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Astral Science in Uruk during the First Millennium BCE: Libraries, Communities and Transfer of Knowledge

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Uruk ist der einzige Ort neben Babylon, wo alle Kategorien der babylonischen Sternkunde durch Keilschrifttafeln belegt sind. Obwohl die Anzahl dieser Tafeln deutlich geringer ist als in Babylon, sind sie besser geeignet für archivorientierte, kontextuelle und diachronische Fragestellungen, weil ihr archäologischer Kontext vergleichsweise gut dokumentiert ist. In Uruk ist die babylonische Sternkunde am vollständigsten im Rēš-Tempel der späten Seleukidenzeit belegt. In diesem Beitrag werden drei Bibliotheken in Uruk mit sternkundigen Tafeln aus der Zeit davor untersucht: die Bibliothek des Eanna-Tempels, die Bibliothek von Anu-ikṣur und seiner Familie und diejenige von Iqīšâ und seiner Familie. Ziel der Untersuchung ist es, die Beteiligung der Gelehrtenkreise Uruks an den unterschiedlichen Bereichen der Sternkunde, sowie die Entwicklungen und der Wissenstransfer in der Sternkunde für Uruk im ersten Jahrtausend v. Chr. zu rekonstruieren.

Uruk is the only other site apart from Babylon where all major categories of Babylonian astral science[1] are represented in cuneiform tablets. Although the number of tablets from Uruk with astral science is small compared to Babylon, they are especially relevant for reconstructing the context, development and transmission of astral science during the 1st millennium BCE. This is because most tablets from Uruk were excavated scientifically, unlike those from Babylon. Hence we know, albeit to varying degrees of precision, at which locations and in which stratigraphical layers they were found[2] – information that is essential for the present investigation.[3] In Uruk, the

1 Astral science here designates any scholarly activity involving the observation, prediction or interpretation of celestial phenomena, i.e. it includes all textual genres concerned with astronomy, astrology or celestial divination.

2 For the findspots of the tablets from Uruk cf. Finkbeiner (1993) and Kose (1998, 421–555).

3 For about 10 tablets from Babylon that may contain astral science the archaeological context is known. They were excavated by R. Koldewey in a what has been interpreted as a private house located about 60 m to the west of the Išḫara temple (library N19 in Pedersén 2005). This interpretation has been contested by Clancier (2009, 149–150), who argues that it is an institutional building.

full range of Babylonian astral science is best represented in the Late Seleucid library of the Rēš, temple of the skygod Anu. Since this library and the scholars associated with it have been the subject of detailed investigations,[4] the focus is shifted here to libraries from the preceding Neo Babylonian, Achaemenid and Early Seleucid periods. Three libraries in Uruk that predate the Rēš have yielded tablets with astral science: the library of the Eanna temple, that of Anu-ikṣur and his family and that of Iqīšâ and his family, two private libraries located in the same house (fig. 1). While all three have been surveyed elsewhere in the literature, the present contribution attempts to trace the development and the transfer of Babylonian astral science in and between these libraries in more detail.

Babylonian astral science in the Neo-Babylonian and early Achaemenid periods

Before addressing these topics, the main categories of Babylonian astral science from the 1st millennium BCE are briefly characterized. Celestial divination, the traditional form of Mesopotamian astral science inherited from the 2nd millennium BCE, is attested in Babylon, Uruk and elsewhere through the omen series *Enūma Anu Enlil* (EAE), ‚When Anu and Enlil', and *Iqqur īpuš*, ‚He demolished and built', and various commentaries associated with them. Only little is known about the usage of celestial divination by Babylonian kings, because their libraries, which presumably contained astrological reports similar to those from Assurbanipal's library in Nineveh (Hunger 1992), have not been discovered. The omen series continued to be copied even after the Persian conquest in 539 BCE, even though there was little practical use for them in the absence of a Babylonian king. Moreover, even in the Seleucid era EAE inspired the production of new commentaries (Frahm 2011, 333–335).

Between 750 BCE and 330 BCE the astral sciences underwent several profound changes in Babylonia. Numerous tablets, mainly from Babylon and Uruk, document innovations in the areas of observation, prediction and interpretation of celestial phenomena. Astronomical diaries and related texts are products of a systematic program of observation and prediction, henceforth referred to as the ‚diary project' which continued, probably without major interruptions, from the 8th century BCE until the 1st century AD. More than one thousands of such texts, dwarfing all other genres of Babylonian astral science, were found in Babylon; only a few dozen in Uruk and Nippur. Diaries, the most common subgroup, are 6-monthly compilations of astronomical, meteorological, economic and historical data (Sachs/Hunger 1988–1996). The oldest known diary dates to 652 BCE, but the diary project probably began near 750 BCE, during the reign of Nabonassar. Diaries imply a complex data management operation in which short-term reports with different types of data obtained from dif-

4 Cf. Hunger (1968), Beaulieu (2000), Pearce/Doty (2000), Frahm (2002), Pedersén (1998), Rochberg (2004, 229–236), Ossendrijver (2011a, b).

ferent scholars were collected, evaluated, processed and compiled into the desired format. This required the collaboration of a rather large number of scholars, say 5–15, at any given time.[5] Compilations of selected data covering longer periods of time were also excerpted from the diaries (Hunger/Sachs 2001).

Diary-type texts differ from the astrological reports from Nineveh (Hunger 1992) in terms of the selection of phenomena, the style of reporting and their immediate purpose. Some of the reported astronomical phenomena did not play any role in celestial divination.[6] In diary-type texts, phenomena are not reported in the form of omen quotations, but in a standardised, technical terminology largely devoid of metaphors. Furthermore, the immediate purpose of these texts is astronomical prediction rather than the interpretation of signs. By about 600 BCE, a simple but effective method had been developed by which nearly all of the reported astronomical phenomena could be predicted. This so-called Goal-Year method exploits that lunar and planetary phenomena repeat near the same celestial position and calendar date after a certain period which is different for each planet (e.g. 8 years for Venus or 18 years for the Moon).[7] Three types of compilations with astronomical predictions for a future calendar year were derived from the diaries by this method: Goal-Year texts (Hunger 2006), Almanacs, and Normal-Star Almanacs (Hunger 2014), all attested from the Seleucid era onwards. Even though diary-type texts are mainly concerned with reporting and predicting astronomical phenomena, this was not their ultimate purpose. The juxtaposition of astronomical and terrestrial data in the diaries and certain astrological procedure texts suggest that astrological prediction of terrestrial phenomena was the ultimate purpose of the diary project, apart from a possible role in regulating the calendar (Ossendrijver 2011c).

The library of the Eanna

The Eanna, temple of Ištar, was home to the largest known cuneiform archive in Uruk from the 1st millennium BCE. More than 12,000 tablets and fragments, nearly all economic and legal documents dating between year 1 of Nabopolassar (625/4 BCE) and year 29 of Darius I (493/2 BCE), were excavated in the 1920s and 1950s by Ger-

5 An administrative text from Achaemenid Babylon lists 14 astronomers as receivers of rations from the Esagila temple (Beaulieu 2006).

6 For instance some of the Lunar Six, six time intervals delimited by the rising or setting of the Sun and that of the Moon near New Moon or Full Moon. For their definition cf. Sachs/Hunger (1988). Only three of them (NA, NA_N and KUR) are known from the omen literature, e.g. EAE Tablet 14.

7 For the Goal-Year method cf. Brack-Bernsen (2002), Hunger (2006). For the earliest attestation of this method cf. Huber (2007).

man archaeologists or acquired through the antiquities market by various museums.[8] The latest tablets from this archive date from 493 BCE which constitutes a terminus post quem for the final destruction and irrevocable loss of the Eanna, one of the oldest and most eminent cultic institutions of Mesopotamia. Among the economic and legal documents, about 250 fragments of scholarly tablets were found at four different locations in the northeastern part of the complex (Falkenstein 1931). They constitute the sparse remains of a rather comprehensive scholarly library. Along with astral science, most branches of Mesopotamian scholarship, except mathematics, are represented on these tablets: lexical lists, extispicy, terrestrial omens, birth omens, hemerologies, medical texts, incantations and mythology. A selection of 136 fragments were published by Falkenstein (1931), including 18 tablets with astral science. The latter can be divided into the following groups. The celestial omen series EAE is represented by up to 14 fragments concerning the Moon (5),[9] Venus (3),[10] Jupiter (1),[11] stars (1), weather (1), and unidentified phenomena (4)[12]. Two fragments with lunar omens belong to the hemerological series *Iqqur īpuš*[13] and one fragmentary commentary concerns Venus omens that may belong to EAE.[14] Finally, one tablet preserves a part of MUL.APIN, ‚Plow Star', the well-known compendium of astral science (Hunger/Pingree 1989).[15] This copy of MUL.APIN is unique in that the entire composition is written on a single tablet instead of the usual two. About 40 small fragments with astral science mentioned in Falkenstein (1931), probably all celestial omens, remain unpublished.[16]

A comparison between the astral corpus from the Eanna and that from Babylon reveals a notable difference. All the Eanna fragments belong to traditional series

8 For the Eanna archive cf. Gehlken (1990, 1996), van Driel (1998), Pedersén (1998, 205–206), Jursa (2005, 138–139), Kleber (2008). It is difficult to estimate the size of the Eanna archive, since very different numbers of tablets are quoted in the literature. The number of 12,000 tablets and fragments is obtained as the total of 6,000 found in the 1928/9 campaign, 4,000 from the campaigns of the 1950s, and some 2,000 from illicit excavations, as mentioned in Pedersén (1998, 205). However, Beaulieu (2003, 3), quotes the number of fragments from illicit excavations kept in Yale and Princeton alone as 6,200, which would yield a total of 16,200 fragments.

9 *LKU* 108 (Verderame 2002, 167, Text m) = excerpt of EAE T. 6; *LKU* 105, 106 = EAE T. 12; *LKU* 11[illegible]bat 1965, §§70–74, 78; Rochberg 1988, 154–155) = EAE T. 18 (lunar eclipses).

10 *LKU* 10[illegible]haps EAE T. 55; *LKU* 103 (Reiner 1998, 110, Text C), *LKU* 110 (Reiner 1998, 110, Text L).

11 *LKU* 109 (Reiner 2005, 59, Text A): perhaps a tablet of EAE.

12 Stars: *LKU* 112; weather: *LKU* 107; unidentified celestial omens: *LKU* 114, 116, 117, 118, 120.

13 *LKU* 119 (Labat 1965, §69).

14 *LKU* 111 (Reiner 1998, 257; Frahm 2011, 289).

15 *AUWE II* 204a+AO 7540+LKU 113. The latter two fragments were published by Hunger/Pingree (1989) as Text E; for the join with *AUWE II* 204a cf. Ossendrijver (2012b).

16 Falkenstein (1931), 1. As far as known, all of these fragments contain celestial divination (M. Hilgert, private communication). After having been rediscovered in the Vorderasiatische Museum (Berlin) in recent years, an edition by M. Hilgert is forthcoming.

composed before 1000 BCE. Astronomical diaries and related texts, attested in Babylon in small numbers after 652 BCE and in large numbers after 385 BCE, are completely lacking. In what follows, evidence will be presented that scholars associated with the Eanna pursued astronomical activities related to the diary project and had access to diary-type texts. Furthermore, it will be argued that they probably wrote such texts themselves, like their colleagues in Babylon.[17]

A first indication that scholars associated with the Eanna carried out celestial observations is contained in five astrological reports sent by the scholar Aḫḫēšâya from Uruk to king Esarhaddon (681–669 BCE) in Nineveh (Oppenheim 1969).[18] The celestial omens quoted by Aḫḫēšâya imply that he had observed the Moon, Venus, Mars and weather phenomena. Probably the same Aḫḫēšâya is the author of two letters to the Assyrian king, one of which contains a greeting on behalf of the Eanna.[19] Hence at least one scholar associated with the Eanna carried out celestial observations by the end of the 7th century BCE. Aḫḫēšâya is the only scholar from Uruk known to have sent such reports, but there were probably more of them.[20] One letter to Esarhaddon, *SAA* X 114, sent by Bēl-ušēzib, a colleague of Aḫḫēšâya who may have lived in Sippar (Oppenheim 1969, 104), also refers to celestial observations in Uruk. Note that in Babylon both astrological reports and diary-type texts were being produced at that time.[21] Furthermore, from the Seleucid era onwards several scholars from Babylon and Uruk were active in both categories of astral science. It is conceivable that this was also true in Uruk during the 7th century BCE, and that Aḫḫēšâya and his colleagues produced diary-type texts.

Some 150 years later an indication of astronomical activities more closely connected to the diary project is contained in two tablets from the Eanna archive with protocols of the temple council concerning a lunar eclipse ritual conducted in Uruk and Larsa in the 8th year of Cyrus (Beaulieu/Britton 1994). On day 13 of month III in that year (15 June 531 BCE), a lunar eclipse was expected but did not occur, thereby rendering the ritual superfluous, which led to the protocols. What concerns us here is that this implies knowledge of a method for predicting eclipses. As shown by Beau-

17 For a different interpretation of the evidence for astronomical observations in Uruk see Steele (forthcoming a),

18 For these reports cf. now *SAA* VIII, Nos. 449–453. Two of them have been dated astronomically to 674 BCE (No. 451) and 672 BCE (No. 452), near the end of Esarhaddon's reign. As pointed out by Oppenheim, Aḫḫēšâya is also mentioned in the unsigned report RMA 124 (*SAA* VIII, No. 517).

19 *ABL* 965 and *ABL* 1062 (Oppenheim 1969, 102). For *ABL* 1062 cf. now *SAA* XVIII, No. 79.

20 Approximately 900 tablets with celestial divination from the library of Assurbanipal, including 333 reports, employ the Babylonian script and were thus written by Babylonian scholars (Fincke 2003/4, Appendix). It seems likely that in addition to Aḫḫēšâya at least some of these scholars also originate from Uruk.

21 None of the extant astrological reports from Nineveh was demonstrably sent from Babylon, but it is very likely that scholars in Babylon wrote such reports (Oppenheim 1969, 103–104).

lieu and Britton, a lunar eclipse possibility would indeed be predicted for that month if the astronomers in Uruk used the same method which their colleagues in Babylon are thought to have used since the 8th century BCE. According to this method, 38 eclipse possibilities, of which only some will turn out to be observable eclipses in Babylonia, are distributed over one saros period of 18 years according to a fixed pattern. The protocols therefore suggest that this method, which is closely related to the diary project, was known to the astronomers of the Eanna, which supports the assumption that they had access to diaries and related texts.

Further evidence follows from the presence of two diary-type compilations of planetary phenomena from the time of the Eanna in the later library of Anu-ikṣur or Iqīšâ (Table 1).[22] *SpTU* 4 171 contains data for years 28–31 of Nebukadnezzar;[23] *SpTU* 1 100 for the reigns of Nabonidus, Cambyses and Darius I. Whether or not they were originally compiled before the end of the Eanna archive or after it, they imply a transfer of diary-type reports from the time of the Eanna.[24] A third fragment from the library of Anu-ikṣur, *SpTU* 4 169, belongs to a table of computed solstices partly overlapping with the time of the Eanna. Such tables were probably computed near their initial date. All three tablets contain astronomical data that are considerably older than the library in which they were found and must therefore originate from another location. There is no direct evidence that the Eanna was the source of these data, but it is significant that two scholarly tablets from the library of Anu-ikṣur, *SpTU* 3 66 and *SpTU* 4 127, both belonging to the ritual series *Bīt rimki*, ‚Bath house', can be traced back to the Eanna on account of the phrase *gabarê*(GABA.RI) *lē'i*(^{giš}DA) *makkur*(NIG$_2$.GA) *E$_2$-an-na* „copy of a wooden board, property of the Eanna", in their colophon. Both were copied by Šamaš-iddina, the father of Anu-ikṣur, from wooden boards which were, at one time, in the property of the Eanna.[25] The three mentioned astronomical tablets might also have been copied from tablets or wooden boards from the Eanna, or themselves originate from there.[26]

22 Note that the three listed diary-type excerpts from *SpTU* are not included or mentioned in *ADRT* V (Hunger/Sachs 2001), an otherwise complete edition of such texts.

23 No name of a ruler or era is preserved on this fragment. Originally von Weiher and Hunger (*SpTU* 4) suggested Nebukadnezzar or the Seleucid era, but subsequently Hunger (2000) has ruled out the latter. For an astronomical analysis of this tablet see de Jong (2002).

24 Such compilations were probably written not long after the final observations contained in them. Since both tablets are broken at the end, the final date is not preserved; hence only lower bounds can be given for the time of writing.

25 These wooden boards must have been inscribed before 493/2 BCE, while Šamaš-iddina was probably active in 445–425 BCE. Remarkably or not, they remained legible for at least 50–70 years, but the original of *SpTU* 3 66 was in a bad shape, given the numerous instances of *ḫepi eššu*, „broken anew".

26 The only other known source of the tablets in the library of Anu-ikṣur is Babylon. There is reason to believe that these tablets were at one time stored in the Eanna library (cf. below).

Tablet	Origin	Type	Astronomical Data
SpTU 4 171	Anu-ikṣur/Iqīšâ library	diary-type excerpt: Saturn	Nbk 28–31 (577–574 BCE)
SpTU 1 100	Anu-ikṣur library	diary-type excerpt: planets	Nbn-Dar I (555–486 BCE)
SpTU 4 169	Anu-ikṣur/Iqīšâ library	computed solstices	Nbk-Nrg (604–506 BCE)
ADRT I -463	Rēš library	diary	Artx I yr 1 (464 BCE)
SpTU 5 267*	Anu-ikṣur/Iqīšâ library	diary-type excerpt: Mercury	Artx I yr 2–3 (463–462 BCE)
SpTU 5 268**	Anu-ikṣur library	diary-type excerpt: planets	Artx I yr 1–4 (464–461 BCE)

Table 1. Tablets from later libraries with astronomical data from the time of the Eanna or shortly after it.[27]
* For the astronomical dating of this tablet see Steele (forthcoming c).
** For the astronomical dating of this tablet see Hunger (2015).

The evidence presented here suggests that astronomical diaries and related texts were available to scholars of the Eanna. As to the question why they were not found in the Eanna, two possible answers offer themselves. If diary-type texts were at one time stored in the Eanna, their absence could be a consequence of selection procedures underlying the formation of the archive when the Eanna was abandoned. According to van Driel (1998), the bad state of preservation, typology and content of many economic and legal documents from the Eanna suggest that they no longer had any practical relevance and were purposely discarded, constituting a ‚dead archive'. Documents that were still important at that time were apparently transferred elsewhere, leaving no trace in the Eanna. A similar procedure might have been applied to the scholarly tablets, since those that were found in the Eanna were likewise in a bad shape and appear to have been discarded (Falkenstein 1931). Furthermore, it would make perfect sense, from a purely practical point of view, for the astronomers to salvage diary-type texts with a higher sense of urgency than the omen tablets. The availability of a complete sequence of diary-type texts going back several decades is essential for making astronomical predictions with the Goal-Year method, which requires for every prediction a recorded observation of the same phenomenon. This could explain why diary-type texts with data from the time of the Eanna were transferred to subsequent libraries (Table 1). However, one would still expect to find at least a few discarded, damaged fragments of diary-type texts in the Eanna, but none have been found. Hence this explanation must remain hypothetical for the moment.

27 Nbk = Nebukadnezzar II, Nbn = Nabonidus, Dar = Darius, Nrg = Neriglissar, Artx = Artaxerxes.

A second explanation, which seems more probable on the available evidence, is that diary-type texts were not kept within the Eanna complex, but in one or more separate scholarly libraries that have not been found. The existence in Uruk of scholarly libraries separate from the main temple would be analogous to the situation in Babylon, where most tablets with astral science, including virtually all known diaries and related texts, were found in unscientific excavations in the area Amran, outside the Esagila temple, which remains unexcavated. In the same area, R. Koldewey excavated tablets with astral science in a structure that may have been an institutional building associated with the Esagila (Clancier 2009, 150). This library, labeled N 19 by Pedersén (2005), is probably a source of numerous tablets with astral science excavated in the 19th century. It therefore seems possible that diary-type texts were not stored within the Eanna, but in a separate building or private houses. Some time after the demise of the Eanna, they were removed, which explains the presence of such texts with data from the time of the Eanna in subsequent libraries (Table 1). As mentioned earlier, mathematical tablets are conspicuously lacking from the Eanna archive along with the diary-type texts. This supports the second explanation, because they may have been stored in the same library, as appears to be the case in Babylon.

In order to learn more about the scholars of the Eanna one might hope to find references to them in the Eanna archive, but they are very rare (Kümmel 1979). In one of the mentioned protocols concerning the eclipse ritual, *YOS* 7 71, three members of the Sîn-lēqi-unninni clan are referred to as "lamentation priests (*kalû*) of the Lady of Uruk" (^{lú}GALA.ME *ša*$_2$ ^{d}GAŠAN *ša*$_2$ UNUG^{ki}), i.e. of the Eanna. Some are named in the few preserved colophons of the scholarly tablets.[28] One bilingual incantation was written by a member of the Ekur-zākir clan.[29] Both clans, Sîn-lēqi-unninni and Ekur-zākir, were rooted in Uruk and would continue to play a dominant role in its intellectual life throughout the Seleucid era.[30] In the Eanna archive, native Urukean families are identifiable on account of their preference for names based on Ištar, Anu or Šamaš, the gods of Uruk and Larsa, while the northern Babylonian families often chose names containing Marduk, Bēl or Nabû, the gods of Babylon and Borsippa, as a theophoric element (Kessler 2004). In the colophons of the scholarly tablets, the northern Babylonian names clearly predominate.[31] This strong presence of northern Babylonian families among the elites of Uruk, a well-established feature of the Eanna archive as a whole, produced favorable conditions for the exchange of knowl-

28 Thirteen legible colophons of the scholarly tablets from the Eanna were edited in *BAK* (Hunger 1968, Nos. 74–86).

29 *LKU* 21 (BAK 79).

30 For the Sîn-lēqi-unninni clan during the Neo Babylonian and Achaemenid periods cf. Beaulieu (2000).

31 Examples are Bēl-jû (*BAK* 78), Nabû-šuma-iddina (*BAK* 76), Itti-Marduk-balāṭu (*BAK* 81), Lābaši-Marduk (*BAK* 82), all personal names; northern Babylonian clan names are not preserved in these colophons.

edge between Babylon and Uruk. Several tablets from the Eanna labeled as copies of originals from Babylon and Borsippa document a transfer of scholarly knowledge to Uruk from these cities.[32] It appears altogether likely that the diary project traveled in the same direction. At face value, the large number and the temporal distribution of the diary-type texts from Babylon and suggest that the diary project was initiated in Babylon, the political and intellectual center of Babylonia.

Although the demise of the Eanna cannot yet be reconstructed and explained in detail,[33] it is probably not a coincidence that the final stage of it more or less coincides with the end of numerous Babylonian private archives near year 2 of Xerxes (Joannès 1995). This phenomenon has recently been explained as a removal from power, possibly including deportation, of Babylonian elites that were considered to be sympathetic with two uprisings against Achaemenid rule in that year (Waerzeggers 2003/4, Kessler 2004).[34] Northern Babylonian cities including Babylon, which appears to have been at the center of the uprisings, were most strongly affected by the measures of the Achaemenid authorities. The end of the Eanna is probably also related to these measures, which were mainly directed at the northern Babylonian families, who were prominent in the Eanna archive and now suddenly disappear from the scene. Subsequently, families of Urukean origin regain their hold on the cultic and economic life of the city, bringing about a reorientation on local traditions.[35] One expression of this development is the increasing popularity of names based on Anu, Ištar, Nanāya and Šamaš, the gods of Uruk and Larsa, replacing Bēl/Marduk and Nabû.[36]

The last three tablets in Table 1 contain astronomical data that postdate the Eanna by about three decades. *ADRT* I -463, a diary for year 1 of Artaxerxes I (464/3 BCE), was found in the Rēš library and must have been copied or transferred[37] from another

32 Originals (*gabarê*) from Babylon: *LKU* 54 (*BAK* 86), a hemerology; *LKU* 65 (*BAK* 84), diagnostic omens; from Borsippa: *LKU* 133 (*BAK* 75), extispicy; from an illegible city: *LKU* 61 (*BAK* 74), a medical text.

33 The definite end of the Eanna archive near year 29 of Darius I was preceded by a sharp reduction of the number of tablets after year 2 of Darius I. It therefore appears that the demise of the Eanna proceded through a sequence of distinct events in the decades before year2 of Xerxes. Van Driel (1998) has suggested that the decline in year 2 of Darius I resulted from a rearrangement of the archive undertaken after a corruption case involving a temple servant named Gimillu (cf. also Jursa 2004).

34 The uprisings were led by Šamaš-ēriba and Bēl-šimanni, respectively. They were previously often dated to various other regnal years of Xerxes (Waerzeggers 2004).

35 These developments are mirrored in other Babylonian cities and were probably supported by the Achaemenid authorities, because the resulting fragmentation of Babylonian power reduced the risk of further uprisings.

36 Oelsner (1978, 1981), Stolper (1990), Beaulieu (1992, 55).

37 Since the reported observations occurred more than two centuries before the Rēš library came into being, the tablet is most likely a copy. Note however that the preserved part does not contain any instance of *ḫepi*, ‚broken'.

library. SpTU 5 268 is a planetary excerpt with data from the same period, namely years 1–4 of Artaxerxes I (464/3–461/0 BCE). It was copied from a damaged original, as indicated by an instance of *ḫepi ešše*, ‚newly broken', and this original was itself a copy, as indicated by an instance of *ḫepi*, ‚broken'. Apparently the events during year 2 of Xerxes did not interrupt the availability of diary-type texts in Uruk. This is analogous to the situation in Babylon, where diary-type texts continued to be written throughout the reigns of Xerxes and his successor Artaxerxes I.[38] Hence the astral sciences were not significantly disturbed by the political upheavals, neither in Babylon nor in Uruk. If anything, they appear to have been pursued with increased intensity in both cities towards the end of the 5th century BCE. In Uruk, the loss of the Eanna was followed by a shift of the cultic focus from Ištar towards the skygod Anu, who became head of the local pantheon in the course of the 5th century BCE (Beaulieu 1992). Subsequent developments near 400 BCE suggest that the astral sciences may well have benefited from this reform.

Babylonian astral science in the late Achaemenid and Seleucid periods

Two further major innovations of the astral sciences occurred in the late Achaemenid era. Near 400 BCE Babylonian astronomers introduced the zodiac, a division of the Sun's path into 12 sections of 30 degrees, each of which was named after a nearby constellation.[39] In the course of several decades, mathematical astronomy emerged as a new method for predicting essentially the same astronomical phenomena as possible with the Goal-Year method. Mathematical astronomy is attested in Babylon and Uruk in the form of numerical tables for the Moon, the planets and the Sun, and procedure texts with the corresponding computational instructions.[40] Most tablets date after 330 BCE and reflect the fully developed stage of the algorithms, which was reached by about 350 BCE. Near 400 BCE new forms of astrology based on the zodiac were also invented. Microzodiac texts and calendar texts employ an astrological division of each zodiacal sign and the month associated with it into twelve segments that are named after the zodiacal signs.[41] Horoscopes, procedures for predicting weather and market prices and other astrological texts testify to an increasing interest in the prediction of terrestrial phenomena through their assumed correlations with astronomical phenomena. The latter could be predicted either with the exist-

38 Although no astronomical diaries from the reign of Xerxes have been found, numerous eclipse reports from his reign are preserved. The fragmentary saros text BM 32234 (*ADRT* V 4) preserves lunar eclipse reports from years 3 and 21; the so-called Text S (Aaboe *et al.* 1991) contains reports of solar eclipse possibilities from year 11 of Xerxes to year 8 of Artaxerxes II.

39 Britton (2010) has shown that the zodiac was probably introduced no earlier than about 400 BCE, some 50 years later than commonly assumed in the literature.

40 For this corpus see Neugebauer (1955) and Ossendrijver (2012a).

41 For the calendar texts see Weidner (1967).

ing Goal-Year method or with the newly developed algorithms of mathematical astronomy. Furthermore, various branches of science, e.g. medicine and extispicy, were combined with astrology in this period. In Uruk, three libraries contain evidence for these innovations, the earliest one being that of Anu-ikṣur.

The library of Anu-ikṣur

The house of Anu-ikṣur, a diviner (^{lú}MAŠ.MAŠ = *mašmaššu* or *āšipu*) of the Šangû-Ninurta clan, was excavated to the east of the main temples (fig. 1).[42] At least 131 tablets and fragments can be assigned to this library on archaeological or internal criteria (Clancier 2009). For some 120 further tablets and fragments found in a mixed archaeological context it is uncertain whether they belong to the library of Anu-ikṣur or to that of Iqīšâ (cf. below). Three generations of diviners – Anu-ikṣur, his brother Rīmūt-Anu, their father Šamaš-iddin and Anu-ikṣur's son Anu-ušallim – are attested in the colophons of this library. None of the tablets preserves a complete and unique date, but one tablet written by Rīmūt-Anu (*SpTU* 5 231) dates to the reign of a king Darius, most likely to be identified with Darius II.[43] Assigning this tablet to the middle of his reign and counting 20 years for each generation, Clancier (2009) estimates that Anu-ikṣur and his family were active between 445 BCE and 385 BCE. Hence they partly overlap with the formative period of Babylonian mathematical astronomy and zodiacal astrology (400–350 BCE) – a unique feature of this library. However, a few tablets are considerably older, e.g. *SpTU* 5 283 and 284, two legal acts from

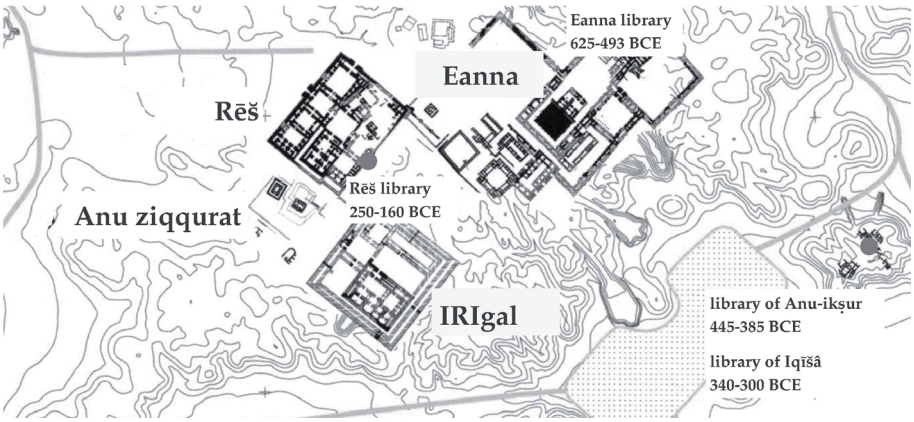

Fig. 1. Scholarly libraries in Uruk during the first Millennium BCE.

42 For this library and the family of Anu-ikṣur cf. Hoh (1979), Clancier (2009, 47–73, 387–406), Farber (1989), Frahm (2002), Frahm (2011, 290–292), Oelsner (1993), Pedersén (1998, 212–213), Robson (2008, 227–240), which includes a list of colophons.

43 Thus Oelsner (2002: 63), Clancier (2009: 58–59) and Frahm (2011: 290).

the reign of Nebukadnezzar, and this also applies to some of the astronomical data (cf. below).

Tablet	Content	Colophon	Astronomical Data	Remarks
Celestial Divination				
SpTU 1 91, 92	EAE Tablet 56	-	-	
SpTU 5 261	EAE-type omens: planets	-	-	
SpTU 4 160	EAE-type omens: eclipses	-	-	
SpTU 5 264	commentary EAE Tablet 7	-	-	‚newly broken'
SpTU 5 262	commentary EAE Tablet 26	-	-	
SpTU 1 84	commentary: celestial + physiognomic omens	-	-	
Diary-Type Texts				
SpTU 1 100	excerpt: planets	-	Nbn-Dar I (555–486 BCE)	
SpTU 5 268	excerpt: planets	-	Artx I yr 1–4 (464–461 BCE)	
Late Astrology				
SpTU 5 265	omens for new-borns derived from *ziqpu* stars	Balāṭu//Ekur-zākir*	-	copied and checked
SpTU 4 161	astrological prediction of market prices		-	excerpt of wooden tablet
SpTU 5 243	zodiacal signs and associated incantations	-		

Table 2. Tablets and fragments with astral science from the library of Anu-ikṣur
* The symbol // precedes the clan affiliation of an individual.

Among the scholarly tablets, medicine, rituals, incantations and learned commentaries stand out most prominently, but astral science and mathematics are also represented. Twelve tablets with astral science are securely assigned to this library

(Table 2); at most ten other tablets may also belong to it (Table 3). The former group includes three tablets of the traditional omen series EAE, three related commentaries and one commentary on astronomical and physiognomic omens. The only diary-type texts securely assigned to this library are two compilations with planetary data. As mentioned earlier, *SpTU* 1 100 contains reports from the lifetime of the Eanna and *SpTU* 5 268 contains data that for years 1–4 of Artaxerxes I (464/3–461/0 BCE).. Three tablets contain innovative forms of astrology. *SpTU* 5 265 is a fragmentary tablet with omens for newborns derived from culminating stars (*ziqpu*) for which no earlier parallels are known. Two tablets presuppose the zodiac: *SpTU* 5 243 partly preserves a list of quotations from incantations and associated zodiacal signs. *SpTU* 4 161 is a procedure text for predicting market prices from planetary and lunar phenomena. It makes mention of the 'height and depth of the Moon' (*šu-qa u šup-*[*lu*] *ša*$_2$ ^{d}*sin*), perhaps the earliest attestation of this technical term for the Moon's distance to the ecliptic, which is otherwise known only from mathematical astronomy.[44] It therefore appears that Anu-ikṣur and his family learned about new concepts that are central to mathematical astronomy and zodiacal astrology at an early stage. Beyond the reference to the Moon's distance to the ecliptic in the mentioned astrological text, mathematical astronomy is not attested, but this is not surprising, since it cannot have developed very far yet near 400 BCE. However, the presence of at least seven mathematical tablets[45] in this library is significant. Several innovative problem texts and tables with many-digit sexagesimal numbers imply advanced computational skills as they are needed for mathematical astronomy.[46] Two of them were probably owned or written by Šamaš-iddin and two others by Rīmūt-Anu.[47] None of the tablets with astral science mentions a member of this family, but the partly overlapping skills required for mathematics suggests that astral science and mathematics were often pursued by the same individuals. It therefore seems altogether possible that Šamaš-iddin and Rīmūt-Anu pursued mathematical astronomy. Indeed, tablets with mathematical

44 A new translation of this difficult text will be published elsewhere. As mentioned by Hunger (*SpTU*), it is partially duplicated on the reverse of *LBAT* 1600, a Late Babylonian tablet from Babylon.

45 *SpTU* 4, 172–177 and W 23291-x (Friberg/Hunger/al-Rawi 1990). Four mathematical tablets from a mixed context, *SpTU* 1 101, 102 and *SpTU* 5 316, 317, might also belong to this library. Some of these texts are translated in Robson (2007, 160–174), with references to further literature.

46 Innovative problem texts: W 23291-x (Friberg/Hunger/al-Rawi 1990); *SpTU* 4 175 (Friberg 1997); tabular texts with very large numbers: *SpTU* 4 174, a unique table of reciprocals of numbers with initial digits between 1 and 4, and *SpTU* 4 176, a bicolumnar computation of reciprocal numbers (Friberg 1999).

47 Mathematical tablets of Šamaš-iddina: W 23291-x, copied from a wooden board; probably also *SpTU* 4 175, which lacks a colophon; of Rīmūt-Anu: *SpTU* 4 172, a compilation of mainly metrological tables; *SpTU* 4 174 (cf. previous footnote). The latter three were found together in a clay jar, along with other tablets (Friberg 1999).

astronomy show up only a few decades later in the same house, when it was inhabited by Iqīšâ//Ekur-zākir and his family. In this connection note that the owner of *SpTU* 5 265 is also a member of the Ekur-zākir clan. Hence at least one scholar of that clan contributed to the library of Anu-ikṣur long before Iqīšâ moved into his house.

With regard to the sources of the library, recall that two ritual tablets are copies of originals from the Eanna and both diary-type texts might also originate from there. The only other identifiable source of the library of Anu-ikṣur is Babylon, where several of its tablets were written either by a local scribe or by a scribe from Uruk. This very likely applies to two tablets with bilingual omens, *SpTU* 1 86 (+) 145, written in year 36 of Darius I (486/5 BCE), and *SpTU* 3 86, written in year 15 of Darius I or II (507/6 or 409/8 BCE), and it is certain for the *namburbi* ritual *SpTU* 3 80, copied in Babylon from a wooden board.[48] It is probably significant that these tablets may all date from the time of the Eanna, when ties with Babylon were particularly close. Hence these tablets, or their originals, may well have been removed from the Eanna.

In Uruk, the Šangû-Ninurta clan can be traced back to the time of the Eanna, when its members carry names that contain Anu and Ištar as theophoric elements (Kessler 2004, 246).[49] Their loyalty to Urukean traditions is also apparent in several tablets from the library of Anu-ikṣur that display a profound scholarly devotion to Anu, the new head of the local pantheon (Frahm 2002). Apparently, the theological implications of this cultic reform continued to be worked out around 400 BCE. It is probably not a coincidence that the astral sciences went through a rapid development at that time. Given the attention paid to Anu one might also expect to find references to the Rēš temple in this library, but there are none. Furthermore, the priestly titles of Anu-ikṣur and his relatives do not yet include the phrase ‚of Anu and Antu', which is well known from the Rēš library. It is attested for the first time in a colophon of Iqīšâ, who is definitely connected to the Rēš (cf. below). In fact there is currently no evidence that the Rēš temple existed in the time of Anu-ikṣur.[50] The end of the library of Anu-ikṣur is correlated with traces of a fire,[51] perhaps indicative of a catastrophic event. After the family of Anu-ikṣur abandoned the house, there is no trace of them in cuneiform texts from Uruk or elsewhere.

48 Cf. Frahm (2002, 95). Note that *SpTU* 3 86 is from a mixed context; hence it may also belong to the library of Iqīšâ (Clancier 2009). *SpTU* 5 283 and 284, found in layer IV and thus from the library of Anu-ikṣur, are legal documents written in Babylon in years 11 and 15 of Nebukadnezzar II, respectively (= 594/3 BCE and 590/589 BCE).

49 At about the same time, between the reigns of Nebukadnezzar II and Xerxes, members of the same clan but carrying northern Babylonian names are attested in Babylon (Jursa 2005, 71–72).

50 On this topic cf. the illuminating discussion by Kose (1998, 186–188). A temple of Anu is referred to in a document from year 15 of Nebukadnezzar (589 BCE), but the earliest references to the Rēš are Seleucid.

51 According to Kose (1998, 385), layer IV in room 4 of the house shows evidence of a fire followed by a deposition of debris including numerous cuneiform tablets.

Tablet	Content	Astronomical Data
Diary-Type Texts		
SpTU 1 99	almanac	79/80 AD?
SpTU 4 171	excerpt: Saturn	Nbk yr 28–31 (577–574 BCE)
SpTU 5 266*	excerpt: Mars	Nbk yr 1–14 (604–591 BCE)
SpTU 5 267	excerpt: Mercury	Artx I yr 2–3 (463–462 BCE)
Other Non-Mathematical Astronomical Texts		
SpTU 4 168	computed solstices	Artx II yr 44 (361 BCE)
SpTU 4 169	computed solstices	Nbk-Nrg (604–506 BCE)
SpTU 1 95	ideal calendar with stellar phenomena	-
Late Astrology		
SpTU 5 271	small astrological or astronomical fragment	-
SpTU 1 93	fragment concerning eclipses and stars	-
SpTU 1 97	astrological table and concentrically written text	-

Table 3. Tablets and fragments with astral science from a mixed context (library of Anu-ikṣur, Iqīšâ or later)
* For the astronomical dating of this text see Steele (forthcoming b).

The library of Iqīšâ

A few decades after the end of the library of Anu-ikṣur, the scholar Iqīšâ and his family, of the Ekur-zākir clan, occupied the same house. This Urukean clan is especially prominent in the Rēš library about a century later, along with the Sîn-lēqi-unninni clan. Iqīšâ and his son Ištar-šuma-ēreš appear as owner or scribe in the colophons of about 45 scholarly tablets.[52] Both identify themselves as diviners (^{lú}MAŠ.MAŠ = *mašmaššu* or *āšipu*). On one astrological tablet, *SpTU* [illegible], Iqīšâ adds to this the title of 'enterer of the temple of Anu and Antu' (^{lú}KU$_4$ E$_2$ ^{d}*A-nu u An-tu$_4$*), a priestly title of the Rēš temple. The preserved dates of their tablets cover years 2–8 of Philip Arrhidaios (322/1–316/5 BCE). Assuming 20 years for each generation, they must have been active approximately between year 20 of Artaxerxes III (339 BCE) and year 12 of the Seleucid era (299 BCE). Several tablets from the Late Seleucid era and, perhaps, the Parthian era are the sparse remains of a later library in the same house (cf. below).

52 For this library cf. Hoh (1979), Farber (1987), Frahm (2002), Robson (2008, 237–240). Iqīšâ is mentioned in about 38 tablets, Ištar-šuma-ēreš in about 13 tablets.

Tablet	Content	Colophon	Date
Celestial Divination			
SpTU 2 40	EAE Tablet 7	-	-
SpTU 2 41	EAE Tablet 33?	-	-
TU 17	commentary EAE Tablet 8	Iqīšâ	-
SpTU 4 162	commentary EAE Tablet 20	Iqīšâ (owner), Anu-aba-uṣur//Kurî (scribe)	3/VI/Philip Arrhidaios yr 2 (322 BCE)
SpTU 1 90	commentary EAE Tablet 56	Iqīšâ (owner), Anu-aba-uṣur//Kurî (scribe)	[x]/VI/Philip Arrhidaios yr [2] (322 BCE)
SpTU 5 263	commentary EAE Tablet 38/39/40?	-	-
SpTU 2 42	commentary EAE-type omens	Iqīšâ	-
SpTU 3 101	commentary EAE-type omens: Mars	tablet from Nippur	-
Mathematical Astronomy			
SpTU 4 170	synodic table Saturn system B‘	-	data: SE 4–21 (308–291 BCE)
SpTU 1 98	synodic table Moon system A	-	data: SE 40 (272/1 BCE)
Non-Mathematical Astronomy			
SpTU 5 269	theoretical text: *ziqpu* stars, planets, and solstices	-	-
SpTU 5 270	star names	-	-
Late Astrology			
SpTU 2 43	zodiacal astrology	Iqīšâ	-
SpTU 3 104	calendar text: month IV	Iqīšâ (owner), Ištar-šuma-ēreš (scribe)	-
SpTU 3 105	calendar text: month VIII	Iqīšâ	-
SpTU 4 167*	microzodiac text: Gemini, Cancer	-	-
BRM 4 20**	commentary: microzodiac and rituals	Iqīšâ; copy of originals from Babylon and Uruk	-
SpTU 1 94	astrological procedure for predicting market prices	Iqīšâ	-
SpTU 1 96	‚touching‘ of zodiacal signs	Iqīšâ	-
SpTU 4 159	astrology and extispicy	Iqīšâ	-
SpTU 3 102, 103	*ziqpu* stars and lunar eclipses	-	-

Table 4. Tablets and fragments with astral science from the library of Iqīšâ.
* For an edition of this text see Hunger (2007).
** Editions of this text are quoted in Frahm (2011, 128).

At least 22 tablets with astral science can be assigned to the library of Iqīšâ (Table 4), to which up to ten tablets from a mixed context may be added (Table 3). The library of Iqīšâ is the earliest one in Uruk that contains all categories of Babylonian astral science. Celestial divination is represented by eight tablets, including six commentaries exhibiting previously unknown, innovative hermeneutical methods (Frahm 2011, 332–338). Mathematical astronomy is represented by two synodic tables, among the earliest examples of such texts. Both tablets lack a colophon. The synodic table SpTU 1 98 with lunar data for the year SE 40 (272/1 BCE) was probably computed shortly before that year, i.e. about 30 years after the estimated end of Iqīšâ's library, too late to have been produced by Ištar-šuma-ēreš. Whoever computed this table, perhaps a grandson of Iqīšâ, that scholar mastered the most complex topics of mathematical astronomy.

All four diary-type texts from a mixed context (Table 3) have recently been dated astronomically. Three of them may belong to the library of Iqīšâ. *SpTU* 4 171 and *SpTU* 5 266 contain phenomena from the time of the Eanna, SpTU 5 267 from the reign of Artaxerxes I, shortly after the end of the Eanna (see also Table 2). In order to fully assess the textual evidence for a diary project in Uruk, note that 11 diary-type texts were found in the Rēš library, which, added to the six from the libraries of Anu-ikṣur and Iqīšâ, yield a total of 17 diary-type texts for Uruk.[53] This number, while larger than commonly believed, remains very small in comparison to Babylon, both absolutely and relatively speaking. Furthermore, the observational data in some of these tablets were very likely not made in Uruk but copied from Babylon (Steele forthcoming a). Indeed, none of them preserves a historical section that might mention events in Uruk, nor do they contain other explicit indications about the location where the observations were made. Nevertheless, some of the observational tablets from the Seleucid era were clearly written in Uruk. Some mention a Urukean scholar in the colophon[54] and sometimes the layout and orthography betray that the tablet was written in Uruk and less likely copied from an original from Babylon.[55] Most of the diary-type texts from Seleucid Uruk are almanacs or normal-star almanacs, predictive texts that were compiled from reports covering several decades, which can be taken to imply the presence in Uruk of many more diaries than were actually found. Hence a diary project may have been pursued in Uruk by the time of the Rēš, and presumably also before that, although it may not have had the same scale as in Babylon.

53 Diaries: *ADRT* I-463; excerpts: A 3456 (Hunger 1988), *ADRT* V 42, 82; Normal Star Almanacs: *ADRT* VII 24, 57, 64, 65, 69; Almanacs: *ADRT* VII 159, 160. Steele (forthcoming a) has convincingly shown that A 3456 contains observations that were made in Babylon.

54 The normal star almanac *ADRT* VII 24 was written by Anu-uballiṭ; the almanac *ADRT* VII 160 by Anu-balāssu-iqbi, son of Lābâš.

55 Several features that are unique to diary-type tablets from Uruk are mentioned in Hunger (2014, XV–XVI).

One tablet with ‚non-mathematical astronomy' from Iqīšâ's library, *SpTU* 5 269, combines traditional concepts in innovative ways. Zodiacal and other late forms of astrology are represented by ten tablets, eight of which were owned by Iqīšâ and presumably written by himself. *SpTU* 1 94 is a remarkable procedure text for predicting market prices from lunar and planetary phenomena as they are reported in diary-type texts or computed with mathematical astronomy. This tablet constitutes another link between Babylonian astronomical observations and predictions on the one hand, and their astrological applications on the other hand. Several astrological tablets deal with the microzodiac. These and other tablets from the library of Iqīšâ testify to the increasing use of astrology by private individuals after 400 BCE, a notable break from traditional celestial divination.

Several tablets inform us about Iqīšâ's regional and institutional connections. At least four tablets, including one with celestial omens (*SpTU* 3 101), originate from Nippur (Frahm 2002, 91–94; 2011, 294–295). Some were written there by scribes who were also brewers, as is true for Iqīšâ himself (Frahm 2002, 83). One tablet from Iqīšâ's library, *SpTU* 2 22 + *SpTU* 3 85, a ritual involving stones, was copied from an original from Babylon (Frahm 2002, 95–96). The astrological commentary *BRM* 4 20, a tablet of Iqīšâ, was copied from two originals – one from Babylon and one from Uruk.[56] However, in the astral sciences contacts with Babylon were more intense than what is suggested by these colophons. Both tablets with mathematical astronomy and many of the astrological tablets (Table 4) have close parallels in Babylon and nowhere else. Synodic tables computed with the same algorithms for Saturn (*SpTU* 4 170) and the Moon (*SpTU* 1 98) are known from Seleucid Babylon.[57] Hence these algorithms were exchanged between Babylon and Uruk without any modification in or before the time of Iqīšâ, and the same can be said for the schemes underlying the microzodiac and calendar texts. Since lunar system A is attested much earlier in Babylon[58] it was probably invented there, but otherwise the direction of transfer of these new forms of astral science remains unclear.[59]

As opposed to the Rēš library, only few colophons from the library of Iqīšâ mention the scribe of the tablet (*qāt* PN = 'hand of PN') in addition to its owner (*ṭuppi* PN = 'tablet of PN'); the same is true for the library of Anu-ikṣur. Several tablets of Iqīšâ, e.g. the calendar text *SpTU* 3 104, were written by his son Ištar-šuma-ēreš. Two of his

56 This tablet and *TU* 17 were acquired through the antiquities market and might have been excavated in the Rēš (Frahm 2011, 293).

57 Saturn system B': BM 34589+35745 (Neugebauer 1955, No. 704) +40620 (unpublished join) with data for SE 155–243; Moon system A: BM 36890 (Steele 2002) with data for year 7 of Philip Arrhidaios (317/6 BCE); BM 40094+45662 (Aaboe/Hamilton 1979) with data for years 5–7 of Philip Arrhidaios (319/8–317/6 BCE).

58 Cf. Aaboe *et al*. (1991, Text S).

59 One tablet, the extispicy commentary *SpTU* 2 46, originates from Assurbanipal's library in Nineveh, perhaps a testimony to Uruk's relatively good relations to the Assyrian kings (Frahm 2002, 97–98; 2011, 295).

commentaries on EAE were written by Anu-aba-uṣur, son of Anu-mukīn-apli, of the Kurî clan.[60] As in the Rēš library, these scribes can be assumed to be junior scholars, while Iqīšâ, the ‚owner', is a senior scholar supervising the production of the tablet (Ossendrijver 2011a, b). However, most of Iqīšâ's tablets were written by himself. This may reflect the different modes of production of scholarly tablets for private libraries and temple libraries. The elaborate colophons of the Rēš library probably reflect the educational context in which these tablets were produced as well as a desire to achieve the highest possible standards of scholarship for Uruk's most prestigious temple. The special care with which these tablets were written is also apparent in several colophons mentioning that they were to be displayed in the temple. For a private library such as that of Iqīšâ, a less rigorous procedure was apparently sufficient.

The celestial omen commentary *TU* 17 is one of several tablets of Iqīšâ that may have been excavated in the Rēš. If true, then this group documents a transfer of scholarly knowledge, including astral science, from Iqīšâ's library to the Rēš. Conversely, three scholarly tablets from Iqīšâ's house are 50–100 years later than the time of Iqīšâ.[61] Two were ‚owned' by scholars of the Ekur-zākir clan who are well known from the Rēš library. This group documents a transfer of knowledge between the Late Seleucid library of the Rēš and the library that succeeded that of Iqīšâ in his house. Since layer I, which dates to the time after Iqīšâ, was heavily disturbed, little can be said about that library, except that the house was apparently still inhabited by members of the Ekur-zākir clan. Finally, one astronomical almanac from a mixed context, *SpTU* 1 99 (Table 2), has recently been dated tentatively to 79/80 AD, more than 150 years after the end of the Rēš temple as well as the latest tablet from Uruk known thus far.[62] If this date is correct then the astral sciences continued to be pursued in Uruk as long as in Babylon, which thus far holds the record of the latest datable cuneiform tablet – also an astronomical almanac (Sachs 1976).

60 For this well-attested Urukean clan cf. Kessler (1991, 27–32).

61 *SpTU* 1 2, a historical chronicle 'owned' by Anu-aḫa-ušabši/Kidin-Anu//Ekur-zākir and written by his son Anu-balāssu-iqbi in SE 61 (251 BCE); *SpTU* 2 33, an excerpt of the terrestrial omen series Šumma ālu owned by Nidinti-Anu/Anu-bēlšunu//Ekur-zākir and written by his son Mannu-iqāpi, who were active near SE 100 (near 210 BCE); *SpTU* 4 157, a tablet with extispicy omens owned by a member of the Ekur-zākir clan and written by Ša-Anu-iššu/Ištar-šuma-ēreš (clan affiliation not preserved) on 27 VI SE 83 (229 BCE).

62 Hunger/de Jong (2014). For the latest securely dated cuneiform text from Uruk cf. Kessler (1984).

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