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Astronomy and culture in Late Babylonian Uruk†

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Abstract. This article presents three case studies of the role of astronomy within the culture of Late Babylonian Uruk. I argue that in order to fully understand Babylonian astronomy it is necessary to combine technical study of astronomical cuneiform texts with wider cultural study of Babylonian scholarship, archival practice and society.

Keywords. astrology, astral medicine, calendar, Uruk

1. Introduction

The initial decipherment of astronomical cuneiform tablets from Babylonia in the late nineteenth century quickly led to the realisation that during the so-called Late Babylonian period (ca. 750 BC to AD 100) the people of ancient Mesopotamia developed a complex and multi-faceted astronomy that encompassed the precise observation of astronomical phenomena and their regular recording, the use of empirical methods for predicting future astronomical events, and the development of mathematical theories of the motion of the sun, moon and five planets (Hunger & Pingree 1999, Steele 2008). Major advances in our understanding of Babylonian astronomy were made throughout the twentieth century by scholars such as F. X. Kugler, O. Neugebauer, A. Sachs, and A. Aaboe. We are now in a position where large parts of Babylonian astronomy—in particular the mathematical astronomy and the reports of astronomical observations contained in the so-called Astronomical Diaries and related texts (Sachs & Hunger 1988–2006)—are well understood, at least on a technical level. Much work remains to be done on other aspects of Babylonian astronomy, however, and many astronomical cuneiform tablets remain unstudied in museum collections.

Most research on Babylonia astronomy during the twentieth century was focused, as it had to be, on developing an understanding of the astronomical terminology found in cuneiform texts, the technical analysis and reconstruction of Babylonian mathematical astronomy, and the editing of primary source material. Until this work had been done, it was not possible to address wider contextual questions about Babylonian astronomy such as its uses, place in society, and relationship with other aspects of Babylonian scholarship. Furthermore, the available sources material for studying Babylonian astronomy largely came from collections without archaeological provenance. Many of the known astronomical cuneiform tablets were to be found in purchased collections, bought during the nineteenth century by the major western museums from antiquities dealers in the Middle East. Other tablets came from unscientific excavations where the findspots of tablets were not recorded or were lost during museum registration of the tablets (Steele 2010). It was therefore not possible to ask questions about the archival contexts of astronomical

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tablets, or to look at issues such as regional variations within Babylonian astronomy (for an exception, see Neugebauer's work on the texts of mathematical astronomy in which he is able, on the basis of colophons, to establish certain traits of tablets that come from the cities Babylon and Uruk (Neugebauer 1955)).

The last few years have seen a shift within the study of Babylonian astronomy, indeed within the study of Babylonian scholarship more generally. More recent, scientific excavations of sites within Mesopotamia, in particular the German excavations at Babylon, Uruk and Assur, have provided researchers with scholarly tablets that have an archival context. In addition, research on the collection and registration practices of museums have allowed some information about the provenance of purchased and unscientifically excavated tablets to be reconstructed (e.g. Reade 1986, Pedersen 2005). Coupled with the study of the colophons preserved on tablets, significant progress has been made in understanding the networks of scholars working on astronomical and other scholarly topics in ancient Babylonia (e.g. Rochberg 2000, Robson 2008, Clancier 2009, Ossendrijver 2010). These types of studies have been assisted by a now common policy of the publication of excavated cuneiform tablets by findspot rather than by genre as used to be the norm.

In the following I investigate the role of astronomy within the culture of the city of Uruk in southern Babylonia during the Late Babylonian period. My approach will be to undertake three case studies to illustrate some of the different uses and social contexts of astronomy: the calendar, astral medicine and astrology. It should be pointed out straight away, however, that these are only some of the uses and contexts that astronomy had in Uruk and we cannot always generalise from the interests of a particular scribe to the astronomical community as a whole, nor from Uruk to the rest of Babylonia. Uruk is particularly well suited to asking these types of questions for two reasons, however. First, Uruk was the site of detailed and productive archaeological excavations conducted by the Deutsche Orient-Gesellshaft over many seasons during the twentieth century. These excavations resulted in the discovery of several scholarly archives from both temples and private dwellings within the city (Hunger 1976, Van Dijk & Mayer 1980, von Weiher 1983–1998). Secondly, the scribes of Uruk frequently included detailed colophons on their tablets, often including information on the owner of the tablet and his occupation and lineage, the scribe of the tablet and his occupation and lineage if the scribe and the owner were not the same person, the date on which a tablet was copied, and sometimes also details on where the tablet had been copied from and whether the tablet was part of a temple archive.

2. The city of Uruk in the Late Babylonian period

The city of Uruk was located on the north bank of the river Euphrates in southern Babylonia (Fig. 1). One of the oldest sites in Mesopotamia, the city was occupied continuously from the fourth millennium BC down to (at least) the last century BC. Throughout this period, the city acted as a major cultic, cultural and ideological centre, although politically after the third millennium BC the city was always overshadowed by cities in central and northern Mesopotamia, in particular Assur and Nineveh in Assyria and Babylon in Babylonia. The city went through considerable change over the first millennium BC including significant decline during the period of Achaemenid Persian rule of Babylonia (sixth to fourth century BC) followed by rapid regrowth during the subsequent period of Seleucid Greek and Parthian rule (late fourth to first century BC).

The city of Uruk was enclosed by a perimeter wall delineating an area of about 2.5 by 3km (Jordan 1928). Close to the centre of the city were three major temple buildings: the Eanna temple, the Irigal Temple and the Bit-Reš sanctuary (Downey 1988: 15–47).

Figure 1. Map showing the major cities in Mesopotamia during the Late Babylonian period.

Surrounding this central area we find residential streets, smaller temples and other civic buildings (Fig. 2). Cuneiform tablets have been excavated from several sites in the city including major finds within the Eanna temple, the Bit-Reš and a private house in the residential area to the southwest of the Eanna (Pedersen 1998: 204–213).

Several hundred astronomical cuneiform tablets are known from Uruk. These tablets can be divided into three groups based upon the manner of their excavation:

- Material bought from antiquities dealers in the nineteenth and early twentieth century and now largely held at the Louvre in Paris, the Oriental Institute in Chicago, the Yale Babylonian Collection and the Vorderasiatische Museum in Berlin. *No archaeological context.*
- Material excavated by German archaeologists in the early twentieth century and now held in Istanbul and Berlin. *Partial archaeological context. It is known that these tablets were excavated at Uruk, but detailed findspot information is usually not available.*
- Tablets excavated by German archaeologists from ca. 1960 onwards and now mainly in Heidelberg and Baghdad. *Detailed archaeological context including precise findspot information.*

Sometimes it is possible to reconstruct some archaeological context for tablets in the first group because of the existence of physical joins with fragments from the second or (very occasionally) third group. The existence of these joins indicates that some tablets sold on the antiquities market leaked out of the early official excavations. This was not uncommon at the time. For example, there are many joins between fragments of tablets from Babylon bought by the British Museum and tablets that were excavated on British Museum sponsored digs in the 1870s and 1880s.

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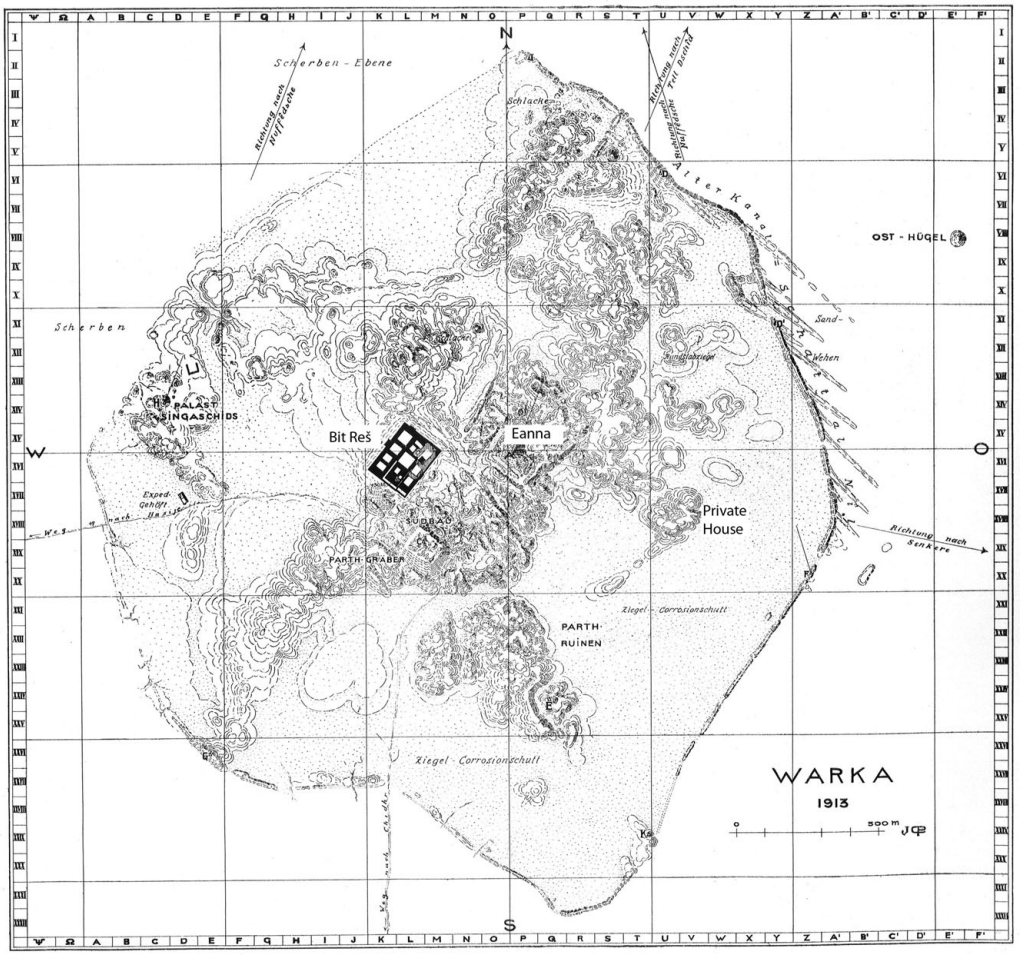

Figure 2. Plan of the site of Uruk (adapted from Jordan 1928: tafel 1).

3. Case Study I: the calendar

The calendar in use throughout Mesopotamia during the first millennium BC operated as follows: months could have either 29 or 30 days determined by whether the new moon was seen (or calculated to be seen) on the evening beginning the 30th day. If the moon was seen (or calculated to be seen) then the current 30th day which was just beginning would be renamed as the 1st day of the new month; if not, then the 30th day was allowed to run its course and the following day would be the 1st day of the new month. This rule is subtly different from saying that the month began on the evening of first crescent visibility: only visibility on the evening of the beginning of the 30th day mattered. The year normally contained twelve months but an intercalary thirteenth month was added roughly every three years to keep the calendar in line with the seasons (Beaulieu 1993, Britton 2007, Steele 2007, Steele 2011a, Stern 2008). Intercalary months could be added either after the sixth or the twelfth month.

Probably around the end of the seventh century BC astronomers in Babylonia developed fairly accurate methods for predicting whether a month would have 29 or 30 days in advance. These methods made use of observations made 18 years earlier, and so allowed the length of each month in a year to be predicted a year or more in advance

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(Brack-Bernsen 2002). I have argued elsewhere that at least in the period after about 300 BC, and quite possibly earlier, months in the Babylonian calendar was always calculated in advance rather than relying upon direct observation of the new moon crescent (Steele 2007—for an alternate view, see Stern 2008). Beginning around the early 5th century, intercalation was governed by a strict 19-year cycle. Thus, by the latter half of the first millennium BC, it appears that the calendar in use throughout Babylonia was a calendar determined by calculation. In other words, power over the calendar was transferred to the astronomical scribes (Steele 2011a), though we do not know exactly which scribes were charged with this task, whether, for example, this was purely the responsibility of the astronomers in Babylon, or whether astronomers in other cities, such as Uruk, were also involved.

The calendar was not just of interest to astronomers, of course, but played an important role in Babylonian society (Steele 2011b). Throughout the year a busy and fixed calendar of cultic activities was prescribed and enacted throughout Babylonia. This included the important *Akītu* or 'New Year' festival, which acted as a link between the people, the king and the gods and lasted for several days at the beginning of the year, as well as less spectacular, but still important, god-clothing and offering rituals within the temples. Records of animal sacrifice within the temples of Uruk illustrate the importance of the cultic calendar, providing evidence of a monthly pattern of sacrifice (Robbins 1996). Having a calendar that was fixed in advance would have simplified the planning for cultic activities and, perhaps crucially, ensured that activities were performed at the same time throughout the empire. Indeed, these advantages may well have been the reason for making the transition to an astronomically calculated, rather than a simple observational, calendar (Steele 2011a, Steele 2011b). The astronomers in Uruk appear to have played a role in maintaining the calendar and in distributing calendrical information to nearby cities. The neighbouring town of Larsa, for example, appears to have relied on information from Uruk for details of the calendar. Śameš-'idrī, a high official of the Ebabbar temple in Larsa, wrote to a *šatammu* official of the Eanna temple in Uruk noting that he has heard the report that the previous month had only 29 days (the 'turning back' of the 30th day):

> Letter of Śameš-'idrī to the *šatammu* my father. May Šamaš and Bunene decree the well-being and health of my father. We heard the report concerning the "turning back" of the day. Šamaš will be clothed on the 15th day. May the lord send whatever (is needed) on (that) day. May the lord (also) send a weaver and a cleaner.
>
> [NCBT 58 trans. Beaulieu (1993: 77)]

The calendar provided one use of astronomy in Uruk through the very real needs of cultic practice and administration.

4. Case Study II: Iqīšâ and the use of astronomy in astral medicine

Excavations of a house in the residential area to the south-east of the Eanna in Uruk uncovered two archives of cuneiform tablets belonging to two different scribal families: the descendants of Šangû-Ninurta and of Ekur-zākir (Pedersén 1998: 212–213, Robson 2008: 227–240). It appears that the Šangû-Ninurta family occupied the house during the sixth and fifth centuries BC, leaving the house towards the end of the fifth century, after which the Ekur-zākir family moved in. On leaving the house, the Šangû-Ninurta family buried their tablets in clay jars, found at a lower stratigraphic level, but it is not impossible that some tablets from the former owners were also incorporated within the later library of the Ekur-zākir family. Many scholarly tablets are found in both libraries, including many omen texts. Strictly astronomical texts, however, are only found in the later library, primarily owned by a man named Iqīšâ.

Iqīšâ was a *mašmaššu* priest (generally translated as 'exorcist') who worked for the temples in Uruk in the late fourth century BC (Hunger 1971, Oelsner 2000). He owned more than thirty scholarly tablets, including seven copied by his son Ištar-šuma-ēreš. Their topics included omens, including several tablets from the standard celestial, terrestrial and liver series, medical omens (both diagnostic and prognostic), tablets containing astronomical observations, mathematical astronomy, and simple schematic astronomy (e.g. tablets giving a simple function for the variation of the length of daylight over the course of the year), and various astrological tablets.

Of particular interest among the astrological tablets owned by Iqīšâ are two so-called *'kalendartexte'* tablets. These texts, which are known from both Babylon and Uruk, link a numerical scheme with groups of things of cultic interest: the names of cities, stones, animals etc. The numerical scheme associated days in the schematic calendar of twelve 30-day months totalling 360 days with positions in the zodiac. Each day of the year corresponds to a unique position in the zodiac (a non-trivial requirement of the scheme) and positions for successive days are separated by 277°. Thus day 1 of Month I is associated with 7° of Capricorn, day 2 with 4° of Libra, day 3 with 21° of Cancer, and so on. Because the schematic calendar contains 360 days and the zodiac 360°, the mean motion of the sun is 1° per day, implying in this simple model that the sun's position in the zodiac is equal to the day in the schematic calendar (assuming that at the beginning of the year the sun is at the beginning of Aries). The parallelism between schematic days and the sun's position in the zodiac led to double meanings of a date or position, and we find in some of the *kalendartexte* that month names and the names of zodiacal signs may be juxtaposed. The daily motion of 277° used in the *kalendartexte* was derived through the mathematical manipulation of a similar astrological scheme known as the *dodekatemoria* which was itself based upon the assumption of mean lunar motion of 13° per day (Brack-Bernsen & Steele 2004).

The two *kalendartexte* owned by Iqīšâ each cover a single month: SpTU III 104 concerns Month IV and SpTU III 105 Month VIII. These must have been part of a twelve-tablet series, the remaining tablets of which have been lost. Alongside the numerical data both tablets list animal parts (blood, fat, hair, etc) that are to be made into a mixture that can be used in anointing an individual. A roughly contemporary astrological text from Babylon explains that the *kalendartexte* are to be used to produce medical remedies:

> For the animal(s) of 13 and 4,37 (=277) you take one with the other, you salve, feed, and fumigate the patient with the stone, herb, and wood (respectively).
> [LBAT 1593 trans. Reiner (2000)]

The 'animals' are the signs of the zodiac and the numbers 13 and 277 refer to the *dodekatemoria* and *kalendertexte* schemes respectively. This text explains that the items listed for each day (stone, herb, wood, or, in the present case, parts of animals) are to be used to make the remedy for the patient.

Below I translate the first twelve lines of Iqīšâ's *kalendartexte* for Month IV:

Month IV	1	Aries	7	Sheep-blood, sheep-fat, and sheep-hair, you anoint.
Ditto	2	Capricorn	14	Goat-bood, goat-fat, and goat-hair, you anoint.
Ditto	3	Libra	21	"Empty place", you anoint.
Ditto	4	Cancer	28	Crab-blood, or crab-fat, ditto.
Ditto	5	Taurus	5	Bull-blood, or bull-fat, or bull-hair, ditto.
Ditto	6	Aquarius	12	Eagle-head, wing, and blood, ditto.
Ditto	7	Scorpio	19	"Empty place", ditto.
Ditto	8	Leo	26	Lion-blood, lion-fat, or lion-hair, ditto.
Ditto	9	Gemini	3	Rooster-head, blood, and wing, ditto.
Ditto	10	Pisces	10	Dove-head, blood, swallow-head, blood, ditto.

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Ditto	11	Sagittarius	17	Anzu(-bird?)-head, Anzu(-bird?)-wing, Anzu(-bird)-blood, ditto.
Ditto	12	Virgo	24	*šigušu*-barley-flour, raven-head, and raven-wing, ditto.

The format of the text is straightforward. In the first four columns we have the name of the month, the day of the month and a position in the zodiac given by sign and degrees. To the right of this data we find a list of (generally) three parts of an animal that are to be used in anointing the patient. In one case (day 12), in addition to animal parts we find a type of flour. In two other cases (day 3 and day 7) we find the phrase 'empty place', which probably means that the tablet from which Iqīšâ made his copy was blank at these points.

Throughout Iqīšâ's *kalendartexte* the same ingredients are given whenever the zodiacal sign produced by the *kalendartexte* scheme is the same (this pattern extends to Iqīšâ's other *kalendartexte* for Month VIII). For example, a position with the zodiacal sign Aries lists sheep-blood, sheep-fat, and sheep-hair as the ingredients for the remedy, and bull-blood, bull-fat, and bull-hair are listed whenever the zodiacal sign is Taurus. The kalendartexte scheme is being used to determine which remedy is to be used each day. In Table 1 I give the ingredients listed for each sign of the zodiac. In many cases, an obvious and direct link can be seen between the sign of the zodiac and the animal to be used (Steele 2006). For Cancer, generally written logographically in cuneiform with the sign ALLA for the Akkadian word *alluttu* 'crab', parts of a crab are used. Similarly, for Leo, written with the logogram A for the Akkadian word *urgulû* 'lion', parts of a lion are used, and for Capricorn, written with the logogram MÁŠ for *suhurmāšu* 'the goat-fish', parts of a goat are used. Where the zodiacal signs are not animals, nearby constellations are used (Steele 2006). For example, the Babylonian sign Taurus is MÚL.MÚL 'the stars', referring to the Pleiades. But close to the Pleiades is the constellation the 'bull of heaven', and so the ingredients are taken from a bull.

The animals listed in Iqīšâ's *kalendartexte* raise the question of whether and how these texts were used in practice. Remedies made from parts of lions and eagles can hardly have been widely available, and even using parts of bulls and goats would have been prohibitively expensive for most Babylonians. Were these texts only of theoretical interest, therefore, never intended to be used in the practice of medicine? It is perfectly possible that this was the case, that these texts were no more than scholarly amusements or texts used to show how erudite the owner of the tablet was. But I would like to

Table 1. Animals used to make the healing ingredients associated with each zodiacal sign in Iqīšâ's *kalendartexte*.

Zodiacal Sign	Normal Babylonian Name	Ingredient
Aries	The Hired Man	Sheep
Taurus	The Stars (Pleiades)	Bull
Gemini	The Twin	Rooster
Cancer	The Crab	Crab
Leo	The Lion	Lion
Virgo	The Barleystalk	Barley-flour, Raven
Libra	The Balance	"empty"
Scorpio	The Scorpion	"empty"
Sagittarius	Pabilsag	Anzu-bird
Capricorn	The Goat-fish	Goat
Aquarius	The Great One	Eagle
Pisces	The Tails	Dove, Swallow

suggest an alternative hypothesis. There exists a tradition of *Dreckapotheke* in Babylonian medicine where common plants or drugs are given other names in order to keep their identification a secret within the medical community (Geller 2010: 53). Frequently these names refer to unpleasant-sounding ingredients including human or animal excrement, leper's blood, and human semen. I suggest, therefore, that the names of the ingredients given in Iqīšâ's *kalendartexte* might also be *Dreckapotheke*, and refer to common or garden herbs and plants, not to the animals themselves. For example, 'lion's blood' is found in *Dreckapotheke* lists to refer to the juice from the middle of the tamarisk (Geller 2010: 157). This would make Iqīšâ's *kalendartexte* of practical use in medical practice.

Support for my interpretation of Iqīšâ's *kalendartexte* comes from a partially preserved medical commentary text written by Iqīšâ himself. MLC 1863, edited and translated by Geller (2010: 166–173), is a commentary on a text discussing strokes. In his text Iqīšâ links the plant *amīlānu* with a raven and the "single"-plant with a dove—both the raven and the dove appear as ingredients in his *kalendartexte*. Other ingredients in the kalendartexte appear in other lists of *Dreckapotheke*.

If my interpretation of Iqīšâ's *kalendartexte* as incorporating *Dreckapotheke* is correct it has an interesting consequence. The ingredients found in the kalendartexte are not random—they are defined for each day by the *kalendartexte* scheme. In the context of the *kalendartexte*, therefore, the *Dreckapotheke* names for the ingredients are not simply secret code names for common plants or herbs, but themselves underpin the theory of calendrical medicine found in the *kalendartexte*. In essence, the *Dreckapotheke* names have acquired a reality themselves. The scholarly arguments used to justify the names become for the scribe not his creation but his discovery of an underlying reality where the *amīlānu* plant fundamentally is related to the raven, and where the multiple readings of cuneiform signs really does tell us about the nature of the world.

Iqīšâ's *kalendartexte* ends with a short colophon:

> Tablet of Iqīšâ, firstborn son of Ištar-šuma-ēreš, descendant of Ekur-zākir, the *mašmaššu* priest. (Hand of) Ištar-šuma-ēreš, his son. He who worships Anu, Enlil and Ea shall not remove it.

Iqīšâ identifies himself as a *mašmaššu* priest. This title, probably synonymous with the title *āšipu* (but see Geller 2010: 48–50), is generally translated as 'exorcist', a somewhat problematical translation due to the connotations of the word in modern western usage. In Mesopotamia, one important role of the exorcist was in medicine as it was believed that many illnesses were caused by the presence of ghosts or other divine spirits within a person's body. Removal of these spirits required the patient participating in rituals, often involving the consuming of prepared food or drink. Modern views of the division of Mesopotamian medicine between the *mašmaššu* or *āšipu* and a physical healer called the *asû* are probably overstated. Recent studies have instead emphasised the fluidity between the two roles. Iqīšâ was a professional healer who used both spiritual and physical means to assist his patients.

Looking at Iqīšâ's archive of cuneiform tablets as a whole, we see a great interest in texts dealing with medicine. It is therefore tempting to see Iqīšâ's interest in astronomy as part of his medical interests: the *kalendartexte* at least serve a medical purpose. Unfortunately, we have insufficient evidence to know whether this extended to the rest of his astronomical tablets. Perhaps they simply reflect the wider interests of an educated scholar. But as a working hypothesis, I think it is worth considering that astral-medicine may have been a significant interest of Iqīšâ, and it is worthwhile investigating further whether other astronomical tablets among his archive could also have had a link with medicine.

5. Case Study III: Anu-Bēlšunu and the use of astronomy in astrology

Anu-Bēlšunu, a lamentation priest of the Bit-Reš sanctuary, was another prolific scholar of Late Babylonian Uruk. We know that Anu-Bēlšunu lived from 249 BC to at least 185 BC. He was the son of a man named Nidintu-Anu and claimed to be a descendant of the legendary scribe Sin-leqē-unninnī, who was said to be a scholar from the time of Gilgameš (Beaulieu 2000, Pearce & Doty 2000, Steele 2000, Robson 2008: 240–260). The Sin-leqē-unninnī family had a long history of involvement in astronomy that can be traced back to the sixth century BC when a group of lamentation priests of the Sin-leqē-unninnī family were investigated by the temple authorities for the waste caused by a ceremony occasioned by their prediction of a lunar eclipse which failed to occur on the day in question (Beaulieu & Britton 1994).

Cuneiform tablets either owned or written by Anu-Bēlšunu are known from all three of the groups I outlined in section 2 above: material bought from antiquities dealers, material from the early German excavations, and material from the better documented German excavations of the second half of the 20th century. In particular, several tablets were excavated at the Bit-Reš during the 1959–60 season of the Deutsche Orient-Gesellshaft's work at the site. These tablets were not found inside the building but in what appears to be a secondary context in the doorway to the complex. It has been suggested that these tablets were first discovered during illicit tablet hunts at the beginning of the 20th century and dropped as they were being removed from the site: there are certainly similarities between this material and certain tablets now in the Louvre (Van Dijk & Mayer 1980).

Anu-Bēlšunu's astronomical activity appears to have been concerned with two primary aspects: mathematical astronomy and astrology. In contrast to Iqīšâ, Anu-Bēlšunu does not appear to have owned tablets containing observations. His astrological tablets are all examples of what might be called 'late astrology'—no tablets containing celestial omens from the standard series *Enūma Anu Enlil* are known among his tablets. Instead we find examples of *kalendertexte* and the famous illustrated astrological tablets that link the moon, eclipses, the *dodekatemoria* scheme and various cultic items. In addition, Anu-Bēlšunu kept a copy of his own horoscope (Beaulieu & Rochberg 1996), and owned a complication of planetary data that was computed using lunar and planetary ephemerides (Steele 2000). This latter text is unusual in containing astronomical data for each of the planets and the moon calculated by using mathematical astronomy. We have no other examples of mathematical astronomy appearing outside of the mathematical astronomical texts themselves. The text is also unusual in containing astronomical data calculated for an eleven-year period from years 60 to 70 of the Seleucid Era, but having a colophon which explains that it was written in year 121 of the Seleucid Era. I have argued elsewhere that this text was probably used in the preparation of horoscopes (in support of this suggestion it is worth noting that Anu-Bēlšunu's own horoscope falls within the period covered by the calculations in the text) (Steele 2000).

The limited evidence that is provided by Anu-Bēlšunu's preserved astronomical tablets all points to the conclusion that an important part of Anu-Bēlšunu's interest in astronomy was directed towards the construction of horoscopes. Observational records appear to have been used only rarely to provide the astronomical data needed to cast a horoscope in the ancient world: Babylonian observations are not well suited to providing the information needed for a Babylonian horoscope (planetary, lunar and solar longitudes that would have to be obtained by interpolation from the infrequent records of planets passing by stars typical of Babylonian observations). Mathematical astronomy, however, provided the tools to compute the required information for a horoscope fairly easily

(although, it should be noted, this information is not directly recorded in the ephemerides). Anu-Bēlšunu's interest in (and probably business of) constructing horoscopes may explain why he appears not to have been interested in observation.

6. Concluding remarks

My aim with the preceding case studies has been to show how the study of the wider archival and cultural context of Babylonian astronomical texts can help understand both the astronomy itself and its role within Babylonian society. By looking at evidence from non-astronomical texts it has been possible to identify some of the uses astronomy had in Babylonian society. These uses provided motivations for the study and development of astronomy in Babylonia. However, I stress again that the uses I have identified here are only some of the uses astronomy may have had, and provided only part of the motivation for its practice. These can change over relatively short timeframes. For example, there are both many similarities and certain clear differences between the practice (and social context) of astronomy in Uruk during the third and fourth centuries BC and that in the Neo-Assyrian empire during the seventh century BC. Furthermore, it is also evident that not all of Babylonian astronomy developed because of some practical need: some Babylonian scholars clearly were interested in astronomy as an intellectual pursuit (notwithstanding that the same individuals may also have had uses for their astronomy). Better understanding of these issues will only be possible by studying all aspects of Babylonian astronomy—technical and cultural—together.

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