

Signs from the Sky, Signs from the Earth: The Diviner's Manual Revisited

Clemency Williams, Providence

In the closing words of his article, "A Babylonian Diviner's Manual" (1974), Oppenheim appealed to "historians of science" to help "identify the specific [astronomical] methods alluded to in the text." His request was no trivial one, for the passage, and no less the whole text is by no means straightforward. His appeal was what first drew me towards studying this astronomical portion in more detail.¹ This section, fifteen lines in length (lines 57–71), occupies a position between two sections of the text, which contrast with it in both style and content. The preceding section (lines 1–35) gives a list of the protases of 14 "signs of the earth" [*i-da-at KI-tim*] and 11 "signs of the sky" [*i-da-at AN-e*] accompanied by some commentary (lines 36–56). The section following (lines 72–84) comprises two tables: the first, a menological table, sets out a listing of the twelve months of the year beginning with BĀR (Nisannu), and the second lists the three watches. Both tables give seemingly random designations of favourable [ŠE/SIG₅] or not (favourable) [NU (ŠE)] for each entry.

The astronomical section contains references to methods concerning the observations of various astronomical phenomena. On a more detailed examination, these methods can be grouped into two distinct types: methods concerned with intercalation and methods which concern the composition of the year (the number of months in the year, the number of days in each month, etc.). The first group, those dealing with intercalation methods, outline techniques which serve to *check* the composition of the year; that is, to determine whether the calendar date is in sufficient agreement with respect to the astronomical phenomena, and make the necessary intercalations to correct it if required. The second group urges the diviner to establish the composition of the year; that is, having established the proper intercalations, to set out the year's format, with its months, the number of days each month contains, and also to establish exactly which is the present day in the current year. Many of the methods alluded to resemble those techniques expounded in works such as MUL.APIN and Tablet 14 of the astrological compendium *Enūma Anu Enlil* (henceforth EAE). Below is an attempt to identify the methods one by one, and then to put each of the methods into a larger context. First I give a transliteration and a translation of this section of the text.²

¹ For the full details of the Diviner's Manual, see OPPENHEIM (1974). This passage has also been (partially) translated by BROWN (2000), p. 121 [lines 57–62 and half of line 71] and HOROWITZ (1998), p. 151 [lines 57–63].

² The transliteration is that of OPPENHEIM (1974), lines 57–71, p. 200.

57. 12 ITU.MEŠ šá MU 1.KAM 6 UŠ UD-me-šá mi-na-at zag-muk
58. ina ŠU-ka DIB-ma bi-ib-li UD.DA.ZAL.LÁ-e šá ta-mar-ti MUL.MEŠ
59. a-dan-na-ti-šú-nu mit-ḥur-ti SAG.MU šá MUL AŠ.GÁN
60. ta-mar-ti ^dEŠ u ^dUTU šá ITU ŠE u ITU KIN
61. ni-ip-ḥa u IGI.DU₈.A.MEŠ šá ^dEŠ ar-ḥi-šam IGI-ru KIN.KIN-ma
62. šit-qul-ta šá MUL.MUL u ^dEŠ ŠEŠ-ma li-pu-ul-ka-ma
63. šá MU ITU.MEŠ-šá ITU.MEŠ UD.MEŠ-šú kin-ma mim-mu-ú te-pu-šu šu-ul-lim
64. e-nu-ma ina IGI.DU₈.A ^dEŠ UD-mu er-pu GÁL-ka li-ti-ik-šú D[UG maš-qu-u]
65. e-nu-ma ina bi-ib-lu UD-mu er-pu GÁL-ka li-ti-ik-šú DUG maš-qu-u
66. ana la-tak bi-ib-li u na-an-mur-ti GURUN EN [ITU]
67. ù ša-at-tum ^{be-pi}
68. 12 ITU.MEŠ ina ŠU-ka tu-kal a-na la-tak UD-me ki-nu-tim
69. šit-qul-ti MUL.MUL u ^dEŠ ina ŠU^{II}-ka tu-kal
70. áš-ri šip-ki KIN.KIN-ma UD.MEŠ DIRI.MEŠ lu-ú ti-di-ma
71. MU.AN.NA ki-in-ma di-ri-ša šu-ul-lim it-i-id la te-eg-gi

Twelve are the months of the year. Three hundred and sixty are its days. Take into your hand the expected time of the *zagmukku*. Investigate thoroughly the day of disappearance of the moon, the dates of the first appearances of the stars, their time periods, the correspondence of the beginning of the year and the Field, the first appearances of the Moon and the Sun in the month Addaru (XII) and in the month Ululu (VI), the risings and first appearances of the Moon as observed each month. Keep watch for the “balancing” of the Pleiades (MUL.MUL) and the Moon. May this answer you. Establish the months of the year and the days of the month and carry out perfectly whatever you do. When, at the first appearance of the moon, the day is cloudy for you, its checking device³ is a *mašqu* vessel. When, at the disappearance of the Moon, the day is cloudy for you, its checking device is a *mašqu* vessel. For the text of disappearance and reappearance, take into your hand *Inbu Bel Arhi* and Year *broken* twelve months. For the test of the correct days take into your hand the “balancing” of the Pleiades and the Moon. Search thoroughly the place of the *šipku*. May you learn the extra days. Establish the year and carry out perfectly its intercalation. Pay attention! Do not be careless!

Let us consider the astronomical content of this section statement by statement:

Twelve are the months of the year. Three hundred and sixty are its days. (12 ITU.MEŠ šá MU 1.KAM 6 UŠ UD-me-šá)

This emphatic statement immediately evokes the notion of the so-called “schematic” (ideal) calendar, a systematic arrangement of certain astronomical phenomena (solstices and equinoxes, risings of the stars &c) established within a constructed time frame. In this schematic calendar, thirty days comprise one month, and twelve

³ Following BROWN, FERMOR, and WALKER (1999), p. 139.

months, that is, three hundred and sixty days, comprise one year. The schematic calendar has many uses in an astronomical context. One of these is to function as a "blueprint" which can be used to compare the actual date on which a phenomena occurs against the corresponding schematic date. Such a comparison can be useful to indicate whether or not one needs to intercalate. The schematic calendar is first attested in an astronomical context in the Old Babylonian text BM 17175 +17284 and is subsequently found in EAE 14 and MUL.APIN.⁴

This reference is also a reminder of the juxtaposition of the schematic calendar's twelve 30-day months, on which all omen literature is based, against the "actual" calendar where all the months are either 29 or 30 days in length. A large part of the diviner's job, then, is to interpret the data given according to the schematic calendar and convert it so it makes sense with respect to the actual calendar.

Take into your hand the expected time of the zagmukku. (*mi-na-at zag-muk ina ŠU-ka DIB-ma*)

Zagmukku, from the Sumerogram, ZAG.MU (literally: the threshold of the year) is a term often associated with the new-year festivals, but in this context it refers to the beginning of the new year. This term reappears towards the very end of the text (line 72) where it is contrasted with *qí-ti-šú* (literally: its end), confirming its interpretation of the beginning of the year. It seems likely that the motivation for having this figure at hand could simply be an instruction to establish the starting date from which to determine the dates of the various phenomena in the year. In order to date phenomena so as to check them against the schematic calendar, one must know where to begin the year from.

Of particular interest here is the use of the term *minītu*, a term which, among other usages, conveys the notion that the item it qualifies has been established through calculation.⁵ A parameter which is 'minītu', be it a moment in time, a measure or a length, is one which has been calculated. Perhaps the nuance of this term then suggests an element of flexibility in the selection of this date. In accordance with this section's emphasis on checking and rechecking the composition of the year and whether it has been intercalated properly, it is fitting that the most logical place to start one's checks is with the beginning of the year, especially given that the beginning has been calculated, a procedure that may have been carried out less than perfectly.

(Investigate thoroughly) the day of disappearance of the moon (*bi-ib-li (...KIN.KIN-ma)*)

The above reference to the investigation of the day of the disappearance of the moon suggests techniques that establish the lengths of the months. The question of whether a month was hollow (29 days in length) or full (30 days in length) was a problem which greatly occupied astronomers. To ascertain this, they were interested

⁴ MUL.APIN's schematic calendar can be derived from the second section of the work (I ii 36-iii 12: sequential calendar dates of the heliacal risings of certain constellations) and has the following arrangement, namely that 1 month = 30 days and 1 year = 12 months = 360 days. See the discussion in HUNGER and PINGREE (1989) pp. 139-40.

⁵ See CAD "M" Vol. 10 part II, *minītu*, 1d), p. 87.

in determining how many days the interval was between the last visibility of the moon at the end of a month and its first visibility that marked the beginning.

Many sophisticated methods were developed for predicting this, one of which included the technique pertaining to the KUR value, one of the so-called lunar six that concern time periods between phenomena of moon and sunrise and set. Although these techniques were not developed to a suitable level of sophistication until around the sixth century B.C., it is likely that general, 'rule-of-thumb' methods that had been noticed existed prior to this.⁶ The KUR value is the interval of time from moonrise to sunrise on the day when the moon is visible for the last time before conjunction. In very general terms, a large KUR value implied that conjunction (and hence the beginning of the next month) was farther off than when the KUR value was small, so that accordingly in the former case the month will be longer than in the latter case. Therefore this type of measurement of the KUR value allows one, at least in a very crude sense, to predict the length of the current month. The application of this principle could be what is alluded to here in this text.

The diviner can use this information when he is trying to establish how long the month he is in is going to last, before the first sighting of the new crescent. It lets him determine, in advance, how many days he must allow before he starts the beginning of the next month.

**the dates of the first appearances of the stars, their time periods
(UD.DA.ZAL.LÁ-*e šá ta-mar-ti* MUL.MEŠ *a-dan-na-ti-šú-nu*)**

This procedure refers to a scheme similar to (if not identical to) that set out in MUL.APIN I ii 36-iii 12 in which the heliacal risings (denoted by the word IGI.LÁ = akkadian *tamartu*) of 35 constellations are laid down in order of their occurrence in the schematic calendar. This is useful as an intercalation check as one can observe the phenomena they describe and compare the date of occurrence against the one provided in MUL.APIN and shift the date as necessary. This intercalation is also practical, as it involves phenomena which are happening throughout the span of the schematic year, rather than phenomena that occur only once or twice in the year. As the diviner wishes to check the composition of the year right at the moment he is working, and may not have the liberty to wait six months or more for a certain phenomena to occur with which he can check the intercalation, the ideal situation is to have intercalation checks that are distributed in such a way that there is one close at hand from any given moment in the year.

Supposing the procedure for risings given in MUL.APIN was envisioned. Then, as we have seen, listing the thirty-five constellations spread out through the length of the schematic year, one has at hand a specified rising time at least at a five, a ten, a fifteen, or a twenty day interval (with two exceptions being as long as thirty days), so that there will be an intercalation check by this means close at hand.

⁶ See, for example, the observations and predictions set out in the Letters and Reports, as discussed by HUNGER and PINGREE (1999), pp. 116–117, in which similar practices are used, involving the observation of the Sun and the Moon in opposition to each other in the middle of the month for the predictions both of the day of opposition and of the day of the New Moon.

The correspondence of the beginning of the year and the Field (*mit-hur-ti* SAG.MU šá MUL AŠ.GÁN)

The meaning of this is somewhat obscure, as the beginning of the year follows the rising of the Field. Therefore it is difficult to imagine the precise nuance of the word 'correspondence' (*mithurti*) which is used here. According to MUL.APIN, the Field rises on month XI (Šabatu) day 5: DIŠ *ina* ⁱⁱⁱZÍZ UD 5 KAM ^{mul}GU.LA ^{mul}AŠ.IKU *u* ^{mul}lu.lim IGI^{mes} "On the 5th of Šabatu, the Great One, the Field and the Stag become visible" (I iii 10).⁷ MUL.APIN repeats this information later (I iii 42ff), stating that the Field rises 70 days before the Vernal Equinox, or on day 305 of the ideal year. In 1000 BC β Peg (the first star of the Field) rises approximately 60 days before the Vernal Equinox. Within MUL.APIN's limits, if the Vernal Equinox falls on I 1 then β Peg rises on X 30/XI 1. Similarly if the Vernal Equinox falls on I 30 then β Peg rises on XI 30/XII 1. In accordance with the astronomical reality, a plausible intercalation rule could be something like the following: *If β Peg rises in month XII (i.e. has not risen before XII) this year is intercalary (i.e. add an intercalary XII₂).* In this way there is some connection between the beginning of the year and the Field pertaining to intercalation.

There is also a potentially meaningful association between the Field and Nisannu (Month I) in EAE. In the assumed Tablet 51,⁸ an interesting astrological scheme, based on a tradition closely associated with Astrolabe B, is set up in which various constellations are correlated to the first nine months of the year.⁹ Although this scheme is astrologically based, and thus is not necessarily constrained by the need to reflect astronomical reality, the sequence set out is not grossly divergent from the astronomical phenomena.¹⁰ Of particular note is the connection of month I with the Field: MUL.AŠ.GÁN *ina* ITI.BÁR [IGI-mar BE-ma MUL BI NIM-ma IGI...] BE-ma MUL BI ZAL-ma I[TI-šú DIB-ma IGI...] "The Field rises helically in Nisannu; if this star rises early:[...] if this star is late and passes by its month and rises [...]"¹¹ (IX 1), and similarly in IX 16, X 1 and XII 1.

To further sustain the connection between the beginning of the year and the Field, in a previous section of the Diviner's manual itself, in the list of the "Signs of the Sky", the following omen is cited: DIŠ MUL AŠ.GÁN *ina* ITU BÁR IGI-ir "If the Field is seen in the month Nisannu" (line 34). However, in the Old Babylonian Schematic calendar, β Peg rises one month earlier than month XI, in month X (as the equinox dates are placed one month before), so it is difficult to see why it would be associated with the beginning of the year. Therefore, it seems more plausible that the intercalary rule is linked with a later Neo Assyrian convention. Thus it seems that there was some special relationship between the beginning of the year and the Field for the compiler of this text, whether it be that he identified the heliacal rising of the Field with month I, or some other connection between the two, which he saw

⁷ HUNGER and PINGREE (1989), p. 46.

⁸ See REINER and PINGREE (1981), p. 52 and following.

⁹ I =AŠ.GÁN, II=MUL.MUL, III=SIPA.ZI.AN.NA, IV=KAK.SI.SÁ, V=BAN, VI=BIR, VII=zibanitu, VIII=GIR.TAB, IX=UD.KA.DU₈.A.

¹⁰ REINER and PINGREE (1981), p. 53 rightly point out that "this is not a bad sequence astronomically; MUL.APIN has the above nine constellations rise respectively on X I 5; II 1; III 10; IV 15; V 15 VI 10 VII 15; VIII 5; and IX 15."

¹¹ REINER and PINGREE (1981), p. 56.

fit to include amongst material dealing with intercalation methods. Its general format is the same as other intercalation methods included in this text which involve a constellation rising in an expected month.

The first appearances of the Moon and the Sun in the month Addaru (XII) and in the month Ululu (VI) (*ta-mar-ti* ^dEŠ *u* ^dUTU šá ITU ŠE *u* ITU KIN)

The precise significance of this is unclear. However, the months of Addaru (XII) and Ululu (VI) are significant as these are the two months which are designated as intercalary months. If an extra month is to be added, either of these months will be the ones which are repeated. These months are also significant because they are the months in which the equinoxes are placed in the Old Babylonian version of the ideal calendar,¹² notably one month before their dates in the schematic calendar as set out in MUL.APIN.¹³

The risings and first appearances of the Moon as observed each month (*ni-ip-ħa* *u* IGI.DU₈.A.MEŠ šá ^dEŠ *ar-ħi-šam* IGI-ru KIN.KIN-*ma*)

The first appearances of the Moon determine the beginning of the month. One must take account of these to check them against the lengths of the months in days that have already been established. No precise method is specified; however, it is likely that methods which used a comparison between the NA value with its calculated value from EAE 14 were meant.¹⁴ The length of the *observed* NA compared with the *calculated* NA indicates whether the month began on the correct day.

The emphasis of the importance of the first day of the month, when the new moon appears, has also been suggested by Livingstone, who finds that it is frequently favourable in hemerologies.¹⁵

Keep watch for the “balancing” of the Pleiades (MUL.MUL) and the Moon. (*šit-qul-ta* šá MUL.MUL *u* ^dEŠ ŠEŠ-*ma*)

Methods involving the Pleiades and the Moon are a common intercalation check and are documented in several other sources. Such a scheme, the so-called “Pleiaden-Schaltregel”, first recognized by Schaumberger,¹⁶ is described in MUL.APIN II Gap A 8–9¹⁷ as:

¹² See, for example, BM 17175+17284, the Old Babylonian tablet published in the Appendix of HUNGER and PINGREE (1989), p. 163.

¹³ MUL.APIN has an intercalation scheme (discussed by HUNGER and PINGREE (1989), pp. 150–151) which is based on observations of the Sun and the Moon in equinoctial months (also includes observations of only the sun at solstices). Of course, the scheme is a month out, but the general idea is similar.

¹⁴ Table A in AL-RAWI and GEORGE (1991–1992), p. 55 gives the NA value as a function of the day since the conjunction in an equinoctial month based on a linear zigzag scheme (from day 5–25).

¹⁵ LIVINGSTONE (1993), p. 110.

¹⁶ SCHAUMBERGER (1909/10).

¹⁷ HUNGER and PINGREE (1989), pp. 89–90. See also II Gap A ii 1–2, an intercalation rule which also includes the Pleiades and the Moon being in conjunction on different months (Arahsamnu and Kislimu). BROWN (2000) p. 121 mentions “a scheme very similar to that in

8. [DIŠ ina ITI.BÁR UD 1 K]AM MUL.MUL u ^dSin šit-qu-lu MU BI GI.NA-ta
9. [DIŠ ina ITI.BÁR U]D 3 KAM MUL.MUL u ^dSin LÁL MU BI DIRI-át
8. [*If on the 1st of Nisannu*] the Stars and the Moon are in conjunction, this year is normal.
9. [*If*] on the 3rd [of Nisannu] the Stars and the Moon are in conjunction, this year is a leap year

The Pleiades are at longitude 18° and latitude 3° in 1000 BC. On I 1 the Sun is at 345° (given that the Vernal Equinox is on I 15) and the Moon is around 0° (because it is the night of First Visibility). Therefore at beginning of night of I 2, the Moon is at approx. 13°, and by the end of the night, 18.5°–19°, which is in the Pleiades. So in order to make some sense of the rule, (understanding that *šitqultu* = balancing (i.e. at the same longitude but not necessarily same latitude)), something like the following could be understood: *If on the second night the Moon passes into the Pleiades this year is normal. If this occurs a night later (because the Sun and Moon are farther back) intercalation is needed.* However, this interpretation notably does not use day 1, as the rule mentions. Pingree has ingeniously suggested a solution which concerns the rising of the Moon before and after the Pleiades as a check.¹⁸ While this solution for the most part would work as an intercalation rule, it fits awkwardly with the attested meanings of *šitqultu*.

A more elaborate form of this method – one that can be applied in all twelve months of the year – is the scheme explained by Hunger and Reiner.¹⁹ In this scheme, each month a particular day is assigned for checking the longitude of the Moon and the Pleiades. If they are the “same”, then intercalation is not necessary; however, if they are different, then intercalation is necessary. The general scheme Hunger and Reiner extract from the text is the following: “If in month *n* on the (27–2*n*)th day you observe the Pleiades and the Moon and they have the same longitude, then this year is normal; if they fall down, it is left behind.”²⁰

When, at the first appearance of the moon, the day is cloudy for you, its checking device is a mašqu vessel. (e-nu-ma ina IGI.DU₈.A ^dEŠ UD-mu er-pu GÁL-ka li-ti-ik-šú D[UG maš-qu-u])

When, at the disappearance of the Moon the day is cloudy for you, its checking device is a mašqu vessel. (e-nu-ma ina bi-ib-lu UD-mu er-pu GÁL-ka li-ti-ik-šú DUG maš-qu-u)

The situation referred to here is one in which the first appearance of the new moon that marks the beginning of the month, or the final appearance at almost the end of the month could not be viewed due to inclement weather conditions. The purpose of

MUL.APIN GapA10–ii6 for determining when a year should be intercalated is described”, an identification which misses out the obvious Gap A 8–9 and includes methods which, although similar in format, do not include the Moon and may deal with constellations other than the Pleiades.

¹⁸ HUNGER and PINGREE (1989), p. 152.

¹⁹ HUNGER and REINER (1975).

²⁰ HUNGER and REINER (1975), p. 24.

sighting the first scenario is of course to establish the beginning of the month. The above reference gives the diviner an alternative option to establishing this observation should the weather prevent it, by means of a later observation and measurement of a time interval by using a specific vessel called a *mašqu* (from *šaqu* to fill (with water)),²¹ probably some sort of water clock.

This is a clear reference to the employment of the techniques and time periods similar to those in Tablet 14 of EAE.²² These tables set out differing time periods of lunar visibilities and invisibilities, calculated by means of linear zigzag functions, with values tabulated, in two of the tables, for each day of the month, and in the other two, on the 15th and 30th/1st day of each month. The desired values can be determined by using a combination of tables, Table A and Table D. As mentioned previously, Table A gives the NA value as a function of the day since conjunction for an equinoctial month and Table D gives the deviation of this increment by month. Therefore, given any month and day, one can take the value of calculated NA for an equinoctial month from Table A corresponding to the day in question, and the increment for that month in Table D, divide by twelve and multiply it by the first value to obtain a calculated NA which corresponds to the day and month in question. So that, if the day is cloudy at the time of the disappearance or reappearance of the moon, one simply waits the number of days until the weather is clear, and makes a measure of the appropriate phenomena. Using this value, one selects the appropriate tables and calculates the theoretical value. Comparing these two values, the observed and the calculated, one can then “count back” to establish which day is the first day of the month, that is, the day on which the first visibility of the crescent should have been sighted were it not cloudy.

This method of checking the beginning of the month is notable for its practicality. Again it is worth mentioning, that not only does this take note of the difficulty of practicing astronomy with certain intrusive weather elements, but also, this is an intercalation check that is not exclusive to one particular instance in the year.

For the test of disappearance and reappearance, take into your hand Inbu Bel Arhi and Year broken twelve months. (*ana la-tak bi-ib-li u na-an-mur-ti GURUN EN [ITU] à ša-at-tum*^{be-pi} 12 ITU.MEŠ *ina ŠU-ka tu-kal*)

An astrological text by the name *Inbu Bel Arhi* (“Fruit, Lord of the Month”) is extant. Livingstone has called it “one of the most enigmatic magical texts”²³ and described the content of the text as follows: “individual tablets for each day of an ideal month and extra tablets for intercalary Nisan and Elul. Each tablet specifies rules of cultic hygiene, behavior, dietary prohibitions day by day through the month. Combined with this is an extremely detailed day by day account of what type of offerings the king is to make to which particular deities throughout the day and/or

²¹ As observed by BROWN, FERMOR and WALKER (1999), p. 139 n. 35, such an instrument is also attested in a commentary text in the Sin section of EAE: [*li*]-*ti-iq-šu maš-qu-ú*, ACh 2 Supp. Sin 19 = K3123 (8).

²² AL-RAWI and GEORGE (1991–1992), pp. 52–73. I thank John Britton who helped me work through this.

²³ See LIVINGSTONE (1999) and also LIVINGSTONE (1993). For other references to this series, see CAD *inbu* mng. 1 d).

night. This is then followed for each month by sections which ring the changes on omens of the Iqqur Ipuš type, but with the king as subject of the protasis. This of course amounts to a prescription of royal behaviour through the seasons of the year.”²⁴ As Livingstone explains, *Inbu Bel Arhi* is a series of hemerological tables. Therefore, given the inclusion of the menological material at the end of the Diviner's Manual, a reference to it is not out of place at all. But while its format does fit in with the character of the contents of the Diviner's Manual in general, its content does not seem to be in any sort of correspondence with the function the Diviner's Manual suggests, when it says that one should use it to “check the disappearance and reappearance.”²⁵ It could be that the phrase *ana la-tak bi-ib-li u na-an-mur-ti* is to be understood as pertaining to the procedures on the previous two lines which are closer in content.

For the test of the correct days take into your hand the “balancing” of the Pleiades and the Moon (*a-na la-tak UD-me ki-nu-tim šit-qul-ti MUL.MUL u “EŠ ina ŠU”-ka tu-kal*)

This, of course, is repeating the statement mentioned above which has already been discussed, this time however with a view to establishing the composition of the year, as it mentions a connection with days.

Investigate thoroughly the place of the *šipku* (*aš-ri šip-ki KIN.KIN-ma*)

This is a suggestion to the diviner to keep observing, reminding him of the importance of the astral phenomena in his work. What is worthy of mention here is the phrase *aš-ri šip-ki*. There has been some uncertainty as to how to translate this phrase.²⁶ *Šipku*, in an astronomical setting, is commonly combined in the phrase *šipku šame* to mean horizon²⁷ (literally “the base of the sky”). *Aš-ru* is a general word for a “place”, but when combined with words denoting the netherworld (KUR.NI.GI₄.A, *dannīna*)²⁸ it refers to the heavens. Therefore, given the astronomical context and given that many of the observations referred to in the preceding lines are ones that are made at the horizon, it may not be wrong to assume *aš-ri šip-ki* means “the horizon.” Taken also in its proximity to the next phrase “may you learn the extra days”, it seems to further suggest that horizon is meant. Understanding UD.MEŠ DIRI.MEŠ as being the extra days, or the epact, that is the days in excess of 12 months corresponding to a year, these days are determined by using observational data (rising and settings) observed on the horizon. However, the use of this phrase for “horizon”, when the phrase *šipku šame* already exists, is puzzling and so this translation should be taken with caution.

²⁴ LIVINGSTONE (1999), p. 137.

²⁵ Although LIVINGSTONE (1993) does suggest that there is a relationship between the phases of the moon and the favourability and unfavourability of the days and the months, with the days of disappearance and reappearance being particularly important (p. 102, p. 108, and p. 110).

²⁶ OPPENHEIM (1974) renders the phrase as “Look up the ...” and in a footnote (n. 41) he comments “the sign group *aš-ri šip/me-ki* remains a mystery”.

²⁷ See respectively the entries in the CAD for *šipku* vol. 17 p. 70–71 mng. 1d) and also *šupku* vol. 17, p. 323–324, mng. c).

²⁸ See CAD vol. I part II *aš-ru* p. 456–460, mng. 2e).

May you learn the extra days. Establish the year and carry out perfectly its intercalation. Pay attention! Do not be careless! (UD.MEŠ DIRI.MEŠ *lu-ú ti-di-ma* MU.AN.NA *ki-in-ma di-ri-ša šu-ul-lim it-i-id la te-eg-gi*)

Thus we see that the astronomical section of the Diviner's manual sets forth a number of different intercalations and methods to establish the correct number of days and their arrangement in each year. The phrase used to describe this list of astronomical intercalation techniques is especially pertinent. In the second half of line 56, the astronomical section is introduced by the phrase: *an-nu-ú NAM.BÚR.BI-šú-nu*, translated literally as "this is their 'loosing'",²⁹ that is, the means to dispel the unfavourable consequences of the omens. This establishes the expectation that the list of what is to follow are methods to subvert the unfavourable results predicted by the omens.

It seems then that the purpose of including these intercalations are, as their introduction implies, to remove the evil consequences of an omen which has been found to be unfavourable.³⁰ This section presents one option the diviner has for removing these evil consequences, that is, by checking the validity of the date on which the omen occurred, and if he is able, to change this date, either by a number of days or even by a whole month, using one of the intercalary techniques mentioned as a justification for his date-alteration.

These astronomical techniques are not so much for the diviner to necessarily establish the "exact date" of his omen, but more to provide him with options for "correcting" the date should he need a way to avert an ill-boding omen. These techniques are not for strict astronomical calculations but rather for divinatory purposes.

To support this one must consider the nature of these techniques described. None of the schemes mentioned above are a reflection of any sort of astronomical precision. They seem not so much to be an attempt at a highly accurate representation of the heavenly phenomena they deal with, but are rather simple,

²⁹ For discussion of the Sumerian word NAM.BÚR.BI, and the Akkadian loan word *namburba*, see REINER (1995), p. 81–82.

³⁰ See also BROWN (2000), pp. 121–122 (section 3.1.2), who comes to the same conclusion. However, this conclusion fits in uneasily with his overall thesis set out in this section of his book, namely that "...when a celestial body was behaving according to the ideal and when it was not...the evidence is that the former was considered propitious and the latter not" (p. 113, repeated again with reference to the astrolabes, p. 115, with reference to MUL.APIN, p. 117, and with reference to the Pleiades rule, p. 119). He asserts that this thesis applies to all the texts he discusses in the previous section (3.1.1) of which the Diviner's Manual is one. However, the emphasis of the Diviner's Manual is quite distinct from this. It is focused not on deriving significance from the date of when the omen occurred and its aberration from the ideal, but in fact, it uses the astronomical phenomena in question to provide "alternative options" for establishing the date, and thus the prediction of the omen. That is, if these phenomena are distinct from their "ideal" predicted times, the diviner has a justifiable reason to recalculate the date so that the phenomena are synchronized with their ideal times, which will in turn alter the forecast of the omen, hopefully, for the diviner, for the better. In this text, their aberration from the ideal is not significant in itself, but only as far as it allows the Diviner to be able to justify an intercalation to change the date.

rule-of-thumb type schemes,³¹ which seek to highlight general astronomical trends. For example, the Pleiades/Moon intercalation scheme (line 7) as discussed by Hunger and Reiner³² is a major simplification of the astronomical reality. The EAE 14 type schemes are based on mathematical linear approximations of time periods and the time periods seen in MUL.APIN for the risings of the stars are also approximations.

Also noticeable is the inclusion of many parallel methods for intercalation, some of which have conflicting sets of underlying astronomical parameters (such as different dates for solstices etc as seen in the references to both MUL.APIN and also Old Babylonian material).³³ This is further support for the idea that these schemes are primarily for divinatory uses rather than strictly astronomical ones. The inclusion of many different techniques is an advantage of the diviner for a number of reasons. Firstly their variety will allow him to select one appropriate for where he is in the year. Secondly, the diviner will have several intercalation procedures at his disposal, some of which may give different results with respect to the need to intercalate or not, and the amount he needs to intercalate. Such flexibility is crucial in emphasizing that it is not the astronomical techniques in themselves that are important, but rather their ability in allowing the diviner to readjust the date should he need to.

There is much evidence to suggest that the forecasts of omens cast with respect to similar phenomena changed (sometimes substantially) when one readjusts the date. This is especially true with astral phenomena.³⁴ The connection between the time of occurrence and forecast of omen is readily apparent in EAE. For example, in lunar eclipse phenomena, the date (the variables being a month, a day, one of the three watches etc) is the dominant parameter for organizing and cataloguing the omens and directly impacts the forecast of the result. If one selects identical astronomical occurrences on two corresponding dates, there is (almost always) a large variation in the apodoses. For example, comparing lunar eclipse phenomena in EAE 22,³⁵ one finds that if an eclipse occurs on the 14th day of the first month

³¹ See also BROWN (2000), pp. 121–122.

³² HUNGER and REINER (1975), p. 27 observe the discrepancies which occur when they try and derive the beginning of the year from the rule and get many different values. They comment: "These discrepancies are caused by the nature of the text, which tries to devise a simple scheme for the observation of the Moon and Pleiades throughout the year, and ignores some of the more complicated factors."

³³ This point is pertinent for previous techniques that have been employed to estimate the date of this text. For example, BROWN (2000), pp. 120–121, uses evidence from this astronomical section with the rising of MUL.AŠ.GĀN coinciding with month I as an OB feature and also the possible connection between the OB equinoxes and months XII and VI to date the text as "...substantially older than Oppenheim suggests". However, he ignores the material that is clearly from later sources, and as we see, because of this misses one of the distinctive features of this text, namely that the inclusion of methods based on seemingly contradictory astronomical parameters (such as the month difference between the OB and MUL.APIN ideal calendar) is done quite purposefully, for it offers the diviner more scope and flexibility in changing the date with methods that are backed up by the literature.

³⁴ For two examples of date-changing that are not astronomical see OPPENHEIM (1974) n. 46, who provides one with respect to gall bladders and the other with respect to snake encounters.

³⁵ ROCHBERG-HALTON (1988), p. 253, I 1 I, p. 254 I II 1, I III 1.

"...there will be lamentation in the land of the enemy and the land will dwindle; the king will die", on 14th day of the second month, "...there will be destruction and there will be perpetual famine and the king will die", on the 14th day of the third month, "...rain in the sky, flood in the source will come; Adad will trample; the vast army of Akkad will disappear" and so on. The concept behind the menologies and hemerologies, that certain months or days can be favourable or unfavourable, also attests the importance of the date for divinatory outcomes.

The practice of diviners subverting the unfavourable consequences of an event by manipulating the date of a planned activity is also documented. For example, in a report sent by Balasī to the Assyrian King, there is a plea for intercalation, lest the month pass unfavourably: "Let them intercalate a month; all the stars of the sky have fallen behind. Adar must not pass unfavourably; let them intercalate!"³⁶ More generally, the actions of the diviners to surpass ill effects by ingenious methods are well known. For example, in a letter from Issar-šumu-ereš to the king,³⁷ in which he, recognizing from the hemerologies that the 15th day of the month for a planned activity was unfavourable, bypassed this by recommending that the activity be carried out under the influence of astral phenomena that would effectively cancel out the ill effects: "...however, it is written as follows in the hemerologies of the month Nisan: 'He should not swear on the 15th day, (or else) the Gods will seize him.' (Hence) they should en[ter] the treaty on the 15th day, at d[awn], (but) conclude it only in the night of the 16[th] day before the stars."

In conclusion then, lines 57–71 of the Diviner's Manual form a set of techniques which involve intercalary checks and procedures. None of the methods listed were technically sophisticated enough to represent accurately the behavior of the celestial phenomena they pertained to, but their purpose was not to coordinate or rigorously systematize the calendar, but rather to provide diviners with methods to intercalate, should they, having exhausted all other methods, need to dispel the evil consequences of an ill-boding omen by altering the date on which the omen fell.

Acknowledgements

Many thanks must go to John Britton, David Pingree and John Steele for their patient and helpful comments. To them I am very grateful.

References

- BROWN, David. 2000. *Mesopotamian Planetary Astronomy-Astrology*. Groningen: Styx Publications.
- , FERMOR, John and WALKER, Christopher. 1999. "The Water Clock in Mesopotamia". *Archiv für Orientforschung* 47: 130–148.
- HUNGER, Hermann. 1992. *Astrological Reports to Assyrian Kings*. Helsinki: Helsinki University Press.
- and PINGREE, David. 1989. *MUL.APIN, An Astronomical Compendium in Cuneiform* (Archiv für Orientforschung Beiheft 24). Horn: Ferdinand Bergern & Söhne.

³⁶ HUNGER (1992), p. 57, lines 8–10.

³⁷ PARPOLA (1993), number 6, p. 7–8 esp. lines r. 11–19.

- and PINGREE, David. 1999. *Astral Sciences in Mesopotamia*. Leiden: Brill.
- and REINER, Erica. 1975. "A Scheme for Intercalary Months from Babylonian". *Wiener Zeitschrift für die Kunde des Morgenlandes* 67: 21–28.
- HOROWITZ, Wayne. 1998. *Mesopotamian Cosmic Geography*. Indiana: Eisenbrauns.
- LIVINGSTONE, Alasdair. 1993. "The Case of the Hemerologies: Official Cult, Learned Formulation and Popular Practice". In: Eiko MATSUSHIMA (ed.), *Official Cult and Popular Religion in the Ancient Near East*: 97–113. Heidelberg: C. Winter.
- 1999. "The Magic of Time". In: Tzvi ABUSCH and Karel VAN DER TOORN (eds.), *Mesopotamian Magic Textual, Historical, and Interpretative Perspectives*: 131–137. Groningen: Styx Publications.
- OPPENHEIM, A. Leo. 1974. "A Babylonian Diviner's Manual". *Journal of Near Eastern Studies* 33: 197–220.
- PARPOLA, Simo. 1993. *Letters from Assyrian and Babylonian Scholars* (State Archives of Assyria 10). Helsinki: Helsinki University Press.
- AL-RAWI, Farouk N.H. and GEORGE, Andrew R. 1991–1991. "Enūma Anu Enlil 14 and Other Early Astronomical Tables". *Archiv für Orientforschung* 38/39: 52–73.
- REINER, Erica. 1995. *Astral Magic in Babylonia*. Philadelphia: The American Philosophical Society.
- and PINGREE, David. 1981. *Babylonian Planetary Omens 2: Enūma Anu Enlil Tablet 50-51*. Malibu: Undena Publications.
- ROCHBERG-HALTON, Francesca. 1988. *Aspects of Babylonian Celestial Divination: The Lunar Eclipse Tablets of Enūma Anu Enlil* (Archiv für Orientforschung Beiheft 22). Horn: Ferdinand Berger & Söhne.
- KUGLER, Franz X. and SCHAUMBERGER, Johann. 1935. *Sternkunde und Sterndienst in Babel*. Ergänzungen 3. Münster in Westfalen: Verlag der Aschendorffschen Verlagbuchhandlung.
- VIROLLEAUD, Charles. 1905–1912, *L'astrologie chaldéenne, le livre intitulé «Enuma (Anu) ^{III} Bêl»*. Paris: Librairie Paul Geuthner.

Under One Sky

**Astronomy and Mathematics
in the Ancient Near East**

edited by

John M. Steele - Annette Imhausen

2002

Ugarit-Verlag
Münster