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THE DEVELOPMENT OF THE BABYLONIAN ZODIAC: SOME PRELIMINARY OBSERVATIONS

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ABSTRACT

The development of the signs of the zodiac as a division of the band through which the moon, sun, and planets travel into twelve equal parts represents a major step in the history of ancient astronomy. The development of the uniform zodiac took place in Babylonia in the late fifth century BC and was subsequently transmitted to other parts of the ancient world. In this paper I present a preliminary discussion of the development of the zodiac as a framework for positioning celestial bodies. This development took place within a Babylonian tradition which was both observational and computational. In addition to consideering the conceptual framework of the zodiac, I pay particular attention to the way that names for the signs of the zodiac were assigned.

KEYWORDS: Zodiac, Babylonian Astronomy, Constellations.

1. INTRODUCTION

The development of the zodiac was a key event in the history of Babylonian astronomy and astrology. In astronomy, the zodiac provided a uniform mathematical framework within which celestial bodies, in particular the moon, the sun, and the five planets, could be located (Steele, 2006, 2007). This mathematical framework greatly simplified the calculation of astronomical phenomena. Within astrology, the zodiac opened up a whole range of new possibilities for making associations between the terrestrial and the celestial realm. The development of the zodiac took place sometime in Babylonia during the late fifth century BC (Britton, 2010). The concept of the zodiac subsequently circulated around the near east, being transmitted to Egypt and the Greek world, from where it spread to India and then from India to China and other parts of east Asia, while in the west it became a standard part of Greek, Islamic and European astronomy (van der Waerden, 1952; Ross, 2014; Song, 2016).

It is important before going any further to clarify the distinction between the *zodiac* and the *zodiacal constellations*. The *zodiacal constellations* are a set of constellations through which the sun, moon, and the planets move. These constellations are a subset of the larger number of constellations which are spread out across the whole of the celestial sphere, and, like all constellations, they differ in size and shape and have gaps between them. All constellations are human constructs, projections made onto the large number of stars visible to the naked eye which are distributed throughout the night sky. The constellations are therefore culturally dependent—different cultures will arrange the stars into different patterns and name them different things—although like any astronomical knowledge, traditions of defining and naming constellations can circulate between cultures. In modern terms, the *zodiacal constellations* are a series of constellations distributed around a band centred on the ecliptic through which the moon, sun and plants move. We can call this the *zodiacal band*. The *zodiac* is a uniform mathematical division of the *zodiacal band* into twelve equal-length parts, each of 30°, which we can call *zodiacal signs* (or *signs of the zodiac*). Unlike the *zodiacal constellations* the *zodiacal signs* are all the same size and have no gaps between them. However, whereas the boundaries of constellations can be seen in the night sky by imagining lines between stars, the boundaries of *zodiacal signs* are defined mathematically and cannot be directly seen in the sky.

The development of the zodiac in Babylonia grew out of an existing tradition of zodiacal constellations. I begin this paper, therefore, with a brief discussion of these constellations before reviewing the way that the zodiac was used and referred to in astronomical and astrological texts. I will then turn to the development of the zodiac itself. My discussion of this development will be split into two parts. First, I will consider the development of the concept of the zodiac as a uniform division of the zodiacal band. And second, I will examine the naming of the zodiacal signs, a question has been almost completely overlooked in previous studies.

2. BEFORE THE ZODIAC: ZODIACAL CONSTELLATIONS

The text known as MUL.APIN, a compendium of early astronomical knowledge composed sometime before the beginning of the seventh century BC (possibly several centuries earlier), contains a list of seventeen zodiacal constellations (MUL.APIN I iv 31–37, see Hunger and Steele, 2018):

The stars who stand in the path of the moon, through whose region the moon during a month passes repeatedly and keeps touching them: The Stars, the Bull of Heaven, the True Shepherd of Anu, the Old Man, the Crook, the Great Twins, the Crab, the Lion, the Furrow, the Scales, the Scorpion, Pabilsag, the Goat-fish, the Great One, the Tails of the Swallow, Anunitu, and the Hired Man.

This list begins with the Stars (the Pleiades) because it is assumed in MUL.APIN that in a normal year the moon is situated within this constellation at the start of the year. In the Babylonian calendar, months begin on the evening when the new moon crescent is visible for the first time. The year begins in the spring, around the time of the spring equinox (exactly when in relation to the equinox depends upon intercalation). Thus, the year begins on the evening of the first visibility of the moon near the spring equinox.

Observational texts from the seventh century BC onwards include reports of the position of the moon and the planets relative to the zodiacal constellations or individual stars or small star groups within those constellations (e.g. the Front Star of the Head of the Hired Man). These texts add one further zodiacal constellation to the list of zodiacal constellations: the Chariot. Astrological texts from the same period attest to one further zodiacal constellation: the Field. Thus, at least nineteen zodiacal constellations were identified by the Babylonians (see also Ratzon, 2016).

3. REFERENCES TO ZODIACAL SIGNS IN ASTRONOMICAL AND ASTROLOGICAL TEXTS

3.1. Observational and related texts

A large number of cuneiform tablets are known from Babylonia which contain reports of astronomical observations. The observations contained in the texts written on these tablets date from the middle of the eighth down to the end of the first century BC. Most of the tablets contain texts which fall into a small number of named (mostly by the Babylonians themselves) text types. The most widely attested text type of the Astronomical Diary, which contains astronomical and terrestrial data covering a period of several months (usually half a year, but Diaries covering periods from a few months up to a year are known) (Sachs and Hunger, 1988–96). From the Diaries various texts were produced which contain collections of astronomical data either for analysing past data in order to identify astronomical regularities (lunar and planetary compilations—see Hunger, 2001), or in order to make future predictions (Goal-Year Texts—see Hunger, 2006). These predictions were written in so-called Almanacs and Normal Stars Almanacs, which are very similar in style to the Diaries (Hunger, 2014).

Beginning in around 400 BC, zodiacal signs are almost always given in reports of observations of the first or last appearance (heliacal rising and setting) of a planet. They are also occasionally given in reports of observations of planetary stations and of lunar eclipses. Predicted first and last appearances and stations of the planets also usually include the zodiacal sign in which the planet was located on that date. Here is a typical example: "Month IX, the 20th, Saturn's first appearance in Sagittarius" (Hunger, 2006: no. 41). If the planet was near the start or the end of the zodiacal sign, the name of the zodiacal sign may be preceded by the word "beginning" (SAG) or "end" (TIL). The "beginning" and "end" zones of a zodiacal sign correspond to about the first and last 5° of the sign (Steele and Gray, 2007). In contrast to statements referring to constellations, where a planet can be "in", "in front of" or "behind" a constellation, planets can only ever be "in" a zodiacal sign.

The second type of statements involving the zodiac found in the Diaries and the Almanacs are statements of which sign of the zodiac a planet was located in during a particular month. If the planet moved from one sign to another sign that date is reported as well. For example: "[That month … Jup]iter was in Scorpio; Venus and Mars were in Gemini; Saturn was in Virgo; the 19th, Mars reached Cancer; the 21st, Venus reached Cancer" (Sachs and Hunger, 1996: no. -140A).

The dates when a planet reached a new sign of the zodiac cannot be directly observed because the zodiacal signs do not have visible boundaries. Instead, these dates were derived from the position of the planet relative to certain reference stars (named by modern scholars "Normal Stars"). It was assumed that the boundaries of the zodiacal signs either coincided with (in the case of the Southern Rein of the Chariot (ζ Tau), the Rear Twin star (β Gem), and the Rear Star of the Goat-fish (δ Cap), which were taken to mark the beginning of Gemini, Cancer, and Aquarius respectively) or at known distances in front of or behind a Normal Star (Huber, 1958; Jones, 2004). This link between the beginning of zodiacal signs and the location of stars indicates that the Babylonian zodiac was sidereal and therefore slips relative to our tropical zodiac over time, a conclusion confirmed through analysis of comparisons of Babylonian zodiacal positions with modern computation (Huber, 1958; Steele and Gray, 2007; Britton, 2010). Two star catalogues are known which give the positions of the Normal Stars within the signs of the zodiac (Roughton, Steele and Walker, 2004).

3.2. Mathematical astronomical texts

Babylonian mathematical astronomy used arithmetical functions to calculate the date and position of the moon and the planets at their synodic phenomena (conjunction and opposition for the moon, first and last appearance, stations, and acronychal rising for the planets) along with related material such as the body's celestial latitude, the lunar velocity, and the length of the synodic month. In the texts containing the results of these calculations the position of the moon or a planet is specified by the number of degrees (UŠ) within a sign of the zodiac.

3.3. Astrological texts

The zodiac appears in a wide variety of astrological texts dating from around 400 BC onwards. These texts include horoscopes which contain collections of astronomical data for days on and around the date of birth of an individual (Rochberg, 1998). This data often includes the sign of the zodiac within which the sun, moon, and planets were located on that date. Related to the horoscopes are texts which list nativity omens which relate the sign of the zodiac that the sun, moon, or a planet are located in with the future life and death of that child. Other astrological texts which make use of the signs of the zodiac include texts giving associations between the zodiacal signs and cities (Steele, 2015a), texts which associate zodiacal signs with parts of the human body (Wee, 2015), and texts which associate the signs

of the zodiac and the signs of the microzodiac (1/12th of a sign of the zodiac) with medical ingredients, cultic sites, etc (Monroe, 2016).

A particularly interesting group of astrological texts are the so-called *kalendertext*, which use a simple numerical scheme to connect dates in the calendar with positions in the zodiac (Brack-Bernsen and Steele, 2004). These zodiacal sign of this position is then associated with terrestrial items such as cultic sites and, most commonly, the materials for making medical remedies (Wee, 2016; Steele, 2017a). Here is a typical example of an entry from one of these texts:

8 12 1 6 nam.tar-wood, ú.gír-wood, white-plant, thyme-plant, […]-plant, sag.gil.mud-stone. Eanna. Day of the city god. Opening of the gate, Sin, Šamaš, and [Ištar, A]nu, Enlil and Ea and the warrior Ningirsu. Jupiter. Weapons, strife. He should go out for judgment. He should prostrate before Sin and Šamaš, and he will prove to be merciful. 3 18

The entry begins with four numbers. The first two numbers are the sign of the zodiac and the number of degrees within that sign (in this case 12° of the 8th sign which is Scorpio). The second two numbers correspond to the month of the year and the day within the month. The sign and degrees are calculated from the month and day according to calculation based upon the rule that the position increases by 277° each day. The text from which this example is taken covers the whole of the first month of the year. The material following the four numbers repeats every time the same sign of the zodiac is given by the scheme. (The final two numbers follow a different scheme which increases 13° per day.)

3.4. Schematic astronomical texts

The zodiac appears in a small number of texts from a larger corpus of what I term schematic astronomy (Steele, 2017b). Schematic astronomical texts contain simple mathematical schemes which describe astronomical phenomena such as the variation in the length of daylight across the year, the duration of lunar visibility, and the length of a shadow cast by a gnomon. One group of texts in this genre present a scheme for the so-called rising times. These texts exist in two forms: a calendar based version which presents a scheme for the culmination of certain stars (or distances behind those stars) at sunrise on dates through the year, and a zodiac based version which presents the same scheme but relating the culminations to the rising at the eastern horizon of points in the zodiac (Steele, 2017b).

4. THE DEVELOPMENT OF THE CONCEPT OF THE ZODIAC

It is generally agreed among historians of Babylonian astronomy that the concept of the zodiac as a uniform division of the band through which the sun, moon and planets move into twelve equal parts, each of which was further subdivided into 30° developed by analogy with the division of the schematic year into twelve months, each of which contains 30 days (Stephenson et al., 1995; Brack-Bernsen and Hunger, 1999; Brown, 2000; Steele, 2007; Britton, 2010). The Babylonian calendar was a luni-solar calendar in which the beginning of the month was governed by the first visibility of the new moon crescent, leading to months lasting either 29 or 30 days, and the year normally contained 12 months but slightly more often than every three years an extra intercalary month was added to prevent the calendar from wandering too far with respect to the seasons, bringing the number of months in those years to 13. Because of the uncertainty in whether a month will have 29 or 30 days, and whether a year will have 12 or 13 months, from very early in Mesopotamian history we find evidence for the use of a simplified schematic calendar when making calculations. This calendar, which was purely used for calculation and was never considered to be an actual calendar, simply made each month 30 days long and each year 12 months long, making a total of 360 days within a year. The schematic calendar is first attested in economic documents to simplify the calculation of the allocation of rations and the calculation of interest on loans, etc, but from the second millennium BC onwards it was also often used in astronomical calculations (Steele, 2011).

Clear evidence for the role of the schematic calendar in the development of the concept of the zodiac is provided by several astronomical and astrological texts which use month names to refer to the signs of the zodiac (see section 5 below). Within schematic astronomy the parallel structure of the zodiac and the schematic calendar provided a simple model for the sun's motion in longitude in which the (mean) sun moves by 1° per day. Thus, if we assume that the sun is located at 1° in Aries on the 1st day of the year, the sun's position is always equal to the day of the year. Thus, the month and day number are the same as the sign of the zodiac and the degrees within that sign. For example, on the 14th day of Month IV, the sun will be located 14° within the 4th zodiacal sign which is Cancer. This equivalence between the date in the schematic calendar and the position of the sun was exploited in the rising time texts which transform a calendar based scheme into a zodiac based scheme, and also in the astrological *kalen-*

dertext, which exploit the parallelism of the calendar and the zodiac to create an astrological scheme (Brack-Bernsen and Steele 2004).

The concept of the zodiac, therefore, comes out of the schematic calendar. In a sense, the zodiac served a parallel function to the schematic calendar as well. The schematic calendar simplified calculation by providing a uniform system of constant length months and years. Similarly, the zodiac simplified the calculation of the position of the sun, moon, and planets by providing a "schematic" set of constellations of uniform length. Just as there are 12 months of 30 days each in the schematic calendar, the zodiac is divided into 12 signs each containing 30 UŠ. The zodiac, therefore, is not a reduction of a large number of zodiacal constellations to 12 but rather an independent system of dividing the zodiacal band. As I will discuss in the next section, one tradition for naming the signs of the zodiac was to use the names of constellations selected from the available repertoire of zodiacal constellations.

5. NAMING THE ZODIACAL SIGNS

The process of naming the signs of the zodiac has received very little attention by previous scholars. A full study of the signs of the zodiac should take into account not only the names of the signs as found in astronomical and astrological texts but also the imagery of zodiacal signs found in seal impressions (see provisionally Wallenfels, 1993), drawings on cuneiform tablets, etc. I hope to undertake such a study in due course but space considerations prevent me from doing so here. In the following, therefore, I consider only textual evidence and restrict even this to only selected astrological tablets and the Astronomical Diaries. Nevertheless, the results I present here seem to provide a coherent, if not necessarily complete, picture of the naming of the zodiacal signs.

Three methods for naming the signs of the zodiac are known: (i) by month name, (ii) by number, and (iii) by a constellation name.

5.1. *Naming by month name*

A small number of texts use month names to indicate the signs of the zodiac. The earliest of these, BM 53282, a collection of horoscopes dating to the reign of one of the kings named Artaxerxes (almost certainly Artaxerxces II) uses the terminology É ^{itu}MN literally "house of Month MN" (Hunger, 1999; Brown, 2017) to indicate the sign of the zodiac. The same "house of Month MN" terminology is used in BM 36609+, a text containing a list of Normal Stars with their zodiacal positions (Roughton, Steele and Walker, 2004). Several astrological texts refer to the signs of the zodiac by the equivalent month name. For example, a list of the so-called "terms" (the division of each sign of the zodiac into unequal length parts each associated with a particular planet) found in the astrological compendium BM 36303+ (+) BM 36628+ (+) BM 36988 uses month names to refer to the signs of the zodiac (Steele 2015b), and two *kalendertext* tablets, SpTU III 104 and 105, mix month names and constellation names to indicate the signs of the zodiac (Steele 2017a).

5.2. *Naming by number*

Several of the *kalendertext* tablets and related astrological material refer to the signs of the zodiac using numerals. The signs of the zodiac are numbered in order beginning with Aries. This practice seems to be restricted to texts which employ mathematical astrological schemes.

5.3. *Naming by constellation name*

The most common way of naming the signs of the zodiac was by the names of constellations located within the signs. A fairly standard list of the names of the twelve signs emerged by in the last few centuries BC. This list is presented on the BM 34566 Obv. 2–4 (I give both a transcription of the cuneiform signs and a translation for reference):

HUN MÚL-MÚL MAŠ-MAŠ ALLA A ABSIN RÍN GÍR-TAB PA MÁŠ GU *zib*^{me}

The Hired Man, the Stars, the Twins, the Crab, the Lion, the Furrow, the Scales, the Scorpion, Pabilsag, the Goat-fist, the Great One, the Tails.

This "standard list", as I shall henceforth call it, is used for the names for the twelve signs of the zodiac that appear in the Astronomical Diaries and related texts, in texts of mathematical astronomy, and in most astrological texts of this period, with only a few exceptions which I shall discuss below. (Note that sometimes these names are written slightly differently in different texts, for example in fuller forms such as UR.A for the Lion, or shorter abbreviations, for example MAŠ for the Twins and GÍR for the Scorpion; these shorter forms are common in the texts of mathematical astronomy where space in a table was at a premium and where visually it made sense to refer to each sign of the zodiac by only one cuneiform sign rather than two signs as would be the case for four signs using the writings above.)

Comparing the standard list with the list of zodiacal constellations in MUL.APIN, we find that all of these constellation names appear in the earlier list. As we will see, however, the process of choosing which twelve constellations to use was not straight forward. Furthermore, it is clear that alternate names for some of the signs of the zodiac were still in use in

the early third century BC, well over a hundred years after the zodiac was developed.

In the following, I present brief discussions of the names of each sign of the zodiac.

5.3.1. Aries

The name of the zodiacal sign Aries is written using two different cuneiform signs: HUN and LU. HUN is the most common writing at Babylon and is an abbreviation of ^{mul} ^{lú}HUN.GA "the Hired Man". LU is commonly used at Uruk, but is also occasionally used at Babylon (the earliest example in a Diary being from 374 BC). I am uncertain how to translate LU. LU could simply be another abbreviation of ^{mul} ^{lú}HUN.GA. The sign LÚ in this name is a determinative indicating that the following signs denote a profession. It is possible that LÚ has been taken as an abbreviation of the whole name and then replaced by the homophone cuneiform sign LU. We sometimes find cases where complicated cuneiform signs are replaced by signs that have the same pronunciation but which are simpler to write (for example, in the Late Babylonian period the complicated signs BÁR and SIG_4 for Month I and Month III respectively were often replaced by the signs BAR and SIG, which are simpler signs requiring less wedges and taking up less space). However, the sign LU is not simpler than LÚ, requiring more not less wedges to write. The alternative is to read the sign LU as UDU (they are the same sign) which can mean "sheep". Evidence from the early third century BC onwards suggests that the zodiacal sign Aries was sometimes interpreted as a sheep: a *kalendertext* which makes a simple association between animals used to make medical ingredients with the corresponding animals uses as the names for zodiacal signs (e.g. Lion's blood and hair for Leo), lists sheep's blood, hair, and fat for Aries (Steele, 2017a), and sheep seemingly representing Aries are depicted in seals of the Hellenistic period from Uruk. Thus, it may be that "the Sheep" was an alternate name to "the Hired Man" for Aries. A text describing the constellation known on a tablet from Uruk dating to the late third century BC rationalises the transformation of "the Hired Man" into "the Sheep" by cuneiform wordplay as follows (MLC 1866 Obv. I 13–16; Beaulieu et al. 2018):

"The Hired Sheep Man" (^{mul}MÚ.MU.HUN.GA), "the Hired Sheep" (^{mul}LU.HUN.GÁ), Nisan, the Month of Anu, it is the star of the New Year. "The Hired Man" (^{mul}LÚ.HUN.GÁ), the lamb, ram, Dumuzi. Concerning "the Hired Sheep" (^{mul}LU.HUN.GÁ) — three stars are drawn at its forehead; two stars are drawn on its thigh: four stars stand at its feet.

Word play is used to transform "the Hired Man" into "the Hired Sheep Man" and then into "the Hired Sheep". It is not hard to imagine the final step in which "the Hired Sheep" is abbreviated to "the Sheep". It is possible that this transformation of "the Hired Man" into "the Sheep" was influenced by the Greek tradition of Aries the Ram. However, given that the sign is already referred to as LU in an Astronomical Diary fro 374 BC, Greek influence seems unlikely.

5.3.2. Taurus

Taurus presents a particularly complicated case. The so-called TE-tablet (BM 77824; Weidner 1915), which lists zodiacal signs with their associated months, gives two names next to the entry for Month II: "the Stars" and "the Bull of Heaven". These two names are also given together as a pair in the microzodiac texts to indicate Taurus (Monroe 2016). Thus, it would seem that either or both the names "the Stars" and "the Bull of Heaven" could refer to Taurus. In the Astronomical Diaries, Taurus is usually referred to as "the Stars" (MÚL-MÚL). However, before 267 BC we find cases of the names "the Bull of Heaven" (GU_4-AN) and "the Chariot" (^{giš}GIGIR or GIGIR) where we would expect the name of the sign Taurus. Comparing these cases with modern computation of the position of the planet when it is said to be in "the Bull of Heaven" and "the Chariot", however, we find "the Bull of Heaven" seems to be used only for roughly the first half of Taurus and "the Chariot" is only used for the second half of the sign. "The Stars" seems to be used for the whole sign. No matter which name was used, the entries follow the style of reports which otherwise are only used for zodiacal signs. It would seem, therefore, that Taurus—uniquely—could sometimes be divided into two halves when used as a sign of the zodiac, at least before about 267 BC.

Although Taurus is most commonly called "the Stars", seal impressions from Hellenistic Uruk always portray the zodiacal sign as a bull. Further research is required to understand whether this is purely a local variation or whether the zodiacal sign Taurus was generally understood as a bull irrespective of how it was named.

5.3.3. Gemini

The TE tablet lists a pair of names for the zodiacal sign Gemini: "the True Shepherd of Anu" and "the Great Twins". The same pairing is used to name Gemini in the microzodiac texts. In the Astronomical Diaries and related material, however, Gemini is only ever called "the Twins". It is always written MAŠ-MAŠ.

5.3.4. Cancer

All known texts refer to the zodiacal sign Cancer as "the Crab". In the Astronomical Diaries, the Crab is always written using the cuneiform sign ALLA. Astrological texts sometimes use instead AL.LUL.

5.3.5. Leo

All known texts refer to the zodiacal sign Leo as "the Lion". In the Astronomical Diaries, "the Lion" is written UR-A in texts dating from the sixth century down to 309 BC, and as A in texts from 307 BC onwards. (The single exception to this rule is a Diary from 381 BC which writes A rather than the expected UR-A). Both forms are found in astrological texts along with UR-GU-LA.

5.3.6. Virgo

All known texts refer to the zodiacal sign Virgo as "the Furrow". In the Astronomical Diaries, "the Furrow" is always written using the sign ABSIN. Astrological texts sometimes use instead AB-SÍN.

5.3.7. Libra

All known texts refer to the zodiacal sign Libra as "the Scales". In the Astronomical Diaries, "the Scales" is always written using the sign RÍN. Astrological texts sometimes use the fuller form ^{giš}RÍN or write the name syllabically (e.g. *zi-ba-an-na*).

5.3.8. Scorpio

All known texts refer to the zodiacal sign Scorpio as "the Scorpion". In the Astronomical Diaries, "the Scorpion is always written GÍR-TAB.

5.3.9. Sagittarius

All known texts refer to the zodiacal sign Sagittarius as "Pabilsag" (a Babylonian god). In the Astronomical Diaries, "Pabilsag" is usually written PA, but earlier Diaries up to 369 BC sometimes use the fuller forms PA-BIL-SAG or PA-BIL. All three forms are found in astrological texts.

5.3.10. Capricorn

All known texts refer to the zodiacal sign Capricorn as "the Goat-fish". In the Astronomical Diaries, "the Goat-fish" is always written MÁŠ. Astrological texts sometimes use the fuller form SUHUR-MÁŠ.

5.3.11. Aquarius

All known texts refer to the zodiacal sign Aquarius as "the Great One". In the Astronomical Diaries, "the Great One" is usually written GU, although one Diary (dating to 344 BC) writes GU-LA. Astrological texts use both forms.

5.3.12. Pisces

The TE tablet refers to Pisces by the pair of names "the Field" and "the Tails". Surprisingly, the micro-zodiac tablets only refer to Pisces as "the Field". "The Field" is used quite often in astrological texts, but is never used in the Astronomical Diaries which always call Pisces "the Tails", written KUN^{me} in early Diaries up to 381 BC and *zib*^{me} in later Diaries beginning in 330 BC (with a single known exception in 383 BC where *zib*^{me} is used, perhaps suggesting that it was right around this time where the convention switched and the two forms coexisted for some years).

6. CONCLUSION

The development of the zodiac was a significant event in the history of Babylonian astronomy, providing a uniform system of positional reference, simplifying the mathematical calculation of astronomical phenomena, and opening up new possibilities within for the astrological interpretation of astronomical data.

The development of the zodiac required not only conceiving the concept of a uniform division of the zodiacal band, which came out of the parallel division of the year in the schematic calendar, but also decisions over how the individual signs should be named. The most frequently adopted convention was to name the signs after a selection of the zodiacal constellations. By tracing the names used for the signs of the zodiac attested in the Astronomical Diaries, it has been possible to explore which constellations were chosen as names for zodiacal signs, and how this changed over time. In doing so, a better understanding of the cultural significance of the individual zodiacal signs emerges (in particular, an apparent preference for representing Aries and Taurus as animals at Uruk). In addition, the change in naming conventions may provide a further criterion that can be used in dating fragmentary Astronomical Diaries.

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The Babylonian origins of the Greek zodiacal constellations is an established fact; see van der Waerden, 1952/3, Rogers 1998, Brack-Bernsen and Hunger 1999 Herodotus, Histories 7.34-6; Diels 1904, 8. The text reads (Laterculi Alexandrini, col. The chronology of the early greek natural philosophers.Â Over time, the systematization of these observations led to a real scientific knowledge. In this paper we will follow in the footsteps of the scribes who created the astronomy.Â Late Babylonian astronomical texts contain frequent measurements of the positions of the Moon and planets. These measurements include distances of the Moon or a planet from a reference star and measurements of the position of celestial bodies within a sign of the zodiac. The zodiac of twelve is defined by its comparison with a beginning, signs, which seems to have been devised by the Bectatur bellas eques Anser ubique puellas. which is necessarily conceived of as soon as we Egyptians out of the thirty Babylonian divi- Et sibi cognomen bellipotentis avet. wish to realise what an end. Whatever. The variety of sources from which the ver-. Prof.Â The problem. precision through their. Irving presents a preliminary paper on his possess two opposite senges, like black. still remains where it was. work among the Archaean formations of the bleach, tho two senses defining and determining.Â TIIE BABYLONIAN ZODI.XC. become one of the most useful branches of the the oldest form of speech of which we have. London : Jan. The Babylonian system of astrology contained many things that we would recognize today. They divided the fixed stars into three groups - Anu, Enlil, and Ea - based on where they rose on the Eastern horizon. The Babylonians originally recognized 18 constellations among these fixed stars, but they later focused on the 12 most important constellations, which were adopted by the Greeks and align with the constellations that we use in the West today. Top Image: Babylonian Astrologers mapping the stars. Babylonian astrology was seen as very important in the running of the state. Source: Cradle of Civilization. Reading the Will of the Gods. The Babylonians also recognized five of the planets, along with the Sun and Moon.