"He assigned Him as the Jewel of the Night" – The Knowledge of the Moon in Mesopotamian Texts of the Late Second and First Millennia BCE

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Introduction

Several hundred letters and reports written by Mesopotamian scholars to various Assyrian kings survive from the palace archive of the Assyrian capital, Nineveh.[1] Within these documents, one group of themes that was obviously of outstanding interest to the king and his scholars appears repeatedly: namely, the observation of the celestial bodies. Within this group, reports concerning the observation of the moon take a special position as regards quantity.

The moon was of importance for the Babylonians and Assyrians in two ways: Firstly, the moon was the manifestation of the moon-god, known as Nanna in Sumerian and Sîn in Akkadian. The moon-god was one of the high gods of the Mesopotamian pantheon and thus had been of fundamental importance. Like every other deity in ancient Mesopotamia, he received offerings, was the object of cultic activities, and had temples and cultic personnel. In this article, the moon as a personalized god will not be taken into further considerations.[2] Nevertheless, the divine nature of the moon has to be

1 Edited by Hunger, 1992 and Parpola, 1993.

2 For the moon as a deity, see Hall, 1995; Sjöberg, 1960; Krebernik, 1995, pp. 360-369.

kept in mind discussing the knowledge of the moon in ancient Babylonia and Assyria. Secondly, the moon was not only worshipped as a deity, but was – as a celestial body – at the same time the object of scientific interest. As a result, Mesopotamian scholars acquired considerable knowledge about the moon, its path in the night sky and its phases. Knowledge of the moon was always mixed with the religious beliefs of the people, as was the knowledge of nature in general. *Science* and *religion/theology* cannot be differentiated in respect to ancient Mesopotamia. Both blended into each other. There was no discrepancy in this for scholars in ancient Babylonia and Assyria.

The following article aims to, firstly, give an insight into the knowledge of the moon existing at the time of the late second and early first millennia BCE in both Assyria and Babylonia,[3] and, secondly, to examine the role played by this knowledge in these societies. Since a detailed analysis of the sum of all knowledge of the moon in these societies would massively exceed the limits of the article, only selected insights will be given here.[4] Therefore, two domains were chosen in which the knowledge of the moon was of crucial importance: the calendar, on the one hand, and celestial omens, on the other. After that, the book's superordinate topic of knowledge being transferred from or to other cultures shall be examined more closely.

3 In the historical setting this article deals with, Assyria had grown from a territorial realm to a vast empire, which came to an end in the late seventh century BCE. In the first half of the first millennium BCE, the power of the Neo-Assyrian Empire was at its peak. In this period, Assyria dominated its southern neighbour Babylonia politically and militarily. Culturally, however, it was the other way around. From the mid-second millennium onward, Assyria increasingly borrowed elements of Babylonian culture, especially with regard to religious practice and science (in the broadest sense).
Although formally Babylonia and Assyria were two separate political entities, we can assume that there were strong political and cultural connections between these two, a common cultural basis, with the details being slightly different. This, not least, becomes apparent through the common language, Akkadian, used by both the Babylonians and the Assyrians.

4 Accordingly, this paper makes no claim of being complete. Texts dealing with the physical appearance of the moon, for example, will not be taken into account. The same applies to mathematical astronomical texts of the second half of the first millennium BCE.

The Moon as an Indicator of Time

Many ancient societies developed a calendrical system to organize their social and economic activities. The societies of ancient Mesopotamia were no exception to this. Originally, there was no common calendar across Mesopotamia. In the third millennium BCE, most of the urban centres still used their own calendrical system.[5] Probably around 2000 BCE, the calendar of the ancient, important Sumerian cultic centre of Nippur became prevalent in Babylonia, as would later be the case in Assyria.[6] This calendar was luni-solar in its structure.

The written sources of Babylonia and Assyria demonstrate that the cycles of the celestial bodies were of primary importance for the perception of time in general and the corresponding formation of the calendar. Among all the celestial bodies, the moon was of outstanding significance. One demonstration of this might be found in the introduction of Rm. 288, a hymn to the moon-god Sîn:

1) *a-na* ^{d}30 *na-an-nàr* AN-*e* [*u* KI-*tim*]
2) *a-pir* AGA ^{d}*a-num-ú-ti š*[*á*]
3) [*m*]*u-ad-du-ú* u_4*-me* ITI *u* M[U]

1) For Sîn the light of the heavens [and the earth],
2) who is covered with the crown of Anu-ship[7] o[f …],
3) who assigns day, month and ye[ar …].[8]

Thanks to its obvious dominance in the night sky and its regular cycle, the moon was responsible for the perception of time in the Mesopotamian scholarly tradition. The year, for example, was dependent on the cycle of the moon insofar as it consisted of twelve months. This is stated explicitly in the so-called *Diviner's Manual*, which not only summarizes the curriculum of a

5 For a comprehensive overview of Mesopotamian calendrical systems from the third millennium up to the first millennium BCE see COHEN, 1993.
6 COHEN, 1993, pp. 11 and 225f.
7 Anu (or An in Sumerian) was the god of the sky. He was depicted in both Sumerian and Akkadian literature as one of the highest gods. He was, for example, considered the father of Enlil, the king of the gods. For a comprehensive overview, see WOHLSTEIN, 1976.
8 Edited by PERRY, 1907, pp. 28-30.

diviner, but also gives instructions about how to practise this profession.[9] Within these instructions, one passage begins with the words:

57) 12 ITI.MEŠ *šá* MU.1.KAM 6 UŠ u_4-*me-ša*

57) Twelve are the month of the year; six times sixty are its days.[10]

The month was also obviously dependent on the cycle of the moon. In several texts, it is clear that a new month started with the first visibility of the moon after its phase of invisibility.[11] Accordingly, Assyrian and Babylonian scholars made use of the synodic month, i.e., the timespan the moon needs to go from one lunar phase through to the same lunar phase again. Although hardly mentioned explicitly, it is clear that the calendrical day in Mesopotamia officially started in the evening.[12]

Altogether, knowledge of the cycles of the moon was the foundation of calendar and time. Several mythological texts specifically deal with this fact. It especially becomes clear in the mythical text *Enūma eliš*.[13] The text describes the rise of the Babylonian city-god Marduk to become the king of the gods. Prior to his elevation, Marduk had to defeat the primeval goddess Tiāmat, who planned to wipe out the gods. Out of her dead body, he formed the cosmos. In the course of creation, he also established the stars and let the moon become apparent, as described in the fifth tablet:

1) *ú-ba-áš-šim man-za-*[*za an* …[14] GA]L.GAL
2) MUL.MEŠ *tam-šil-šu-n*[*u lu-ma-š*]*i uš-zi-iz*
3) *ú-ad-di* MU.AN.NA *m*[*i-iṣ-ra-ta*] ˹*ú*˺*-aṣ-ṣir*
4) 12 ITI.MEŠ MUL.MEŠ 3.TA.[ÀM] *uš-zi-iz*
[…]
12) ^{d}NANNA-*ru uš-te-pa-a mu-šá i*[*q-t*]*i-pa*
13) *ú-ad-di-šum-ma šu-uk-nat mu-ši a-na ud-d*[*u-ú*] ˹u_4˺*-mi*

9 Edited by OPPENHEIM, 1974, pp. 197-220.
10 IBID., pp. 200 and 205.
11 See BEAULIEU, 1993, p. 66.
12 As discussed by SMITH, 1969, p. 74. Cf., among others, BEAULIEU, 1993, p. 66; BROWN, 2000a, p. 107 and STEELE, 2011, p. 471.
13 Latest edition by LAMBERT, 2013.
14 Other manuscripts show that the lacuna has to be complemented by DINGIR. DINGIR – "gods". See KÄMMERER/METZLER, 2012, p. 228.

14) *ar-ḫi-šam la na-par-ka-a ina a-ge-ʾe* [*ú*]-*ṣir*
15) *i-na* SAG ITI-*ma na-pa-ḫi ʾe*-[*li ma-a-t*]*i*
16) *qar-ni na-ba-a-ta a-na ud-du-ú* 6 [u_4]-*mu*
17) *i-na* U_4.7.KÁM *a-ga-a* [*lu ma-aš*]-*la*
18) [*š*]*á-pat-tu lu-ú šu-tam-ḫu-rat meš-l*[*i ar-ḫi*]-*šam*
19) [*e-n*]*u-ma* ^{d}UTU *i-na i-šid* AN-*e ina*-[x-x]-x-*ka*[15]
20) [*ina s*]*i*$^{!}$-ʾ*im*ʾ-*ti šu-tak-ṣi-ba-am-ma bi/pé* [16]-ʾ*ni arʾ-k*[*a-nu*]-*uš*
21) [u_4]-*mi bu-ub-bu-l*]*um a-na ḫar-ra-an* ^{d}UTU *šu-taq-ri*[*b-m*]*a*
22) [*šá-pat-tu* [17] U_4.3]0.KÁM *lu šu-tam-ḫu-rat* ^{d}UTU *lu šá-na-at*

1) He (=Marduk) formed the position for the great gods.
2) He established the stars, their likeness, (as) *lumāšu*-stars.[18]
3) He assigned the year, drew the plan.
4) Twelve months (consisting of) three stars each he established.
[…]
12) He made Nannaru (=the moon-god) appear (and) entrusted the night to him.
13) He assigned him as the jewel of the night to determine the days.
14) Month by month without cease, he marked (him) with a crown:
15) "At the beginning of the month, while rising over the land,
16) you shine with horns to reveal six days.

15 LAMBERT, 2013, p. 98 complements *ina*-[*aṭ-ṭa-l*]*u-ka*.

16 KÄMMERER/METZLER, 2012, p. 231 read this sign as *pé*. LAMBERT, 2013, p. 98, however, offers the reading of this sign as *bi*. The different readings imply the usage of different verbs: *banû* – "to grow" on the one hand, and *panû* – "to turn" on the other hand. *The Chicago Assyrian Dictionary* b, *banû* B 1., 91 applies the verb *banû*. The different verbs, however, do not change the general meaning of the line, i.e., the decreasing of the moon.

17 The meaning of *šapattu* – "fifteenth day, fifteen days" in this context remains unclear. KÄMMERER/METZLER, 2012, p. 232 omit the translation of the word in their edition: "Der Ša[pattu des] 30. Tages sei wiederum ausgeglichen mit Šamaš." LAMBERT, 2013, pp. 98f. even applies an alternative transliteration, omitting the word *šapattu* completely: "*šá* [x (x) ud-3]0-kám *lu šu-tam-ḫu-rat* ^{d}*Šamaš lu šá-na-at*" and translates the line accordingly ". [. . .] the thirtieth day, stands in conjunction and rivals Šamaš."

18 According to the *Chicago Assyrian Dictionary* l, *lumāšu*, pp. 245f. the term *lumāšu* refers to stars, "whose heliacal risings fall at or near the solstices and equinoxes, and which therefore serve to divide the year". It can also be used as a term for star or for a zodiacal constellation. Considering that Marduk establishes perceivable time in this passage, the first identification just quoted seems to be the most likely in this context.

17) On the seventh day, (your) disc shall be halved.
18) On the fifteenth day, in the middle of each month, you shall stand in opposition.[19]
19) As soon as Šamaš (= the sun-god) sees you on the horizon,
20) reach properly your full measure and form yourself back.
21) At the day of disappearance, approach the path of Šamaš.
22) [… 3]0. day you shall stand in conjunction. You shall be equal to Šamaš.[20]

The lines just presented illustrate how the astronomical knowledge at the time was connected to a mythological narrative.[21] According to this text, Marduk established the constellations of the stars, and as part of that also the year and its twelve months. The year was fixed by assigning three stars each to each month.[22]

Finally, Marduk let the moon, or rather, the moon-god become apparent and gave him instructions about how to behave within one cycle. This means that the *Enūma eliš* describes the induction of the phases of the moon. Thus, the phases of the moon were associated with concrete days of the month and formed the basis for the Mesopotamian calendar.

The *Enūma eliš* incorporates by far the most extensive cosmological passage in Akkadian literature and so contains the most extensive report of the creation of perceivable time. However, it represents only one tradition among several others.[23] An older tradition is concisely written down in the context of

19 Literally, *šutamḫuru* means "to assume the same rank as someone else, to compete with someone, etc.". However, in this context, as well as in line 22, it refers to the position of the moon in respect to the sun (i.e., conjunction and opposition). See *Chicago Assyrian Dictionary* m1, *maḫāru* 11 a, p. 70.

20 *Enūma eliš* tablet V. Transliteration according to Manuscript B (K 3567 + K 8588), which covers all the lines presented here. KÄMMERER/METZLER, 2012, pp. 228-232.

21 For a detailed analysis of the relationship between Astronomy and the *Enūma eliš* see, among others, HOROWITZ, 2014, pp. 1-8; LAMBERT, 2013, pp. 169-200.

22 Apart from *Enūma eliš*, this system, usually referred to as "Zwölfmaldrei", is best known from the so-called "Astrolabes". For the designation see WALKER, 1977, pp. 27 and 34. For a detailed edition of these texts, see also HOROWITZ, 2014.

23 LAMBERT, 2013, p. 169 points out that there is actually no systematic treatment of cosmology in the Sumerian and Akkadian literature, and that the *Enūma eliš* was construed out of the textual material and traditions already available. This becomes even more clear when the fact that the *Enūma eliš* is the only text attributing the introduction of perceivable time to Marduk is considered. Other texts ascribe these deeds to Anu, Enlil, and Ea, a triad of gods already occurring in Sumerian literary texts. The earliest Akkadian text mentioning the three gods as establishers of the

a large series of tablets concerning celestial omens called *Enūma Anu Enlil*. Altogether, the three short mythological passages of this text describe quite similar themes to *Enūma eliš*, including how the three gods Anu, Enlil, and Ea put the celestial bodies in place and thus made time perceivable for humankind.[24] Both, the *Enūma eliš* and *Enūma Anu Enlil* clearly state that the moon was established in respect to the perception of time, which in turn was inseparably associated with the calendar.

It is worth discussing at this point another aspect of the moon as a celestial body of time. As already explained, every month began with the first visibility of the moon and the foundation for the length of the month was the so-called synodic month. Since a year consisting of twelve synodic months is only about 354 days long, it does not match the actual solar year. To fill the gap, the Mesopotamians intercalated an entire month as soon as they realized that this was necessary. It was not until the fifth century BCE that the intercalation-system was formalized.[25]

This practical handling of the calendar was juxtaposed with an idealized idea of the calendar, and the corresponding ideal movement of the celestial bodies. Scholarly texts of several kinds describe the year as consisting of exactly 360 days, consisting of twelve months of thirty days each.[26]

The ideal lunar month was also worked into the lines of the *Enūma eliš* mentioned above. Marduk gave the moon instructions for exactly thirty days. The ideal time was thus arranged at the beginning of creation and was therefore an integral part of the cosmos.

In Mesopotamia, the theological practice of identifying the high gods with certain numbers existed. In this numerical system, the moon-god was identified with the number thirty, which goes together with the idea of this ideal lunar month.[27]

The ideal course of time was closely connected to the paths of the celestial bodies: every star and every constellation was supposed to rise on a certain day

celestial bodies is KUB IV 47 rev. 37-38, a Hittite ritual-tablet found in the Hittite capital Hattuša (Boğazköy). See LAMBERT, 2013, p. 177.

24 For the latest translation of these passages see LAMBERT, 2013, pp. 175-177.

25 BRITTON, 2007, pp. 115-131.

26 Compare the line of the *Diviner's Manual* cited above.

27 PARPOLA, 2000, pp. 182-184.

of the year. Therefore, the stars virtually fixed the calendrical months to their places.[28]

Equally, the moon was supposed to cross certain constellations in its path during an ideal month. The astronomical-astrological Compendium MUL.APIN I iv 31-39 states:

31) DINGIR.MEŠ *ša i-na* KASKAL ^{d}30 GUB.MEŠ-*ma* ^{d}30 *e-ma* ITI
32) *ina pi-rik-šú-nu* DIB.MEŠ-*ma* TAG.MEŠ-*šú-nu-ti*
33) MUL.MUL ^{MUL}GU$_4$.AN.NA ^{MUL}SIPA.ZI.AN.NA ^{MUL}ŠU.GI
34) ^{MUL}GÀM ^{MUL}MAŠ.TAB.BA.GAL.GAL ^{MUL}AL.LUL ^{MUL}UR.GU.LA
35) ^{MUL}AB.SÍN ^{MUL}*zi-ba-ni-tu*$_4$ ^{MUL}GÍR.TAB ^{MUL}PA.BIL.SAG
36) ^{MUL}SUḪUR.MÁŠ ^{MUL}*gu-la* KUN.MEŠ ^{MUL}SIM.MAḪ
37) ^{MUL}*a-nu-ni-tu*$_4$ *u* $^{MUL\ LÚ}$ḪUN.GÁ
38) PAP *an-nu-tu*$_4$ DINGIR.MEŠ *šá ina* KASKAL ^{d}30 GUB.MEŠ-*ma e-ma* ITI
39) *ina pi-rik-šú-nu* DIB.MEŠ-*ma* TAG.MEŠ-*šú-nu-ti*

31/32) The gods who stand in the path of Sîn (= the moon-god) and whose regions Sîn crosses in the course of a month and whom he touches:
33) The Pleïades, the Bull of Heaven, the true Shepherd of Anu, the Old Man,
34) the Crook, the Great Twins, the Crab, the Lion,
35) the Furrow, the Scales, the Scorpion, Pabilsag,
36) the Goat-Fish, the Great One, the Tails, the Swallow,
37) Anunītu and the Hired Man.
38/39) All these gods stand in the path of Sîn, whose regions Sîn crosses in the course of a month and whom he touches.[29]

The ideal – or harmonic – course of the cosmos was more or less the measuring stick the actual world had to compete with. Thus, the Assyrian scholar Balasî warns his King:

28 This especially becomes clear in the schemes written down in MUL.APIN. The Text edited by HUNGER/PINGREE, 1989 contains several sections in which astronomical phenomena are linked to fixed calendrical dates or time intervals. See, e.g., MUL.APIN I ii 36-47 and I iii 1-12.

29 Edited by HUNGER/PINGREE, 1989, pp. 67-69.

8) ITI *lid-ru-ru* MUL AN-*e gab-bu*
9) *it-ta-ma*[*r*]*-ku-u ina* ḪUL ^{ITI}ŠE
10) *lu la et-ti-iq lid-ru-ru*

8) Let them intercalate a month; all the stars of the sky
9) have fallen behind. (The month) *Addaru* must not pass unfavourably!
10) Let them intercalate![30]

From this report, we learn that it was considered an evil portent when parts of the cosmos were no longer in balance with their ideal pattern. The same can be observed with respect to the moon. The moon bothered the Babylonian and Assyrian scholars insofar as a synodic month is not – like the ideal state of the cosmos demands – exactly thirty days long but in average only 29.53 days. Because of certain variations, a synodic month can accordingly be twenty-nine or thirty days long.[31] For Mesopotamian Scholars, this represented a practical problem inasmuch as the beginning of a month could not easily be computed in advance. Accordingly, the beginning of a month had to be determined by observation most of the time.[32]

The Moon in the Context of Celestial Divination

The problem of the moon departing from its ideal path also leads straight to the second domain of knowledge discussed here in which the moon was of great importance: omens. Over the centuries, the Babylonians and Assyrians developed a rich literature on good and evil portents. In this respect, recognizing and interpreting omens and, if necessary, performing their ritual resolution, formed one of the main interests of Mesopotamian scholarship. For this purpose, all parts of the surrounding world were observed very closely, because almost every conspicuity in nature, from lightning up to human physiognomy and behavior, could be a sign sent by the gods to proclaim their benevolence or their anger.[33] Hence, the night sky and the moon were observed precisely. Of the few early examples of celestial divination from the Old Babylonian period,

30 K 760. Edited by HUNGER, 1992, p. 57, no. 98.
31 BRACK-BERNSEN, 2007, p. 83.
32 BEAULIEU, 1993, p. 66.
33 MAUL, 1994, pp. 3f.

most texts are concerned with lunar omens.[34] This might give an impression of the importance of the moon within the sphere of celestial divination.

The Babylonians developed a system according to which they were at least theoretically able to detect whether the cosmos still followed its ideal path by observing the celestial bodies and the time of their appearance.[35] The Assyrian palace archive of Nineveh with its letters and reports of scholars was mentioned at the beginning of the article. Among these reports, the matter was often discussed of the month reaching its ideal length of thirty days or the moon being seen too early, as in the following example K 696:

1) DIŠ 30 *ina* U_4.1.KÁM IGI
2) KA GI.NA ŠÀ KUR DÙG.GA
3) DIŠ u_4-*mu a-na mi-na-tu-šú e-ri-ik*
4) BALA U_4.MEŠ GÍD.MEŠ
5) DIŠ 30 *ina* IGI.LAL-*šú* AGA *a-pir*
6) LUGAL *a-šá-ri-*(*du*)-*tú* DU-*ak*

1) If Sîn becomes visible on the first day:[36]
2) (this signifies) reliable speech; the heart of the land will be glad.
3) When the day reaches its appropriate length:
4) (this signifies) a rule of long days.
5) If Sîn wears a crown on his appearance:
6) the king will have a good reputation.[37]

The text demonstrates that the appearance of the moon is not just of calendrical interest. The exact time of the moon's appearance was interpreted as an omen. If the moon appeared according to the divine plan after thirty days, it was considered a good portent. Nevertheless, if the moon was seen too early, mean-

34 ROCHBERG-HALTON, 1988, p. 9.
35 As Brown has already demonstrated the corresponding schemes recorded in texts such as MUL.APIN, *Enūma Anu Enlil*, and i.NAM.giš.hur.an.ki.a (a mystical or rather explanatory text combining philological and mathematical explanations) are ideal schemes, which means they are not based on observation but are elaborated and idealized. See BROWN, 2000b, pp. 113-125.
36 Meaning the expected first day of the new month. It implies that the previous month lasted exactly thirty days. See BROWN, 2000b, p. 147.
37 Edited by HUNGER, 1992, p. 10, no. 10.

ing on the thirtieth day of the old month or even earlier, the consequences were negative. This is also mentioned in several letters and reports, such as K 722:

1) DIŠ 30 *ina* ^{ITI}AB U_4.30.KÁM IGI
2) SU.BIR_4^{KI} *aḫ-la-mu-ú* GU_7
3) EME *a-ḫi-tum* KUR MAR.TU^{KI}
4) EN-*el*

1) If Sîn becomes visible on the thirtieth day of (the month) *Ṭebētu*,
2) the Arameans will devour *Subartu*;[38]
3/4) A Foreigner[39] will rule *Amurru*.[40]

However, letters and reports are not the only sources containing material related to lunar omens. The most characteristic sources for Mesopotamian divination are the omen collections: texts dealing with a certain phenomenon and its good and evil portents according to behaviour, appearance, time, and other variables.

Only scant material evidence related to celestial omens survives from both the Old and Middle Babylonian periods, i.e., the first half of the second millennium BCE.[41] Sometime during the second half of the second millennium BCE, Mesopotamian scholars began to compile and canonize individual omen-texts into large omen collections. These collections have come down to us from the neo-Assyrian and neo-Babylonian periods in the first millennium BCE. As a result, a very comprehensive collection of omens concerning all the signs observable in the sky (both celestial and meteorological) was written down. This collection called *Enūma Anu Enlil*[42] comprises at least seventy tablets,[43] of which the first twenty-two tablets are concerned with omens of the moon alone. Further tablets are concerned with solar omens, weather omens, and omens relating to stars and planets.[44]

According to a catalogue from Uruk, the lunar part of the series can furthermore be subdivided into omens concerning the appearance of the moon

38 A designation for the land of Assyria.
39 Literally, one of a foreign language.
40 Edited by HUNGER, 1992, p. 147, no. 264.
41 HUNGER/PINGREE, 1999, p. 12.
42 See also the previous section of this paper.
43 ROCHBERG-HALTON, 1988, p. 18.
44 HUNGER/PINGREE, 1999, pp. 12f.

(Tablets 1-14) and separate from those, lunar eclipse omens (Tablets 15-22).[45] The following lunar phenomena (cited from Hunger and Pingree) were of interest for scholars concerned with celestial divination:

> The first section contains omens concerning unusually early or otherwise irregular (*ina lā minâtišu*) appearances of the moon. There follow possibly dark risings of the moon. Many omens are taken from the moon's horns, and from the stars, which are observed next to them. Tablets 8-10 deal with lunar halos. Little is preserved of Tablets 11-13. Tablet 14 is made up of tables for the moon, i.e. it is largely astronomical […]. Tablets 15-22 deal with lunar eclipses.[46]

It might be interesting to point out again that the mythological passages describing the instalment of the moon by Anu, Enlil, and Ea, as mentioned above, were written as an introduction to the omen collections of *Enūma Anu Enlil*.

The sheer amount of twenty-two tablets with lunar omens makes it clear that knowledge of the moon and its associated phenomena was of crucial importance for Babylonian and Assyrian scholars. Among the lunar omens, those concerned with eclipses seem to have been the most important and the most closely observed. The scholars of Babylonia and Assyria considered eclipses to be an exceedingly dangerous sign. Accordingly, they paid great attention to this phenomenon. As already mentioned, the collection of eclipse omens in *Enūma Anu Enlil* alone comprises eight tablets. A short example from Tablet 21 § VI, 1 f. shall be given here:

1) DIŠ *ina* ^{ITI}KIN U_4.14.KAM AN.MI GAR-*ma ina* ^{IM}SI.SÁ SAR-*ma ina* $^{IM}U_{18}$.LU KIMIN ^{IM}KUR.RA *iz-ku*
ina EN.NUN AN.ÚSAN SAR-*ma ina* EN.NUN $MURUB_4$.BA *iz-ku* ^{IM}SI.SÁ *ina* ŠU-*ka tu-kal*
KAxMI-*šú* IGI-*ma ana* LUGAL URI^{KI} EŠ.BAR SUM *ana* LUGAL ḪI.GAR
šum-ma LUGAL AN.MI *i-te-ti-iq-šú* ŠÈG.MEŠ *ina* AN-*e* A.KAL.MEŠ *ina* IDIM TAR.MEŠ
SU.KÚ *ina* KUR GÁL UN.MEŠ TUR.MEŠ-*ši-na ana* KÙ.BABBAR BÚR.MEŠ

45 IBID., p. 13.
46 IBID., pp. 14f.

2) DIŠ U_4.15.KAM AN.MI GAR DUMU LUGAL AD-*šú* GAZ-*ma* AŠ.TE DIB-*bat* KIMIN KÚR ZI-*ma* KUR KÚ

[…]

1) When in the month *Ulūlu*, on the fourteenth day, an eclipse occurs (and) it begins in the north and clears in the south – variant: east,
(that eclipse) begins during the evening watch and clears during the middle watch; the north you keep in mind;
You observe the eclipse; for the king of Akkad[47] will the prediction be set: There will be a rebellion against the king.
If the eclipse goes past the king, the rain in the sky and the flood in the springs will be cut off.
There will be a famine in the country; people will sell their children for silver.
2) If on the fifteenth day an eclipse occurs, the son will kill his father and seize the throne – variant: an enemy will rise and devour the land.

[…][48]

According to this example, the consequences connected to a lunar eclipse were quite dramatic. Either the king would be somehow deprived of his throne or the water supply of the land somehow cut off – both causing an existential crisis for the entire land. All in all, knowledge of the moon was a crucial factor in divination, and by that one could even say that from the ancient point of view the knowledge of the moon even was of fundamental importance for the king and all his country.

Transfer of Knowledge

Since the overall topic of the conference seeks to investigate the origin and transfer of knowledge, it is now time to turn the attention towards this issue, having outlined the knowledge of the moon available to and used by Babylonian and Assyrian scholars. This shall be done by initially giving a short overview of the best-known instances of knowledge transfer in the ancient Near East. Here, one has to assume the occurrence of an external transfers between the different cultural spheres of the ancient Near East and internal

47 Meaning Babylonia.
48 Edited by ROCHBERG-HALTON, 1988, p. 241.

transfer involving the passing on of knowledge over the course of time within one cultural sphere (inheriting).

To start with, there is no hint that the scholars of Mesopotamia adopted elements of their body of knowledge about the moon from any of the other surrounding cultures. If there were any sign of foreign knowledge, one would expect to find it either indirectly in the texts themselves, e.g., through loan-words, or directly through ascriptions in the colophons of the texts. However, none of these things can be proven with respect to the body of knowledge about the moon. It does not necessarily mean that no foreign knowledge was ever adapted – the preconditions were certainly there – but if it happened, it was not emphasized in any way. Colophons, for example, sometimes give information about the origin of the text copied on its tablet.[49] However, the information of the colophons gathered and published by Hermann Hunger[50] refer entirely to Mesopotamian cities.[51] Accordingly, they are more indicative of an intra-Mesopotamian transfer of knowledge. This internal transfer, as well as the transfer from Mesopotamia to other regions of the ancient Near East, has already been the subject of several studies. Therefore, it should suffice to point out the well-known "highlights" from this research on knowledge-transfer.

Considering the internal transfer of knowledge, we can assume that at least part of the knowledge was simply inherited from Sumerian traditions of the third millennium BCE. The areas of Sumer and Akkad, with their ancient city-states, lay in southern Mesopotamia and later became the heartland of Babylonia. Although Akkadian displaced Sumerian as a spoken language roughly around 2000 BCE, Sumerian did not vanish in any way. On the contrary, Sumerian remained an important literary language until the end of cuneiform writing. Accordingly, traditions and knowledge of Sumerian texts were passed on over the course of time. Babylonian scholars thus directly followed Sumerian cultural traditions and knowledge. The prestigious and venerable cities of southern Mesopotamia were also important to Assyrian kings, as will be demonstrated below. The importance of these old traditions for both Babylonian and Assyrian scholars can be illustrated through the

49 HUNGER, 1968, pp. 6f.

50 IBID.

51 Cf. Index II of HUNGER, 1968, pp. 157f., which lists the places of origin mentioned in the colophons discussed in the book. As pointed out previously by FRAHM, 2012, p. 17, note 7, the collection is no longer up to date in respect to new texts and is in need of revision.

example of the colophon of KAR 177, a hemerological tablet found in Assur and dating to the Middle Babylonian Period.

25) U_4.ME DÙG.GA.MEŠ KA 7 *ṭ[up*[52]*-pa-a-n]i*
26) GABA.RI UD.KIB.NUN^{KI} NIBUR^{KI}
27) KÁ.DINGIR.RA^{KI} UD.UNUG^{KI}
28) ŠEŠ.UNUG^{KI} UNUG^{KI} *u eri-du*$_{10}$^{KI}
29) *um-ma-a-ni ú-na-as-si-ḫu-ma*
30) *ú-na-as-si-qu-ma*
31) *a-na* ^{m}*Na-zi-múru-*˹*taš*˺
32) LUGAL ŠÚ SUM-*nu*

25) The favourable days according to the wording of seven T[ablets]
26) (after) the originals of Sippar, Nippur,
27) Babylon, Larsa,
28) Ur, Uruk and Eridu.
29) The scholars excerpted
30) and chose (them)
31) (and) to Nazimaruttaš
32) the king of the universe they gave (it).[53]

In this colophon, all important cities of southern Mesopotamia are listed. The text thus indicates a crucial aspect concerning the intra-Mesopotamian transfer of knowledge: the cities mentioned were Babylonian cities, but the tablet itself was found in Assur, the longstanding capital and cultic centre of Assyria. Correspondingly, the Assyrian scholars who compiled this tablet must have had access to the Babylonian originals. Indeed, the transfer of an immense amount of knowledge in form of tablets from Babylonia to Assyria is a well-explored theme within Babylonian and Assyrian cultural historiography. This transfer of knowledge increasingly occurred during military conflicts between Assyria and Babylonia in the second half of the second millennium BCE. The Assyrian King Tukulti-Ninurta conquered Babylon and thus gained access to extensive knowledge in form of text-collections.[54] In the so-called Tukulti-Ninurta-Epic, the king directly states that, after the battle with his Babylonian opponent, he

52 For the reading of this sign as DUB see HEEßEL, 2001, pp. 172f.
53 KAR 177, iv, 25-32. HEEßEL, 2011, pp. 171f.
54 CANCIK-KIRSCHBAUM, 2013, pp. 110f.

plundered his cities and carried off all the tablets available.[55] Eva Cancik-Kirschbaum describes these events accordingly as "[…] Beispiel der systematischen Abschöpfung, Dissoziierung und Re-Implementierung einer ganzen Wissenskultur in Gestalt ihrer Textüberlieferung […]".[56]

The same can be demonstrated several centuries later during the reign of Assurbanipal. After a fratricidal war against his brother Šamaš-šumu-ukīn, who held the throne of Babylon, Assurbanipal took tablets from Babylon, Nippur and Bīt-Ibâ and transferred them to his residence at Nineveh, where he had built up the large and famous collection of cuneiform tablets today known as "the library of Assurbanipal".[57]

Certainly, the transfer of knowledge did not just take place within the context of military conflicts. Assurbanipal, for example, not only took away tablets by force during his military campaigns in Babylonia, but also advised scholars to send him tablets.[58] Kings and rulers were not the sole moving force behind knowledge-transfer. Scholars also visited other cities on their own and seem to have copied tablets they found there. Moreover, as certain colophons state, tablets could have been borrowed.[59] The relative mobility of scholars implies that knowledge could also have been transferred orally.

As already mentioned, the borrowing of foreign knowledge cannot be proven for Mesopotamian scholarly texts, but it is quite clear that scholarly contacts to foreign regions of the ancient Near East existed in both the second as well as the first millennium BCE. The Sargonid Court in Nineveh, for example, not only kept Assyrian scholars, but also Babylonians, Syrians and Egyptians – even if these individuals did not necessarily stay voluntarily.[60] Probably the best example of knowledge transfer in the second half of the second millennium BCE is the fact that a great number of scholarly texts written in Akkadian were found in Hattuša, the capital of the Hittite Empire in today's central Anatolia. The transfer of knowledge from Mesopotamia into the Hittite empire occurred indirectly at first: The knowledge spread first into

55 Column VI B 1`-11`. Edited by MACHINIST, 1978, pp. 128f.
56 CANCIK-KIRSCHBAUM, 2013, p. 111: "[...] an example of the systematic absorption, dissociation, and re-implementation of a whole culture of knowledge as constituted by its textual tradition [...]".
57 FRAHM, 2012, p. 21.
58 IBID., pp. 22f.
59 IBID., pp. 17-20.
60 IBID., p. 24.

the area of northern Syria and from there it reached Hittite territory.[61] Later, during the time of the Hittite Middle Kingdom, knowledge was transferred both indirectly, via Hurrian intermediaries, and directly, through Mesopotamian scholars being sent to the Hittite court for diplomatic reasons and who sometimes settled there permanently.[62] Similar exchanges are illustrated by the Amarna Letters and can be proven not only for the Hittite heartland, but also for the regions of northern Syria (Emar) and the northern Levant (Ugarit).[63]

After this very brief overview of the possible ways knowledge might have been transferred, both within Mesopotamia and going out from Mesopotamia, it is time to take a look at the concrete examples presented in this paper concerning the moon.

Regarding the calendrical domain, it can be argued that at least a large part of this calendrical knowledge went back to Sumerian traditions and was therefore inherited. The most striking example is probably the Babylonian calendar itself, or more precisely, its month-names. The calendar used by the Babylonians and Assyrians in the late second and first millennia BCE is the so-called Standard Mesopotamian Calendar. However, in the third millennium BCE, the situation was still quite different: several calendrical systems recognizable through their varying month-names were in use by the various small city- and territorial states.[64] The first attempts to unify a larger territory under one calendrical system were probably made by Išbi-Erra of Isin at the very beginning of the second millennium BCE. For this purpose, he used the local calendar of Nippur, the most important transregional cultic centre at that time. This calendar was adapted throughout southern Mesopotamia. In regions further north, such as Mari for example, local calendars continued to exist besides the Nippur Calendar until the reign of the Old Babylonian king Samsuiluna, after which they disappeared.[65] This Nippur Calendar clearly used Sumerian month-names.[66]

When exactly the Standard Mesopotamian Calendar came into use, is still not entirely clear. The issue gets more complicated through the fact that this Standard Mesopotamian Calendar used the Sumerian month-names of the Nippur-Calendar as logograms to express the corresponding actual month-

61 BECKMANN, 1983, p. 98.
62 IBID., pp. 102-112.
63 RUTZ, 2016, pp. 19f.
64 See, in general, COHEN, 1993.
65 IBID., pp. 11 and 225f.
66 IBID., p. 226.

names. First syllable writings of the month-names clearly indicating the use of this calendar can be found in several personal-names of the Kassite and Middle Babylonian periods. A lexical list called *ur$_5$-ra = ḫubullu* dating to the end of the second millennium BCE records for the first time – so far known – a bilingual juxtaposition of the logographic and its corresponding syllabic writing.[67] It might be interesting to note that Mark E. Cohen has already pointed out that the syllabic month names were of different origin. In this respect, he remarks:

> Based on the peculiarities of this calendar, the Standard Mesopotamian calendar may have been an artificial creation, a means to unify a divergent empire. It may have been difficult to perpetuate the use of a Sumerian calendar outside of Southern Mesopotamia. However, the economic and political advantages of a single, standard calendar were as obvious in the second millennium B.C. as they had been on a smaller scale hundreds of years earlier to Išbi-Erra of Isin. So, rather than select one particular city's calendar as the new Reichskalender – […] – the Babylonian administration invented a hybrid Reichskalender, culling months from various calendars throughout the realm and beyond, thereby hoping to gain international acceptance.[68]

In the present context, it is of peculiar interest that the Standard Mesopotamian Calendar spread far beyond southern Mesopotamia. Under the reign of Tiglath-Pilesar I, for example, this Babylonian calendrical system began to be used in Assyrian documents. Under his successors, the Standard Mesopotamian Calendar even replaced the Assyrian calendar, a system originally completely based on the lunar cycle without any intercalary month like in Babylonia.[69]

It was not only the month-names that were taken over by Babylonian, and later Assyrian, scholars, but the underlying system of time-units as well, likewise the idea of the moon being responsible for these time-units. For example, an inscription from Warad-Sîn from the beginning of the second millennium BCE and written in Sumerian describes the moon-god Nanna:

1) ^{d}nanna en gal
2) u$_4$ an kù-ge si
3) men nun-na sag-íl
4) dingir zi u$_4$ ge$_6$-bi ḫé-ḫé

67 IBID., pp. 13 and 297f.
68 IBID., pp. 303f.
69 IBID., pp. 300-302.

5) iti ge-en-ge-en
6) mu silim-ma
[…]

1) (For) Nanna, the great lord,
2) the light that fills up the pure heaven,
3) who wears the princely crown,
4) reliable god, who *alternates*[70] day and night,
5) who fixes the month,
6) who completes the year.
[…][71]

This rather early text demonstrates that all the assignments ascribed to the moon as an indicator of time in the first millennium BCE were already fully elaborated in earlier periods and thus passed on over the course of centuries.

The idea of an idealized system of time reckoning, too, can be traced back to Sumerian origins. The idealized month, in which the complete cycle of the moon lasts exactly thirty days can first be detected in economic texts from the early third millennium BCE and was used as a simplified system for calculation and administration.[72] Ever since the first half of the second millennium BCE, this scheme had been adopted for scholarly texts. The circulation of this idea found its most widespread application in divinatory contexts.[73] Accordingly, this special perception of the moon was not only taken over from earlier traditions. The Babylonian scholars took over the underlying system but massively expanded the field of its application.

Overall, calendrical knowledge of the moon was more or less inherited from earlier traditions. The situation concerning the transfer of the knowledge of the moon in respect to its application as a celestial omen is a little bit more complex. As already mentioned, celestial omens concerning the moon are recorded in the Old Babylonian Period for the first time. Whether they were inherited from earlier traditions cannot be proven, due to a lack of textual evidence.[74] In this case, conversely, we have the situation that the body of

70 Translation according to IBID., p. 220.
71 IM 85469/IM 85470. FRAYNE, 1990, p. 220.
72 ENGLUND, 1988, p. 131; BRACK-BERNSEN, 2007, pp. 92f. and CANCIK-KIRSCHBAUM, 2009, p. 33.
73 BROWN, 2000a, p. 103.
74 ROCHBERG, 2006, p. 337.

knowledge related to good and evil portents spread over large parts of the ancient Near East and the omens concerning the moon with them.

The clearest example for this stems from Hattuša, the capital of the Hittite Empire. There, tablets with lunar omens written in Akkadian were found. A short extract from them shall be given here:

5) [BE 30 SI ZA]G-*šú* AN IGI EBUR *nap-ša* KUR KUR G[U_7]
6) BE 30 SI ZAG-*šú* KI IGI EBUR KUR TUR-[*ir*]
7) BE 30 SI GÙB-*šú* AN IGI TI.LA.ḪI.A *ina* KU[R…]
8) BE 30 SI GÙB-*šú* KI IGI ÚŠ.MEŠ *ina* KUR […]

5) [When Sîn] turns his ri[ght Horn] towards the sky, the land will con[sume] an abundant crop.
6) When Sîn turns his right horn towards the earth, the crop of the land will be small.
7) When Sîn turns his left horn towards the sky, life in the land will be […]
8) When Sîn turns his left horn towards the earth, death will […] in the land.[75]

The example demonstrates that the visual appearance of the moon and its concrete opposite are interpreted as either positive or negative. As just mentioned, the origin of the tablet is not Mesopotamian. The content of the text, however, is from Mesopotamia. The text is thus a direct example of how the knowledge of the moon was transferred from Mesopotamia to neighbouring regions. Regarding the legitimation of this knowledge, we have the same situation as in Mesopotamia: The origin is not explicitly mentioned. However, it stands to reason that the omens were borrowed from Mesopotamia, since the primary language is Akkadian with a translation into Hittite also provided (which is not taken into account in the example). However, the knowledge was not only copied by the Hittite scribes, but occasionally also adapted to local needs:[76] The Text KUB VIII 35 contains a series of omens concerning the moon. The apodosis of these omens follows a Babylonian scheme insofar as four regions are mentioned that can be affected by the omen, three, Subartu (i.e., Assyria), Amurru, and Elam, are each well-known from Babylonian omen-texts. The fourth region, however, was changed from Akkad (i.e.,

75 KUB 8.6 and KUB 29.11. GÜTERBOCK, 1988, pp. 163-166.
76 RUTZ, 2016, pp. 36-39.

Babylonia) to Ḫatti.[77] This makes it clear that the Hittites not only copied Babylonian texts but changed it in order to make it useable for themselves.

In their furthermost extent, Mesopotamian lunar omens even reached Egypt,[78] although apparently not until the Achaemenid period.[79] A very striking example of this is the demotic papyrus pWien D 6278-6289 + D 6698 + D 10111, copied some time during the second or early third centuries CE.[80] This demotic text shows how the system of Mesopotamian lunar eclipse omens was adopted by the Egyptian scribe, which becomes especially clear through the use of Babylonian month names. Furthermore, the idea of connecting the evil portent with different countries is definitely of Mesopotamian origin. However, the Egyptian scribe did not simply copy the Mesopotamian text, he used the underlying Mesopotamian system of interpretation and changed it: as was already shown in the textual example of *Enūma Anu Enlil* above, eclipses could have been interpreted differently according to the month, day and night-watch on which they occurred. Furthermore, the differences indicated which land would be affected by the evil portent. The Egyptian scribe took this system and altered the content so that it fitted Egyptian circumstances and needs. The Babylonian months were written but at the same time identified with Egyptian ones, and the possible lands affected by the eclipse were exchanged with lands important for the political sphere of Egypt.[81]

77 FINCKE, 2004, pp. 235.

78 In relation to knowledge of the moon in Egypt, see the corresponding article *Shapeshifter – Knowledge of the Moon in Graeco-Roman Egypt* by Victoria Altmann-Wendling in this volume.

79 The editor of the text pWien D 6278-6289 + D 6698 + D 10111, Richard A. Parker, argues that the material must have reached Egypt sometime between 625 and 482 BCE. He hypothetically limits this date even further to the reign of the Persian King Darius I, whose reign falls into this time-span and who is probably mentioned in Text A Column IV, 10. For a detailed explanation see PARKER, 1959, pp. 29f.

80 IBID., p. 3.

81 For a detailed analysis of the text's Babylonian origin see IBID., pp. 28-34. Additionally, Victoria Altmann-Wendling extensively discusses this text in her article published in this volume.

Summary

To sum up, Babylonian and Assyrian scholars of the late second and first millennia BCE had accumulated a considerable amount of knowledge concerning the celestial bodies. For practical reasons, the moon had always been of special interest for them: it was the moon on which the Babylonian calendrical system was based, and the moon was probably one of the most important indicators in celestial divination – a profession considered vital for the prosperity of the king and his land. Therefore, the accumulation of knowledge was not only of intellectual interest, but was also actively used within the context of time perception and the science of good and evil portents.

Thereby, Babylonian scholars, and through them also their Assyrian counterparts, profited from a long, direct scientific tradition that can, at least in respect to the calendrical sphere, be traced back to Sumerian origins of the third millennium BCE. The organization of the calendar used by Babylonian and Assyrian scholars from the mid-second millennium BCE onward represents a direct inheritance from earlier periods. Even the Sumerian month-names of the formerly local calendar of Nippur were used in the script as logograms to indicate the month names of the Babylonian calendar. In the scholarly context, the idea of an idealized process of time gained influence. In the third millennium BCE, this idea was only used in the context of economic management, but at least as early as the Old Babylonian Period this conception was transferred into divinatory and other scholarly contexts.

The system of celestial divination cannot be traced back so far with as much certainty. The first texts emerge from the Old Babylonian Period onwards. It might be interesting to mention here that, conversely, celestial divination was probably the most long-living element of cuneiform literature. Even the emergence of mathematical astronomy and the accompanying discovery of the regularity of certain celestial events (including eclipses of the moon) did not put an end to the omen tradition: *Enūma Anu Enlil* was still copied in the second half of the first millennium BCE.[82] This might give a hint to the importance Mesopotamian scholars ascribed to their own traditions. This divinatory knowledge also appealed to the rest of the Near East. Hence, the knowledge was transferred from Mesopotamia to regions such as Anatolia, Syria, and, to a certain degree Egypt. In Hatti and especially in Egypt, we can

82 HUNGER/PINGREE, 1999, p. 14.

observe how the body of knowledge was not only adapted, but also transformed in order to make it fit into the local cultural and political milieu.

On the contrary, there are no hints that foreign knowledge of the moon was ever adopted by Mesopotamian scholars. The scholars sometimes wrote about the origin of texts in the colophons of tablets, but the data given there only refer to an intra-Mesopotamian exchange of tablets. No input from other regions is explicitly mentioned there so far.

Overall, from the mid-second millennium BCE onward, Mesopotamian scholars not only preserved the knowledge they inherited from earlier periods, but they also used it, worked with it, and ultimately further developed it. The best proof of this is the rise of mathematical astronomy from the middle of the first millennium BCE onward. This topic was not elaborated in this article, but it could serve as another example and a reminder that the knowledge of the moon presented here is just a glimpse on the knowledge of the moon in Mesopotamia.

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