Hermann Hunger

The So-Called Report on Seasonal Hours (K 2077+): A New Interpretation

Summary

The tablet K 2077+ was when first published taken to be an example of the use of seasonal hours in Babylonian astronomy. Since then, it has been joined to BM 54619. This article provides a new edition and discussion of the text which can now be seen to be not describing seasonal hours but can better be understood as giving a scheme for the seasonally varying motion of the sun.

Keywords: Daylight and night; seasonal hour; motion of sun and moon; astronomical report; Assyrian royal correspondence; Assyrian astronomy.

Die Tafel K 2077+ wurde bei ihrer Erstpublikation als Beispiel für die Verwendung von Temporalstunden in der babylonischen Astronomie angesehen. Inzwischen wurde sie mit BM 54619 zusammengefügt. Dieser Beitrag stellt eine Neuedition und Diskussion des Textes vor, der nun weniger als Beschreibung der Temporalstunden denn als ein Schema für jahreszeitlich variierende Sonnenbewegungen angesehen werden kann.

Keywords: Dauer von Tag und Nacht; Temporalstunden; Sonnen- und Mondbewegung; astronomischer Bericht; assyrische Hofkorrespondenz; assyrische Astronomie.

I thank the Trustees of the British Museum for permission to publish BM 54619.

John Steele, Mathieu Ossendrijver (eds.) | Studies on the Ancient Exact Sciences in Honor of Lis Brack-Bernsen | Berlin Studies of the Ancient World 44
(ISBN 978-3-9816384-5-5; URN urn:nbn:de:kobv:11-100246190) | www.edition-topoi.de

1 Introduction

The tablet K 2077+ was published by E. Reiner and D. Pingree.[1] Since then, an additional fragment (BM 54619) was joined to it (Figs. 1, 2, 3, and 4). The outline of the tablet is now almost complete; due to extensive damage of the obverse, however, the text is still only partly understandable.

The two parts of the tablet belong today to two different collections in the British Museum, one from Nineveh, the other from Babylon. However, not infrequently tablets from other findspots have ended up in these collections. The main text is written in Babylonian script and in the Neo-Babylonian variant of Akkadian. Such a tablet could have been written in Babylonia and intended to be sent to the Assyrian king. It could also have been written by a Babylonian living in Nineveh. The colophon, however, is written in Assyrian script, which was not used after the end of the Assyrian empire. Also, the dating by eponyms is characteristic of Assyria. It is therefore very likely that the tablet was finished and found in Nineveh. The eponym, Bel-šaduʾa, had the office in 650 BC.

2 Transliteration[2]

2.1 Obverse

(1) [DIŠ] ⸢*i*⸣-*na* $^{\text{itu}}$Š[U UD-15-KAM $^{\text{d}}$UTU *i-na šu-ut* $^{\text{d}}$*En-líl i-na* MURU]$\text{B}_4^{?}$ $^{\text{mul}}$AL-LUL GUB-*az ù* $^{\text{d}}$*Sin*

(2) [*i*]-*na šu-ut* ⸢$^{\text{d}}$⸣[*É-a i-na* ....] ⸢x⸣ $^{\text{mul}}$SUḪUR-MÁŠ$^{\text{ku}}{}_6$ GUB-*ma* 8 DANNA u_4-*mu* 4 DANNA GE_6

---

(3) UD-15-KAM $^{\text{d}}$UTU 1 UŠ 20 NINDA *šá* u_4-*mu* GIN-*ak-m*[*a*] ⸢2/3⸣ DANNA *qaq-qa-ru* 10 UŠ u_4-*mu ik-te-ri*

(4) *šá-ni-ti* UD-15-KAM 2/3 DANNA 50 NINDA LAL-*ṭi* GIN-*ak šá-lul-tú* UD-15-KAM 18 UŠ 20 NINDA GIN-*ak*

(5) 3 UD-15-KAM$^{\text{me}}$ GIN-*ak-ma* 1 DANNA u_4-*mu i-ker-ri šá* 3 UD-15-KAM$^{\text{meš}}$ 1 2/3 DANNA ⸢7⸣ [UŠ 30 NINDA] ⸢*a*⸣-*lak šá* $^{\text{d}}$UTU

(6) 12-*ú šá* u_4-*mu* 15 UD$^{\text{meš}}$ GIN-*ak* a ⸢x x⸣ [x x x (x)] ⸢x *i*$^{?}$ x -*ru*$^{?}$⸣-*ú* 12-*ú* ⸢10$^{?}$⸣ [x x x] LAL-*ṭi*

---

1 Pingree and Reiner 1974/1977.

2 [....] stands for a break of unspecified length; where the size of a break can be estimated, x stands for one missing sign.

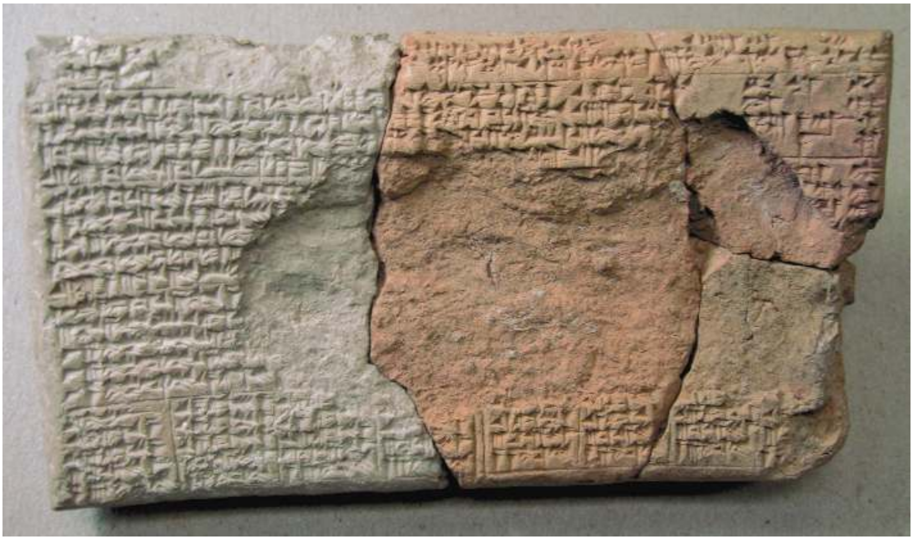

Fig. 1 K. 2077+3771+11044 + BM 54619 Obverse.

Fig. 2 K. 2077+3771+11044 + BM 54619 Obverse, left side.

(7) *ul-tu* UD-15-KAM *šá* ^{itu}ŠU EN UD-⸢30⸣-[KAM *šá* ^{itu}IZI 1 DANNA u_4*-mu* LUGUD-DA-*ma a-na* 7 DANNA u_4*-mu*] GUR-*ár*

(8) *šá* 7 DANNA 12-*šú* 17 UŠ 30 NINDA ⸢x⸣ [.... 1 DANNA u_4*-mu* LUG]UD-DA-*ma*

(9) *a-na* 6 DANNA u_4*-mu* GUR-*ár* ⸢*šá*⸣ [....] ^{itu}APIN

(10) 1 DANNA u_4*-mu* LUGUD-DA-*ma a*-[*na* 5 DANNA u_4*-mu* GUR-*ár* ....] ⸢x x⸣ [x]

(11) 12-*ú*? *šá* 3 UD-15-KAM^{meš} ⸢x⸣ [....]

---

(12) DIŠ *ina* ^{itu}AB UD-15-KAM 4 [DANNA u_4*-mu* 8 DANNA GE$_6$ ....]

(13) 3 UD-15-KAM^{meš} 10 UŠ ⸢x⸣ [....]

(14) *ina* 5 DANNA u_4*-mu* 12 U[Š 30 NINDA ....]

(15) *ina* 6 DANNA u_4*-mu* 15 UŠ [....]

(16) *ina* ⸢7⸣ DANNA u_4*-mu* 17 UŠ 30 NIN[DA ....]

(17)	2/3 DANNA	17 UŠ 30 NINDA	15 UŠ	[12 UŠ 30 NINDA
(18)	19 UŠ 10 NINDA	16 UŠ 40 NINDA	14 UŠ ⸢10⸣ NINDA	1[1 UŠ 40 NI]NDA
(19)	18 UŠ 20 NINDA	15 UŠ 20[3] NINDA	13 UŠ 20 NINDA	10 [UŠ] ⸢50 NINDA⸣
(20)	3 UD-15-KAM^{me}	3 UD-15-KAM^{me}	3 UD-15-KAM^{me}	3 UD-15-KAM^{me}
(21)	*šá* 8 KAS u_4*-mu*	*šá* 7 KAS u_4*-mu*	*šá* 6 KAS u_4*-mu*	*šá* 5 KAS u_4*-mu*

(lines 17 to 21 continued)

(17)	10 UŠ	12 UŠ 30 NINDA	15 UŠ	17 UŠ 30 NINDA]
(18)	⸢10 UŠ 50 NINDA⸣	⸢13 UŠ 20⸣[NINDA]	⸢15 UŠ⸣[50 NINDA]	18 UŠ [20 NINDA]
(19)	11 UŠ 40 NINDA	14 UŠ 10 NINDA	16 UŠ 40 NINDA	19 UŠ [10 NINDA]
(20)	3 UD-15]-KAM^{me}	3 UD-15-KAM^{me}	3 UD-15-KAM^{me}	3 U[D-15-KAM^{me}]
(21)	*šá* 4 KAS u_4*-mu*	*šá* 5 KAS u_4*-mu*	*šá* 6 KAS u_4*-mu*	*šá* 7 KAS u_4*-mu*

3 (Obv. 19) The same error occurs in rev. right col. 20 in the same number.

2.2 Reverse

2.2.1 *Right column*

(1) *an-nu-ú tal-lak-tú šá* ^{d}UTU TA KASKAL^{II} *šu-ut* ^{d}*En-l*[*íl*]

(2) EN KASKAL^{II} *šu-ut* ^{d}*É-a* TA KASKAL^{II} *šu-ut* ^{d}*É-a*

(3) EN KASKAL^{II} *šu-ut* ^{d}*En-líl* TA ^{d}UTU-È EN ^{d}UTU-ŠÚ-A

(4) TA ^{d}UTU-ŠÚ-A EN ^{d}UTU-È 12 DANNA *qaq-qar mi-šiḫ-ti a-šar-ri*

(5) *ki-ṣip-ta-šú šá-lim-ti áš-ṭur qaq-qar ul ma-al-la a-ḫa-meš šú-ú*

(6) *ut-ru ù muṭ-ṭi-e li-ik-ṣi-pu-ma liq-bu-nim-ma*

(7) *ina pi-i lu-še-eš-mi* LUGAL *i-de ki-i dib-bi an-nu-tì*

(8) *ina ṭup-pi la šaṭ-ru ù ina pi-i* UN^{me} *la ba-šu-ú*

(9) *ina ṭup-pi* ^{lú}ŠAMAN-LÁ *ul i-šem-mi-i ú-*⸢x⸣ [x x]

(10) ^{lú}SAG LUGAL *ḫat-tu-ú* ⸢*lu*⸣*-kal-li-mu* ⸢x⸣ [....]

(11) *mi-šiḫ-ti* KI^{meš} *ù bi-rit* ⸢x⸣ [....]

(12) *an-na-a-ti ina pi-i lu-šá-*[....]

(13) *tal-lak-ti* ^{d}*Sin* ^{d}UTU ^{d}UDU-IDIM^{meš} [....]

(14) *di-ri u na-dan* GISKIM *ina lìb-bi in-na*[*m-m*]*a-ru*

(15)	2/3 DANNA	15 UŠ	10 UŠ	15 UŠ
(16)	19 UŠ 10 NINDA	14 UŠ 10 NINDA	10 UŠ 50 NINDA	15 UŠ 50 NINDA
(17)	18 UŠ 20 NINDA	13 UŠ 20 NINDA	11 UŠ 40 NINDA	16 UŠ 40 NINDA
(18)	17 UŠ 30 NINDA	12 UŠ 30 NINDA [	12] UŠ 30 NINDA	17 UŠ 30 NINDA
(19)	16 UŠ 40 NINDA	11 UŠ 40 NINDA [	13 U]Š 20 NINDA	18 UŠ 20 NINDA
(20)	15 UŠ 20[4] NINDA	10 UŠ 50 [NINDA] [	14 U]Š 10 NINDA	19 UŠ 10 NINDA

(21) *tal-lak-tú šá* ^{d}UTU [x] *di-ib-bu*

2.2.2 *Left column*

(1)	16 UŠ	8 UŠ
(2)	15 UŠ 20 NINDA	8 UŠ 40 NINDA
(3)	14 UŠ 40 NINDA	*9* UŠ 20 NINDA
(4)	14 UŠ	10 UŠ
(5)	13 UŠ 20 NINDA	10 UŠ 40 NINDA
(6)	12 UŠ 40 NINDA	11 UŠ 20 NINDA
(7)	12 UŠ	12 UŠ
(8)	11 UŠ 20 NINDA	12 UŠ 40 NINDA
(9)	10 UŠ 40 NINDA	13 UŠ 20 NINDA
(10)	10 UŠ	14 UŠ
(11)	*9* UŠ 20 NINDA	14 UŠ 40 NINDA
(12)	8 UŠ 40 NINDA	15 [UŠ 20 NINDA]

(13) *an-nu-ú šá* ^{d}*Sin* DIB-D[IB x x]

(14) EN-NUN *u šit-ti lu-*[x x]

(15) *lu-še-eš-*[*mi*]

2.2.3 *Upper edge (in Neo-Assyrian script)*

(1) [.... ^{I}x]-^{d}Gu-la ^{lú}A-ZU

(2) [^{itu}x U]D-1[5]-KAM [*li*]*m-mu* ^{Id}EN-KUR-*u-a*

4 (Rev. right col. 20) The same error occurs in obv. 19 in the same number.

5 (Upper edge, 2) Or: [UD x] + 2.

Fig. 3 K. 2077 + 3771 + 11044 + BM 54619 Reverse.

Fig. 4 K. 2077 + 3771 + 11044 + BM 54619 Reverse, left side.

3 Translation

3.1 Obverse

(1) [¶] In month IV, [on the 15th day .... the sun] stands in [the (stars) of Enlil in the midd]le$^{?}$ of Cancer, and the (full) moon

(2) stands in the (stars) of [Ea in ....] Capricorn, and there are 8 *bēru* day, 4 *bēru* night.

(3) (In) 15 days, the sun goes 1 UŠ 20 NINDA (= 1° 20′) per day, and 2/3 *bēru* (= 20°) is the *qaqqaru*. 10 UŠ the day became shorter.

(4) The second 15-day (period), it goes 2/3 *bēru* less 50 NINDA (= 19° 10′). The third 15-day (period), it goes 18 UŠ 20 NINDA.

(5) 3 15-day (periods) it goes, and the day becomes shorter (by) 1 *bēru*. Of 3 15-day (periods), 1 2/3 *bēru* 7 [UŠ 30 NINDA] (= 57° 30′) is the going of the sun.

(6) One-twelfth of a day it goes (in) 15 days .... [....] .... one-twelfth [....] becomes less.

(7) From the 15th day of month IV until the 3[0th day of month V the day becomes shorter (by) 1 *bēru*, and the day] returns [to 7 *bēru*.]

(8) Of 7 *bēru*, one-twelfth (is) 17 UŠ 30 NINDA [.... the day] becomes shorter [(by) 1 *bēru*,] and

(9) the day returns to 6 *bēru* .... [....] month VIII

(10) the day becomes shorter (by) 1 *bēru*, and [the day returns to 5 *bēru* ....] .... [....]

(11) One-twelfth$^{?}$ of 3 15-day (periods) .... [....]

(12) ¶ In month X, the 15th day, 4 [*bēru* day, 8 *bēru* night ....]

(13) 3 15-day (periods) 10 UŠ .... [....]

(14) At 5 *bēru* day, 12 UŠ [30 NINDA ....]

(15) At 6 *bēru* day, 15 UŠ [....]

(16) At 7 *bēru* day, 17 UŠ 30 NINDA [....]

(17)	20°	17°30′	15°	12°30′	10°	12°30′	15°	17°30
(18)	19°10′	16°40′	14°10′	11°40′	10°50′	13°20′	15°50′	18°20′

(19)	18°20′	15°50′$^{!}$	13°20′	10°50′	11°40′	14°10′	16°40′	19°10′
(20)	3 15-days	3 15-days	3 15-days	3 15-days	3 15-days	3 15-days	3 15-days	3 15-days
(21)	of 8 *bēru* day	of 7 *bēru* day	of 6 *bēru* day	of 5 *bēru* day	of 4 *bēru* day	of 5 *bēru* day	of 6 *bēru* day	of 7 *bēru* day

3.2 Reverse

3.2.1 Right column

(1) This is the course of the sun from the path of Enlil

(2) to the path of Ea, from the path of Ea

(3) to the path of Enlil. From sunrise to sunset,

(4) from sunset to sunrise 12 *bēru qaqqaru* is the measurement of the places$^{?}$.

(5) I wrote down its complete computation. The *qaqqaru* is not equal to each other.

(6) Let them compute the excess and the deficiencies, and let them tell me, and

(7) I will let it be heard. The king knows that these words

(8) are not written on a tablet and do not exist in the mouth of people;

(9) the apprentice scribe does not hear (them) from a tablet .... [....]

(10) I will show (it$^{?}$) the Hittite$^{?}$ *ša rēš šarri*-official [....]

(11) the measurement of the places$^{?}$ and the interval [....]

(12) these I will [....] by mouth$^{?}$ [....]

(13) the course of moon, sun, planets [....]

(14) intercalations and giving of signs will be seen in it.

(15)	20°		15°		10°		15°	
(16)	19°	10′	14°	10′	10°	50′	15°	50′
(17)	18°	20′	13°	20′	11°	40′	16°	40′
(18)	17°	30′	12°	30′	12°	30′	17°	30′

(19)	16°	40′	11°	40′	‖	13°	20′	18°	20′
(20)	15°	50′!	10°	50′	‖	14°	10′	19°	10′

(21) The course which the Sun [...]....

3.2.2 *Left column*

(1)	16°		8°	
(2)	15°	20′	8°	40′
(3)	14°	40′	9°	20′
(4)	14°		10°	
(5)	13°	20′	10°	40′
(6)	12°	40′	11°	20′
(7)	12°		12°	
(8)	11°	20′	12°	40′
(9)	10°	40′	13°	20′
(10)	10°		14°	
(11)	9°	20′	14°	40′
(12)	8°	40′	15°	20′

(13) This (is) what the moon pa[sses?]

(14) Watch and sleep? let me [....]

(15) I will let [hear?.]

3.2.3 *Upper edge (across both columns)*

(1) [....]-Gula, the scribe.

(2) [Month ....,] 1st? day, eponym Bel-šaduʾa.

4 Philological notes

4.1 Obverse

(1) (2) restored in analogy to statements in $^{\text{mul}}$Apin.

(3) UD-15-KAM is to be read *šapattu*, as can be seen from the fem. adjectives in line 4.

(6) seems to say that the sun moves $^{1}/_{12}$th of a day in 15 days.

4.2 Reverse right column

(4) *a-šar-ri* seems to be an unknown word. Its measurement (*mišiḫtu*) is 12 *bēr qaqqaru*, i.e. a full circle – which is approximate for the distance from one sunrise to the next. *mišiḫtu* occurs again several lines later, followed by KI$^{\text{meš}}$. Since KI$^{\text{meš}}$ can be read *ašrī*, I propose to see in *a-šar-ri* an unconventional writing for *ašrī* (a similarly strange writing is found in *ma-al-la* for *mala* in line 5). KI is the usual term for 'place, position' in astronomical texts; it can even be translated as 'longitude' in a technical context. While *qaqqaru* is the more frequent reading of KI in late texts, *ašru* is not excluded here.

(8) *la ba-šu-ú*: *ba* here is clearly different from *ma* (e.g., in line 6) and *bašû* makes sense: the theory proposed by the writer cannot be found anywhere else.

(10) like Reiner and Pingree, I cannot explain the presence of a Hittite official here. PA-*tu-ú* yields no better meaning.

(21) This line is still in Babylonian script (see the sign *šá*), and it begins flush with the table preceding it. It is therefore not to be connected to the following two lines on the edge which are in Assyrian script (see the sign LÚ). [x]-*di-ib-bu* could be a verb in a relative clause: which the sun .... Unfortunately, I cannot find a meaningful restoration.

4.3 Reverse left column

(13) (14) maybe 'watch' is here in contrast to 'sleep' because knowing how long one has to wait for the moon means knowing when one can go to sleep.

4.4 Upper edge

A.ZU can be a logogram for 'scribe'; on the other hand, names containing Gula are likely to be those of physicians so that the more common meaning 'physician' may be intended here. Since the colophon is in Neo-Assyrian script, it may not contain the name of the writer of the main text but rather its owner. The name Arad-Gula in ABL 1109 r. 6, mentioned by Reiner, is to be read Arda-Mullissi according to collation in SAA 10, 113 r. 5.

5 Discussion

As was recognized by Pingree, the numbers in the tables at the end of obverse and reverse would be the lengths of seasonal hours measured in UŠ. This implies that UŠ is intended to be a measure of time. If we had only the table, this would be a convincing explanation, especially since there is another text apparently giving seasonal hours, the Ivory Prism BM 123340 in the British Museum.[6] However, there are problems with the statements in the second section of the obverse (which were not known to Pingree). Here the sun is explicitly said to move (GIN-*ak* etc.). The section starts with the daily movement of the sun at the time of the summer solstice, which is given as 1 UŠ 20 NINDA. Line 3 further states that the amount by which the sun moves in the 15-day period following the summer solstice is 2/3 *bēr qaqqaru*. *qaqqaru* cannot be explained as a time measurement because it would be superfluous. Also, all other passages with *bēr qaqqaru* in other texts refer to distances, not to time spans.[7] The following lines make a clear distinction between time and distance, in spite of using the same units UŠ and NINDA (UŠ and *bēru* are originally length measures which are also used for time).

2/3 *bēru* time is equivalent to 80 of our minutes, which is the length of one seasonal hour at summer solstice, under the assumption of a ratio of 2 : 1 of the longest to the shortest daylight. But 2/3 *bēru* is also, according to our text, the distance traveled by the sun in the 15 days after summer solstice. In line 6, this numerical equivalence is even explicitly stated: one-twelfth of a day (the sun) goes (in) a 15-day period. Unfortunately, the rest of the line is too broken to be understood. In line 8 one-twelfth of the duration of daylight, 7 *bēru*, is again taken to be the distance traveled by the sun; here too the rest of the line is unfortunately missing. It should however be remembered that at the beginning of the description of the sun's course in line 3 (see above) a daily movement of 1 UŠ 20 NINDA, which is obviously one-fifteenth of 2/3 *bēru*, is attributed to the sun. This is not related to a time interval.

6 Hunger and Pingree 1999, 112–115 (with earlier literature).

7 CAD, Vol. 13, Q, 117a–119a, s.v. *qaqqaru* A mng. 3; CAD, Vol. 2, B, 209b–210a, s.v. *bēru* A s. mng. 1b.

The movement ('going') of the sun cannot be an amount of time; it has to move a certain distance. One could assume that the distance is meant which the sun moves in one-twelfth of a day (i.e. one seasonal hour). But this would be just a part of the daily movement parallel to the equator.

In the second section of the text, the movements of the sun in each of the three 15-day periods are added up to its movement in 45 days.

Following this pattern one can add all the numbers in the table, and one arrives at 360 UŠ, or one full circle. In the right column of the reverse the 'measurement' of the daily movement of the sun from sunrise to sunrise is given as 12 *bēr qaqqaru* or 360°. *qaqqaru* here is clearly a distance. This supports the interpretation of *qaqqaru* in obv. 3 that the numbers of the table are not seasonal hours but distances which the sun is assumed to move, arranged by 15-day periods.

If the text had wanted to describe seasonal hours, there would have been no need to explain the sun's movement in distance. A table similar to those in Enūma Anu Enlil XIV would have sufficed. But in this text the decrease in the duration of daylight is taken as justification for the decreasing distance which the sun supposedly moves in a 15-day period.

The first lines of the reverse can be seen as a description of the path of the sun both in the ecliptic (from the path of Enlil to the path of Ea and back) and parallel to the equator (from sunrise to sunset to sunrise). Both are circles (approximately) and therefore 360° or 12 *bēru* in length.

Under the assumptions that

1. the course of the sun in one year equals 12 *bēru*
2. the ratio of longest to shortest daylight is 2 : 1
3. the velocity of the sun varies proportionally to the duration of daylight

then the distances which the sun travels in 15-day periods must be those given in the table.

Whether this was the reasoning of the author can however be doubted.

If one expresses the velocity of the sun in a varying time unit, in our text in one-twelfth of daylight, then the distance traveled by the sun will necessarily vary with the duration of daylight. Due to the relation between the units, the numbers for one-twelfth of daylight and for the sun's progress in 15 days are the same. This need not be deliberate; the duration of daylight is given at 15-day intervals already in $^{\mathrm{mul}}$Apin and EAE XIV. However, one-twelfth of daylight, i.e. one seasonal hour, is unusual for Mesopotamia. The question is whether it really is intended as a unit for time measurement. The text considers the result of dividing the duration of daylight by 12 as the 'going of the sun', i.e. as a distance.

One can object to this mixing of time and space measurement. I do however draw attention to the easy interchanging of months and zodiacal signs in (admittedly later) astronomical texts.

Due to damage on the obverse of the tablet, the reasoning of the author (if anything of this kind was written there) cannot be reconstructed. In my interpretation, he assumed that the sun moves in the ecliptic twice as fast at summer solstice than at winter solstice. This may seem unbelievable; but the assumption of a ratio of 2 : 1 between longest and shortest daylight is also far off the real values.

It is not surprising that the author insists that his knowledge is found nowhere else (rev. 7–9). Unfortunately, the applications of his theory for the calendar (intercalations) and for omens, to which he refers in rev. 10–14, are not clear because of breaks in the tablet.

5.1 Reverse left column

This contains another table,[8] this time varying between a maximum of 16 UŠ and a minimum of 8 UŠ. There are twice 12 lines, so that the difference from line to line is 2/3 UŠ or 40 NINDA. As mentioned in the subscript, this table refers to the moon. The values correspond to tables in $^{\text{mul}}$Apin (II ii 43–iii 12)[9] or tablet XIV of Enūma Anu Enlil (table D)[10] giving the interval from sunset to moonset at new moon, and from sunset to moonrise at full moon, respectively, for every month of a schematic year.

8 Already mentioned in Hunger and Pingree 1999, 115–116.

9 Hunger and Pingree 1989, 101–103.

10 Al-Rawi and George 1991/1992, 58–59.

Bibliography

CAD
Martha T. Roth, Erica Reiner, et al., eds. *The Assyrian Dictionary of the Oriental Institute of the University of Chicago*. 26 vols. Chicago: Oriental Institute of the University of Chicago, 1956–2011. URL: http://oi.uchicago.edu/research/pubs/catalog/cad (visited on 17/7/2017).

Hunger and Pingree 1989
Hermann Hunger and David Edwin Pingree. *MUL.APIN: An Astronomical Compendium in Cuneiform*. Archiv für Orientforschung, Beiheft 24. Horn: Ferdinand Berger & Söhne, 1989.

Hunger and Pingree 1999
Hermann Hunger and David Edwin Pingree. *Astral Sciences in Mesopotamia*. Handbuch der Orientalistik, 1. Abt., Nr. 44. Leiden, Boston, and Köln: Brill, 1999. DOI: 10.1163/9789004294134.

Pingree and Reiner 1974/1977
David Edwin Pingree and Erica Reiner. "A Neo-Babylonian Report on Seasonal Hours". *Archiv für Orientforschung* 25 (1974/1977), 50–55. URL: http://www.jstor.org/stable/41636303 (visited on 17/7/2017).

Al-Rawi and George 1991/1992
Farouk N. H. Al-Rawi and Andrew R. George. "Enūma Anu Enlil XIV and Other Early Astronomical Tables". *Archiv für Orientforschung* 38/39 (1991/1992), 52–73. URL: http://www.jstor.org/stable/41670052 (visited on 17/7/2017).

Illustration credits

1–4 Courtesy of the Trustees of the British Museum.

HERMANN HUNGER

had been Professor of Assyriology at Universität Wien, until his retirement in 2007. He is an expert on Babylonian astronomy and celestial omens. He is member of the American Philosophical Society and the Austrian Academy of Sciences. In 2010 he became a honorary member of the American Oriental Society. He is co-editor of the *Archiv für Orientforschung*. His research focuses on cuneiform sources from Mesopotamia from the 1st millennium BC, especially astronomical texts.

Prof. Dr. Hermann Hunger
Universität Wien
Institut für Orientalistik
Spitalgasse 2, Hof 4
1090 Vienna, Austria
E-mail: hermann.hunger@univie.ac.at