

Twelve cuneiform *tenû* numerals

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1 Summary

This document proposes filling the Cuneiform Numbers and Punctuation block with twelve cuneiform numerals used in the third millennium. Three of those

are additional numerals in the AŠ (or DIŠ) *tenû* series, 7 \nwarrow^1 –9 \nwarrow , where 1 $\nwarrow = \nwarrow$ through 6 $\nwarrow = \nwarrow\!\nwarrow$ are already encoded. Their glyptic range and usage are discussed in §3. The other proposed characters constitute a new series of numerals, formed by \nwarrow numerals crossing an — wedge. They are discussed in §4.

These characters are extensively used in Early Dynastic administrative corpus, which is published online² using Unicode cuneiform as part of the [ePSD2] project. They are also used in publications discussing third millennium administrative texts. Their absence from the Standard can be explained by the initial scope going back only to the Ur III period, and by the explicit exclusion of numbers from the scope of the Early Dynastic extension; see [L2/12-208; L2/24-210R, p. 19 sq. n. 17].

2 Proposed changes to the Standard

2.1 Core specification text

No change is needed in the core specification.

2.2 Code charts

The code charts for the affected block, including the character names list with proposed informative aliases, cross references, and informative notes, are shown on the following pages. A plain text file containing the [NamesList.txt](#) lines is attached to this document.

¹We follow [Gor23; Gor24] and use unit numerals rather than sign names in transliterations to indicate the type of numeral. Contrary to Gori, we use write the multiplicity of the sign rather than its value, as in ATF; thus 3 \nwarrow for both 3(bur₃) and 3(u), rather than 30 \nwarrow for the latter.

²See, e.g., the transcription of [P220703] in <http://oracc.org/epsd2/P220703/cuneified>. Note that the proposed characters, as well as the provisionally assigned ones proposed in [L2/24-210R], are missing from that text; cf. <http://oracc.org/epsd2/P131747/cuneified> for the Ur III [P131747], which does not have this issue.

	1240	1241	1242	1243	1244	1245	1246	1247
0	➡ 12400	☶ 12410	☒ 12420	☒☒☒ 12430	☒☒☒☒ 12440	☒☒☒☒ 12450	☒ 12460	☒ 12470
1	➡➡➡ 12401	☶☶ 12411	☒☒☒ 12421	☒☒☒☒☒ 12431	☒☒☒☒ 12441	☒☒☒ 12451	☒☒ 12461	☒ 12471
2	☒ 12402	☶☶ 12412	☒☒☒ 12422	☒ 12432	☒ 12442	☒ 12452	☒ 12462	☒ 12472
3	☒➡ 12403	☒☒ 12413	☒☒ 12423	☒ 12433	☒ 12443	☒ 12453	☒ 12463	☒ 12473
4	☒☒ 12404	☒☒☒ 12414	☒☒☒ 12424	☒ 12434	☒ 12444	☒ 12454	☒ 12464	☒ 12474
5	☒➡➡ 12405	☒ 12415	☒☒ 12425	☒☒ 12435	☒ 12445	☒ 12455	☒ 12465	☒ 12475
6	☒➡➡➡ 12406	☒ 12416	☒☒☒ 12426	☒☒☒☒ 12436	☒ 12446	☒ 12456	☒ 12466	☒ 12476
7	☒➡➡➡➡ 12407	☒ 12417	☒☒☒ 12427	☒☒☒☒☒ 12437	☒ 12447	☒ 12457	☒ 12467	☒ 12477
8	☒ 12408	☒ 12418	☒☒☒ 12428	☒☒☒☒☒ 12438	☒ 12448	☒ 12458	☒ 12468	☒ 12478
9	☒ 12409	☒ 12419	☒☒☒ 12429	☒☒☒☒☒ 12439	☒ 12449	☒ 12459	☒ 12469	☒ 12479
A	☒ 1240A	☒ 1241A	☒☒☒ 1242A	☒ 1243A	☒ 1244A	☒ 1245A	☒ 1246A	☒ 1247A
B	☒ 1240B	☒ 1241B	☒☒☒☒ 1242B	☒ 1243B	☒ 1244B	☒ 1245B	☒ 1246B	☒ 1247B
C	☒ 1240C	☒ 1241C	☒ 1242C	☒ 1243C	☒ 1244C	☒ 1245C	☒ 1246C	☒ 1247C
D	☒ 1240D	☒ 1241D	☒☒ 1242D	☒ 1243D	☒ 1244D	☒ 1245D	☒ 1246D	☒ 1247D
E	☒ 1240E	☒ 1241E	☒☒ 1242E	☒ 1243E	☒ 1244E	☒ 1245E	☒ 1246E	☒ 1247E
F	☶ 1240F	☒ 1241F	☒☒ 1242F	☒ 1243F	☒ 1244F	☒ 1245F	☒ 1246F	☒ 1247F

Common numeric signs

These are used in multiple metrological systems.

- 12400 ➡ CUNEIFORM NUMERIC SIGN TWO ASH
 = 2 iku
 → 12038 ← cuneiform sign ash
 → 12551 □ cuneiform numeric sign two n01
 → 1264D □ cuneiform numeric sign two n01 flat
- 12401 ➡ CUNEIFORM NUMERIC SIGN THREE ASH
 12402 ⚫ CUNEIFORM NUMERIC SIGN FOUR ASH
 12403 ⚫ CUNEIFORM NUMERIC SIGN FIVE ASH
 12404 ⚫ CUNEIFORM NUMERIC SIGN SIX ASH
 12405 ⚫ CUNEIFORM NUMERIC SIGN SEVEN ASH
 12406 ⚫ CUNEIFORM NUMERIC SIGN EIGHT ASH
 12407 ⚫ CUNEIFORM NUMERIC SIGN NINE ASH
 12408 ⚫ CUNEIFORM NUMERIC SIGN THREE DISH
 → 12079 ፩ cuneiform sign dish
 → 1222B ፪ cuneiform sign min
 → 12559 ፻ cuneiform numeric sign three n08
- 12409 ⚫ CUNEIFORM NUMERIC SIGN FOUR DISH
 = 4 bariga
 1240A ⚫ CUNEIFORM NUMERIC SIGN FIVE DISH
 1240B ⚫ CUNEIFORM NUMERIC SIGN SIX DISH
 1240C ⚫ CUNEIFORM NUMERIC SIGN SEVEN DISH
 1240D ⚫ CUNEIFORM NUMERIC SIGN EIGHT DISH
 1240E ⚫ CUNEIFORM NUMERIC SIGN NINE DISH
 1240F ⚫ CUNEIFORM NUMERIC SIGN FOUR U
 = 4 bur₃
 → 1230B ፲ cuneiform sign u
 → 12399 ፳ cuneiform sign u u
 → 1230D ፳ cuneiform sign u u u
 → 12565 ፳; cuneiform numeric sign four n14
 → 12659 ፳; cuneiform numeric sign four n14 flat
- 12410 ⚫ CUNEIFORM NUMERIC SIGN FIVE U
 12411 ⚫ CUNEIFORM NUMERIC SIGN SIX U
 12412 ⚫ CUNEIFORM NUMERIC SIGN SEVEN U
 12413 ⚫ CUNEIFORM NUMERIC SIGN EIGHT U
 12414 ⚫ CUNEIFORM NUMERIC SIGN NINE U
 12415 ⚫ CUNEIFORM NUMERIC SIGN ONE GESH2
 → 1256B □ cuneiform numeric sign one n34
- 12416 ⚫ CUNEIFORM NUMERIC SIGN TWO GESH2
 12417 ⚫ CUNEIFORM NUMERIC SIGN THREE GESH2
 12418 ⚫ CUNEIFORM NUMERIC SIGN FOUR GESH2
 12419 ⚫ CUNEIFORM NUMERIC SIGN FIVE GESH2
 1241A ⚫ CUNEIFORM NUMERIC SIGN SIX GESH2
 1241B ⚫ CUNEIFORM NUMERIC SIGN SEVEN GESH2
 1241C ⚫ CUNEIFORM NUMERIC SIGN EIGHT GESH2
 1241D ⚫ CUNEIFORM NUMERIC SIGN NINE GESH2
 1241E ⚫ CUNEIFORM NUMERIC SIGN ONE GESU
 → 12574 □ cuneiform numeric sign one n48
- 1241F ⚫ CUNEIFORM NUMERIC SIGN TWO GESU
 12420 ⚫ CUNEIFORM NUMERIC SIGN THREE GESU
 12421 ⚫ CUNEIFORM NUMERIC SIGN FOUR GESU
 12422 ⚫ CUNEIFORM NUMERIC SIGN FIVE GESU
 12423 ⚫ CUNEIFORM NUMERIC SIGN TWO SHAR2
 → 122B9 ● cuneiform sign shar2
 → 12579 ● cuneiform numeric sign two n45
- 12424 ⚫ CUNEIFORM NUMERIC SIGN THREE SHAR2
 12425 ⚫ CUNEIFORM NUMERIC SIGN THREE SHAR2 VARIANT FORM

- 12426 ⚫ CUNEIFORM NUMERIC SIGN FOUR SHAR2
 12427 ⚫ CUNEIFORM NUMERIC SIGN FIVE SHAR2
 12428 ⚫ CUNEIFORM NUMERIC SIGN SIX SHAR2
 12429 ⚫ CUNEIFORM NUMERIC SIGN SEVEN SHAR2
 1242A ⚫ CUNEIFORM NUMERIC SIGN EIGHT SHAR2
 1242B ⚫ CUNEIFORM NUMERIC SIGN NINE SHAR2
 1242C ⚫ CUNEIFORM NUMERIC SIGN ONE SHARU
 → 12582 ◉ cuneiform numeric sign one n50
- 1242D ⚫ CUNEIFORM NUMERIC SIGN TWO SHARU
 1242E ⚫ CUNEIFORM NUMERIC SIGN THREE SHARU
 1242F ⚫ CUNEIFORM NUMERIC SIGN THREE SHARU VARIANT FORM
- 12430 ⚫ CUNEIFORM NUMERIC SIGN FOUR SHARU
 12431 ⚫ CUNEIFORM NUMERIC SIGN FIVE SHARU
 12432 ⚫ CUNEIFORM NUMERIC SIGN SHAR2 TIMES GAL PLUS DISH
 12433 ⚫ CUNEIFORM NUMERIC SIGN SHAR2 TIMES GAL PLUS MIN

Area measures

- 12434 ⚫ CUNEIFORM NUMERIC SIGN ONE BURU
 → 1258E ★ cuneiform numeric sign one buru curved
 → 12582 ◉ cuneiform numeric sign one n50
- 12435 ⚫ CUNEIFORM NUMERIC SIGN TWO BURU
 12436 ⚫ CUNEIFORM NUMERIC SIGN THREE BURU
 12437 ⚫ CUNEIFORM NUMERIC SIGN THREE BURU VARIANT FORM
- 12438 ⚫ CUNEIFORM NUMERIC SIGN FOUR BURU
 12439 ⚫ CUNEIFORM NUMERIC SIGN FIVE BURU

Variant stacking patterns

- 1243A ⚫ CUNEIFORM NUMERIC SIGN THREE VARIANT FORM ESH16
 1243B ➡ CUNEIFORM NUMERIC SIGN THREE VARIANT FORM ESH21
 1243C ⚫ CUNEIFORM NUMERIC SIGN FOUR VARIANT FORM LIMMU
 1243D ⚫ CUNEIFORM NUMERIC SIGN FOUR VARIANT FORM LIMMU4
 1243E ⚫ CUNEIFORM NUMERIC SIGN FOUR VARIANT FORM LIMMU A
 1243F ⚫ CUNEIFORM NUMERIC SIGN FOUR VARIANT FORM LIMMU B
 12440 ⚫ CUNEIFORM NUMERIC SIGN SIX VARIANT FORM ASH9
 12441 ⚫ CUNEIFORM NUMERIC SIGN SEVEN VARIANT FORM IMIN3
 12442 ⚫ CUNEIFORM NUMERIC SIGN SEVEN VARIANT FORM IMIN A
 12443 ⚫ CUNEIFORM NUMERIC SIGN SEVEN VARIANT FORM IMIN B
 12444 ⚫ CUNEIFORM NUMERIC SIGN EIGHT VARIANT FORM USSU
 12445 ⚫ CUNEIFORM NUMERIC SIGN EIGHT VARIANT FORM USSU3
 12446 ⚫ CUNEIFORM NUMERIC SIGN NINE VARIANT FORM ILIMMU
 12447 ⚫ CUNEIFORM NUMERIC SIGN NINE VARIANT FORM ILIMMU3
 12448 ⚫ CUNEIFORM NUMERIC SIGN NINE VARIANT FORM ILIMMU4
 12449 ⚫ CUNEIFORM NUMERIC SIGN NINE VARIANT FORM ILIMMU A

Slanted numerals

These are used in multiple Early Dynastic metrological systems, as well as Ur III dates and subtractive notations.

- 1244A ⚫ CUNEIFORM NUMERIC SIGN TWO ASH TENU
 = 2 diš tenū
 → 12039 ḫ cuneiform sign ash zida tenu

- 1244B ☰ CUNEIFORM NUMERIC SIGN THREE ASH TENU
 1244C ☱ CUNEIFORM NUMERIC SIGN FOUR ASH TENU
 1244D ☲ CUNEIFORM NUMERIC SIGN FIVE ASH TENU
 1244E ☳ CUNEIFORM NUMERIC SIGN SIX ASH TENU

Capacity measures

- 1244F ✕ CUNEIFORM NUMERIC SIGN ONE BAN2
 • 12226 ✕ should be used for 1/2 diš
 → 12226 ✕ cuneiform sign mash
 → 12593 ✕ cuneiform numeric sign one ban2 curved
- 12450 ✖ CUNEIFORM NUMERIC SIGN TWO BAN2
 12451 ✷ CUNEIFORM NUMERIC SIGN THREE BAN2
 12452 ✸ CUNEIFORM NUMERIC SIGN FOUR BAN2
 12453 ✹ CUNEIFORM NUMERIC SIGN FOUR BAN2 VARIANT FORM
 12454 ✺ CUNEIFORM NUMERIC SIGN FIVE BAN2
 12455 ✻ CUNEIFORM NUMERIC SIGN FIVE BAN2 VARIANT FORM
 12456 ✼ CUNEIFORM NUMERIC SIGN NIGIDAMIN
 = 2 bariga
 → 12079 ✼ cuneiform sign dish
 → 1255A ✽ cuneiform numeric sign two n08
- 12457 ✽ CUNEIFORM NUMERIC SIGN NIGIDAESH
 = 3 bariga

Area measures

- 12458 ✾ CUNEIFORM NUMERIC SIGN ONE ESHE3
 → 1258C ✾ cuneiform numeric sign one n22
- 12459 ✿ CUNEIFORM NUMERIC SIGN TWO ESHE3

Fractions

- 1245A ✿ CUNEIFORM NUMERIC SIGN ONE THIRD DISH
 1245B ✿ CUNEIFORM NUMERIC SIGN TWO THIRDS DISH
 1245C ✿ CUNEIFORM NUMERIC SIGN FIVE SIXTHS DISH
 1245D ✿ CUNEIFORM NUMERIC SIGN ONE THIRD VARIANT FORM A
 = 1/3 aš curved
 = 1/3 diš curved
 → 12598 ✿ cuneiform numeric sign ninda2 times
 she plus one ash curved
- 1245E ✿ CUNEIFORM NUMERIC SIGN TWO THIRDS VARIANT FORM A
 = 2/3 aš curved
 = 2/3 diš curved
 → 12599 ✿ cuneiform numeric sign ninda2 times
 she plus two ash curved
- 1245F ✿ CUNEIFORM NUMERIC SIGN ONE EIGHTH ASH
 = 1/8 iku
 → 12587 • cuneiform numeric sign one eighth iku
 curved
 → 12588 ☽ cuneiform numeric sign one eighth iku
 curved variant form
- 12460 ✿ CUNEIFORM NUMERIC SIGN ONE QUARTER ASH
 = 1/4 iku
 → 12589 ☿ cuneiform numeric sign one n01 reversed
 → 1258A ☿ cuneiform numeric sign one quarter iku
 curved variant form
- 12461 ☽ CUNEIFORM NUMERIC SIGN OLD ASSYRIAN ONE SIXTH

- 12462 ☽ CUNEIFORM NUMERIC SIGN OLD ASSYRIAN ONE QUARTER

Capacity measures

- These are used in Umma in the Ur III period with a gur of 4 bariga.*
- 12463 ✿ CUNEIFORM NUMERIC SIGN ONE QUARTER GUR
 = 1 bariga variant form
- 12464 ✿ CUNEIFORM NUMERIC SIGN ONE HALF GUR
 = 2 bariga variant form
 • The sequence 12464 ✿ 12463 ✿ is used for 3/4 gur

Elamite fractions

- 12465 ☿ CUNEIFORM NUMERIC SIGN ELAMITE ONE THIRD
 12466 ☿ CUNEIFORM NUMERIC SIGN ELAMITE TWO THIRDS

Elamite numeric signs

- 12467 ☿ CUNEIFORM NUMERIC SIGN ELAMITE FORTY
 12468 ☿ CUNEIFORM NUMERIC SIGN ELAMITE FIFTY

Variant stacking patterns

- 12469 ☰ CUNEIFORM NUMERIC SIGN FOUR U VARIANT FORM
 1246A ☱ CUNEIFORM NUMERIC SIGN FIVE U VARIANT FORM
 1246B ☲ CUNEIFORM NUMERIC SIGN SIX U VARIANT FORM
 1246C ☳ CUNEIFORM NUMERIC SIGN SEVEN U VARIANT FORM
 1246D ☴ CUNEIFORM NUMERIC SIGN EIGHT U VARIANT FORM
 1246E ☵ CUNEIFORM NUMERIC SIGN NINE U VARIANT FORM

Slanted numeral

- 1246F ☽ CUNEIFORM NUMERIC SIGN SEVEN ASH TENU

Punctuation

- 12470 ✿ CUNEIFORM PUNCTUATION SIGN OLD ASSYRIAN WORD DIVIDER
 → 1039F ✿ ugaritic word divider
 → 103D0 ✿ old persian word divider
- 12471 ✿ CUNEIFORM PUNCTUATION SIGN VERTICAL COLON
 12472 ✿ CUNEIFORM PUNCTUATION SIGN DIAGONAL COLON
 12473 ✿ CUNEIFORM PUNCTUATION SIGN DIAGONAL TRICOLON
 12474 ✿ CUNEIFORM PUNCTUATION SIGN DIAGONAL QUADCOLON

Slanted numerals

- 12475 ☽ CUNEIFORM NUMERIC SIGN EIGHT ASH TENU
 12476 ☽ CUNEIFORM NUMERIC SIGN NINE ASH TENU

Numerals for Early Dynastic regnal years

These are used in regnal years of the rulers of the first dynasty of Lagash.

- 12477 ✿ CUNEIFORM NUMERIC SIGN ASH TIMES ONE DISH TENU
 12478 ✿ CUNEIFORM NUMERIC SIGN ASH TIMES TWO DISH TENU
 12479 ✿ CUNEIFORM NUMERIC SIGN ASH TIMES THREE DISH TENU
 1247A ✿ CUNEIFORM NUMERIC SIGN ASH TIMES FOUR DISH TENU
 1247B ✿ CUNEIFORM NUMERIC SIGN ASH TIMES FIVE DISH TENU
 1247C ✿ CUNEIFORM NUMERIC SIGN ASH TIMES SIX DISH TENU
 1247D ✿ CUNEIFORM NUMERIC SIGN ASH TIMES SEVEN DISH TENU
 1247E ✿ CUNEIFORM NUMERIC SIGN ASH TIMES EIGHT DISH TENU
 1247F ✿ CUNEIFORM NUMERIC SIGN ASH TIMES NINE DISH TENU

2.3 Properties

Add to the respective UCD files the lines given in this section. These are available as plain text files attached to this document. Changes to derived files are not listed.

2.3.1 Name, General_Category, Numeric_Value, etc.

Attached: [UnicodeData.txt](#).

```
1246F;CUNEIFORM NUMERIC SIGN SEVEN ASH TENU;N1;0;L;;;;7;N;;;;;
12475;CUNEIFORM NUMERIC SIGN EIGHT ASH TENU;N1;0;L;;;;8;N;;;;;
12476;CUNEIFORM NUMERIC SIGN NINE ASH TENU;N1;0;L;;;;9;N;;;;;
12477;CUNEIFORM NUMERIC SIGN ASH TIMES ONE DISH TENU;N1;0;L;;;;1;N;;;;;
12478;CUNEIFORM NUMERIC SIGN ASH TIMES TWO DISH TENU;N1;0;L;;;;2;N;;;;;
12479;CUNEIFORM NUMERIC SIGN ASH TIMES THREE DISH TENU;N1;0;L;;;;3;N;;;;;
1247A;CUNEIFORM NUMERIC SIGN ASH TIMES FOUR DISH TENU;N1;0;L;;;;4;N;;;;;
1247B;CUNEIFORM NUMERIC SIGN ASH TIMES FIVE DISH TENU;N1;0;L;;;;5;N;;;;;
1247C;CUNEIFORM NUMERIC SIGN ASH TIMES SIX DISH TENU;N1;0;L;;;;6;N;;;;;
1247D;CUNEIFORM NUMERIC SIGN ASH TIMES SEVEN DISH TENU;N1;0;L;;;;7;N;;;;;
1247E;CUNEIFORM NUMERIC SIGN ASH TIMES EIGHT DISH TENU;N1;0;L;;;;8;N;;;;;
1247F;CUNEIFORM NUMERIC SIGN ASH TIMES NINE DISH TENU;N1;0;L;;;;9;N;;;;;
```

2.3.2 Line_Break

Attached: [LineBreak.txt](#).

```
1246F ; AL # N1 CUNEIFORM NUMERIC SIGN SEVEN ASH TENU
12475..1247F ; AL # N1 [11] CUNEIFORM NUMERIC SIGN EIGHT ASH TENU..CUNEIFORM NUMERIC SIGN
 ↳ ASH TIMES NINE DISH TENU
```

2.3.3 Script

Attached: [Scripts.txt](#).

```
1246F ; Cuneiform # N1 CUNEIFORM NUMERIC SIGN SEVEN ASH TENU
12475..1247F ; Cuneiform # N1 [11] CUNEIFORM NUMERIC SIGN EIGHT ASH TENU..CUNEIFORM NUMERIC
 ↳ SIGN ASH TIMES NINE DISH TENU
```

3 DIŠ *tenû* numerals

This section discusses the following proposed characters:

- U+1246F  CUNEIFORM NUMERIC SIGN SEVEN ASH TENU
- U+12475  CUNEIFORM NUMERIC SIGN EIGHT ASH TENU
- U+12476  CUNEIFORM NUMERIC SIGN NINE ASH TENU

3.1 Name

The existing numerals in the  series are named U+12039  CUNEIFORM SIGN ASH ZIDA TENU for the first one and U+1244A–U+1244E  CUNEIFORM NUMERIC SIGN *n* ASH TENU for the others.

Some³ technical terms used in cuneiform character names are derived originate from the structural descriptions of cuneiform signs by Akkadian-speaking scribes in late second and first millennium lexical texts. [TODO(egg): Cite Yushu Gong on *tenu* itself] In particular, the word *tenû* is used to describe slanted signs or parts

³TODO also note *gunû* but contrast CROSSING rather than *gi-li-mu-u*, SQUARED rather than *li-mu-bu* *i-gi-gu-ub-bu-u*

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b) DIE SCHIEFEN KEILE UND DIE WINKELHAKEN (für die Einheiten von 1-9, neben den senkrechten keilförmigen Zahlenzeichen).

a) bei : RTC. 276:
Bart. III 116, 249: 3 gín igi--gál ūe.
Legr. TRU. 310: uá- kam.
Gen. TD. 5487: áb.

b) vor kam und àm:
Bart. III 152, 398: áub--ám
Legr. TRU. 42: a-du--kam
a-du -kam
a-du -kam
a-du -kam
Legr. TRU. 346: i máš-gal-še -kam-uš
i udu-še -kam-uš
Siehe: itu-šu--ša; itu šu--ša; itu šu--ša.

c) nach gud, áb, anše, zur Bezeichnung des Alters.
ITT III, II 4956: 20 áb--še 3 qa-ta
ITT III, II 6090: 3 anše-sal-; 1 anše-nita
Pinch. AT. I. 53: 3 gud ; 1 áb
Bart. III 106, 191: 3 anše-nita
ITT II, I. 6965: 20 zu-gud- 15 zu-gud

Figure 1: [Sch35, p. 135]

of signs: thus is described as *tenû* in [P365233, rev.i 46']⁴, as *tenû* in [P391514, rev.ii 47; P467315, obv.ii 80], as *tenû* in [P391514, p. ii 33], as (containing) — *tenû* in [P365267, obv.16']⁵. In most cases, the direction of the slant not explicitly specified. The terms *kaba tenû* and *zida tenû*, from Sumerian gab₂ “left” and zid “right” respectively, are used in [P345960], which contrasts described as *kaba tenû* and described as *zida tenû*.

In modern transliteration, numerals are described as — *tenû* (ATF: *asz@t*) or *tenû* (ATF: *disz@t*), the latter being more common⁶. Informative aliases using *diš tenû* have been recommended for the existing characters in [L2/24-239]. The proposed names use ASH TENU for consistency with the already-encoded characters, and the proposed annotations include informative aliases with *diš tenû*.

3.2 Ur III usage

As described in [Sch35, p. 135] (see Figure 1), slanted signs are used in Ur III economic texts primarily in subtractive notation with *lal*⁷, as well as for ordinals⁸ and for

⁴Note that while the third millennium and are related by a 45° rotation, in the Neo-Assyrian style used by this list, these signs look like and , so that only one wedge is slanted, as noted in [Gonoo, TODO].

⁵TODO something on spelling out names ga-na te-nu-u₂ and še te-nu-u; *ku te-nu-u*, etc.

⁶For an example of a transliteration using *aš tenû*, see [Greco2021]; note that only the HTML version uses *aš tenû*, the PDF uses *diš*.

⁷As noted in [L2/24-210R, p. 25 n. 40], the sign (*lal*, “minus”) is often ligated with the following numerals, with the subtrahend placed under a sometimes considerably enlarged , similar to the layout of the radical in modern mathematical notation, see, e.g., [P020092, rev. 3 1, 2]. The font used in this document ligates or kerns subtrahends, but does not enlarge the .

⁸Also transliterated *la₂*, as in [CDLI]. In the transliterated Ur III corpus on [CDLI], out of 3304 occurrences of (*disz@t*), 1971 are in *n* *la₂ n(disz@t)*.

⁹1583 out of 3304 occurrences are *n* *n(disz@t)-kam*, including 647 after .

b) GEBRAUCH VON ∇ .

$$\begin{array}{rcl} \text{177. IV. } 7164^{\text{a}}: & \cancel{\text{177}} & = 20 \text{ minus } 3 = 17. \\ \text{CT. 10, } 24964: & \cancel{\text{249}} & = 40 \text{ minus } 4 = 36. \\ \text{Gen. TEO. } 5670: & \cancel{\text{567}} & = 240 \text{ minus } 2 = 238 \end{array}$$

Nota: Pgl. im römischen Zahlen-
system: IX = X minus 1; XIX =
XX minus 1; ferner die la-
teinischen Ausdrücke:
undeviginti = 20 minus 1; duodektri-
ginta = 30 minus 2.

Figure 2: [Sch35, p. 132]

ages of animals in years¹⁰.

Accounts of animals giving their ages in years rarely go beyond three-year old animals. Subtractive notation, which appears in the ED IIIa period [Robo8, p. 77], is used to compactly express numbers close to a larger round number, e.g., $\text{𒌵 } 10 - 1$ instead of $\text{𒂏} 9$, $\text{𒂏 } 30 - 2$ instead of $\text{𒂏 } 28$, or $\text{𒂏 } 60 - 1$ instead of $\text{𒂏 } 59$; cf. IX instead of VIIII in Roman numerals. It is therefore usually limited to small subtrahends¹¹. Larger subtrahends do occur for quantities close to a much larger unit; however in Ur III, they are often written I numerals, as in [P109346, obv. 2 15] $\text{𒂔 } \text{𒂏 }$ “4 shekels minus 7 grains of gold”, a weight which would otherwise be written $\text{𒂔 } \text{𒂔 } \text{𒂏 } \text{𒂏 } \text{𒂏 } \text{𒂏 } \text{𒂏 } \text{𒂏 }$ “ $3 + \frac{2}{3}$ shekels and 53 grains”, as $180\text{𒂏} = 1\text{𒂔}$.

The rarity of the higher \wedge numerals in the Ur III corpus likely explains the absence of 7 \wedge –9 \wedge from the répertoire of Unicode Version 5.0, which was aiming to encode a répertoire appropriate for the Ur III period and later.

3.3 Early Dynastic usage

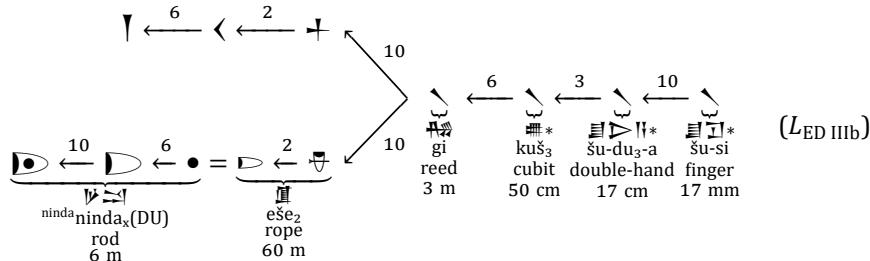
The situation is different in the Early Dynastic corpus. As described in [L2/24-210R], numerals are used in many Early Dynastic metrological systems, and in particular in the Early Dynastic IIIb length system [Pow87, p. 466; Lec16; Lec20, pp. 289 sq.;

¹⁰203 occurrences of gu4, ab2, ansze, or dur3 n(disz@t)

¹¹Of the 1971 Ur III occurrences of *lal n(disz@t)*, 1930 are with $n \leq 2$, of which 1823 with $n = 1$.

¹²430 occurrences of $n(\text{disz@t})$ -kam are on lines starting with mu, of which 308 are in KR.

Rob22; L2/24-210R, pp. 23 sq.]



where, as in [L2/24-210R], * indicates prefix units.

While this system has a unit 1 $\text{š} \text{š}$ = 2 $\text{š} \text{š}$, lengths above 1 $\text{š} \text{š}$ are only expressed in $\text{š} \text{š}$, or equivalently in tens of $\text{š} \text{š}$, and in half- $\text{š} \text{š}$ equal to 10 $\text{š} \text{š}$. We can therefore expect 7–9 $\text{š} \text{š}$ to occur, expressed using N numerals. Indeed, 37 texts in the transliterated ED IIIb corpus on [CDLI] contain undamaged attestations of either $\text{š} \text{š}$ or $\text{š} \text{š}$.¹³ Some of these attestations are shown in Figures 3–6. However, $\text{š} \text{š}$ is not attested, since instead subtractive notation is used, as in $\text{DDD} \text{š} \text{š}$ in [P020129, obv. 3 3], $\text{D} \text{š} \text{š} \text{š} \text{š} \text{š} \text{š}$ in [P221272, rev. 2 2], or $\text{š} \text{š} \text{š}$ in [P020304, obv. 3 8].

A similar situation occurs in some systems of capacity with N numerals counting $\text{š} \text{š}$ *sila*₃, so that $\text{š} \text{š}$ and $\text{š} \text{š}$ are attested, see Figures 7 and 8.

The use of N numerals for ordinals, especially for days, is more prevalent in the Early Dynastic period than in the Ur III period, and the use of subtractive notation is less frequent.¹⁴ in these numbers. We therefore find attestations of $\text{š} \text{š} - \text{š} \text{š}$ in “nth day”, some of which are shown in Figures 9–13.

In Ebla, the N numerals are primarily used in subtractive notation, see [Gor24, p. 88 n. 298, p. 120 n. 465, p. 167 n. 739, p. 180 n. 801]. However, contrary to Ur III, N numerals remain used for large subtrahends, thus [Gor24, p. 101 n. 355] cites occurrences of $\text{š} \text{š} \text{š} \text{š}$ for 36 and $\text{š} \text{š} \text{š} \text{š} \text{š} \text{š}$ for 94. In particular, [Gor24, pp. 129 sq.] cites occurrences of $\text{š} \text{š} \text{N}$ in Ebla, shown in Figure 14.



Figure 3: $\text{I} \text{š} \text{š} \text{š} \text{š}$ “501 m (first width) (of a field) in [P221254, obv. 3 7] from Nirsu, dated to the reign of $\text{š} \text{š} \text{š}$. Left: Copy from [AllottededelaFuye1920]. Right: [CDLI] photograph.

¹³ Of those, 34 have $\text{š} \text{š}$ and 9 have $\text{š} \text{š}$.

¹⁴ Although also attested, see, e.g., [P221346, rev. 3 6] $\text{š} \text{š} \text{š} \text{š}$, [P221006, rev. 2 1] $\text{š} \text{š} \text{š} \text{š}$.

¹⁵ Recall that $\text{š} \text{š} \text{š}$ *mi-at* is Eblaite for “hundred”, see [Arc15, p. 33; L2/24-210R, p. 27].



Figure 4: ፳፻፻፻ “21 m of reed-bed dyke” (attributed to ሰ፻፻፻ the farmer) in [P221266, obv. 11] from Nirsu, dated to the reign of ዘ፻፻፻፻. Left: Copy from [AllottededelaFuye1920]. Right: [LouvreCollections] photograph.



Figure 5: Dimensions of a dyke on the river [Po20303, obv. 2 2] from Nirsu, dated to the reign of [Marzahn1991]. Left: Copy from [CDLI] photograph.



Figure 6: 𠂔 𠂔 𠂔 𠂔 “444 m equal widths” (of a field) in [P221254, obv. 1 2]. Left: Copy from [AllottededelaFuye1920]. Right: [CDLI] photograph.

¹⁶TODO something about rhomboidal numerals, cite [Gor24].

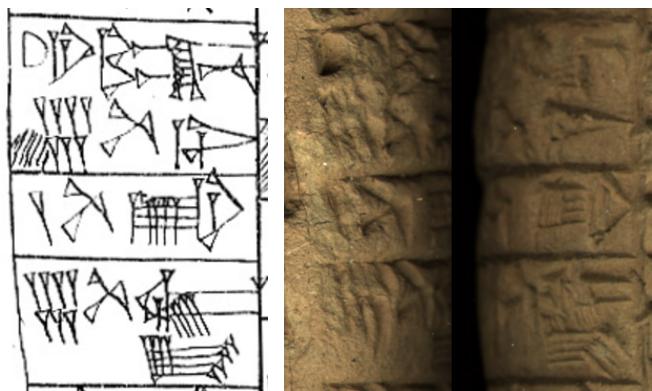


Figure 7: “1 ninjbanda 7 sila of butter, 1 sila of cream, 7 sila of dates” in [P020182, rev. 3 5–7] from Nirsu, dated to the reign of . Left: Copy from [För16]. Right: [CDLI] photograph.

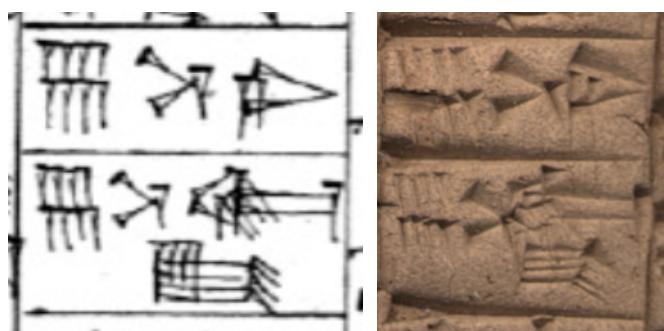


Figure 8: “8 sila of butter, 8 sila of dates” in [P221730, rev. 2 5–6] from Nirsu, dated to the reign of . Left: Copy from [Никольский1908]. Right: [CDLI] photograph.



Figure 9: “seventh day” in [P220703, rev. 2 7] from Nirsu, dated to the 3rd year of the reign of . Left: Copy from [AllottededelaFuye1918]. Right: [LouvreCollections] photograph.



Figure 10: “seventh day passed” in [P221590, obv. 2 3] from Nippur. Left: Copy from [Westenholz1975]. Right: [CDLI] photograph.



Figure 11: “eighth day” in [P220703, rev. 3 1]. Left: Copy from [AllottededelaFuye1918]. Right: [LouvreCollections] photograph.



Figure 12: “ninth day passed” in [P452986, obv. 1 1], dated to the ED IIIa period. [CDLI] photograph.

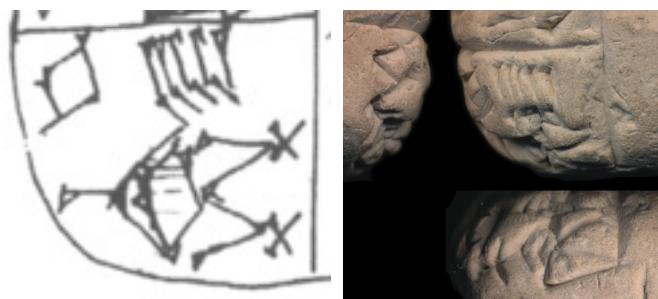


Figure 13: “ninth day” in [P222129, obv. 1 2] from Šuruppag, dated to the ED IIIa period. Left: Copy from [Martin2001]. Right: [CDLI] photograph.

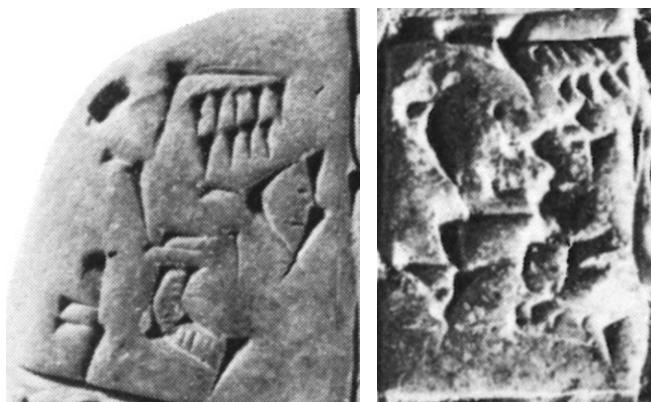


Figure 14: Left: “9 minas and 51 shekels of silver” in [P241283, *recto 1 1*]; right: “1 mina and 51 shekels of silver” in [P241325, *verso 3 2*], both from Ebla. Photographs from [EbDA].

3.4 Glyphs

As illustrated in the above figures, the angle of the varies, and is not always faithfully reproduced in copies. The representative glyphs retain the same angle used for the already-encoded numerals.

The stacking patterns for the proposed characters do not vary among the attestations cited above. Note that stacking patterns are known to vary for other numerals in this series; for instance, and sometimes appear with all wedges in a row in ED IIIa tablets, as in [P010787; P010896; P010928]. As discussed in [L2/24-210R, pp. 45 sqq.], the disunification of variant stacking patterns poses problems when producing cuneiform text from transliterated corpora, as the stacking patterns are not normally indicated in transliteration, and the default stacking pattern varies over time: in Ur III, in Neo-Assyrian. While and numerals needed to have their stacking patterns disunified for compatibility with [Bor10], this practice should not be extended to numerals.

4 AŠ×(DIŠ *tenû*) numerals

This section discusses the following proposed characters:

- U+12477 ✕ CUNEIFORM NUMERIC SIGN ASH TIMES ONE DISH TENU
- U+12478 ✖ CUNEIFORM NUMERIC SIGN ASH TIMES TWO DISH TENU
- U+12479 ✗ CUNEIFORM NUMERIC SIGN ASH TIMES THREE DISH TENU
- U+1247A ✘ CUNEIFORM NUMERIC SIGN ASH TIMES FOUR DISH TENU
- U+1247B ✙ CUNEIFORM NUMERIC SIGN ASH TIMES FIVE DISH TENU
- U+1247C ✚ CUNEIFORM NUMERIC SIGN ASH TIMES SIX DISH TENU
- U+1247D ✛ CUNEIFORM NUMERIC SIGN ASH TIMES SEVEN DISH TENU
- U+1247E ✜ CUNEIFORM NUMERIC SIGN ASH TIMES EIGHT DISH TENU
- U+1247F ✝ CUNEIFORM NUMERIC SIGN ASH TIMES NINE DISH TENU

4.1 Name

As indicated by their name, these signs consist of a horizontal wedge (AŠ) with an overlaid ✕ numeral. Their ATF name is *n(|ASZxDISZ@t|)*, as ATF numerals are of the form *n(<name>)*. Since we have no such restriction in Unicode character names, we move the number before the DISH TENU to better describe their structure. These numerals are not described in terms of AŠ *tenû*, so we follow [CDLI] and [OSL] terminology instead of attempting consistency with the names of the ✕ series. Two characters already have DISH TENU in their names: U+12483 ✕ CUNEIFORM SIGN BAD TIMES DISH TENU and U+12543 ✖ CUNEIFORM SIGN ZU5 TIMES THREE DISH TENU.

4.2 Usage

These numerals are used in the Early Dynastic IIIb period to indicate regnal years. They are extremely well attested, with 1482 artefacts containing (*|ASZxDISZ@t|*) in the current transliterated [CDLI] corpus. Almost all attestations are from Nirsu, and most of them are in regnal years of 𒃩𒀭𒊏𒄑 and his predecessor 𒃩𒀭＊𒂢, but their use is also attested in regnal years of earlier rulers in the first dynasty of Lagaš: 72 tablets dated to the reign of 𒃩𒀭＊𒂢, [P247594] possibly¹⁷ dated to the reign of 𒃩＊𒂢 the second, [P222224] to the reign of 𒃩𒀭＊𒂢, and [P221783] from Lagaš to the reign of 𒃩＊𒂢 the first.

Where attested¹⁸, regnal years beyond the ninth are written differently: ✕ for the 10th year of 𒃩𒀭𒊏𒄑 in [P222640], and with subtractive subtraction for the 17th¹⁹ written ॥ᬁ in [P221483, rev. 4 12] and the 19th year of 𒃩𒀭＊𒂢 written ॥ᬁ in [P221413, rev. 3 3; P222223, rev. 3 3]. The numeral series therefore stops at ✕×9. Figures 15–21 show these numerals used in ancient and modern text.

¹⁷Dated instead to the reign of 𒃩𒀭＊𒂢 by [SallabergerSchrakamp2015].

¹⁸The length of the reign of 𒃩＊𒂢 (6 years and 1 month) and the dearth of documents dated to the reign of 𒃩𒀭＊𒂢 after his defeat by 𒃩＊𒂢 mean that these are quite rare; see [SallabergerSchrakamp2015].

¹⁹This text mentions 𒃩＊𒂢 as temple administrator. See [SallabergerSchrakamp2015] for its attribution to the reign of 𒃩𒀭＊𒂢.

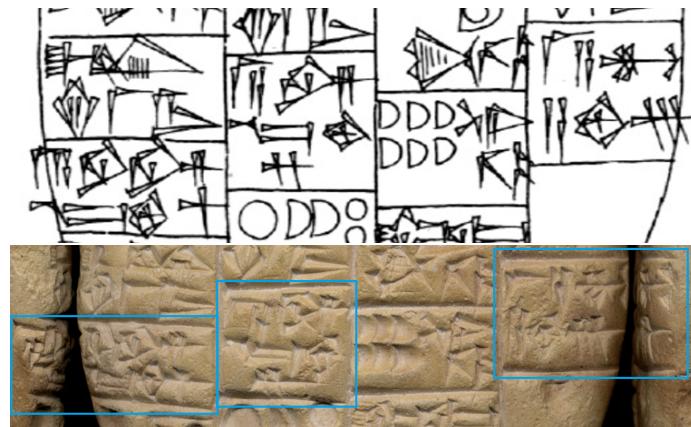


Figure 15: Obverse of [P220930], showing 𒂗 ॥ 𒈚 ॥ 𒈚 ॥ 𒈚 ॥ “arrears of the year before last 1 (of the reign of 𒀭 𒉢 𒀭 𒉢 𒀭 𒉢)”, 𒂗 ॥ 𒈚 ॥ 𒈚 ॥ 𒈚 ॥ “arrears of last year 2”, 𒂗 ॥ 𒈚 ॥ 𒈚 ॥ 𒈚 ॥ “arrears of this year 3”. The arrears in question consist of fish and turtles. Top: Copy from [AllottededaFuye1918]. Bottom: [CDLI] photograph.

A connection of im with the later usage of im(.ma) (presargonic Lagash and later; Akkadian šaddaqdi/a(m) with lexical equivalent MU.IM.MA [MSL 5, 65:195]), meaning “previous (year)” is not apparent. For the latter usage cf. particularly DP 280 (= 281), a presargonic temple document which “loads onto the backs” (gu₂.ne.ne.a e.ne.gar) of the fisheries foremen Ne.sag and Lugal.ša₃.la₂.tuku the quota arrears of im..im.ma.kam 𒈚, im.ma.kam 𒈚 and mu.a.kam 𒈚, that is of the year before last = year one (of the king Urugagina [second regnal year]), of last year = year 2 and of this year = year 3. Also DP 243 goats of various colors / maš im.ma.kam / ditto / maš mu.a.kam and DP 94. maš im.ma as delivery arrears noted after grown nannies (ud₅) and before maš ša₃.hi (//mu.a.kam, “of the current year”), further maš im.ma = maš.gal.gal in the summation rev i2 (see footnote 17 to the notations of the type 𒈚). A parallel usage is found in the Old Akkadian text ITT 2/1, 3078 obv 1-4. 3 1/2 ma.na.siki / [i]m.ma.kam / 1 gu₂ la₂.4 ma.na.siki / mu.a.kam. It would seem difficult to reconcile this clear usage im = “previous year” with the often translated im = “account tablet” (im = clay)

Figure 16: Discussion of 𒈚 notation for year names in [Eng88, p. 166 n. 37], referring to [P220930]. See Figure 15.

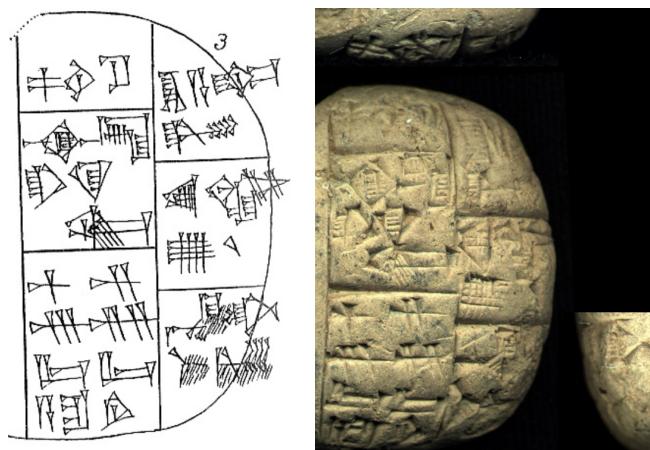


Figure 17: / / / “Enentarzi was ensik of Lagaš. 1st 2nd 3rd 4th (years) consolidated” in [P020133, rev. 13 sqq.]. Left: Copy from [AllottededelaFuye1918]. Right: [CDLI] photograph.

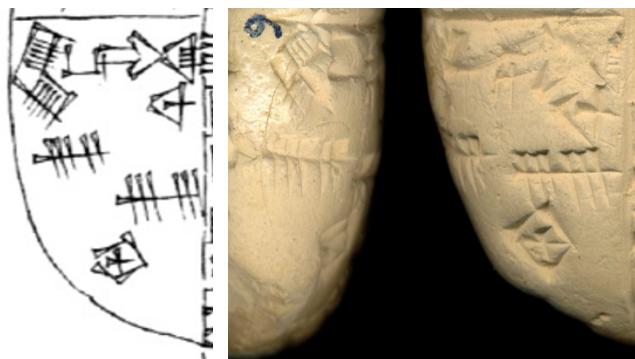


Figure 18: “Silver payment 5th and 6th (years of Lugaland)” in [P221169, rev. 3 2], dated to the 1st year of . Left: Copy from [AllottededelaFuye1918]. Right: [CDLI] photograph.

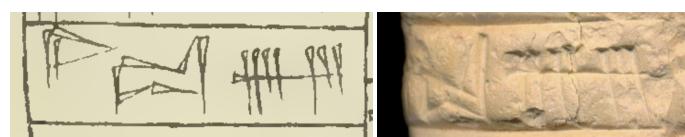


Figure 19: “delivered, 7th (year of Lugaland)” in [P221034, rev. 2 5], dated to the 1st year of . Left: Copy from [AllottededelaFuye1918]. Right: [CDLI] photograph.

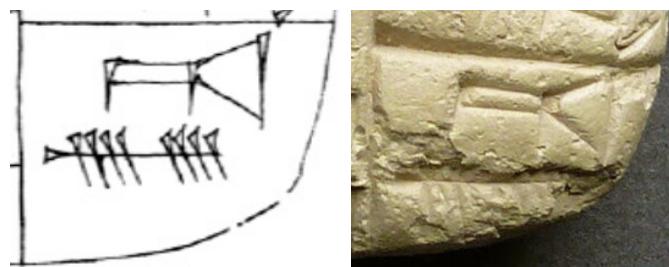


Figure 20: (referencing the 8th year of in [P222224, rev. 24]). Left: Copy from [CrosThureau-Dangin1910]. Right: [LouvreCollections] photograph.



Figure 21: (of in [P221906, rev. 2]). Left: Copy from [Никольский1908]. Right: [CDLI] photograph.

4.3 Glyphs

The \nwarrow wedges in these numerals are consistently grouped for numbers above : 2-2, 3-2, 3-3, 4-3, 4-4, and 3-3-3. The representative glyphs follow this grouping. is sometimes grouped more finely 2-2-3, as in [P221075, obv. 3 6; P221034, rev. 2 5]. Grouping distinctions are not marked in transliteration (and often even lost in copy), are not contrastive, and should not be represented in encoding. The \nwarrow wedges are not stacked until the reign of 1, the notation for whose regnal years is discussed in §4.4.

4.4 Later usage



Having raided Lagaš, the leader of Umma surely committed a sin against Ninnirsu! [...] May Nisaba, the personal god of Lugalzagesi, the ruler of Umma, take the responsibility for the punishment!

[P222618, rev. 2 10 sqq.], translation [ETCSRI]

A different notation of regnal years is used during the reign of 𒉢𒃲 𒉣 𒉦 𒉮, sometimes involving numerals of the form 𒉤×𒉤. These numerals are less comprehensively attested, and their interpretation is sometimes still unclear, see Figure 22. The co-occurrence and likely contrast of 𒉤×𒉤 and 𒉤×𒉤 in [P221534] may preclude treating the former as a stylistic variant of the latter. Note that U+12483 𒀭 CUNEIFORM SIGN BAD TIMES DISH TENU is already encoded as a non-numeric character, and should be used for 1(𒉤×𒉤) if needed. These numerals are not being proposed at this time.

The subsequent mu-itî system, which saw limited use at the end of the presargonic and the beginning of the Old Akkadian periods, seems, on its surface, to be a rational development from the system it replaced; the basis of a 30-day month carries on (cf. for instance the texts B. Foster, Umma in the Sargonic Period [Hamden 1982] pl. 18, Nr. 37, discussed by J. Friberg, Scientific American 250/2 [Feb. 1984] 114 and Foster, ASJ 4 [1982] 43 obv. iii9-11) and, for a period at least, a graphically comparable method of representing year dates, with now vertical strokes impressed on either side of the long horizontal, was used (the date of the text BIN 8, 117, 𒉤 7 + 𒉤, which both Powell, HUCA 49, 9 and B. Foster, Or. NS 48 (1979) 156 and USP p. 7 read 7 (mu) 1 (iti) 7 (ud), should be registered with some scepticism). Only here is the refinement of day added, so that documents

Figure 22: Discussion of late presargonic dates in [Eng88, p. 144 n. 11]. Note that the reference to [P221534] should read BIN 8, 116, rather than 117.

Acknowledgements

TODO(egg): Acknowledgements

The Neo-Assyrian font is *Assurbanipal*, a font created by Sylvie Vanséveren, available on the Hethitologie Portal Mainz [Van21]. The *CuneiformComposite* font by Steve Tinney is used for the reference glyphs of already-encoded cuneiform; the proposed reference glyphs were produced by Robin Leroy based on *Cuneiform-Composite*. A modified version of *Noto Sans Cuneiform*, by Monotype Imaging, is used to for most of the cuneiform text in this document; it incorporates glyphs by Steve Tinney for the characters proposed in this document. The font used for the characters proposed in [L2/24-210R] is the one used in that proposal, by Robin Leroy, Anshuman Pandey, and Steve Tinney. Arabic text is set in *Scheherazade New* by SIL International; monospace text is set in *Consolas* by Luc(as) de Groot; the remainder of the text is set in *Cambria* and *Cambria Math* by Monotype Imaging and Tiro Typeworks.





References

Artifacts

- [P010787] Ist Š 0251.
CDLI: [P010787](#).
ORACC: [dccmt/P010787](#).
- [P010896] Ist Š 0752.
CDLI: [P010896](#).
ORACC: [epsd2/P010896](#).
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ORACC: [epsd2/P020303](#).
- [P020304] VAT 04855.
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ORACC: [epsd2/P020304](#).
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CDLI: [P109346](#).
ORACC: [epsd2/P109346](#).
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CDLI: [P131747](#).
ORACC: [epsd2/P131747](#).
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CDLI: [P220703](#).
ORACC: [epsd2/P220703](#).
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CDLI: [P221034](#).
ORACC: [epsd2/P221034](#).
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CDLI: [P221075](#).
ORACC: [epsd2/P221075](#).
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ORACC: [epsd2/P221346](#).
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ORACC: [epsd2/P221413](#).
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CDLI: [P221483](#).
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ORACC: [epsd2/P221534](#).
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CDLI: [P221590](#).
ORACC: [epsd2/P221590](#).
- [P221730] Erm 14023.
CDLI: [P221730](#).
ORACC: [epsd2/P221730](#).
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- [P222640] AO 00402. Paris, France: Musée du Louvre.
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- [P241283] Excavation TM.75.G.01710.
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- [P241325] Excavation TM.75.G.01752.
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- [P247594] AO 04238. Paris, France: Musée du Louvre.
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- [P345960] VAT 09541.
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- [P365233] Accession DT 040.
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- [P365267] BM 093068.
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