255] Williams 1966: 68. The papyrus has been published and analysed by Parker, R.A. 1959. *A Vienna Demotic Papyrus on Eclipse-and Lunar-omina*, Providence.

[256] Koch-Westenholz 1995: 53.

[257] Pingree 1982: 620.

[258] Rochberg-Halton 1988: 62.

[259] Rochberg-Halton 1988: 51, 61-2.

Of course, recent scholarship has shown early Greek science and philosophy to have been heavily dependent upon Mesopotamian sources. However, even if Greek philosophy was formed in an oriental mould, it is of secondary importance here. It is obvious that the Hellenistic world made essential contributions to the more refined and expanded forms of astrology.[260] Thus, Hellenistic astrology was an assimilation and invention at the same time, an interesting cultural hybridization. This is consistent with wider historical and cultural movements. The diffusion of knowledge during the Hellenistic period must have occurred on a large scale and in multiple directions.[261] From what we learn from astrology, Hellenistic tradition responded to its own cultural expansion by presenting as foreign ideas and concepts that were Greek or Hellenistic in essence, and at the same time altered and improved originally (e.g.) Chaldean, Egyptian ideas to make them fit Greek intellectual and cultural needs. The study of the reasons behind this phenomenon is unfortunately beyond the scope of this dissertation.

Ptolemy's work is a good example of how Greco-Roman science of the post-Hellenistic period successfully and open-handedly incorporated ideas, which were considered irrational and mythical by many, simply in the pretence that they were old and oriental. Momigliano argues that:

> ... the most obvious historical consequence of the subordination of Greek thought to Oriental wisdom... is the change from the acquisition of truth through reason to the acquisition of truth through revelation.[262]

Although in Ptolemy one can sense the desire to make an 'ancient' and 'puzzling' wisdom fit the Greek scientific formula, in other astrological authors the readiness to adopt beliefs on the grounds of their oriental origin is obvious. As Rochberg has pointed out, in Hellenistic times 'Oriental wisdom' took on an almost fashionable status. Relations between the real and imaginary were complex. It appears that the flaws in the translation did not let themselves be corrected by

[260] Sachs 1952: 53.

[261] Van der Sluijs 2005: 3.

[262] Momigliano 1990: 147.

the reality. Parker has observed a similar situation in the Roman conception of India, which of course stemmed from traditions that were defined and demarked in the Hellenistic era and before. India in the Roman imagination, he argues, can be viewed as a cultural concept, a scenario.[263] The same applies to Chaldea and through that to astrology.

[263] Parker 2008: 308-11.

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