A Comparison of Astronomical Terminology and Concepts in China and Mesopotamia

J. M. Steele, University of Durham

1. Introduction

An interest in the movement and appearance of the sun, moon, planets and stars can be traced back in contemporary written sources to at least the Old Babylonian period in Mesopotamia (first half of the second millennium BC) and to the Shang dynasty in China (mid to end of the second millennium BC). In Mesopotamia, Old Babylonian cuneiform tablets contain omens drawn from the appearance of lunar eclipses (Rochberg 2006) and schematic lists of the length of day and night throughout the year (Hunger and Pingree 1989, pp. 163–164). In China, references to astronomical phenomena such as eclipses and comets appear on the so-called 'oracle bones' (Xu, Yau and Stephenson 1989; Xu, Stephenson and Jiang 1995). Except for so-called 'star-clocks' and related astronomical material from ancient Egypt, no *contemporary* writings on astronomical subjects are known from other cultures this early.

Although cuneiform texts containing astronomical material are preserved from all periods in the second and first millennium BC, material is very scarce until the Late Babylonian period (c. 750 BC to AD 100), with the vast majority of texts coming from the last four centuries BC. A similar situation holds for China: after the Shang dynasty oracle bones we only have a very few documents containing astronomical records (principally the *Zhushujinian* 竹書紀年 'The Bamboo Annals' and the *Chunqui* 春秋 'The Spring and Autumn Annals') until the second century BC. After this time we have an extensive and continuous tradition of astronomical writings contained within the 25 *Zhengshi* 正史, generally referred to in English as the 'Dynastic Histories', and many individual books on astronomical topics, down to modern times.

The plentiful supply of original sources, albeit for the large part remaining untranslated into a western language, makes Chinese and Mesopotamian astronomies attractive for comparative studies. Indeed, very soon after the decipherment of cuneiform astronomical and astrological texts had been undertaken by scholars such as A. H. Sayce, J. Epping, and F. X. Kugler, western scholars began to compare Chinese and cuneiform astronomical texts. In particular, C. Bezold in an paper entitled 'Sze-ma Ts'ien und die babylonische Astrologie' published in *Ostasiatische Zeitschrift* in 1919 compared Mesopotamian astrological omens with astrological portents given in the *Shiji* 史記 wriiten by Sima Qian 司馬遷 around the turn of the first century BC. He saw striking similarities of form and since the Babylonian sources he was using dated to mainly to the seventh century BC put forward the proposition that the idea of a system of celestial divination originated in Mesopotamia and was transmitted to China.

In the following decades, other western historians took up the idea that some Chinese astronomical and astrological ideas and techniques originated in Babylonia. For example, H. Chatley writing about Chinese astronomy in a wide-ranging and useful review paper entitled 'Ancient Chinese Astronomy' published in the first volume of the *Occasional Notes of the Royal Astronomical Society* in 1939 remarked that:

> After the Bactrian contacts with China one might expect some transmission of astronomical ideas from the West. Although there is no record of such in the Chinese histories until the third century A.D., it is a fact that many foreign curiosities entered China from about 40 B.C., and we find in A.D. 25 Liu Hsin [Liu Xin] producing an astronomical treatise, *The Three Principle Calendar*, which far excels its predecessors for accuracy and system, and antedates Ptolemy's *Almagest* by over 100 years. (p. 66)

Later in the same article he continues

> To the historian of astronomy there are questions of originality and parallelism of development, or, alternatively, the importation of ideas from the West. Scholars are

> divided as to the extent of early foreign importations, but it seams quite certain that some ideas and a few figures filtered through to China from Chaldea and Greece in the fourth century before the Christian era, and again in the first century. After the introduction of Buddhism in the first century A.D. there can be no doubt as to the inflow of Indian ideas, but the community of notions as to the twenty-eight mansions between India and China in, say, the eighth century B.C. leaves little doubt as to indirect contact at an earlier date. (p. 71)

Chartley's view is that there likely was transmission of astronomy from Mesopotamia to China and probably also from India to China (interestingly, he does not consider transmission in the opposite direction). In particular, he links one of the key developments in Chinese mathematical astronomy, the *Santongli* 三統曆 'Triple Concordance Calendar' devised by Liu Xin 劉歆 in the first century AD, with western influence. Recent scholarship has shown this system of mathematical astronomy to be firmly within the tradition of Chinese astronomy (Sivin 1969).

Joseph Needham in the section of his monumental *Science and Civilisation in China* concerning astronomy also postulates Babylonian influence on the development of early Chinese astronomy. In particular he posits a Babylonian origin for the system of *xiu* 宿 'lunar lodges' (Needham 1959, pp. 254–256). Again, more recent scholars have argued for an indigenous Chinese origin for the *xiu* system (eg Chen and Xi 1993).

The year before Needham's section of astronomy was published, H. H. Dubs took a different view in an article on early Chinese astronomy published in the *Journal of the American Oriental Society*. Dubs' conclusion was that "[d]own to at least Han times, then, Chinese astronomy was largely an indigenous development" (Dubs 1958, p. 298). Nevertheless, works have continued to appear, both by western authors and by scholars in China, which have claimed a Babylonian origin for parts of Chinese astronomy.

Evidence for the transmission of astronomy from one culture to another is often hard to prove. Even the contemporary sources can be deceptive in claiming a foreign origin for an idea in order to add to its creditability. For example, in several Greek and Latin works we find scientific ideas and methods attributed to the antiquity of Egypt, when they are clearly nothing of the sort. Clear evidence of transmission can often only be demonstrated for non-trivial numerical parameters, especially when they are given with high precision. The similarity of astronomical methods may not always indicate a common origin. For example, very similar approaches to the use of cycles to predict eclipses (or rather the syzygies at which eclipses are *possible*), are found in Babylonian sources (Steele 2000) and in Mayan codices (Lounsbury 1978), but it is historically impossible that these are related. In order to propose the transmission of astronomical methods from one culture to another it is necessary to be able to demonstrate a historical context that points towards such transmission having taken place in other areas of learning.

The purpose of this paper is to compare selected astronomical concepts and terminology in Chinese and cuneiform sources. The aim is largely comparative, rather than to investigate the transmission of astronomy from one culture to the other; nevertheless, some of the findings of this study may be relevant to that debate. However, it is necessary to note that similarities or differences may not always indicate transmission of lack of transmission. For example, as noted above, similar approaches to astronomical problems have certainly been developed independently in different parts of the world. Furthermore, when transmitted astronomy is assimilated into an existing astronomical tradition it inevitably changes, sometimes even at quite a conceptual level. For example, the Babylonian zodiac was a band through which the planets travelled, but the Greeks transformed it into a great circle on the celestial sphere (Steele 2007).

Three astronomical concepts and terminologies found in China and Mesopotamia are discussed in the following sections: celestial omens, the language used to describe eclipses, and positional measurement in the heavens.

2. Celestial Omens

The Shang dynasty oracle bones attest to the early adoption of divination as a practice in China. A heated needle or brand would be inserted in a drilled hole on the back of a polished animal bone or turtle plastron producing a pattern of cracks. These cracks would then be interpreted by a diviner and the results of the divination, along with observed verifications, would then be recorded on the bone. The divinations were answers to questions asked by the diviners to their ancestral spirits. Astronomical references in the oracle bones appear only in the observations that are the results of the divination. For evidence of the practice of interpreting events in the heavens themselves as omens, we must move into the first millennium BC.

The earliest extensive source for Chinese celestial omens is the *Shiji* compiled by Sima Qian around the turn of the first century BC. Chapter 27 of the *Shiji* is a treatise on *tianguan* 天官. Later dynastic histories usually call this subject *tianwen* 天文. In modern Chinese *tianwen* refers to the subject of astronomy. In ancient and medieval China, however, the term is perhaps better translated as 'observational astrology' since it is the study of observations of celestial phenomena and their interpretation as portents. The investigation of the motions of the celestial bodies and the development of methods of predict the positions of the sun, moon and planets and their resulting phenomena such as eclipses, is part of the study of *li* 曆 'calendrical astronomy', or what would be commonly called in the history of western astronomy 'mathematical astronomy'.

Although written in the seventh century AD, the *tianwen* treatise of the *Jinshu* 晉書 is typical of the style of the *tianwen* treatises in the *Shiji* and later dynastic histories. The whole treatise, chapters 11 to 13 of the *Jinshu*, has been translated into English by Ho Peng Yoke (1966). It contains discussions of cosmological theory, astronomical instruments, stars and constellations, and accounts of observations of astronomical phenomena together with their astrological interpretations arranged by type of phenomena. For example, an observation of a solar eclipse in 260 AD is reported as follows:

> A solar eclipse occurred on a *i-yu* [*yi-you*] day [i.e., 22 of the sexagesimal cycle], the first day in the first month of the 5th year (of the same reign period [i.e., the reign period given above]. According to the prognostications of the *Ching Fang I* [*Jing Fang Yi*] whenever a solar eclipse falls of an *i-yu* day it presages that the Emperor will lose his power to his ministers and that the Minister of War will revolt against him. During the fifth month the crime of Ch`eng Chi [*Cheng Ji*] was committed.
> [*Jinshu* ch. 13; trans. Ho (1966, p. 155–156). Comments by the present author in square brackets].

Frequently, the author of the *tianwen* treatises will link an observed celestial portent with an event here on Earth. In the example just cited, the author links the observation of a solar eclipse with the assassination of the Emperor by Cheng Ji 成濟.

All celestial portents in China are directed towards the Emperor and his government. An emperor only governed through the mandate of heaven and it was believed that unexpected events in the sky were heavens way of criticising the rule of the Emperor, warning him that his rule would be extinguished unless he improved his conduct. Crucially, only unexpected celestial events presaged real danger and so the ability to predict an event in advance removed much of the portent from its occurrence. Thus more easily predictable lunar eclipses were of far less astrological importance than their harder to predict solar counterparts, as is made clear in the *Shijing* 詩經 'Book of Odes':

> That this moon is eclipsed is but an ordinary matter; but that this sun is eclipsed—wherein lies the evil
> [Trans. Karlgren (1950, p. 100)]

Because all astronomical portents were directed towards the emperor, there was a clear link between astronomy and politics in China (Eberhard 1957). The recording of astronomical events was very often politicised, as is shown in this example from the *Houhanshu* 後漢書:

> The sun was eclipsed in the 22nd degree of *tung-ching*. *Tung-ching* is the mansion [lodge] in charge of wine and food, the duty of the wife: 'It will be theirs neither to do wrong

nor good, only about the spirits and the food will they have to think.' In the winter of the previous year, the (Lady) Deng had become empress. She had the nature of a man, she participated in and had knowledge of affairs outside of the palace, therefore Heaven sent a symbol. During that year floods and rain damaged the crops.
[*Houhanshu* 27; trans. Beck (1990, p. 162)]

One result of the political role of astronomy in China was the manipulation of the astronomical record. There is strong evidence for the omission of astronomical observations in certain reigns, and even the addition of faked events in other reigns (Foley 1989).

From Mesopotamia we have two primary sources for celestial omens: compilations of celestial omens, principally the canonical omens series *Enūma Anu Enlil*, and omens cited by the scholars employed as advisors to the Neo-Assyrian kings Essarhaddon and Assurbanipal. In both cases the omens are written as conditional clauses with the protasis generally preceded by the DIŠ sign, either to be read as a logogram for *šumma* 'if' or, as suggested by Erica Reiner, as simply a paragraph marker. Linking the protasis and the apodosis is the conjunction *-ma*.

The tablets containing omen compilations are generally set out very rigidly so that the same signs lie under one-another in successive lines. This emphasizes the schematic nature of the omen compilations, in which all possibilities of a particular kind of phenomena are listed. For example, here is an excerpt from a collection of Venus omens edited and translated by Reiner and Pingree:

[MUL *dil-bat ina*] ITI.N[E KUR-*ha* ŠÈG.MEŠ (*ina* KUR) GÁL.MEŠ *ub-bu-tú* GAR-an]
[MUL *dil-bat ina*] ITI.KIN KU[R-*ha* ŠÀ KUE DÙG-*ab*]
[MUL *dil-bat ina*] ITI.DU$_6$ KUR-*ha* SA[L.KÚR.MEŠ *ina* KUR GÁL-MEŠ EBUR KUR GIŠ]
[MUL *dil-bat ina*] ITI.APIN KUR-*ha* KUR [SAL.KALA.GA DIB-*bat*]
[MUL *dil-bat ina*] ITI.GAN KUR-*ha* SU.K[Ú ŠE *u* IN.NU *ina* KUR GÁL]

[If Venus rises in] Month V: [There will be rains in the land, there will be …]
[If Venus rises in] Month VI: [The land will be happy]
[If Venus rises in] Month VII: [There will be hostility in the land, the harvest will prosper]
[If Venus rises in] Month VIII: [Hard times will sieze] the land
[If Venus rises in] Month IX: [There will be] famine [of barley and straw in the land]

[Sm.1480+1796, 5–9; ed. and trans. Reiner and Pingree (1998, p. 146–7)]

Just as we saw for the Chinese celestial portents, the omens apodoses of Babylonian celestial omens always refer to the country as a whole. The only individual mentioned in apodoses is the king, as his fate was tied to that of the land. Again, as in China, celestial omens were at times of major political importance. For example, astronomical omens are one of the most frequently discussed topics in the correspondence between the Neo-Assyrian kings and their scholars.

Unlike in China, the development of predictive astronomy in Mesopotamia did not reduce the importance of omens drawn from events that could now be predicted in advance with some degree of accuracy, such as eclipses (Brown and Linssen 1997). Instead, there is a suggestion that the ability to know in advance that a particular celestial event was forthcoming enabled the Mesopotamians to make advance preparations for ritual responses to the omens.

In addition the development of predictive astronomy may have been one of the factors that led to the tradition of horoscope casting. This new form of astronomy is first attested in Mesopotamia in the late fifth century BC (Rochberg 1998) and existed in parallel with the older *Enūma Anu Enlil* tradition of celestial omens. Here we have clear evidence of the spread of an astronomical tradition from Mesopotamia to China, through Sanskrit intermediaries. The earliest horoscope yet found in an East Asian source is from Japan and for the year AD 1112, although we know several books describing horoscopes from the Tang dynasty, for example the *Xiuyaojing* 宿曜經 which was translated from an Indian source by Bukong 不空 in AD 759 (Nakayama 1966).

3. Eclipses

The earliest references to eclipses in China are found in the Shang dynasty oracle bones dating from *circa* 1600–1050 BC. The character used to indicate an eclipse is an early form of *shi* 食 which carries the literal meaning 'to eat' (Xu, Yau and Stephenson 1989). This character in its standard form continued to be used to indicate an eclipse of the sun or moon throughout Chinese history, along with its related homophone *shi* 蝕, formed by the addition of the radical 虫. The use of a character with the meaning 'to eat' suggests that the phenomenon of an eclipse was thought to be caused by something eating the sun or moon. Mythological explanations of eclipses along these lines are common throughout the world.

In China, the idea of a creature eating the eclipsed body influenced the terminology employed to describe eclipses and which became standard technical terms. For example, a total eclipse is usually indicated by *ji* 既. In Mathews' Chinese-English dictionary, this character is translated as "since; when" and "already, to finish", but the character was originally a pictogram showing a man turning his head away from a plate of food indicating that he was replete (Stephenson 1997, p. 223). It seems likely that the character was employed to indicate a total eclipse because of the parallel of a meal being finished, and a creature eating the whole of the eclipsed luminary.

Other terms used by astronomers in describing eclipses are more prosaic: *kui chu* 虧初 'loss begins', *shen* 甚 'greatest' and *fu man* 復滿 'return to fullness' are generally used to refer to the beginning, maximum phase and end of an eclipse respectively.

In Late Babylonian astronomical texts eclipses are always referred to using the logogram AN.KU_{10} to be read in Akkadian as *attalû* 'eclipsed' and apparently always to be understood as a technical term. Related Akkadian words such as *adāru* 'to become worried, upheaval', have been shown by Goetze (1946) to be secondary, drawn from the association of eclipses with portended upheaval on Earth. There is no evidence of any mythological explanation for the language used to denote an eclipse. Eclipse myths did exist in Mesopotamia, however. For example, in the sixteenth tablet of the incantation series *utukkû lemnūti* seven demons are said to encircle the moon during an eclipse, covering the moon completely (Kilmer *apud* Azarpay 1978). But this myth is not reflected in the language used to describe an eclipse.

Although eclipse mythology did not inform the choice of language used to describe eclipses in Mesopotamia, apotropaic rituals did. The period of maximum phase of an eclipse is customarily referred to in Late Babylonian astronomical texts using the logogram ÍR to be read as the Akkadian word *bikîtu* 'weeping, lamentation' (Huber and de Meis, 2004, p. 14). This refers to the ritualised performance of drums and the reciting of laments during the eclipse. For an example of a text describing an eclipse ritual, see Brown and Linssen (1997).

4. Positional Measurement in the Heavens

Defining the position of a body in the heavens is an essential part of astronomy. There are many ways in which the position of a celestial object can be measured. For example, it is possible to measure the distance between one body and another body along the straight line that connects them; alternatively, one could measure the altitude of a body above the horizon and combine this with a measure of its azimuth along the horizon to produce a coordinate pair; or one could measure a pair of coordinates in the sky in some invisible reference system. The choice of one system of measurement over another may be a reflection of the cosmological framework in which one is working, or simply a matter of convenience depending upon what instruments are available to help in the task.

Throughout Chinese history the main system for defining the position of a celestial object employed upon the *xiu* 宿 'lunar lodges'. The *xiu* are a division of the sky into 28 zones defined by a determinative star. The zones are unevenly distributed around the celestial equator and fixing their widths was a continuing task for Chinese astronomers throughout the ancient and medieval periods. The origin of the *xiu* is not known, but it is possible that originally they were abstracted from constellations. However, by the Han period at latest they were linked to the celestial equator, called *chidao* 赤道 ‘red road’.

The celestial equator was taken as the reference system for almost all of Chinese astronomy. Within the various calendrical systems of mathematical astronomy, solar, lunar and planetary motions were always calculated along the equator, although as early as the first century AD the problems with doing so had been noted by Jia Kui 賈逵 in a memorial submitted to the emperor:

> Your servant has previously submitted a memorial pointing out that when Fu An and his colleagues used the Yellow Road [= the ecliptic] to measure the [positions of] sun and moon at half and full moons, they were mostly correct. But the astronomical officials, who all used the Red Road [= the celestial equator], were not in agreement with the sun and moon. … The Red Road is the middle of Heaven, and is 90 *du* to from the pole. It is not the path of the sun and moon, and [the effect alleged above] is because one has used such an incorrect standard to measure the sun and moon, and missed the real motions.
> [Trans. Cullen (2000, pp. 359–361)]

Jia Kui is correctly pointing out that the sun and moon do not move along the celestial equator. The sun moves along the *huangdao* 黃道 ‘yellow road’, the ecliptic, and the moon and planets move along paths running above and below the ecliptic. Nevertheless, the ecliptic only played a secondary role in Chinese astronomy, and all movements were translated into (much more complicated) movements relative to the equator.

The terms used to refer to the equator and the ecliptic, ‘red road’ and ‘yellow road’, may have their origin simply in the coloured lines drawn on star maps during the Han period to indicate the equator and ecliptic (Sun and Kistemaker 1995). The orbit of the moon was often called *baidao* 白道 ‘white road’.

Measurements of positions in the sky used the angular measure *du* 度. A *du* was defined by equating the number of days in a solar year with one complete revolution of the heavens. Thus a *du* corresponds to about 360/365.25 degrees. The actual angular extent of a *du* varied at different periods as different lengths of the solar year were adopted in the different calendars. For example, in the *Sifenli* 四分曆 promulgated during the Eastern Han, there were 365 1/4 *du* in a circle, whereas in the *Xuanshili* 玄始曆 used during the Northern Liang there were 364 1759/7200 *du* in a circle (year lengths taken from Yabuuti 1963, p. 459).

The angular measure *du* was only used for measurements parallel to the equator. For other distances, such as those perpendicular to the equator, linear measures such as *chi* 尺 ‘foot’ or its multiple, *zhang* 丈 ’10 feet’, were used (Cullen 1996, p. 41). As we will see, a similar distinction between east-west and north-south measurements appears in Late Babylonian astronomy.

In contrast to its importance in Chinese astronomy, the celestial equator does not feature directly in Mesopotamian astronomy. Indeed, there is no term corresponding to the equator. However, the concept of the daily rotation of the sky and stars that cross a meridian at the same moment is found in several aspects of Mesopotamian astronomy, in particular with the concepts of *ziqpu* stars. Several texts contain lists of simultaneously culminating stars and/or lists of the time intervals between the culminations of certain stars. A statement at the end of on *ziqpu* star list that

> [PA]P$^{?}$ 12 *bēru kip-pat zi-*[*iq-pi*]
> *bi-rit kakkabāni*^{meš} *šá ḫarrān šu-ut* ^{d}[*en-líl*]
>
> [A tota]l$^{?}$ of 12 leagues of the circle of (those that) cul[minate]
> amists the stars of the Path of [Enlil]
>
> [BM 38369+ ii’ 20–21; ed. and trans. Horowitz (1994, p. 92)]

implies that the full circuit of *ziqpu* stars corresponds to 12 *bēru* or 360 UŠ (= 360 'time degrees'), but does not refer to the celestial equator.

In the Late Babylonian period, celestial positions are generally recorded in one of two systems: using distances *e* 'above' or SIG 'below' (and occasionally *ina* IGI 'in front of' or *ár* 'behind') one of the so-called Normal Stars used as reference markers in the sky; or a positions within the zodiac. Positions relative to the Normal Stars are normally given in units of KÙŠ 'cubits' and their subdivision SI 'fingers', where there were 24 SI in a KÙŠ during the Late Babylonian period (at earlier times there were generally 30 SI to a KÙŠ). As their name suggests, KÙŠ and SI are primarily spatial units, not angular measures. The directions 'above', 'below', 'in front of' and 'behind' correspond roughly to measurements in an ecliptical coordinate system. However, as the direction of motion of the moon or a planet through the zodiac is more or less indistinguishable from running parallel to the ecliptic over short timescales, it is quite possible that the Babylonians conceived of these directions as being along a planet's path and at right angles to that path (Swerdlow 1998).

The movement of the moon and planets through the sky takes place in a narrow region of stars in what are called 'zodiacal constellations'. In the early astronomical-astrological text MUL.APIN the eighteen constellations through which the moon, sun and planets pass are listed. By the fifth century BC, an abstract system of twelve equal length zodiacal signs had been developed out of these eighteen constellations. The position of the moon, sun or a planets could now be given as so many UŠ 'degrees' within a zodiacal sign, where each zodiacal sign contained 30 UŠ. The twelve zodiacal signs therefore make up 360 UŠ.

The zodiac was used in both observational and theoretical astronomy by the Babylonians. In the theoretical astronomical texts it functioned in a way similar to an ecliptical coordinate system, but there is evidence that the Babylonians themselves did not conceive of it in this way. For example, although positions within zodiacal signs, equivalent to celestial longitudes, were given in UŠ, measurements up or down within the zodiacal band were generally given using the KÙŠ-system. The UŠ and KÙŠ systems were strictly convertible with 1 KÙŠ taken to be 2 UŠ, but making the choice to use two different units suggests that the Babylonians were not thinking in terms of a coordinate system, but of two separate measurements.

Although the Babylonians used the zodiac, they did not apparently consider the zodiac linked to the ecliptic. Indeed, there appears to be no concept of the ecliptic within Babylonian astronomy. Instead, we find that the paths of the sun, moon and planets are defined as being within individual paths (*mālak*) which have widths, for example in a procedure text concerning Jupiter:

> *ina* DAGAL *ma-lak šá* … *ina* UŠ IGI-*tu*$_4$ ½ KÙŠ *šá-qa ina ár-tu*$_4$ ½ KÙŠ SIG
> in the width of the path … At first station ½ cubit it is high. At second station ½ cubit it is low.
> (BM 36680 + dupl.; ed. and trans. by Steele (2005)]

Each path has a middle known as DUR(*riksu*) MÚRUB 'the ribbon/band of the middle', and upper a lower boundaries. For the moon we have several texts which detail the upper and lower boundaries of its path, giving their distances above and below each Normal Star (Steele 2007). The position of the sun, moon or planet could be given as the number of degree within a zodiacal sign, and the height or depth above or below the middle of its path. This system is very close to an ecliptical coordinate system, such as are found in ancient Greek astronomy, but as I have tried to show, it is conceptually and in some measure practically different.

5. Conclusion

The aim of this paper has been to compare a small selection of astronomical terms and concepts in Chinese and Mesopotamian astronomy. Although one must be cautious in drawing conclusions regarding the possibility of transmission of astronomy from one culture to another based upon this study, I believe a few remarks can be made. First, it is clear that independent traditions can be very similar. For example, historically and textually I see no evidence that

Chinese celestial divination originated in Babylonia; nevertheless, in both cultures the heavens were used to provide portents, and in both cases these portents were at times exploited for political purposes. Secondly, there were clear differences between how the Babylonians and the Chinese conceived of celestial measurement – unsurprisingly, given their different cosmologies. Although this would not preclude the transmission of astronomical knowledge from one culture to another, it would make it harder and does, I think, place the onus on historians claiming the transmission of Babylonian astronomy to China to explain how this problem was overcome.

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