CONCLUSION – OF MOON AND MEN: OBSERVATIONS ABOUT THE KNOWLEDGE OF THE MOON IN ANTIQUITY

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In all epochs, the moon and its changing appearance, its temporary disappearance at new moon or the exceptional event of a lunar eclipse have had a deep impact on humankind. Every culture has created myths, legends or philosophical theories to explain these phenomena.[1] Besides the "man in the moon" other creatures were thought to constitute the dark and light zones visible on its surface. The earthly satellite as a divine entity can be found universally as well, be it the Norse god Máni, the Egyptian Iah, the Sumerian Sîn, the Akkadian Nanna, the Greek goddess Selene or Luna of the Romans, the Hindu gods Chandra and Lona or Ma-Hina in Polynesia. Even in Christian belief, Mary, who stands on a lunar crescent, is a figure described in the *Book of Revelations* (or *Apocalypse of John*) and becomes as the "Mother of the Apocalypse" (or: "Woman clothed in the sun") a popular motif in the fourteenth century CE. In many Asian countries, however, even until today a special Moon Festival (called "Moon-Viewing" in Japan, "Mid-Autumn Festival" or "Harvest Moon Festival" in China and Vietnam) is celebrated every full moon in the eighth month of the traditional Chinese lunar calendar, accompanied by the baking and sharing of special Mooncakes. From Plutarch's *De facie in orbe lunae* from the first century CE up to *De la terre à la lune* by Jules Verne (1865), from William Shakespeare's plays to the poem "An den Mond" by Johann Wolfgang Goethe, the fascination the moon exerted

1 See, e.g., BLUNCK, 2003; NILSSON, 1920 pp. 15f., 147-239.

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on men remained unbroken. The journey "From the earth to the moon" became reality in the *Mare Tranquillitatis* almost 50 years ago and led to the most recent peak of excitement over the earth's satellite. Despite this physical appropriation by the "giant leap for mankind", the moon has never lost its mysterious attraction and probably never will. Furthermore, as a regular and widely visible chronological marker, the moon structured everyday life, and thus was fundamental for developing calendars, defining religious festivals, and casting horoscopes. The close connection with time division is already apparent in the etymology of the words "moon" and "month" or their equivalents in many languages that seem to stem from Proto-Indo-European **mê-* "to measure".[2]

By focusing on the temporally and spatially related cultures of the Mediterranean, ancient Egypt and the Near East, the contributions of this chapter aim at an overview of the manifold interpretations and concepts of the moon in different cultures. They all are specifically interested in comparing these concepts and revealing differences or similarities with a wider perspective as to how they can be explained. The time span ranges from the second millennium BCE to the second century CE, the sources include religious hymns, philosophical treatises, mathematical calculations and astronomical/astrological handbooks. Thus, a broad spectrum of the knowledge about the moon in Antiquity is presented and possible ways and mechanisms of transfer and adoption of concepts of the moon are discussed.

Tim Brandes in his contribution presents the knowledge of the moon in the Mesopotamian sources of the late second to the first millennium BCE, relying on a rich collection of cuneiform tablets from palace archives. The regular and diligent celestial observations carried out by Babylonian scholars led to a comprehensive documentation of heavenly phenomena, including those of the moon. The earthly satellite was not only understood as a measurable astronomical body, but also as a highly worshiped deity, both qualities being inseparably intertwined. Brandes focuses both on the moon as an indicator of time and on its relevance for celestial divination. Regarding the measurement of time, the moon was of importance in the luni-solar calendar that had been in use since 2000 BCE. The early astronomers had skilfully observed that twelve lunar months were eleven days short with respect to the earth's yearly rotation

2 Cf. FRISK, 1960, p. 228; BEEKES, 2010 p. 945. Designations like Greek σελήνη or Latin *luna* are derived from stems meaning "shiny, bright, gleaming", cf. BEEKES, 2010, pp. 1318f.; DE VAAN 2008, p. 235.

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around the sun. Therefore, a leap month had to be inserted periodically. Furthermore, the moon's importance for chronology becomes apparent in religious contexts, as some hymnal and mythological texts indicate, which include information about lunar phases and the moon's orbit in the course of the month. It becomes clear that an idealised regularity in the passage of time was desired, since deviations were feared as menacing portents.

Celestial divination, the second topic of Brandes' paper, can generally be considered as the main reason for astronomical observation in Babylonia, the natural environment being understood as divine and its phenomena as signs sent from gods to men. The omens were always seen as applying not to private persons but to king and country, which turned knowledge about the heavenly bodies into a national and political matter. Among the omens that were described in veritable diviner's handbooks lunar phenomena like the new crescent or its outer appearance received special attention. Lunar eclipses were of particular interest, and different meanings were attributed to their positions and dates of appearance – all these signs being regarded as portentous.

Finally, Brandes pursues the question in which ways the knowledge of the moon that he finds in his texts was transferred. He considers it unlikely that knowledge from a foreign culture was adopted (or "borrowed" in terms of this volume's title). In his view it is more reasonable to assume that an internal transfer (or "inheriting") took place, e.g. from older Sumerian texts (third millenium BCE), as it is sometimes stated in colophons of transmitted texts. But also external knowledge could have been transferred by soldiers during military action or in peaceful exchange by traders and visiting scholars. The clear dominance of the Standard Mesopotamian Calendar and its month names is documented by the removal of local calendrical systems like that of the Assyrians, which was a lunar calendar without leap months. Together with the Standard Calendar the concept of the moon being responsible for chronology in general was adopted by other cultures. A direct proof of such an adoption features in some cuneiform tablets with lunar omens from Hattuša, the capital of the Hittites, which are written in Akkadian. Nevertheless, adjustments to the local needs were made like the replacement of the region Akkad by Hatti. The same mechanism can be found in an Egyptian omen text with clear Mesopotamian predecessors, as is shown in Altmann-Wendling's contribution about the knowledge of the moon in Egypt, especially in the Graeco-Roman period.

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This article illustrates the topic with regard to two fields of knowledge: On the one hand the practical use of the lunar phases for chronology, cult life and astrology, and our knowledge about the underlying astronomical observations and computations; on the other hand, the relevance of lunar phenomena in the religious sphere, their description, symbolism and perception. It is not only a wide-spread assumption but proven by several facts that knowledge about the moon was gained by the Egyptians themselves (and therefore "found" and afterwards internally "inherited" when being handed down from one generation to the next). The traditional month-length of thirty days clearly refers to the synodic month with an average of 29.53 days. Yet, different from Mesopotamia, no luni-solar, but a purely solar calendar of 365 days dominated. Nevertheless, lunar dates (especially certain phases like new moon and full moon) appeared in historical inscriptions, were crucial for the fixation of many religious festivals and were taken into account in conducting rituals. Furthermore, the beginning of the priestly services (*phylai*) was determined by the new crescent. For all these reasons, the moon had to be closely watched, an action carried out by special priests, who were mainly entrusted with the measuring of time. Thus, the observation of celestial phenomena was, like in Mesopotamia, not a scientific end in itself, but served a particular purpose.

While divination was the main reason in Mesopotamia, in the case of Egypt the regulation of religious services, including the punctual offering for the gods, can be seen as the central motive for watching the moon. But the moon's movements were not only observed, but also calculated, as Demotic or Greek papyri from the Roman period attest. The computations show the knowledge of an elaborate theory of lunar movement and were done by means of the "Standard Lunar Scheme", which seems to be no direct adoption from the Greek or Mesopotamian culture but an independent way of computation. Mostly the beginning of the lunar month, i.e. new moon, was calculated, but there also exist lists of full moons, lunar eclipses or the positions of the moon in the sky or in zodiac signs.

The latter leads to a topic that was central in Mesopotamia, but also became increasingly important in Graeco-Roman Egypt. Concerning the zodiacal system and birth horoscopes, a Babylonian origin is not in question, although a mixture with and incorporation of more traditional concepts can be observed. However, the ways of transfer require further discussion, since often only the Ptolemaic and Roman dominion over Egypt was regarded as the phase of the acquisition of astrological knowledge. But firstly, divination is already

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documented from the New Kingdom on, and secondly, latest papyrus finds show that the transmission of astrological lore from Mesopotamia to the Graeco-Roman world is more plausible with Egypt as an intermediary step, which is in addition stated by the Greek sources themselves. The best preserved and for a long time only known example of an Egyptian omen handbook, which besides the sun essentially deals with the moon, shows on the one hand clearly a Mesopotamian handbook as a template. On the other hand, the text was already adopted into a more Egyptian scheme with respect to content, language and structure, the addition of depictions being the most evident alteration. In addition, several facts point towards a date of the text as such in the seventh to fifth century BCE. The exchange of knowledge, therefore, seems most probably to have taken place during the Assyrian and Persian dominion over Egypt, but the process presumably started as early as the major Egyptian expansions during the New Kingdom.

These astronomical-astrological sources are complemented by the far more abundant religious texts and representations, which were particularly extensive and rich in detail during the Graeco-Roman period. These texts also provide knowledge about the moon: First, in terms of the religious interpretation and assessment of the celestial body, referring predominantly to concepts of rejuvenation and cyclicality, describing the moon as a source of night-time light and a surrogate of the sun, secondly, with quite accurate descriptions of the time sequences and phenomena during the course of lunation, like new moon, first crescent and especially full moon. Again, these are basic astronomical facts which could be observed by the priests, and there is no need to ascribe this knowledge to external influence during foreign dominion.

The contribution by Liba Taub deals with concepts of the moon not in iconographical or archaeological sources, but in a Greek text from the Roman imperial epoch: Plutarch's *De facie in orbe lunae* (*On the Face on the Moon*). This book from the first century CE, written in dialogue form, can be seen as a comprehensive collection of various ideas about the moon circulating during that time, but also refers to questions about the legitimisation of knowledge and its association with certain (social or ethnic) groups. Furthermore, Taub raises the question whether rational and mythological concepts were strictly juxtaposed, and whether ideas from experts and those from laymen (in this case even foreigners) were clearly distinguished, and which value was attributed to them.

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On the "scientific" side, theories about the nature of the moon from natural philosophers with differing or rivalling opinions are presented, concerning the source of its light, its place within the cosmos and its material constitution. For example, the light and dark forms visible on the surface of the moon are explained as a mirror image of structures on the earth or simply optical illusions. By referring to these learned theories, the fictitious speakers also demonstrate their own education.

In contrast to these "scientific" explanations, a myth is told which considers the moon as the place to which human souls migrate after death and from whence they return into new-born babies. This account is clearly separated from the "scientific" theories by the fact that the speaker Sulla stresses that he only retells a story he has heard. This separation is underlined by a second myth a stranger has told him, which portrays the moon as being closely connected to the human soul. The fact that these myths are reported only at third or even fourth hand makes them somewhat unreliable. Yet, in the end the reader is requested to choose for himself which explanation he accepts as the most convincing. Hence myth is not dismissed but rather seen as a complementary explanation providing, moreover, a teleological dimension. But other than in Plato's *Timaeus*, for Plutarch a scientific explanation of the world is conceivable. The narrator of the myths is portrayed as a stranger from Carthage. The North-African empire, conquered and made a province by the Romans in the second century BCE, was definitively seen as alien and inferior to the Roman and Greek culture, an attitude which is expressed in several passages of Plutarch's writings.

Another train of thought is introduced by the fact that the second account of the stranger was supposedly told "by the chamberlains of Kronos". Kronos was regarded as an ancient god to whom the Carthaginians allegedly sacrificed children, but he was also portrayed as a king of a bygone Golden Age. Naming him as the ultimate source probably highlights the profound age of the myth and tries to increase its credibility. Taub concludes that although scientific approaches are presented in Plutarch's *De Facie* as sensible, myths still appear in a Platonic way as an important source that could even contain a higher truth about nature, and that the inheriting and borrowing of concepts from foreign and ancient cultures was conceived as valuable.

Interestingly enough, the dark spots on the moon's surface (which are in reality caused by darker volcanic lava) that are treated in Plutarch's *De Facie* are never mentioned in the preserved texts from Egypt and Mesopotamia.

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However, the affiliation of certain animals (like the Sacred Ibis and the Oryx, which both show black and white areas on their coats) to the moon in Egypt was sometimes thought to reflect this lunar feature. But this is not convincing.[3] A possible explanation for the lack of clear references to the dark spots is that their irregular shapes, which disturb the otherwise flawless, almost white surface of the moon, were not seen as appropriate for occurring in religious texts. These texts – especially in Egypt – always strove to reflect the desirable perfect and stable state of the cosmos, leaving out all negative elements or describing them in a euphemistic way.

To conclude: Knowledge about the moon in Antiquity was diverse and multi-layered. It ranges from a purely religious personification of the heavenly body in mythology and theology to complex mathematical-astronomical calculations about its phases and appearances. It was used in calendars, historiography and – most predominantly in Mesopotamia – in astrology. Depictions of the lunar crescent appear not only in connection with central moon gods, but different deities who show certain common features like fertility and power over the heavens. Lunar phases were observed, days of the lunar month were counted, and eclipses were feared. Explanations about the moon's physical nature and the appearance of its surface were treated in philosophical discourse, and a teleological meaning was attributed to the earth's only satellite. Some pieces of this knowledge were transferred from one culture to the next, with alterations, adoptions and through intermediate steps. Especially in the field of astrology, the ways of transmission went most probably from Mesopotamia via Egypt to Greece and Rome, with its tradition persisting until today. The transfer might have happened in times of peace via trading contacts and an exchange of scholars but was certainly enhanced by military campaigns and conquests that led to an amalgamation of different peoples and ideas. Many concepts are, in contrast, specific to their culture, as, e.g., the thought of some Greeks that the moon houses the souls of humans, or the Egyptian myth that the lunar cycle is an eye which is periodically injured and healed. Regarding the computation of the lunar phases and the calendar, most of the cultures examined in this volume developed their own system. This

3 A connection between the colour of the Ibis's feathers and the moon is described not in Egyptian sources, but by Plutarch (*De Iside et Osiride* 75) and Clement of Alexandria (*Stromateis* V.43, 2). However, they only refer to the dark and the light side of the moon, i.e. its phases, and not its spots. For the Oryx there are no ancient sources at all that mention a connection whatsoever.

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was probably due to the significant length of time this system had already been passed down, and because it was held in high esteem on account if its originality. Some cultures shared the idea of attributing different qualities to time, so that some lunar phases or days were emphasised and valued higher than others. Moreover, time cycles were idealised by attributing to them a regularity that did and does not correspond with reality.[4]

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4 On the idea of a "social time" see ZERUBAVEL, 1985.

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