SCIAMVS 16 (2015), 53–73

From Preliminary Diaries to Short Diaries: The First and Second Steps in the Compilation Process of the Late Babylonian Astronomical Diaries

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I Introduction

This paper will clarify the early stages of the compilation process of the astronomical diaries, a series of clay tablets containing Late Babylonian cuneiform texts.* Almost all the datable tablets of the diaries have already been published [Sachs and Hunger 1988, 1989, 1996; Hunger and van der Spek 2006].[1] The compilation of the diaries continued at least from the mid-seventh to the mid-first centuries BC. Almost all of the diaries were made in the city of Babylon. Its most important temple, Esangil, employed some families of scholars.[2] They compiled the diaries from generation to generation. Toward the mid-third century BC, they fixed the format of the diaries, especially the so-called "Longer Diaries" or "Standard Diaries." Each tablet of the

* This paper is an extended version of Yasuyuki Mitsuma, "Scholars' Own Reports and Royal Letters: How and When They Were Included in the Astronomical Diaries?" (presented at the Rencontre Assyriologique Internationale 58, Leiden, 18 July, 2012). My research for this paper is funded by JSPS KAKENHI Grant No. 24700245, 26870111, and JSPS Postdoctoral Fellowship for Research Abroad. My thanks go to the trustees of the British Museum for allowing me to consult the tablets mentioned in this paper and to take their photos. I also thank John M. Steele for revising my English manuscript and giving me many valuable comments. All the remaining errors are, of course, mine. Most abbreviations follow those in the list of Streck [2009–2011], with the following exceptions: *BCHP* = Finkel, I. L., van der Spek, R. J., *Babylonian Chronicles of the Hellenistic Period*, scholarly ed., Livius.org., accessed 7 September, 2015, http://www.livius.org/sources/about/mesopotamian-chronicles/; SE = Seleucid Era.

[1] The notation "-n" in this paper is a text number of the diaries published by Sachs and Hunger [1988, 1989, 1996] and Hunger and van der Spek [2006], although -367 was once called -304 by Sachs and Hunger [1988] and later renumbered by Koch [1991–1992]. For the convention used to indicate a part of a diary, see Sachs and Hunger [1988, 36–38].

[2] For the employment, see *BOR* 4:132; CT 49 144. For further discussion on the scholars, see Mitsuma [2012, 40–43].

standard or longer diaries covers half a year, i.e. six or seven months including an intercalary month.[3] Although the diaries of this type were made from the fourth century, we cannot find any examples of the diaries covering half a year in the period between 366/365 BC and 326/325 BC. Instead, the diaries covering a third of a year, i.e. four months or five months including an intercalary one, fill this period.[4] This group of diaries were probably made as alternative standard diaries, although the diaries of this type did not become the majority of the standard ones in the later period.[5] Horizontal rulings usually divide each tablet of standard diaries into four, five, six or seven sections, according to its coverage. Each section covers a certain month, and arranges its entries according to subject in the following order.

Part 1: daily report of the sky,
Part 2: price list of commodities,[6]
Part 3: summary of the positions of the visible planets,
Part 4: level of the Euphrates, and
Part 5: unusual historical event(s).

Sometimes, no historical accounts are given.[7] This is probably because the scholars could not get information of extraordinary events in the relevant months, or because nothing extraordinary happened in those months.

Previous studies of the diaries have assumed that the standard diaries were compiled through a two-step process [Sachs 1974, 49; Sachs and Hunger 1988, 12; Hunger and Pingree 1999, 142–143]. The first step is the preparation of small tablets; the second is the compilation of a standard diary from some small tablets. Such a conception has justified the classification of the existing diaries into "Standard" and "Short Diaries." Definition of the short diaries, however, has varied between different scholars. Abraham J. Sachs defined them as texts "which refer to a period of anywhere from several days to 2 or 3 months " [Sachs 1974, 49]. Hermann Hunger restricted the maximum length to a little over a month [Sachs and Hunger 1988, 12], and later to twenty nights, in his joint work with David Pingree [Hunger and Pingree

[3] E.g. -384, -293, -199A, -95C. The term "longer diaries" is used for the diaries each of which covers a certain half year by Sachs and Hunger [1988, 12]. The term "standard" is used for the same group of diaries by Sachs [1974, 49] and Hunger and Pingree [1999, 143].

[4] E.g. -362, -346, -338, -329B.

[5] However, some examples of this type are still attested from the third and the second centuries BC (e.g. -242, -168A). The author discussed the coverage of each standard diary in Yasuyuki Mitsuma, "Compilation of the Late Babylonian 'Standard' Astronomical Diaries" (presented at the Rencontre Assyriologique Internationale 59, Ghent, 15 July, 2013).

[6] For the commodities mentioned in the list, see Slotsky [1997, 23–42].

[7] For example, the sections of the months I, II, and V of -170A have historical accounts, while its section of the month IV does not. It is uncertain if there are any historical account in the sections of the months III and VI of the diary, because the relevant parts in those sections are damaged.

1999, 142–143]. Hunger and Pingree [1999, 142–143] also surmised that the diaries for more than twenty nights were equally compiled from short diaries and regarded these short diaries as the primary records of day-by-day observation.[8] This paper, however, will show that the primary observational records should be distinguished from the short diaries as the direct source of the standard diaries.[9]

II Distinction of the Primary Observational Records from the Short Diaries

We can recognize two different types of records among the diaries which cover a period of two months or less.[10] We call the first group among those diaries "Short Diaries." Each of the tablets in the group arranges the aforementioned five kinds of contents of a section in the standard diaries in the same way as a standard one does. We can safely classify the following tablets as "Short Diaries" (See also Table 1):

-367, -229B, -225, -212A, -204C, -187B, -183A, -182B, -179B, -178A, -178C,
-168D, -160C, -158B, -157A, -155A, -140B, -140C, -132B, -132C, -126A, -119A$_{1+2}$.

The following tablets may also belong in this group:

-126B, -119D, -75.

The only difference between the standard and the short diaries is the length of their coverage. Those analogous groups should have adjoined in the compilation process of the diaries. In other words, the short diaries probably served as the direct source of the standard diaries. The standard diary -384, in fact, was clearly the compilation of some short diaries.[11] Rev.' 6 of the diary indicates the existence of its original version on a *lē'u*, i.e. a set of hinged and waxed writing boards made of wood or ivory.[12] The clay diary tablet, now preserved fragmentarily, originally covered the seven months from the month VII to the intercalary month XII$_2$ of 385/384 BC according to its title on Lower Edge 1. Its section of the month IX ends with the following message: APIN *u* GAN NU *ba-ár*, "(the sections of) the months VIII and IX are unchecked" (Rev.' 4). Sections of the months X and XI are missing except for one line showing the astronomical data of the first day of the month X (Rev.' 5). The next line (Rev.' 6) shows the message, AB *u* ZÍZ *ina* ^{giš}DA NU SAR^{meš},

[8] For the alleged character of the short diaries, see also Sachs and Hunger [1988, 12].

[9] For an initial discussion on the subject, see Mitsuma [2009, 48–52].

[10] The minimum coverage of a standard diary is four months except for a single example of the diary covering three months, -212B.

[11] This point is discussed in Mitsuma, "Compilation of the Late Babylonian 'Standard' Astronomical Diaries" (note 5, above).

[12] For this meaning of *lē'u*, see Nemet-Nejat [2000, 251–255]. For the examples of the sets of writing boards discovered at Nimrud, see Wiseman [1955].

"(the sections of) the months X and XI are not written on the (original) *lē'u*." These comments suggest that at least two short diaries—one covering the months VIII and IX, the other covering the months X and XI—were prepared as the sources of the *lē'u* version of -384, but the former was an unchecked draft and the latter had been lost before the compilation of the *lē'u* version. Rev.' 5 seems to have been copied from the closing line of the original short diary of the months VIII and IX, which showed the astronomical data of the first day of the coming month X.[13]

The aforementioned definition of the short diaries excludes certain diary tablets with short coverages from the group. The excluded tables restrict their contents to sky and river level reports, or occasionally to sky reports only. One example of such a diary is -190A. The Obv.' and 'Rev. of its tablet, BM 55539, are shown in Fig. 1. The tablet puts a sky report as the first part (Obv.' 1 - 'Rev. 6') and a river level report as the next and last part ('Rev. 7'-9'). The restricted contents suggest that this type of diary were made as primary records through day-by-day observations. We call this type of record a "Preliminary Diary." We can classify the following tablets in this group (See also Table 1):

Figure 1: BM 55539 (-190A)

-418B, -214, -201A, -201B, -201C, -200B, -199B, -198A, -197A, -195B, -195C, -195E, -194B, -193A, -193C, -192A, -192B, -192C, -191B, -190A, -190C, -190D, -189C, -188, -185A, -184A, -183B, -180A, -180B, -171C, -171D, -171E, -170C, -170E, -170G, -169, -168E, -167A, -167B, -166B, -158D, -155B, -142B, -131B,

[13] Similar closing lines are often attested at the ends of the diary tablets (see e.g. -453 Upper Edge 4; -381A 'Rev. 20'; -286B 'Rev. 3'; -176A Upper Edge 1; -87C 'Rev. 52'). An important role of those lines may have been the indication of the length of the preceding month, which is simply shown on them by the number 30 (the month has 29 days) or 1 (the month has 30 days). For the indication, see Sachs and Hunger [1988, 38].

LBAT 303.

The following may also belong in the same group:

-391, -283B, -262, -238 (a report of a lunar eclipse),[14] -230D, -227, -213, -209E, -204B, -198C, -184B, -179A, -175A, -170B, -170D, -170F, -166A, -165C, -157B.

The following tablets among them clearly omit the record of the river level:

-418B, -238, -214, -201A, -201B, -199B, -195B, -195C, -193C, -192A, -192B, -192C, -190C, -189C, -184A, -183B, -180A, -171C, -171D, -170C, -170E, -170G, -167A, -158D, -142B, LBAT 303.

Some tablets basically concentrate on the record of the sky (and the river level), but have additional entries on price (-154B and -104), on historical events (-204A, -200A, -198B, -175B; -373A, -171B, -158E, and -149A may belong in the same group), or on locusts (-201D).[15] Among them, -154B clearly lacks any river level report

Signs with shallow wedges on some preliminary diary tablets are good indications that this group of diaries were made as primary records through day-by-day observations. During the observations, the scholars recording them kept their tablets moist and inscribable, probably wrapping them in wet cloth.[16] The tablets, however, sometimes became too dry to inscribe clearly, before every line on them was filled. The dryness resulted in shallow wedges within signs, as is shown on the tablets of the preliminary diaries -201C, -200A, -198A, -198B, -191B, -190A, -180B, -158E, and -149A. Almost all of these diaries show shallow signs on the last lines of their sky reports (-201C Rev. 4-7; -200A Rev. 6-9; -198A 'Rev. 6'-7'; -198B Rev. 9-11; -191B Rev. 8-11; -190A 'Rev. 3'-6'; -180B 'Rev. 6'-8'; -158E 'Rev.' 1'-6'). -149A shows shallow signs on the last part of its additional historical accounts ('Rev.' 7'-14'). Fig. 1 shows the shallow signs on 'Rev. 3'-6' of the tablet of -190A, BM 55539.[17] After some efforts to continue their reports, the scholars making those diaries stopped writing on their drying tablets. If they left some lines for sky reports unused, a blank space appears on each of the relevant tablets before their river level reports. -201C, -198A, -198B, -191B, -190A, and -180B show examples of the blank space. Fig. 1 shows the blank space between 'Rev. 6' and 'Rev. 7' on the tablet of -190A. The river level reports in -201C, -200A, -198A, -198B, -190A, and -180B are inscribed with

[14] If -238 can be classified in the preliminary diaries, we may also classify the following tablets, each of which records a single lunar eclipse, in the same group: nos. 14, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31 [Hunger, Sachs and Steele 2001]. See also Hunger, Sachs and Steele [2001, 394].

[15] For the locusts reports in the diaries, see Pirngruber [2014].

[16] This is proposed by Sachs and Hunger [1988, 12].

[17] For the photos of the other diaries, see Sachs and Hunger [1989, Plates 112 (-201C), 113 (-200A), 115 (-198A and -198B), 127 (-191B), and 144 (-180B)], and Sachs and Hunger [1996, Plates 175 (-158E) and 182 (-149A)].

deep wedges,[18] although they are written below the sky report in shallow wedges on each tablet (See e.g. -190A 'Rev. 7'-9' and 'Rev. 3'-6' on Fig. 1). This indicates that each of these river level reports was written simultaneously with the relevant sky report in deep wedges, before their tablet became dry. The river level report on -191B Rev. 12, however, is written with shallow wedges. This means that the report was written after the tablet became dry. Because of the damages on the tablets of -158E and -149A, it is uncertain whether they originally had river level reports or not. In any case, the shallow wedges on cuneiform tablets suggest that inscribing the records on them took considerable time. We cannot suppose that those records with the shallow wedges were made by copying or compositing from existing data at one time. Instead, it is likely that they were made by filling lines day by day with data from fresh observations.[19] The shallow wedges on the aforementioned nine tablets of the preliminary diaries therefore reinforce the argument that this group of diaries were made as day-by-day observational records. Among the short diaries, only -178A clearly shows shallow wedges on its closing line (-178A 'Rev. 7'), which is added to the single monthly section of the diary (Obv.' 1-11 and 'Rev. 1'-6') to show the astronomical data of the first day of the coming month.

The coverage of each preliminary diary is generally short and its tablet is accordingly small. However, the coverage and size are in themselves not decisive in identifying the preliminary diaries, because the distributions of coverage and size overlap with those of the short diaries. Except for the lunar eclipse report -238, which covers only one day but contains a rather long report of the lunar eclipse on the day, the shortest preliminary diaries are -201C, -199B, and -184A. Those diaries cover each three days, but the longest one, -193A, covers one month.[20] The tablets of the shortest preliminary diaries, BM 33808 (-201C), BM 33671 (-199B), and BM 31581 (-184A), are equally well preserved. They measure 38.6 x 37.1 x 18.4 mm, 41.7 x 37.2 x 15.6 mm, and 50.1 x 49 x 17.1 mm, respectively. The tablet of the longest preliminary diary, -193A (BM 32190), is well preserved in its upper half. Although its lower half is lost, the tablet still measures 44.8 x 96.9 x 24.8 mm. The original height of it seems to be twice as large as the height of the preserved part. Each of the longest short diaries, -178C, -158B, -140C, -132B, and -132C, covers a certain

[18] -201C Rev. 8-9; -200A Rev. 13-14; -198A 'Rev. 8'; -198B Rev. 12; -190A 'Rev. 7'-9'; -180B 'Rev. 9'-11'.

[19] Therefore we may use the preliminary diaries with shallow wedges for determining "expiry dates" of clay tablets. However, effects of seasonal changes, weather, treatments by scribes, etc. should be considered in such an analysis. We will leave the further discussion about the problem for another occasion.

[20] -180A also covers a month (I 131 SE), according to Sachs and Hunger [1989, 386–389]. The author's recent study, however, clarifies that the diary covers only twelve days from 23 XII 130 SE to 5 I 131 SE [Mitsuma 2015].

couple of months, but the shortest one, -168D, only covers nine days. The tablets of -168D (BM 35525), -140C (BM 34050), and -132B (BM 35070 + 45699) are nearly completely preserved. BM 34050 with one of the longest short diaries measures 173 x 144.4 x 40.3 mm,[21] but the tablet with the shortest one, BM 35525, measures 54.8 x 53.8 x 18.4 mm. Those values are smaller than the (estimated) measurements of BM 32190, the tablet of the longest preliminary diary -193A. Therefore we cannot distinguish preliminary diaries from short diaries, merely on the basis of the coverage and the size of the tablets. We must also investigate their contents and the conditions of their inscriptions to make the classification.

Recognition of the genre of preliminary diaries implies that the compilation process of the diaries involved three steps, instead of the two steps suggested by previous studies. The new theory defines the preliminary, the short, and the standard diaries, respectively as the first, the second, and the third steps in the compilation process. The preliminary diaries lack price lists, planetary summaries, and historical accounts, but the short and the standard diaries have them. These data must have been added when preliminary diaries were developed into short diaries. The next section discusses two ways in which this process took place.[22]

III From Preliminary Diaries to Short Diaries

The diary -195D seems to show a trace of the development from a preliminary diary to a short diary. Fig. 2 is a photo of the Obv., Rev., Upper Edge, and Left Edge of the tablet of -195D (BM 55523 + 55553). The diary on the tablet has two sections. The first section (Obv. 1-14) shows a short diary of the month IX, 116 SE. The second section shows a preliminary diary with a river level report, covering the first half of the next month (1-20 X 116 SE).[23] It occupies Obv. 15-17, Rev. 1-17, and Upper Edge 1-2 of the tablet. The river level report is on Upper Edge 1-2. Left Edge 1-2 are almost illegible, but probably used for an extension to the sky report of the second section, whose text is incomplete at the end of Rev. 17. The second section shows shallow wedges at the last parts of its sky and river level reports (the right parts of Rev. 11-13 and the whole of Rev. 14-17, Upper Edge 2, and Left Edge

[21] The tablet of -132B, BM 35070 + 45699, was unfortunately missing in the British Museum when the author requested to study and size it (23/05/2013, 27/08/2013, and 11/08/2014).

[22] For a primary discussion on the subject, see Mitsuma [2009, 52–54].

[23] -255B, -203, -186C, -185B, -182C, -180C, -177, -164A, -163A, -162, and -149B also insert a preliminary diary, i.e. a sky report of more than one day, after their short diary of the preceding month. -259 and -178D may also have the same format. Among those tablets, only -185B clearly has a river level report in its preliminary diary section. Some short diaries, whose format is indicated as "SD(?)(+PD?)" in table 1, may insert a closing (a sky report of the first day of the coming month) or a longer preliminary diary section after their last short diary section.

Figure 2: BM 55523 + 55553 (-195D)

1-2).[24] Like the second section, the original record of the first section should have taken the shape of a preliminary diary. The sky report of the first section (Obv. 1-10) only begins with the entry of the night of 16 IX 116 SE and the river level report (Obv. 14) only records the fluctuation of the level in that month from the 19th. The planetary summary of the section (Obv. 12-13), however, does not give any indication that the first half of the month is out of its coverage and the price list (Obv. 11-12) clearly covers the beginning of the month, as is shown in the report of barley price, which shows the prices of barley in the beginning, in the middle, and at the end of the month. The imbalance suggests that the sky and river level report of the latter half of IX 116 SE was originally made separately from the price list and the planetary summary. The original report's contents are typical of a preliminary diary. Later, the report was copied onto the present tablet and combined with the price list and the planetary summary of the whole month IX, 116 SE. After the short diary was made, the remaining space on the tablet was used for the primary observational record of the sky and the river level of the first half of the next month.

The transition to short diaries was made directly on some preliminary diary tablets such as -181 of IV 130 SE and -180D of XII 131 SE. The 'Obv., Lower Edge, Rev.', Upper Edge, and Left Edge of the tablet of -181, BM 40095 + 55572, are shown on Fig. 3. The Obv. and Rev. of the tablet of -180D, BM 34702, are shown on Fig. 4. Both diaries contain a sky report in their first lines (-181 'Obv. 1'-16', Lower Edge 1-2, and Rev.' 1; -180D Obv. 1-21 and Rev. 1-4, only from 11 XII 131

[24] -182C also show shallow wedges in its second section at the last line of the sky report (Upper Edge 1).

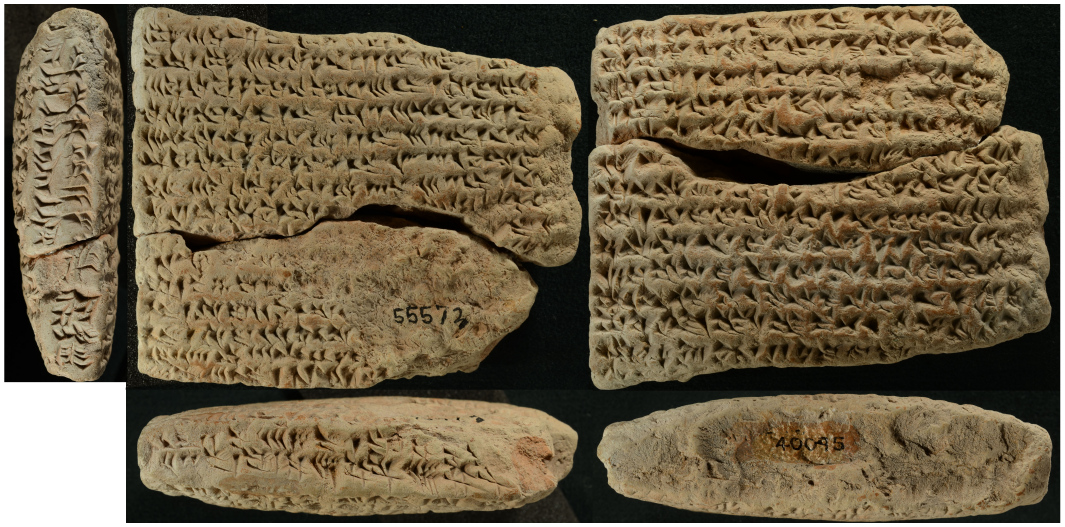

Figure 3: BM 40095 + 55572 (-181)

SE) and a river level report in their last lines (-181 Left Edge 1-2;[25] -180D Rev. 13-14, only from 11 XII 131 SE). This arrangement is typical of preliminary diaries and indicates that those diaries were originally made *as preliminary*. The other data was to have been added later. Both diaries contain a price list (-181 Rev.' 2-4; -180D Rev. 4-8) and a planetary summary (-181 Rev.' 4-7; -180D Rev. 8-11) following their sky reports. -181 further inserts a historical account between its planetary summary and river level report (-181 Rev.' 7-13). Instead, -180D has a blank space at the same place. The signs at the middle of the blank are the last ones of its planetary summary (Rev. 12). If the diaries had originally been made as short ones, the historical account of -181 would have been written after its river level report

[25] Left Edge 2 shows the end of the river level report from its left side and an inverted entry from its right side. The latter is probably added as an supplement to the sky report of the same diary and can be read as follows (cf. Sachs and Hunger [1989, 386]):

<GE$_6$> ⌜25⌝ *ina* ZALÁG *dele-bat* SIG SAG A 4 KÙŠ

<Night> of the 25th, last part of the night, Venus was 4 cubits below ϵ Leonis.

25 IV 130 SE corresponds to the 6th/7th of August, 182 BC (For the dating of 0 IV 130 SE, see Sachs and Hunger [1989, 386]). Angular distance between Venus and ϵ Leonis can be calculated with Stella Navigator ver. 10.0c /AstroArts Inc. On the 7th August, Venus rose at 03:49 (UT+3) in Babylon (32°33' N, 44°26' E according to Klengel-Brandt [1997, 251a]). Venus' apparent position (ecliptic latitude / longitude) at the time was +00°45'36" / 112°23'31." ϵ Leonis' apparent position at the same time was +09°32'34" / 110°22'17." The angular distance between Venus and ϵ Leonis according to their ecliptic latitudes was 08°46'58." The value is near to 4 cubits. Equivalent of a cubit is approximately 2.27° [Jones 2004, 520]. If a cubit is 2.27° (2°16'12"), 4 cubits equals 09°04'48."

Figure 4: BM 34702 (-180D)

and the river level report of -180D would have been written immediately after its planetary summary without any blank. These irregular arrangements indicate that the original preliminary diaries were later developed into the present short diaries on the same tablets.

The condition of the signs of -180D also show a trace of this process. The signs on Rev. 3-12, i.e. the signs of the last two lines of the sky report and the whole of the price list and the planetary summary, shows slight shallowness in comparison with the signs on Obv. 1-21 and Rev. 1-2 (most of the sky report) and on Rev. 13-14 (the river level report). If the diary had been made as a short diary from the beginning and all the data had been written at one time, all the signs on the tablet should be in a similar condition. The shallowness of the signs on Rev. 3-12, however, indicate that the document was originally conceived as a preliminary diary and recorded the sky and the river level reports through day-by-day observation from 11 XII 131 SE. When the sky and river level observation of XII 131 SE finished at the end of the month, the tablet should have left an ample blank space and, although it became slightly dry (as is shown by the signs on Rev. 3-4, the last two lines of the sky report), still remained inscribable. Such a condition allowed the addition of the price list and the planetary summary. We expect a historical account between the summary and the river report, but we do not find it. Perhaps no extraordinary events could be found for the month or the tablet became unfit for writing by the time the account was to be inserted. Instead, two extremely shallow signs were added immediately above Rev. 13. They are not preserved well, but should be read ITI BI, because the first sign of Rev. 13 is ILLU, which is often used in the phrase ITI BI ILLU,

"That month, the river level (was as follows)" in the diaries at the beginning of their river level reports.[26] Preserved wedges of those two signs support the reading ITI BI. They must have been added to supplement the simple beginning of the original river report (Rev. 13-14), ILLU.[27] Judging from their extreme shallowness, those two signs must have been inserted after the list and the summary were added with the slightly shallow wedges.

The developments from preliminary diaries to short diaries, either by making new tablets or by improving existing preliminary diary tablets, required price lists, planetary summaries, and, if any, historical accounts which were made separately from sky and river level reports on preliminary diaries. We can find some materials for the additional data among the chronicles made in Babylon, as is discussed in the next section.[28]

IV The Babylonian Chronicles and the Diaries

The additional data necessary for each monthly section of short diaries must have been prepared before the scholars completed the observation of the sky phenomena and the river level fluctuation of the month. The addition of the data was made directly on some tablets of the preliminary diaries, as is shown in the previous section. The tablets had already been used for a certain time and would shortly become uninscribable. This condition required rapid addition of the data lacking in the preliminary diaries but necessary for the short diaries. This urgent work needed the additional data prepared simultaneously with the day-by-day observation of the sky and the river level of each month. This justified the preparations of the monthly records of the additional data. The monthly records may have been made according to their subject matters, because the short diaries show price lists, planetary summaries, and historical accounts, separately. If some of the historical records had been prepared independently, they must have take the form of the chronicle of a single month. Two chronicles made in Babylon, ABC 9 (BM 31450) and BCHP 15 (BM 32510), take this shape.[29] ABC 9 covers the Month VII, 345/344 BC. This date synchronizes with the emergence of the long historical accounts in the diaries. Some diaries of the mid-fourth century BC show the earliest attestations of the long accounts comparable to the records of a month in the chronicles.[30] Another chronicle, BCHP 15, covers a certain month, probably in the reign of Antiochus IV

[26] -201C Rev. 8; -191A 'Flake.' 11'; -181 Left Edge 1; *et passim.*

[27] For other examples of the simple beginning, see e.g., -198A 'Rev. 8'; -194B Rev. 10; -193A 'Rev. 9'; -191B Rev. 12; -190A 'Rev. 7'; -190D Upper Edge 1; -188 Rev. 11; -180B 'Rev. 9'.

[28] For an initial discussion on the subject, see Mitsuma [2009, 89–91].

[29] For their provenances, see Waerzeggers [2012, 288–292a].

[30] -366A col. ii 2-10; -362 'Rev. 2'-8'; -330 'Rev.' 3'-15'.

or later kings.[31] It describes a gold theft (Obv. 2-12), the trial for it (Obv. 13-15 and Rev. 1-6), and some activity of Greek residents in Babylon (Rev. 6-9). All those subjects are typical of the historical accounts in the diaries.[32] Furthermore, a news report is presented on Rev. 10-12 with the introductory sentence, *al-te-me* [*um-ma-a*],[33] "I heard [as follows]," which is often attested in the diaries.[34] These coincidences between the historical parts in the diaries and the chronicles covering a certain month alone indicate that the latter tablets were prepared as materials for the former accounts.

V Conclusion

This paper shows that the price lists, planetary summaries, and historical accounts in the diaries were later added to the day-by-day observational records of the sky and river level (the preliminary diaries). We define this addition as the development from the preliminary diaries to the short diaries and show the two ways of the development, one by copying a preliminary diary to a new tablet and combining the diary with a set of the additional data on the new tablet, another by adding it to a preliminary diary tablet directly. We can find some materials for the additional historical accounts among the chronicles made in Babylon. However, materials for the price lists and the planetary summaries are still missing. Price data may have been collected together with historical information in some cases. This can be deduced from the unpublished tablet in the British Museum, BM 34117.[35] The upper part of its obverse shows a price list of a certain month VIII. The lower part of the obverse and the upper part of the reverse are missing, but the lower part of the reverse reports some historical events of a month, probably the same month VIII. We will continue the consultation of the unpublished tablets in the British Museum and the other collections in the hope of finding the missing part of BM 34117 and some other materials for the short diaries. This

[31] For detailed discussion of its date, see "Gold Theft Chronicle (BCHP 15)" under "Commentary," Robartus J. van der Spek, accessed 20 August, 2015, http://www.livius.org/cg-cm/chronicles/bchp-gold/theft_2.html.

[32] For thefts and their trials, see -254 'Obv. 12' - Lower Edge 1; -240 'Obv. 5'$^{?}$-8'; -168A 'Rev. 15'-18'; -168B 'Rev.' 14'-15'; -168C 'Rev. 7'-10'; -105A 'Rev. 24'-25'. For the Greek residents in Babylon, see van der Spek [2009].

[33] The restoration is according to the text shown in "Gold Theft Chronicle (BCHP 15)" under "Description, Text and Translation," Robartus J. van der Spek, accessed 20 August, 2015, http://www.livius.org/cg-cm/chronicles/bchp-gold/theft_1.html#TEXT.

[34] See e.g. -264 'Obv. 9'-10'; -168A Obv.' 14-15; -140A 'Rev. 6'.

[35] Christopher B. F. Walker provides its preliminary transliteration in Slotsky and Wallenfels [2009, 33–34n34].

investigation will restore the "missing links" in the compilation process of the diaries.

Key to Table 1

PD	Preliminary Diary
SD	Short Diary
Sky	Sky Report
Price	Price List
Planet	Planetary Summary
River	River Level Report ("no data" in the column for coverage: The relevant part only shows a remark of no observation of the river level.)
History	Historical Account(s)
;	Change of monthly sections
+ (for contents)	Two or more matters are recorded on the same timeline.
+ (for coverage)	If the relevant tablet is better preserved, a longer coverage may be measured.
I, II, III, ...	Babylonian months Nisān, Ayar, Simān ...

Table 1: Preliminary Diaries and Short Diaries

No.	LBAT	Format	Contents	Coverage (of sky)	Remarks
-418B		PD	Sky	27(days)	
-391		PD?	Sky + river*	1+ (river: 7+)	*Remaining parts are lost or omitted.
-373A	233+	PD+sup.?	Sky + history*; sky + history; ?**	15+; 14+; ?	*Remaining parts are lost or omitted in the section. **Only its mth name is preserved.
-367	218	SD(+PD?)	Sky + river, price, planet, sky*(; ?)	17+(; ?)	*Extension of the first sky
-283B	231	PD?	Sky*	7+	*Remaining parts are lost or omitted.
-262	248+	PD?	Sky*	27+	*Remaining parts are lost or omitted.
-259	954+ 980	SD+PD	Sky, price*; sky	7+; 1+	*Remaining parts are lost in the section.
-255B	257	SD+PD	Sky, price, planet, river; sky	9+ (river: ?); 2	
-238		PD?	Sky*	1	*An eclipse report
-230D	665	PD?	Sky*	19+	*Remaining parts are lost or omitted.
-229B		SD(+PD?)	Sky, price, planet, river, history; sky, price, planet, history*(; ?)	2+ (river: no data); 15+(; ?)	*River is lost or omitted in the section.
-227		PD?	Sky*	25+	*Remaining parts are lost or omitted.
-225		SD	Sky + locusts reports, price, planet, river, history (locusts); sky, price, planet*; sky	16** (river: no data); 28; 1	*Remaining parts are lost or omitted in the section. **14-29 III, but the length of II is also shown.
-214	294	PD	Sky	5	
-213		PD?	Sky*	6+	*Remaining parts are lost or omitted.

-212A		SD(+PD?)	Sky, price, planet*(; ?)	23+(; ?)	*Remaining parts are lost or omitted.
-209E	301	PD?	Sky*	12+	*Remaining parts are lost or omitted.
-204A	302	PD+sup.	Sky, river, history	2+ (river: 6)	
-204B	536	PD?	Sky*	6+	*Remaining parts are lost or omitted.
-204C		SD(+PD?)	Sky, price, planet, river, history(; ?)	30(; ?)	
*	303	PD	Sky	4+	*This diary can be dated to 108 or 238 SE (see *LBAT*, xv).
-203	304	SD+PD	Sky, price, planet, river; sky	6 (river: 20); 3	
-201A		PD	Sky	8+	
-201B		PD	Sky	18	
-201C		PD	Sky, river	3 (river: ?)	
-201D		PD+sup.	Sky; sky; river*; a locusts report**	3; 3; (river: 22)	*It covers the end of 110 SE and the beginning of 111 SE. **For 23 XII_2 110 SE.
-200A	308	PD+sup.	Sky, history, river, history, sky*	14 (river: 12)	*Extension of the first sky
-200B		PD	Sky, river	7 (river: 2)	
-199B	310	PD	Sky	3	
-198A	311	PD	Sky, river	6+ (river: 3+)	
-198B		PD+sup.	Sky, river, history	15+ (river: 12)	
-198C	780+	PD?	Sky, river; sky*	21+ (river: ?); 5+	*Remaining parts are lost or omitted.
-197A		PD	Sky, river, sky*	6+ (river: 3)	*Extension of the first sky?
-195B	318	PD	Sky	11	
-195C		PD	Sky	6	
-195D		SD+PD	Sky, price, planet, river; sky, river, sky?*	15 (river: 12); 20+ (river: 10+)	*Extension of the first sky in the section?

-195E	319	PD	Sky, river*	9 (river: 15+)	*It covers the end of XI and the first half of XII.
-194B	321	PD	Sky, river	15 (river: ?)	
-193A	322	PD	Sky; sky*; river, sky**	29; 1; (river: 1m+)	*It is inserted as the closing of the other sections (both for II). **Extension of the first sky
-193C		PD	Sky	14+	
-192A		PD	Sky	4	
-192B	325	PD	Sky; sky	1; 4	
-192C		PD	Sky	6	
-191B		PD	Sky, river	25 (river: 6+)	
-190A		PD	Sky, river	16 (river: 13)	
-190C	327	PD	Sky	2+	
-190D		PD	Sky, river, sky*	11 (river: 7)	*Extension of the first sky
-189C	530	PD	Sky	13+	
-188		PD	Sky, river, sky*	10 (river: 10)	*Extension of the first sky
-187B	330	SD(+PD?)	Sky, price, planet*(; ?)	18+(; ?)	*Remaining parts are lost or omitted.
-186C	334	SD+PD	Sky, price, planet, river; sky	30; 4	
-185A		PD	Sky, river	15 (river: 7)	
-185B		SD+PD	Sky, price, planet*; sky, river	1+; 8+ (river: ?)	*Remaining parts are lost or omitted in the section.
-184A	335	PD	Sky	3	
-184B	336	PD?	Sky*	10+	*Remaining parts are lost or omitted.
-183A	337	SD	Sky, price, planet, river, history	11+ (river: 2+)	
-183B	338	PD	Sky	14	
-182B	629+	SD(+PD?)	Sky, price, planet, river, history*(; ?)	11+ (river: 10)(; ?)	*Remaining parts are lost or omitted.

-182C	342+	SD+PD	Sky, price, planet, river, history; sky	30 (river: 7+); 7	
-181	343+ 344	PD to SD	Sky, price, planet, history, river, sky*	24+	*Extension of the first sky
-180A	345	PD	Sky; sky	7; 5	
-180B		PD	Sky, river	25 (river: 18)	
-180C	346	SD+PD	Sky, price, planet*; sky	1+; 5+	*Remaining parts are lost or omitted in the section.
-180D	347	PD to SD	Sky, price, planet, river	18+ (river: 18)	
-179A	751	PD?	Sky*	19+	*Remaining parts are lost or omitted.
-179B	348	SD	Sky*; sky, price, planet, river, history	4+; 1+ (river: ?)	*Remaining parts are lost in the section.
-178A	352	SD	Sky, price, planet, river; sky	13+ (river: 14); 1	
-178B		SD?+PD	Sky*; sky	5+; 2+	*Remaining parts are lost or omitted in the section.
-178C	353+ 354	SD	Sky*; sky+ a locust report, price, planet, river, history	24+; 18+ (river: 25+)	*Remaining parts are lost in the section.
-178D	351	SD?+PD	Sky*; sky	10+; 2+	*Remaining parts are lost or omitted in the section.
-177	355+ 966+ 990	SD+PD	Sky, price, planet, river; sky	3 (river: ?); 10+	
-175A		PD?	Sky*	5+	*Remaining parts are lost or omitted.
-175B	357	PD+sup.	Sky, history, river, history	10+ (river: ?)	

-171B	362	PD+sup.?	Sky, history, sky?* **	6+	*Extension of the first sky? **Remaining parts are lost or omitted.
-171C		PD	Sky	14	
-171D		PD	Sky	6	
-171E	363	PD	Sky, river	10+ (river: 20+)	
-170B	364	PD?	Sky*	2+	*Remaining parts are lost or omitted.
-170C		PD	Sky	12*	*14-25 III, but the length of II is also shown.
-170D	366	PD?	Sky*	3+	*Remaining parts are lost or omitted.
-170E	367	PD	Sky	16	
-170F	368	PD?	Sky*	6+	*Remaining parts are lost or omitted.
-170G		PD	Sky	8	
-169	370	PD	Sky, river; sky*	5 (river: headline only); 1	*It covers 29 I, the day before the coverage of the first sky (from 1 II = 30 I).
-168D	373	SD	Sky, price, planet, river	9	
-168E	374	PD	Sky, river	15 (river: 15)	
-167A	375	PD	Sky	5*	*15-19 II, but the length of I is also shown.
-167B		PD	Sky, river	5 (river: ?)	
-166A		PD?	Sky*	12+	*Remaining parts are lost or omitted.
-166B	770	PD	Sky, river, sky*	9+ (river: ?)	*Extension of the first sky.
-165C		PD?	Sky*	4+	*Remaining parts are lost or omitted.
-164A		SD+PD	Sky (+/,) locust reports, price, planet, history?*; sky; sky**	29+; 2+	*River is lost or omitted in the section. **Extension of the first sky
-163A	527	SD+PD	Sky, price, planet, river; sky	29+; 12	

-162	381+	SD+PD	Sky, planet, river, history*; sky; sky**	30; 6	*Price is lost or omitted in the section. **Extension of the first sky
-160C		SD(+PD?)	Planet, river, history*,/; sky	? (river: 26+)(; ?)	*Remaining parts are lost or omitted (in the section).
-158B	389	SD	Sky*; sky, price, planet, river, history; sky	25+; 18+; 1	*Remaining parts are lost in the section.
-158D	390	PD	Sky	20+	
-158E	544	PD+sup.?	Sky(; sky), history*	11+(; ?)	*Remaining parts are lost or omitted.
-157A	392+ 573+ 902	SD	Sky, price, planet, river, history?	29	
-157B	391	PD?	Sky*	4+	*Remaining parts are lost or omitted.
-155A	397	SD	Sky, price, planet, river, history	16	
-155B	398	PD	Sky, river	15+ (river: 15)	
-154B		PD+sup.	Sky, price; sky; sky*	7; 7	*Extension of the first sky
-149A	400	PD+sup.?	Sky, history*	18+ (history: 18+)	*Remaining parts are lost or omitted.
-149B	402	SD+PD	Sky, price, planet, river, history; sky	6+ (river: 15); 2+	
-142B	415	PD	Sky	5	
-140B	419+ 820	SD(+PD?)	Sky, price, planet, river, history*(; ?)	16+ (river: ?)(; ?)	*Remaining parts are lost or omitted.
-140C	420	SD	Sky, price, planet, river, history; sky, price, planet, river, history; sky	30; 25+; 1	

-132B	438+ 439	SD	Sky*, price, planet, river, history; sky, price, planet, river, history	30; 30	*A long extension is on Right Edge.
-132C		SD(+PD?)	Sky, price, planet, history*; sky, price, planet**(; ?)	27+; 27+(; ?)	*River is lost or omitted in the section. **Remaining parts are lost or omitted.
-131B	443	PD	Sky, river	5 (river: 8)	
-126A		SD(+PD?)	Price, planet, river, history* (; ?)	? (river: 23) (; ?)	*Sky is lost or omitted in the section.
-126B		SD?(+PD?)	Sky, history*(; ?)	17+(; ?)	*Remaining parts are lost or omitted.
-119 A_{1+2}	456+ 782+ 785+	SD(+PD?)	Sky, price, planet, river, history; ?*(; ?)	29+ (river: 6+); ?(; ?)	*The second monthly section is almost lost, but the title of the diary (A_1 Obv.' 1) indicates its existence.
-119D	860	SD?	Sky(,/;) history*	8+	*Remaining parts are lost or omitted.
-104		PD+sup.	Sky, price, river, price*	10 (river: 8, barley price: 6, dates price: 10)	*Extension of the first price
-75	517	SD?	Sky(;) sky*, price, planet, river	6+(;) 1+ (river: ?)	*It is uncertain if those sky reports belong to the same section or not.

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(Received: October 28, 2015)

(Revised: February 7, 2016)