

# A Collection of Observations from the Reign of Artaxerxes I

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Of the tablet IM 76846, published as No. 268 in volume V of his *Spätbabylonische Texte aus Uruk*, E. von Weiher [1998] could at the time provide only a transliteration. The tablet can be dated to the reign of Artaxerxes I. One side is badly preserved, but at present I cannot collate the tablet itself. This new edition is based on photographs.<sup>1</sup>

## I Transliteration

### Obverse<sup>2</sup>

- 1 AN-KU<sub>10</sub> *sin*  
 2 [MU 2 A]r-tah-šá-si-iš GU<sub>4</sub> 'BE' DIB DU<sub>6</sub> 5 ITU 'DIB'  
 3 [x x x]+1 ME NIM MU 3 KIN DIB 5'5(?)<sup>1</sup> ana ŠÚ [šámaš]  
     ŠE DIB 1,16 ME N[IM]
- 
- 4 [x x x] DIB MU 3 KIN BE DIB ŠE BE DIB
- 
- 5 [x x G]UB DIRI.ŠE 10 LÁL BAR 29 ŠÚ SIG 13 GUB-'iz(?)<sup>1</sup>
- 
- 6 [MU 2 MÚL-BABBAR KIN 1]7 3 KÙŠ *ina* IGI RÍN ŠÚ DU<sub>6</sub> 14 3 KÙŠ *ár* RÍN *e-lat*  
 7 [x IGI x x *ina*] GÍR-TAB UŠ *ana* NIM LAL-*is* ŠE DIR  
 8 [...]'x SAG(?)<sup>1</sup> GÍR-TAB UŠ *ana* ŠÚ LAL KIN 29 *ina* GÍR-TAB ŠÚ  
 9 [... ZÍ]Z(?) 2 *ár* 4-ÀM IGI<sup>meš</sup>(?) šá PA UŠ *ana* 'ŠÚ' LAL ŠE DIR

<sup>1</sup> John M. Steele read a preliminary version of this paper and suggested many improvements. The photos accompanying this article are published by courtesy of the German Archaeological Institute in Berlin. I thank Margarete van Ess for providing them.

<sup>2</sup> I propose to exchange obverse and reverse. It seems more logical to start with lunar eclipses, then have seasonal data, and then planets. In the first edition's arrangement, the planets are split into two sections. Also, the text is concluded by a horizontal line at the end of the reverse. J. M. Steele notes that the king's name occurs only in the eclipse section, making it very likely that this is the beginning of the text.

- 10 [MU 4 ....] 28 KI(?) *šil-taḥ* PA UŠ *ana* NIM LAL  
 11 [...] *šá* PA ŠÚ GAN 13 *ina* TIL PA IGI
- 
- 12 [MU 2 *dele-bat* (...) ŠE] 25 : *ina* ŠÚ *ina* IGI ḤUN-GÁ ŠÚ ŠE x DIR  
 13 [...] '2(?)' : *ina* NIM *ina* ḤUN-GÁ IGI APIN 28 : 24  
 14 [...] 'x' : AB 28 : *ina* ŠÚ *ina* GU IGI  
 15 [DU<sub>6</sub>] '13' : 10 : 'ina' ŠÚ *ina* PA ŠÚ 24 : 21 : *ina* NIM *ina* *šil-taḥ*  
 ————— PA IGI ŠE DIR —————

### Reverse

- 1 [MU 2 AN Š]U 15(?) 5 'KÙŠ' *ina* IGI ÁB(?) UR-A IGI 'ina(?)' MU(?) NE(?)  
 GUB(?)  
 2 [x x DIRI.Š]E(?) EN 6 *ana* NIM *ki* UŠ-'ú' *ina* IGI *šá* x x x UŠ'  
 3 '15(?) x' [x] 'x' DIRI 10(?) ŠE(?) GU<sub>4</sub> EN 18(?) *ana* 'ŠÚ' *ki* UŠ-'a' ⅔ KÙŠ' (erasure)  
 4 'ana SI<sub>4</sub>' NU KUR UŠ 'TA(?)' 26(?) *ana*' NIM LAL ŠE DIR  
 5 'MU' 4(?) GU<sub>4</sub> 1 *ár* ŠU(?) 'x x x x' *šá* SIPA ŠÚ IZI '12+x' *ina* 'IGI GIŠ.KUN' A  
 ————— 2 UŠ IGI 'x DÚ'  
 6 'MU 2<sup>d</sup>(?) GENNA DU<sub>6</sub>' 28 5 UŠ *ina* IGI RÍN IGI 'ZÍZ(?)' 1 1 KÙŠ(?) 8 SI(?)  
 7 *e-lat* RÍN UŠ 'ana ŠÚ(?)' LAL(?) MU 3' GU<sub>4</sub> 26 *ina* IGI 'RÍN' *šá* ULÚ UŠ'  
 8 'SIG 2(?)' *ana* NIM LAL 'KIN 5 2 KÙŠ' *ina* IGI RÍN ŠÚ 'NU' PAP DU<sub>6</sub> 19 6(?)  
 SI(?)  
 9 *ár* RÍN *šá* 'ULÚ' IGI 'AB(?)' 20 7 UŠ *ina* IGI SAG(!) GÍR-TAB 'UŠ'  
 10 'MU' 4 SIG [x] *ana* ŠÚ *ki* UŠ-'a' *ina* IGI RÍN *šá* ULÚ UŠ DU<sub>6</sub> *ina*(?) '4(?) x' [x] 'x  
 x x' NU(?) PAP(?)  
 11 APIN 13 *ina* IGI SAG(!) GÍR-TAB IGI NIM *ina* 11 IGI SI(?) 'x x x UŠ(?)' x [x x x]  
 'x'  
 —————  
 12 MU 2 GU<sub>4</sub>-UD IZI 15 *ina* NIM *ár* LUGAL IGI : KIN '9 *ina*' NIM *ina* IGI UR-A ŠÚ  
 13 'x NU PAP APIN 1(?)' *ina* ŠÚ <sup>be-pi</sup> 16 *ina* 'ŠÚ' *ina* PA ŠÚ 'GAN(?)' 1 *ina* NIM *ár*  
 SI<sub>4</sub> IGI  
 14 [x x] 'x' [*ina*] 'SUḤUR(?)' MÁŠ ŠÚ 'ZÍZ(?)' 14(?) *ina* 'ŠÚ' *ina* 'GU' IGI : ŠE 10  
*ina* ŠÚ *ina* ŠÍM ŠÚ  
 15 [x x] 'x *ina* NIM *ina* KUN(?)<sup>me</sup>(?)' IGI 28 *ina* NIM *ina* DUR ŠÍM ŠÚ : MU 3 BAR  
 [x(?)]  
 16 [x *ina*] ŠÚ *ina* IGI MAŠ-MAŠ IGI : SIG 14 *ina* ŠÚ *ina* IGI LUGAL 'ŠÚ ŠU(?)' 11  
*ina* NIM [*ina* x IGI]  
 17 [x x] 'x' *ina* NIM *ina* SAG(!) UR-A ŠÚ : 'KIN' 24 *ina* [ŠÚ *ina*] GÍR-TAB IGI  
 18 [DU<sub>6</sub>] 7 *ina* ŠÚ *ina* IGI *šil-taḥ* PA ŠÚ 26 *ina* NIM *ina* <sup>be-pi eš-šú</sup> 'U' *ár*  
 19 [x x] : GAN 8 *ina* NIM ŠÚ (erasure)
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## II Translation

### Obverse

- 1 Lunar eclipse(s):
- 2 [Year 2, A]rtaxerxes. Month II, .... omitted. Month VII, (after) 5 months, omitted.
- 3 [Month XII<sub>2</sub>, omitted. x]+1° after sunrise. Year 3, Month VI, omitted. 55° before sunset. Month XII, omitted. 76° after sunrise.
- 
- 4 [...] omitted. Year 3, Month VI, .... omitted. Month XII, .... omitted.
- 
- 5 [...] sol]stice. Month XII<sub>2</sub>, the 10th, equinox. Month I, the 29th, (Sirius') last appearance. Month III, the 13th, solstice.
- 
- 6 [Year 2, Jupiter. Month VI, the 1]7th, last appearance 3 cubits in front of Libra. Month VII, the 14th, [first appearance] 3 cubits behind Libra, above
- 7 [...] it became stationary in Scorpius; it moved on to the east. Month XII was intercalary.
- 8 [...] it became stationary in the head(?) of Scorpius; it moved on to the west. Month VI, the 29th, last appearance in Scorpius.
- 9 [...] Month X]I(?), the 2nd, it became stationary behind the four front ones of Sagittarius; it moved on to the west. Month XII was intercalary.
- 
- 10 [Year 4, ....] the 28th, it became stationary in the area(?) of the arrow of Sagittarius; it moved on to the east.
- 11 [...] last appearance [...] of Sagittarius. Month IX, the 13th, first appearance in the end of Sagittarius.
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- 12 [Year 2, Venus. (...) Month XII,] the 25th, last appearance in the west in front of Aries. Month XII .... was intercalary.
- 13 [...] Month XII<sub>2</sub>,] the 2nd(?), first appearance in the east in Aries. Month VIII, the 28th (or) the 24th,
- 14 [last appearance in the east.] Month X, the 28th, first appearance in the west in Aquarius.

15 [Month VII,] the 13th (or) the 10th, last appearance in the west in Sagittarius. The 24th (or) the 21st, first appearance in the east in the arrow of Sagittarius. Month XII was intercalary.

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### Reverse

1 [Year 2, Mars. Month] IV, the 15th(?), first appearance 5 cubits in front of .... Leo. It stood in ....

2 [... Month] XII<sub>2</sub>, until the 6th, when it became stationary to the east, it became stationary in front of ....

3 The 15th, .... [...] .... Month II, until the 18th(?), when it became stationary to the west,

4 it became stationary  $\frac{2}{3}$  cubit towards  $\alpha$  Scorpii, not having reached (it). From(?) the 26th, it moved on to the east. Month XII was intercalary.

5 Year 4(?), month II, the 1st, last appearance behind .... of the shepherd. Month V, the 12+xth, first appearance  $2^\circ$  in front of  $\theta$  Leonis ....

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6 Year 2, Saturn. Month VII, the 28th, first appearance  $5^\circ$  in front of Libra. Month XI(?), the 1st,

7 it became stationary above Libra; it moved(?) on to the west(?). Year 3, month II, the 26th, it became stationary in front of  $\alpha$  Librae;

8 month III, the 2nd(?), it moved on to the east. Month VI, the 5th, last appearance 2 cubits in front of Libra; I did not watch. Month VII, the 19th, first appearance 6(?) fingers(?)

9 behind  $\alpha$  Librae. Month X(?), the 20th, it became stationary  $7^\circ$  in front of the head of Scorpius.

10 Year 4, month III, [the xth,] when it became stationary to the west, it became stationary in front of  $\alpha$  Librae. Month VII, ....; I did not watch(?).

11 Month VIII, the 13th, first appearance in front of the head of Scorpius. It was high, (ideal) first appearance on the 11th. .... became stationary(?) .... [...] ....

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12 Year 2, Mercury. Month V, the 15th, first appearance in the east behind  $\alpha$  Leonis. Month VI, the 9th, last appearance in the east in front of Leo;

13 ...., I did not watch. Month VIII, the 1st(?), in the west (break) The 16th, last appearance in the west in Sagittarius. Month IX(?), the 1st, first appearance in the east behind  $\alpha$  Scorpii.

14 [...] last appearance [in the east in] Capricorn. Month XI(?), the 14th(?), first appearance in the west in Aquarius. Month XII, the 10th, last appearance in the west in the Swallow.

15 [...] first appearance in the east in the Tails (Pisces)(?). The 28th, last

appearance in the east in the band of the Swallow. Year 3, month I,  
 16 [...] first appearance [in] the west in front of Gemini. Month III, the 14th,  
 last appearance in the west in front of  $\alpha$  Leonis. Month IV(?), the 11th, [first  
 appearance] in the east [in ....]  
 17 [...] last appearance in the east in the beginning(?) of Leo. Month VI, the  
 24th, first appearance in [the west in] Scorpius.  
 18 [Month VII,] the 7th, last appearance in the west in front of the arrow of  
 Sagittarius. The 26th, in the east in (new break) fingers(?) behind  
 19 [...] Month IX, the 8th, last appearance in the east ....

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### III Comments

#### Obverse

- 1: The words are written in the middle of the line and look like a heading. Although the plural is not indicated, several eclipses are listed in the following lines.
- 2: The year number 2 is restored in agreement with the other sections of the text, and with the eclipses mentioned. Both the months and the eclipses' invisibility are confirmed by modern calculation [Huber and De Meis 2004, 190].
- 3: According to calculation, DIRI.ŠE DIB and a number are expected in the break at the beginning of the line. The space is somewhat small for this restoration. It is correct that the eclipse occurred in the morning. Also, the times for the beginning of the eclipses in months VI and XII of year 3 are approximately correct.
- 4: This line probably contains solar eclipse possibilities. The first one is broken; but the others are correctly given as omitted. I do not know what BE means here; certainly not totality.
- 5: The statements are rather abbreviated and can only be understood by means of the 19-year cycle. GUB must mean *šámas* GUB, solstice, and LÁL is equinox. A "last appearance" (ŠÚ) in this context can only refer to Sirius, and indeed all data are in sequence. Another solstice can be restored in the beginning of the line. The problem is that these dates do not belong to years 2 and 3 of Artaxerxes I, but to years 5 and 6—provided that the 19-year cycle is applied. However, the use of the cycle for solstices, equinoxes and Sirius is not attested before the middle of the 4th century, so it need not have been fully developed at the time of this tablet. John Steele notes that, also, the equinox on XII<sub>2</sub> 10 is one day earlier than would be expected from the 19-year cycle. So, other ways of determining the dates seem to have been used.

6: Lines 6 to 11 contain Jupiter data. I quote from tables kindly provided by Norbert Roughton:

Phenomenon	Calculated Date	Longitude
Last visibility	Art I 2 VI 19	178.58
First visibility	Art I 2 VII 17	184.62
Eastern station	Art I 2 XI 19	201.88
Western station	Art I 3 II 24	192.03
Last visibility	Art I 3 VII 3	209.72
First visibility	Art I 3 VII 29	215.67
Eastern station	Art I 3 XII 3	233.61
Western station	Art I 4 IV 10	223.78
Last visibility	Art I 4 VIII 17	242.17
First visibility	Art I 4 IX 14	248.30

There is no doubt that these lines concern Jupiter. The dates, as far as preserved, agree well with calculation. Some of the positions are given in a rather vague manner in the text. But the Diaries too give only the zodiacal sign (or constellation, in the earlier Diaries) for the planetary phases.

Of the date, only the numeral 7 is preserved, but the restoration is certain.

- 7: “Moved on to the east” here and “moved on to the west” in the following line have to be interchanged. The remark that there was an intercalary Addaru is frequent in Goal-year texts.
- 9: If the traces barely visible after the break in the beginning of the line are indeed of month XI, the date is one month different from computation. - The sign after IGI looks more like *tì* than *meš*. The 4 front stars of Sagittarius have been identified as stars around  $\mu$  Sagittarii by Roughton and Canzoneri [1992]. The intercalary Addaru indicated here for year 3 must be an error, but unfortunately the same error occurs in the following section (for Venus), and probably also on the reverse in the section for Mars.
- 10: Whatever month is restored in the beginning of the line, a day number of 28 is far off the mark.
- 12–15: These lines must concern Venus, as can be seen from calculation (courtesy N. Roughton). Venus data for years 2ff. of Artaxerxes I are also listed in BM 45674+ (from Babylon) [ADART, vol. V, No. 56]. The dates in this other tablet are close but do not agree completely. Small double wedges, which I take to be separation signs, are used frequently in the Venus paragraph.

Phenomenon	Calculated Date	Longitude
Last visibility in the west	Art I 2 XII 29	357.83
First visibility in the east	Art I 2 XII <sub>2</sub> 1	356.91
Last visibility in the east	Art I 3 VIII 29	249.43
First visibility in the west	Art I 3 X 28	321.33
Last visibility in the west	Art I 4 VII 12	213.21
First visibility in the east	Art I 4 VII 27	204.74

- 12: Year number and month XII restored from computation. Year 2 did have an intercalary Addaru according to the 19-year cycle. The sign between ŠE and DIR is illegible and probably erased.
- 13: The day number for first visibility is only partly preserved.
- 14: The text agrees with computation.
- 15: The month name is restored from computation and from ADART V, No. 56 B 10' which also has day 13 for the last visibility, but probably located it correctly in Scorpius. That text has VII 26 or 27 for the first visibility, but the zodiacal position is broken. It certainly was far from “the arrow of Sagittarius” which was at ca. 227° longitude. As far as can be said from other sources, year 4 had no intercalary Addaru.

## Reverse

- 1–5: This paragraph is the one remaining for Mars phenomena. It is badly preserved, so only part of the data can be identified. Here are the computed data for Mars in the years 2 to 4 of Artaxerxes I:

Phenomenon	Calculated Date	Longitude
First visibility	Art I 2 IV 23	95.21
Eastern station	Art I 2 XII <sub>2</sub> 20	231.32
Western station	Art I 3 II 29	218.06
Last visibility	Art I 4 II 13	68.24
First visibility	Art I 4 V 16	126.65

- 1: The restoration at the beginning of the line is based on lines 6 and 12. The reference to Leo would mean that the planet became visible 5 cubits in front of the constellation. The sign before UR-A looks like DÙ or ÁB. ÁB is occasionally used as a determinative for “star;” but no other star names in the text have determinatives. ÁB could be read *lētu* “cheek” or “side;” but I do not know such a star name.

I do not understand the end of the line; no further remark is expected between first visibility and eastern station in line 2.

2: *šil-tah* PA “arrow of Sagittarius” would be a fitting star for the end of the line but I cannot really see it.

3f.: The first part of the line should mention year 3, which I cannot see. Between eastern and western station, acronychal rising could be mentioned. However, this is nowhere else listed on this tablet, and the damaged signs do not lend themselves to such a reading.

At western station the planet was not far to the east of  $\alpha$  Scorpii. NU KUR seems to mean that Mars had “not reached” the star when it became stationary.

Year 3 was not intercalary in the 19-year cycle. Apart from not fitting the 19-year cycle, intercalations in year 3 would not agree with the time intervals between planetary phenomena.

5: Last visibility occurred when Mars had passed MAŠ-MAŠ *šá* SIPA ( $\gamma$  Geminorum) but the details are illegible to me.

6–11: These lines concern Saturn, so the planet’s name was probably written in the damaged beginning of line 6. It seems to be preceded by the determinative dingir for “god;” but no other planet (or star) name is written in this way on the tablet.

Phenomenon	Calculated Date	Longitude
First visibility	Art I 2 VII 20	184.73
Eastern station	Art I 2 XI 2	191.84
Western station	Art I 3 II 27	185.20
Last visibility	Art I 3 VI 10	192.14
First visibility	Art I 3 VII 14	196.17
Eastern station	Art I 3 X 25	203.17
Western station	Art I 4 III 20	196.56
Last visibility	Art I 4 VII 4	203.49
First visibility	Art I 4 VIII 6	207.36
Eastern station	Art I 4 XI 18	214.37

6f: As in obv. 6, no star within Libra is identified for first visibility and eastern station. Since the planet is “above” Libra in line 7, probably  $\alpha$  Librae is meant.

7: At the end of the line,  $\alpha$  Librae would again have to be restored.

8: Last visibility was not observed; according to computation, Saturn would just have passed  $\alpha$  Librae. First visibility is placed behind  $\alpha$  Librae;  $\beta$  Librae would be more in agreement with computation.

10: According to computation, western station did not take place that far back that Saturn would have passed  $\alpha$  Librae again. At the end of the line, last visibility is expected. Month VII is correct, and day 4 would be perfect; I cannot understand the horizontal wedge after the month name. One could assume that the day number was left out, and that the month name is followed



immediately by the position, which I cannot read however. Some place between Libra and Scorpius is expected.

The signs NU PAP, if read correctly, are written on the edge above the last signs of line 10.

- 11: At the end of the line, eastern station could have been mentioned, but I cannot read the traces.
- 12–15: Section on Mercury: calculations were done with N.M. Swerdlow's program "Acyone." This section is paralleled by SpTU V 267, of which a transliteration is given below, in the Appendix.

Phenomenon	Calculated Date	Longitude	Line in SpTU V 267
First visibility, east	Art I 2 V 14	117° 15′	Obv. 1
Last visibility, east	Art I 2 VI 6	143° 41′	2
First visibility, west	Art I 2 VII 27	223° 49′	3
Last visibility, west	Art I 2 VIII 13	238° 07′	3
First visibility, east	Art I 2 VIII 29	223° 01′	4
Last visibility, east	Art I 2 X 14	268° 04′	5
First visibility, west	Art I 2 XI 13	321° 09′	6
Last visibility, west	Art I 2 XII 9	346° 03′	6
First visibility, east	Art I 2 XII <sub>2</sub> 9	338° 22′	7
Last visibility, east	Art I 3 I 2	5° 05′	8
First visibility, west	Art I 3 II 1	63° 23′	Rev. 1
Last visibility, west	Art I 3 III 15	112° 55′	2
First visibility, east	Art I 3 IV 9	100° 46′	3
Last visibility, east	Art I 3 IV 29	126° 31′	4
First visibility, west	Art I 3 VI 20	206° 41′	5
Last visibility, west	Art I 3 VII 5	221° 32′	6
First visibility, east	Art I 3 VII 25	207° 05′	
Last visibility, east	Art I 3 IX 8	252° 24′	

- 12: First visibility in the east occurred behind  $\alpha$  Leonis, but last visibility was near  $\beta$  Virginis, the rear foot of the Lion. I cannot fit the traces to this situation. A similar problem occurs in line 17 where however the sign preceding UR-A is a clear KA. There too a part of the Lion farther to the east is expected.

The dates are plausible.

- 13: The beginning of the line remains uncertain. If NU PAP is read correctly, some reason for not observing would have to be written before it; line 12 ends with

last visibility in the east.

In line 13 we have to accommodate first and last visibility in the west, and a first visibility in the east. VIII 1 (could also be 2) is a guess based on computation. VIII 1 could correspond to the computed date VII 27; after “in the west,” a break (already in the original from which the tablet was copied) interrupts the text. “16” after the break belongs to the same month and is the date for last visibility in the west.

- 14: The beginning is broken, but [*ina*] SUḤUR(?) MÁŠ ŠÚ agrees with the position of the next last visibility in the east. After that, a first visibility in the west in Aquarius is expected, as is a last visibility on XII 9 (position illegible, constellation Pisces).
- 15: From calculation, KUN<sup>me</sup> is read into the traces for first visibility in the east. The following day number 28 (of month XII<sub>2</sub>) corresponds to computed I 2 of year 3. The position indications seem to use parts of constellations.
- 16: The next phenomenon is first visibility in the west, expected for the beginning of month II. Mercury is several degrees west of  $\alpha$  Geminorum according to calculation.

In the break at the end of the line, and possibly in the beginning of line 17, a first visibility in the east will have been dealt with.

- 17: At last visibility in the east, the planet was already far beyond the beginning of the Lion, if the sign KA is to be emended to SAG. I cannot see how KA (mouth(?)) would refer to the stars near Mercury on this date. However, the parallel SpTU V 267 has a clear SAG here.
- 18: Month VII is restored from calculation; the position agrees. Unfortunately the data for first visibility in the east were broken already on the original.
- 19: The date IX 8 fits a last visibility in the east, even though the following signs are illegible (erased?).

## IV Discussion

The tablet is a copy, as can be seen from the remarks “break” and “new break” in rev. 13 and 18. This may account for some of the inconsistencies in the text, but the situation is far from clear.

The occurrence of NU PAP “I did not watch” (rev. 8 and 13) can be taken to imply that the text contains observations where not stated otherwise. However, the fact that apparently all phenomena of Mercury were listed makes one wonder if they were all observable, especially since there are some that deviate quite a bit from modern computation. For the Mercury section, there is a parallel in SpTU V 267 (see below). It is unfortunately rather fragmentary.

Each of the years mentioned (2, 3 and 4) is at least once said to have an intercalary

Addaru. Since this is clearly impossible—which would have been known to every astronomer—some mix-up must have occurred.

This text is comparable to early compilations of planetary observations (from the 7th to 5th century BC). The following can be listed:

1. Saturn, first and last appearances, time of Kandalanu [Walker 1999]. The positions of the planet are given in reference to constellations or stars; month names are written with determinative, days as U<sub>4</sub>-x-KAM; occasionally, the unit UŠ for degree is used.
2. Saturn, time of Nebukadnezar [Hunger 2000]. Like the tablet edited here, this is from Uruk. It lists first and last appearances, but also stations and dates of the planet's re-assuming motion after station. Positions refer to constellations and/or stars.
3. Mars, time of Nebukadnezar [Steele forthcoming].
4. ADART V no. 52 contains data on approaches of Mars and Mercury (from the 7th century and later), as well as on the movements of Mars and Saturn.
5. ADART V no. 54, although very broken, contains Jupiter's first and last appearances, stations and acronychal risings for at least the years –535 to –498. Dates of re-assuming motion after stations are given.
6. ADART V No. 55 (Camb. 400) collects lunar and planetary data for year 7 of Cambyses, both from contemporary observations and from earlier records [Britton 2008].
7. ADART V No. 56 has Venus data from –462 to –392, together with information on the beginning of each month.

All these tablets, whether from Uruk or Babylon, show differences when compared to early Diaries. In general, the Diaries develop more and more a consistent terminology and layout, avoiding redundancy to a large extent. The texts listed above are still less rigidly organized.

In the present text, positions of the phenomena are mostly given by reference to constellations only; sometimes specific stars are used. Even then, the distance between the planet and the star is not always indicated. Distances are given in cubits or in UŠ. Stations are just listed in the Jupiter section; in the Mars and Saturn sections, sometimes the expression usual in the Diaries “when it became stationary to the east/west, it became stationary in constellation X” occurs. Acronychal risings are not listed; but these are rare in early Diaries too.

A sequence eclipses-seasonal data-planets agrees broadly with Goal-year Texts. However, the sequence of the planets does not agree with that found elsewhere in the Late Babylonian astronomical texts. Nevertheless, this tablet looks like an early attempt to collect data from observations and sort them by planets, as was done later by the Goal-year Texts.

## V Appendix

### SpTU V 267 (IM 76980)

#### Obverse

- 1 [... ] ʿGU<sub>4</sub><sup>1</sup>-UD *ina* NIM *ár* LUGAL IGI
- 2 [... ] *ina* UR-]A ŠÚ NU PAP
- 3 [... ] *ina* ŠÚ *ina* PA ŠÚ
- 4 [... ]
- 5 [... ] *ina* MÁ]Š ŠÚ
- 6 [... ] ʿx<sup>1</sup> *ina* ŠÍM ŠÚ
- 7 [... ] IGI
- 8 [... ] ʿx<sup>1</sup> ŠÚ

#### Reverse

- 1 [... BA]R(?) ʿ1<sup>1</sup> *ina* ŠÚ *ina* IGI MAŠ-MAŠ IGI
- 2 [x x *ina* Š]Ú *ina* IGI LUGAL ŠÚ
- 3 [x x] *ina* NIM *ina* IGI ALLA IGI
- 4 [x] ʿx<sup>1</sup> *ina* NIM *ina* SAG UR-A ŠÚ
- 5 [KIN] 24 *ina* ŠÚ *ina* GÍR-TAB IGI
- 6 [DU<sub>6</sub>] ʿ7<sup>1</sup> *ina* ŠÚ *ina* IGI *šil-taḥ* PA ŠÚ
- 7 [x x] Û.TU-*ma* 1 NITÁ 1 MUNUS
- 8 ŠÀ-šá *pag-ri kal-bu*

#### Translation

##### Obverse

- 1 [... ] Mercury's first appearance in the east behind α Leonis.
- 2 [... ] last appearance [in the east in] Leo; I did not watch.
- 3 [... ] last appearance in the west in Sagittarius.
- 4 [... ]
- 5 [... ] last appearance [in the east in Capri]corn.
- 6 [... ] last appearance [in the west] in the Swallow.
- 7 [... ] first appearance [...]
- 8 [... ] last appearance [...]

##### Reverse

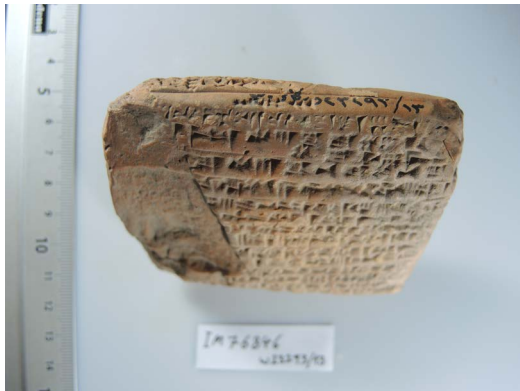
- 1 [... month] I(?) , the 1st, first appearance in the west in front of Gemini.
- 2 [... ] last appearance [in the we]st in front of α Leonis.

- 3 [...] first appearance in the east in front of Cancer.  
 4 [...] ....., last appearance in the east in the beginning of Leo.  
 5 [Month VI,] the 24th, first appearance in the west in Scorpius.  
 6 [Month VII,] the 7th, last appearance in the west in front of the arrow of Sagittarius.  
 7 [...] gave birth, and (there was) one male, one female (newborn);  
 8 her (the female's) inside (was) the body of a dog.

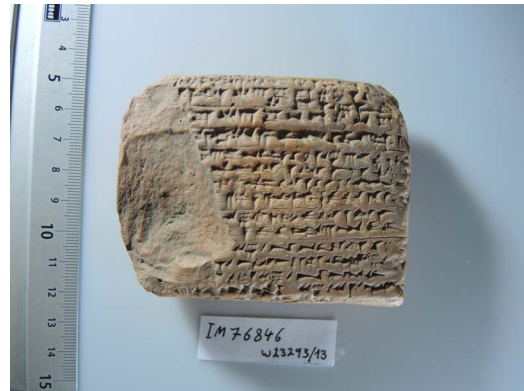
Not much seems to be missing on the left side of the reverse; as can be seen from a comparison with SpTU V 268, above, the Mercury phenomena follow each other in sequence. The same can therefore be assumed for the obverse. One could cautiously propose that this tablet is a “source” or a draft for year 3 of Artaxerxes of the Mercury section of SpTU V 268.

The last two lines of the reverse contain a report about an anomalous birth, in the style of Diaries, where such remarks are also inserted into the observations.

## VI Photographs



**Figure 1:** IM 76846 Upper edge



**Figure 2:** IM 76846 Obv.

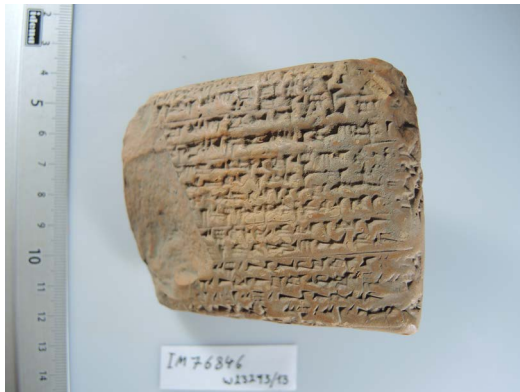


Figure 3: IM 76846 Obv.



Figure 4: IM 76846 Right edge

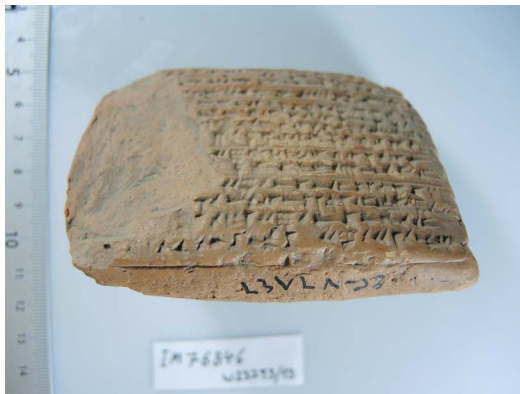


Figure 5: IM 76846 Lower edge

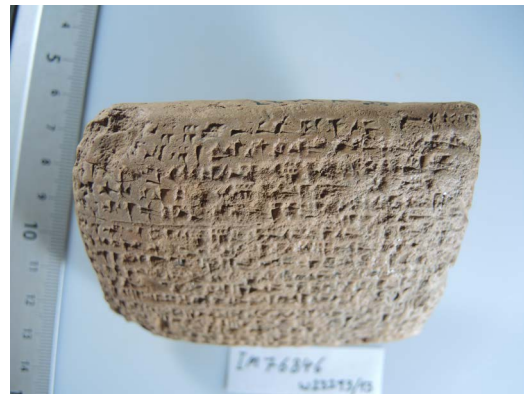


Figure 6: IM 76846 Rev.



Figure 7: IM 76846 Rev.

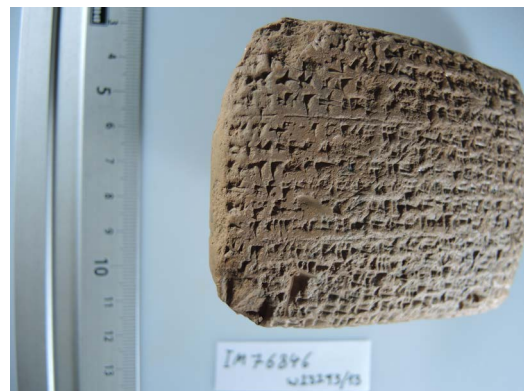


Figure 8: IM 76846 Rev.



Figure 9: IM 76846 Right edge



Figure 10: IM 76846 Upper edge

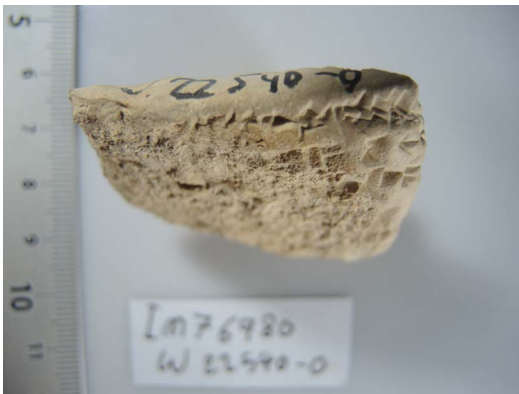


Figure 11: IM 76980 Obv.

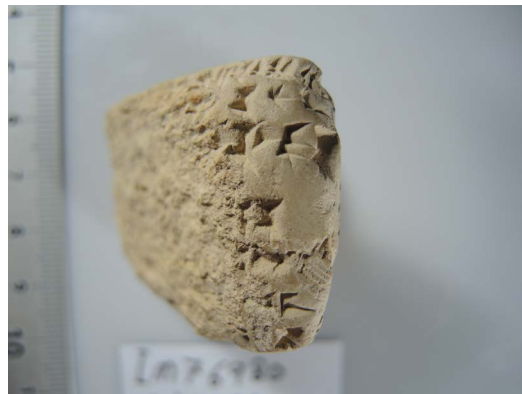


Figure 12: IM 76980 Obv.



Figure 13: IM 76980 Right edge

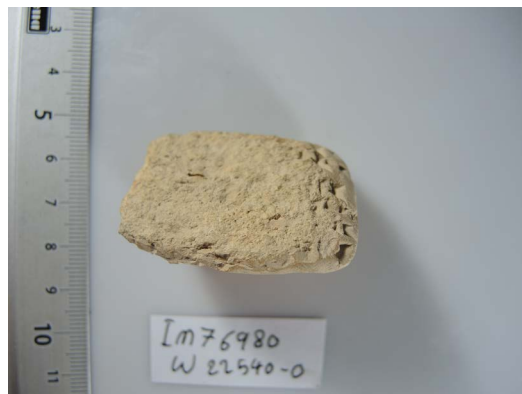


Figure 14: IM 76980 Obv.

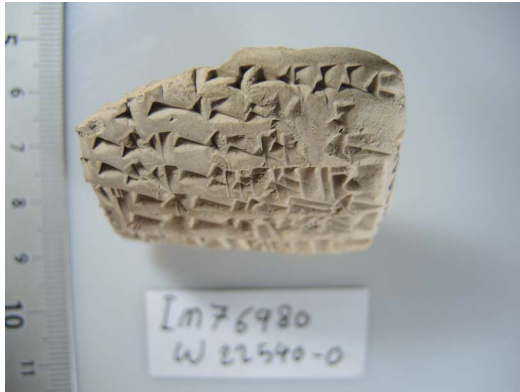


Figure 15: IM 76980 Rev.

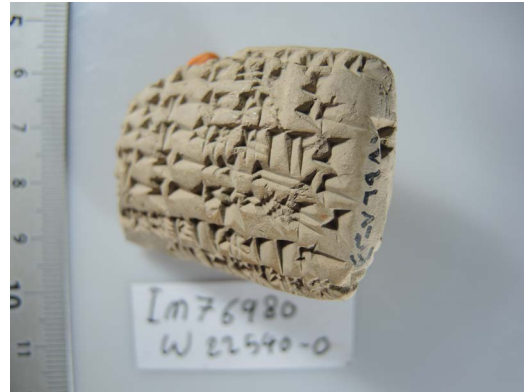


Figure 16: IM 76980 Rev.



Figure 17: IM 76980 Rev.

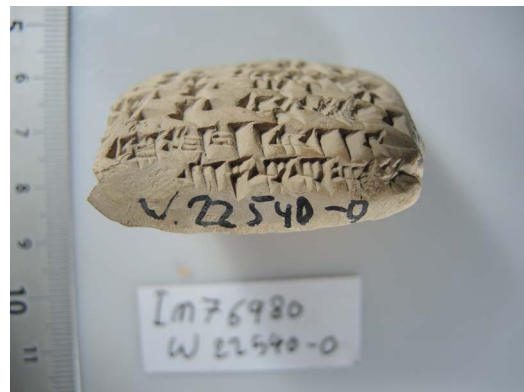


Figure 18: IM 76980 Rev.



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