

# Twelve cuneiform *tenû* numerals

Robin Leroy and Steve Tinney

2024-12-04

## Contents

<b>1</b>	<b>Summary</b>	<b>1</b>
<b>2</b>	<b>Proposed changes to the Standard</b>	<b>2</b>
2.1	Core specification text . . . . .	2
2.2	Code charts . . . . .	2
2.3	Properties . . . . .	2
2.3.1	Name, General_Category, Numeric_Value, etc. . . . .	2
2.3.2	Line_Break . . . . .	2
2.3.3	Script . . . . .	2
<b>3</b>	<b>DIŠ <i>tenû</i> numerals</b>	<b>2</b>
3.1	Name . . . . .	3
3.2	Ur III usage . . . . .	3
3.3	Early Dynastic usage . . . . .	5
3.4	Glyphs . . . . .	10
<b>4</b>	<b>AŠ×(DIŠ <i>tenû</i>) numerals</b>	<b>10</b>
4.1	Name . . . . .	11
4.2	Usage . . . . .	11
4.3	Glyphs . . . . .	14
4.4	Later usage . . . . .	14
	<b>Acknowledgements</b>	<b>15</b>
	<b>References</b>	<b>15</b>
	Artefacts . . . . .	15
	ISO and Unicode documents . . . . .	15
	Online corpora and related projects . . . . .	16
	Other documents . . . . .	16

## 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 $\nwarrow = \nwarrow$  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 online<sup>2</sup> 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.

### 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.

#### 2.3.2 Line\_Break

#### 2.3.3 Script

## 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

<sup>1</sup>We 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⟨ for both 3(bur<sub>3</sub>) and 3(u), rather than 30⟨ for the latter.

<sup>2</sup>See, 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.

### 3.1 Name

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

Some<sup>3</sup> 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 of signs: thus  $\nwarrow$  is described as  $\underline{\nwarrow}$  *tenû* in [P365233]<sup>4</sup>,  $\nwarrow$  as  $\overline{\nwarrow}$  *tenû* in [P391514; P467315],  $\nwarrow$  as  $\overleftarrow{\nwarrow}$  *tenû* in [P391514],  $\square$  as  $\square$  (containing)  $\rightharpoonup$  *tenû* in [P365267]<sup>5</sup>. In most cases, the direction of the slant not explicitly specified. The terms *kaba tenû* and *zida tenû*, from Sumerian  $\underline{\text{L}}$  *gab<sub>2</sub>* “left” and  $\text{H}$  *zid* “right” respectively, are used in [P345960], which contrasts  $\nwarrow$  described as *kaba tenû* and  $\nearrow$  described as *zida tenû*.

In modern transliteration,  $\nwarrow$  numerals are described as  $\rightharpoonup$  *tenû* (ATF: *asz@t*) or  $\nwarrow$  *tenû* (ATF: *disz@t*), the latter being more common<sup>6</sup>. 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  $\Gamma$ <sup>7</sup> *lal*<sup>8</sup>, as well as for ordinals<sup>9</sup> and for ages of animals in years<sup>10</sup>.

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.,  $\nwarrow$  10 – 1 instead of  $\text{|||||}$  for 9,  $\text{<<} \nwarrow$  30 – 2 instead of  $\text{<<} \text{|||||}$  for 28, or  $\nwarrow$  60 – 1 instead of  $\text{<<} \text{|||||}$  for 59; cf. IX instead of VIII in Roman numerals. It is therefore usually limited to small subtrahends<sup>11</sup>. Larger subtrahends do occur for quantities close to a much larger unit; however in Ur III, they are often written  $\nwarrow$  numerals, as in [P109346]  $\text{W} \nwarrow \Gamma \text{W} \text{<<} \text{H}$  “4 shekels minus 7 grains of gold”, a weight

<sup>3</sup>TODO also note *gunû* but contrast CROSSING rather than *gi-li-mu-u*, SQUARED rather than *li-mu-bu-i-gi-gu-ub-bu-u2*

<sup>4</sup>Note that while the third millennium  $\nwarrow$  and  $\underline{\nwarrow}$  are related by a 45° rotation, in the Neo-Assyrian style used by this list, these signs look like  $\nwarrow$  and  $\overleftarrow{\nwarrow}$ , so that only one wedge is slanted, as noted in [Gong2000].

<sup>5</sup>TODO something on spelling out names  $\text{ga-na te-nu-u}_2$  and  $\text{še te-nu-u}; ku te-nu-u$ , etc.

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

<sup>7</sup>As noted in [L2/24-210R, p. 25 n. 40], the sign  $\Gamma$  (*lal*, “minus”) is often ligated with the following numerals, with the subtrahend placed under a sometimes considerably enlarged  $\Gamma$ , similar to the layout of the radical in modern mathematical notation, see, e.g., [Po20092, rev. 3 1, 2]. The font used in this document ligates or kerns  $\nwarrow$  subtrahends, but does not enlarge the  $\Gamma$ .

<sup>8</sup>Also transliterated *la<sub>2</sub>*, as in [CDLI]. In the transliterated Ur III corpus on [CDLI], out of 3304 occurrences of (*disz@t*), 1971 are in  $\Gamma n \nwarrow 1a2 n(\text{disz@t})$ .

<sup>9</sup>1583 out of 3304 occurrences are  $n \nwarrow n(\text{disz@t})$ -*kam*, including 647 after  $\Gamma$

<sup>10</sup>203 occurrences of *gu4*, *ab2*, *ansze*, or *dur3*  $n(\text{disz@t})$

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

- 135 -

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

a) bei  $\text{I}^{\text{I}}$ : RTC. 276:

Bart. III 118, 249: 3 gín igi-4-gál še.

Legr. TRU. 310: ud- kam.

Gen. TD. 5487: áb.

b) vor kam und àm:

Bart. III 152, 398: dub--àm

Legr. TRU. 42: a-du--kam

a-du

a-du

a-du

Legr. TRU. 346: 1 māš-qal-še -kam-uš

1 udu-še -kam-uš

Siehe: itu-šu--sa; itu šu--sa; itu šu--sa.

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- $\text{I}$ ; 1 anše-nita  $\text{I}$ ;

Pinch. AT. I. 53: 3 gud  $\text{I}$ ; 1 áb  $\text{I}$ ;

Bart. III 106, 191: 3 anše-nita

ITT. II, I. 6965: 20 zu-gud- 15 zu-gud

Figure 1: [Sch35, p. 135]

**b) GEBRAUCH VON  $\text{I}^{\text{I}}$ .**

ITT. IV. 7164 \*:  $= 20 \text{ minus } 3 = 17$ .

CT. 10, 24964:  $= 40 \text{ minus } 4 = 36$ .

Gen. TD. 5670:  $= 240 \text{ minus } 2 = 238$ .

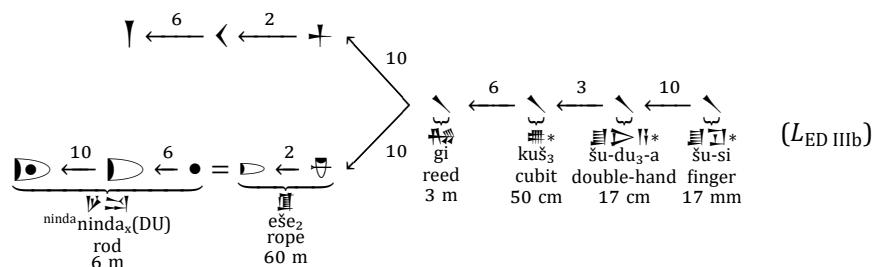
Nota: Pgl. im römischen Zahlen-  
system: IX = X minus I; XIX =  
XX minus I; ferner die la-  
teinischen Ausdrücke:  
undeviginti = 20 minus 1; duodeci-  
ginta = 30 minus 2.

Figure 2: [Sch35, p. 132]

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



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

A similar situation occurs in some systems of capacity with numerals counting **šila**, so that **፩** and **፪** are attested, see Figures 7 and 8.

The use of  $\setminus$  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

<sup>12</sup> 430 occurrences of *n(disz@t)-kam* are on lines starting with *mu*, of which 308 are in 〈K.

<sup>13</sup>Of those, 34 have  and 9 have .

is less frequent<sup>14</sup>, in these numbers. We therefore find attestations of  -  in "nth day", some of which are shown in Figures 9-13.

In Ebla, the  $\setminus$  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,  $\setminus$  numerals remain used for large subtrahends, thus [Gor24, p. 101 n. 355] cites occurrences of for 36 and for 94. In particular, [Gor24, pp. 129 sq.] cites occurrences of  $\setminus 9 \setminus$  in Ebla, shown in Figure 14.



Figure 4: 『**ナニ**』 “21 m of reed-bed dyke” (attributed to **山** the farmer) in [P221266, obv. 11] from Nirsu, dated to the reign of **ニムル・ナニ**. Left: Copy from [AllottededelaFuye1920]. Right: [LouvreCollections] photograph.

<sup>14</sup>Although also attested, see, e.g., [P221346] 𠁥  
[P221006] 𠁦𠁥  
—

<sup>15</sup>Recall that ☰ mi-at is Eblaite for "hundred", see [Arc15, p. 33; L2/24-210R, p. 27].

<sup>16</sup>TODO something about rhomboidal numerals, cite [Gor24].



Figure 5: “1344 m, its height 2 m” (dimensions of a dyke on the river) in [P020303] from Njirsu, dated to the reign of . Left: Copy from [Marzahn1991]. Right: [CDLI] photograph.



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



Figure 7: “1 ninbanda 7 sila of butter, 1 sila of cream, 7 sila of dates” in [Po20182, rev. 3 5-7] from Njirsu, dated to the reign of  Left: Copy from [För16]. Right: [CDLI] photograph.

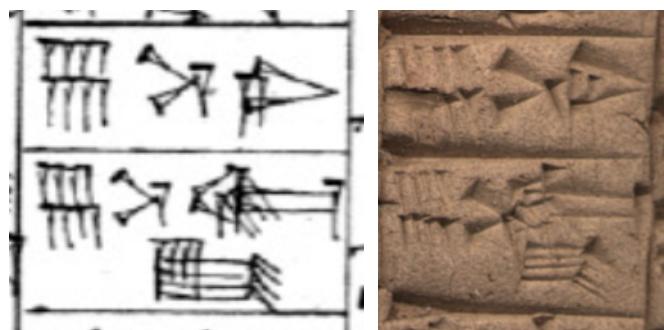


Figure 8: / “8 sila of butter, 8 sila of dates” in [P221730] from Nirsu, dated to the reign of \* . Left: Copy from [Никольский1908]. Right: [CDLI] photograph.



Figure 9: “seventh day” in [P220703] from Nirsu, dated to the 3rd year of the reign of \* . Left: Copy from [AllottedelaFuye1918]. Right: [LouvreCollections] photograph.



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



Figure 11: “eighth day” in [P220703]. Left: Copy from [AllottedelaFuye1918]. Right: [LouvreCollections] photograph.



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



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

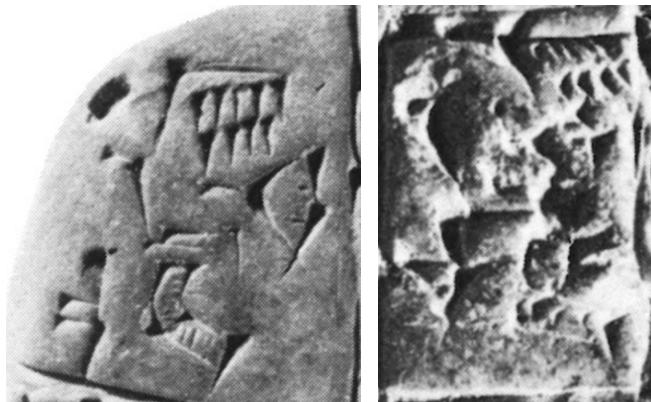


Figure 14: Left: • $\text{↑}\text{↓}$  “9 minas and 51 shekels of silver” in [P241283]; right:  $\text{↔}\text{↑}\text{↓}$  “1 mina and 51 shekels of silver” in [P241325], both from Ebla. Photographs from [EbDA].

### 3.4 Glyphs

As illustrated in the above figures, the angle of the  $\nwarrow$  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,  $\nwarrow$  and  $\swarrow$  sometimes appear with all wedges in a row in ED IIIa tablets, as in [Po10787; Po10896; Po10928]. 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:  $\text{VV}$  in Ur III,  $\text{VV}$  in Neo-Assyrian. While  $\text{I}$  and  $\text{—}$  numerals needed to have their stacking patterns disunified for compatibility with [Bor10], this practice should not be extended to  $\nwarrow$  numerals.

## 4 AŠ×(DIŠ *tenû*) numerals

This section discusses the following proposed characters:

- U+12477  $\nwarrow$  CUNEIFORM NUMERIC SIGN ASH TIMES ONE DISH TENU
- U+12478  $\nwarrow\text{—}$  CUNEIFORM NUMERIC SIGN ASH TIMES TWO DISH TENU
- U+12479  $\nwarrow\text{—}\text{—}$  CUNEIFORM NUMERIC SIGN ASH TIMES THREE DISH TENU
- U+1247A  $\nwarrow\text{—}\text{—}\text{—}$  CUNEIFORM NUMERIC SIGN ASH TIMES FOUR DISH TENU
- U+1247B  $\nwarrow\text{—}\text{—}\text{—}\text{—}$  CUNEIFORM NUMERIC SIGN ASH TIMES FIVE DISH TENU
- U+1247C  $\nwarrow\text{—}\text{—}\text{—}\text{—}\text{—}$  CUNEIFORM NUMERIC SIGN ASH TIMES SIX DISH TENU
- U+1247D  $\nwarrow\text{—}\text{—}\text{—}\text{—}\text{—}\text{—}$  CUNEIFORM NUMERIC SIGN ASH TIMES SEVEN DISH TENU
- U+1247E  $\nwarrow\text{—}\text{—}\text{—}\text{—}\text{—}\text{—}\text{—}$  CUNEIFORM NUMERIC SIGN ASH TIMES EIGHT DISH TENU
- U+1247F  $\nwarrow\text{—}\text{—}\text{—}\text{—}\text{—}\text{—}\text{—}\text{—}$  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  $\wedge$  numeral. Their ATF name is  $n(|ASZ\times DISZ@t|)$ , 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 *tenū*, so we follow [CDLI] and [OSL] terminology instead of attempting consistency with the names of the  $\wedge$  series.

## 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 𠁧 𠁪 𠁫 𠁩 𠁨 and his predecessor 𠁧 𠁪 𠁫 𠁩 𠁨 𠁮 𠁪, 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 𠁧 𠁪 𠁫 𠁩 𠁨, [P247594] possibly<sup>17</sup> dated to the reign of 𠁧 𠁮 𠁩 𠁨 the second, [P222224] to the reign of 𠁧 𠁪 𠁫 𠁩 𠁨, and [P221783] from Lagaš to the reign of 𠁧 𠁮 𠁩 𠁨 the first.

Where attested<sup>18</sup>, regnal years beyond the ninth are written differently: 𠂔 for the 10th year of 𠁷𠁵𠁶𠁸 in [P222640], and with subtractive subtraction for the 17th<sup>19</sup> written 𠂔𠁵 in [P221483] and the 19th year of 𠁷𠁵𠁹𠁸 written 𠂔𠁵 in [P221413; P222223]. The numeral series therefore stops at 𠁵×9𠁻. Figures 15–21 show these numerals used in ancient and modern text.

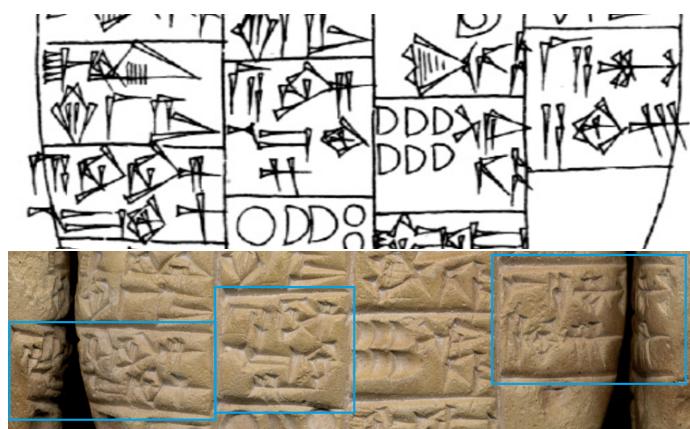


Figure 15: Obverse of [P220930], showing 𠁧𠁨 𠁪 𠁩 𠁨 𠁤 “arrears of the year before last 1 (of the reign of 𠁥 𠁦 𠁨 𠁤)”, 𠁧𠁨 𠁪 𠁤 𠁨 𠁤 “arrears of last year 2”, 𠁧𠁨 𠁫 𠁨 𠁤 𠁤 “arrears of this year 3”. The arrears in question consist of fish and turtles. Top: Copy from [AllottededelaFuye1918]. Bottom: [CDLI] photograph.

<sup>17</sup>Dated instead to the reign of  by [SallabergerSchrakamp2015].

<sup>18</sup>The length of the reign of 𠁧𠁨𠁥 (6 years and 1 month) and the dearth of documents dated to the reign of 𠁧𠁨𠁥 after his defeat by 𠁧𠁨𠁥 mean that these are quite rare; see [Sallabergerschrakamp2015].

<sup>19</sup>This text mentions ዳንብት ተጠሪ as temple administrator. See [SallabergerSchrakamp2015] for its attribution to the reign of ዳንብት ተጠሪ.

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” (**gu<sub>2</sub>.ne.ne.a.e.ne.gar**) of the fisheries foremen **Ne.sag** and **Lugal.ša<sub>3</sub>.la<sub>2</sub>.tuku** the quota arrears of **im.im.ma.kam**  , **im.ma.kam**  and **mu.a.kam**  , that is of the year before last = year one (of the king **Urukagina** [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 (uds) and before **maš ša<sub>3</sub>.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 ). 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 **gu<sub>2</sub>** **la<sub>2</sub>.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  notation for year names in [Eng88, p. 166 n. 37], referring to [P220930]. See Figure 15.

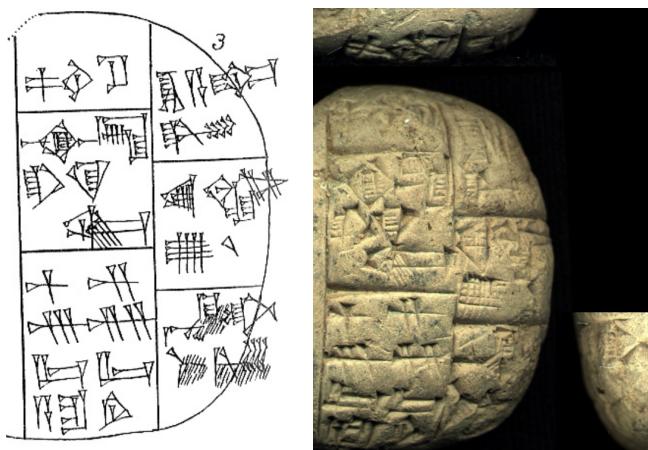
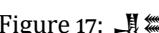


Figure 17:  /  /  /  “Enentarzi was ensik of Lagaš. 1st 2nd 3rd 4th (years) consolidated” in [P020133]. Left: Copy from [AllottededelaFuyc1918]. Right: [CDLI] photograph.

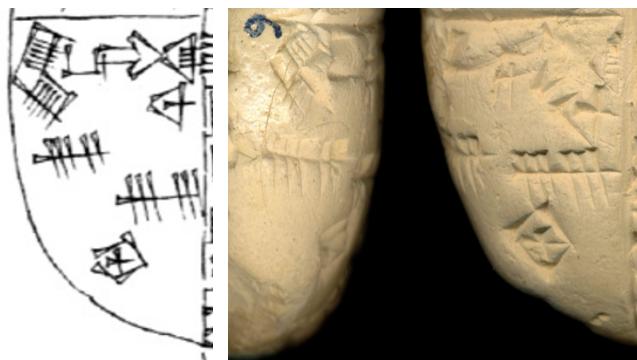


Figure 18: “Silver payment 5th and 6th (years of Lugaland) in [P221169], dated to the 1st year of . Left: Copy from [AllottededelaFuye1918]. Right: [CDLI] photograph.



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

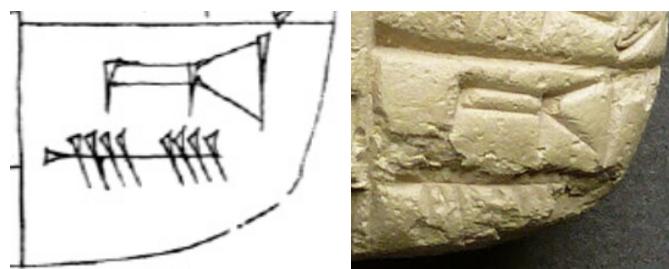


Figure 20: (referencing the 8th year of in [P222224]. Left: Copy from [CrosThureau-Dangin1910]. Right: [LouvreCollections] photograph.



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

### 4.3 Glyphs

The 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 [P239314; P239350]. This distinction is stylistic. The wedges are not stacked until the reign of ; for regnal years of see §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], translation [ETCSRI]

A different notation of regnal years is used during the reign of , sometimes involving numerals of the form . These numerals are less comprehensively attested, and their interpretation is sometimes still unclear, see Figure 22. The co-occurrence and likely contrast of and in [P221534] may preclude treating the former as a stylistic variant of the latter. These numerals are not being proposed at this time.

The subsequent mu-it 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, + , 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

The *CuneiformComposite* font by Steve Tinney is used when referring to the reference glyphs for already-encoded cuneiform. *Noto Sans Cuneiform*, by Monotype Imaging, is used to for most of the cuneiform text in this document, with modifications (cuneiform glyph for ◇ ŠAR<sub>2</sub>, corrected glyphs for UN and KALAM per [Uni16], alternate glyph for l, ligatures and kerning of ḫ). Arabic text is set in *Scheherazade New* by SIL International; Traditional Chinese text is set in *Noto Serif TC* by Ken Lunde et al.; 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

### Artefacts

- [P020092] VAT 04428. Berlin, Germany: Vorderasiatisches Museum.  
CDLI: [P020092](#).  
ORACC: [epsd2/P020092](#).
- [P020129] VAT 04713. Berlin, Germany: Vorderasiatisches Museum.  
CDLI: [P020129](#).  
ORACC: [epsd2/P020129](#).
- [P020182] VAT 04405. Berlin, Germany: Vorderasiatisches Museum.  
CDLI: [P020182](#).  
ORACC: [epsd2/P020182](#).
- [P221266] AO 13825. Paris, France: Musée du Louvre.  
CDLI: [P221266](#).  
ORACC: [epsd2/P221266](#).  
Louvre Collections: [ark:/53355/cl010138527](http://ark:/53355/cl010138527).

### ISO and Unicode documents

- [L2/12-208] M. Everson, C. Jay Crisostomo and S. Tinney. *Proposal for Early Dynastic Cuneiform*. 13th June 2012.  
UTC: [L2/12-208](#).  
ISO/IEC JTC 1/SC 2/WG 2: [N4278](#).

- [L2/24-210R] R. Leroy, A. Pandey and S. Tinney. *Archaic cuneiform numerals*. 23rd Oct. 2024.  
UTC: [L2/24-210R](#).
- [Uni16] The Unicode Consortium. *The Unicode Standard*. Version 16.0.0. The Unicode Consortium, 10th Sept. 2024.  
ISBN: 978-1-936213-34-4.  
<https://www.unicode.org/versions/Unicode16.0.0/core-spec/>.

### Online corpora and related projects

- [CDLI] É. Pagé-Perron, J. L. Dahl, B. Lafont, J. Renn, R. K. Englund and P. Damerow, eds. *Cuneiform Digital Library Initiative*. 2000–.  
<https://cdli.mpiwg-berlin.mpg.de>.
- [EbDA] L. Milano, M. Maiocchi, F. Di Filippo, R. Orsini, E. Scarpa, M. Surdi et al., eds. *Ebla Digital Archives*. 2007–.  
<http://ebda.cnr.it/>.
- [ePSD2] S. Tinney, P. Jones and N. Veldhuis, eds. *The electronic Pennsylvania Sumerian Dictionary*. 2nd ed. 2017–.  
<http://oracc.org/epsd2>.
- [OSL] N. Veldhuis, S. Tinney et al., eds. *Oracc Sign List*. 2014–.  
<http://oracc.org/osl/>.

### Other documents

- [Arc15] A. Archi. *Ebla and Its Archives. Texts, History, and Society*. Studies in ancient Near Eastern records 7. Walter de Gruyter, 2015.  
ISBN: 978-1-61451-716-0.  
DOI: [10.1515/9781614517887](https://doi.org/10.1515/9781614517887).
- [Bor10] R. Borger. *Mesopotamisches Zeichenlexikon*. Alter Orient und Altes Testament 305. Ugarit-Verlag, 2010.
- [Eng88] R. K. Englund. “Administrative Timekeeping in Ancient Mesopotamia”. In: *Journal of the Economic and Social History of the Orient* 31.2 (1988).
- [För16] W. Förtsch. *Altbabylonische Wirtschaftstexte aus der Zeit Lugalanda's und Urugagina's*. Vorderasiatische Schriftdenkmäler der Königlichen Museen zu Berlin 14. J. C. Hinrichs, 1916.
- [Gor23] F. Gori. “On Lapis Lazuli and Linen in Šuruppak Texts. An Analysis Through the Lens of Ebla Studies”. In: *Studia Eblaitica* 9 (2023), pp. 160–166. ISSN: 2364-7124.
- [Gor24] F. Gori. “Numeracy in Early Syro-Mesopotamia. A study of accounting practices from Fāra to Ebla”. PhD thesis. Università degli studi di Verona, 2024.  
[https://iris.univr.it/bitstream/11562/1114808/1/Diss\\_Fiammetta\\_Gori.pdf](https://iris.univr.it/bitstream/11562/1114808/1/Diss_Fiammetta_Gori.pdf).

- 
- [Lec16] C. Lecompte. "ED IIIB metrology: texts from Lagas". In: *CDLI:wiki. A Library of Knowledge of the Cuneiform Digital Library Initiative.* 12th Apr. 2016.  
[https://cdli.ox.ac.uk/wiki/doku.php?id=ed\\_iii\\_metrological\\_systems](https://cdli.ox.ac.uk/wiki/doku.php?id=ed_iii_metrological_systems).
- [Lec20] C. Lecompte. "The Measurement of Fields During the Pre-sargonic Period". In: *Mathematics, Administrative and Economic Activities in Ancient Worlds*. Ed. by C. Michel and K. Chemla. Why the Sciences of the Ancient World Matter 5. Springer, 2020. Chap. 8, pp. 283–344.
- [Pow87] M. Powell. "Maße und Gewichte". In: *Reallexikon der Assyriologie und vorderasiatischen Archäologie*. Ed. by D. O. Edzard. Vol. 7 Libanukšabaš-Medizin. 1987–1990, pp. 457–530.
- [Rob08] E. Robson. *Mathematics in Ancient Iraq. A Social History*. Princeton University Press, 2008.  
ISBN: 978-0-691-09182-2.
- [Rob22] E. Robson. "Overview of Metrological Systems". In: *The Digital Corpus of Cuneiform Mathematical Texts*. 2022.  
ORACC: [dccmt/Metrology](#).
- [Sch35] N. Schneider. *Die Keilschriftzeichen der Wirtschaftsurkunden von Ur III*. Editrice Pontificio Istituto Biblico, 1935.