Twelve cuneiform *tenû* numerals

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Contents

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, 7𒌋[1]–9𒌋, where 1𒌋 = 𒌋 through 6𒌋 = 𒐼 are already encoded. Their glyphic range and usage are discussed in §3. The other proposed characters constitute a new series of numerals, formed by 𒌋 numerals crossing an 𒁹 wedge. They are discussed in §4.

These characters are extensively used in Early Dynastic administrative corpus, which is published online[2] 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 𒐽 CUNEIFORM NUMERIC SIGN SEVEN ASH TENU
— U+12475 𒐾 CUNEIFORM NUMERIC SIGN EIGHT ASH TENU
— U+12476 𒐿 CUNEIFORM NUMERIC SIGN NINE ASH TENU

[1] 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 3𒌍 for both 3(bur$_3$) and 3(u), rather than 30𒌍 for the latter.

[2] 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 𒀹 series are named U+12039 𒀹 CUNEIFORM SIGN ASH ZIDA TENU for the first one and U+1244A–U+1244E 𒑊–𒑎 CUNEIFORM NUMERIC SIGN n ASH TENU for the others.

Some[3] 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 𒋰 is described as 𒋗 *tenû* in [P365233, rev.i 46′][4], 𒈤 as 𒈣 *tenû* in [P391514, rev.ii 47; P467315, obv.ii 80], 𒀯 as 𒀭 *tenû* in [P391514, p. ii 33], 𒀹 as 𒆜 (containing) 𒀸 *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 𒃮 gab₂ "left" and 𒍣 zid "right" respectively, are used in [P345960], which contrasts 𒀹 described as *kaba tenû* and 𒀹 described as *zida tenû*.

In modern transliteration, 𒀹 numerals are described as 𒀸 *tenû* (ATF: `asz@t`) or 𒁹 *tenû* (ATF: `disz@t`), the latter being more common[6]. 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 𒇲[7] lal[8], as well as for ordinals[9] and for ages of animals in years[10].

Accounts of animals giving their ages in years rarely go beyond three-year old animals. Subtractive notation, which appears in the ED IIIa period [Rob08, p. 77], is used to compactly express numbers close to a larger round number, *e.g.*, 𒌋𒇲 10 − 1 instead of 𒐝 for 9, 𒌍𒇲 30 − 2 instead of 𒎙𒐜 for 28, or 𒁹𒇲 60 − 1 instead of 𒐐𒐝 for 59; *cf.* IX instead of VIII in Roman numerals. It is therefore usually limited to small subtrahends[11]. Larger subtrahends do occur for quantities close to a much larger unit; however in Ur III, they are often written 𒁹 numerals, as in [P109346, obv. 2 15] 𒐉𒂆𒇲𒐛𒊺𒄀 "4 shekels minus 7 grains of gold", a weight

[3]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

[4]Note that while the third millennium 𒋗 and 𒋗 are related by a 45° rotation, in the Neo-Assyrian style used by this list, these signs look like 𒋗 and 𒋗, so that only one wedge is slanted, as noted in [**Gong2000**].

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

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

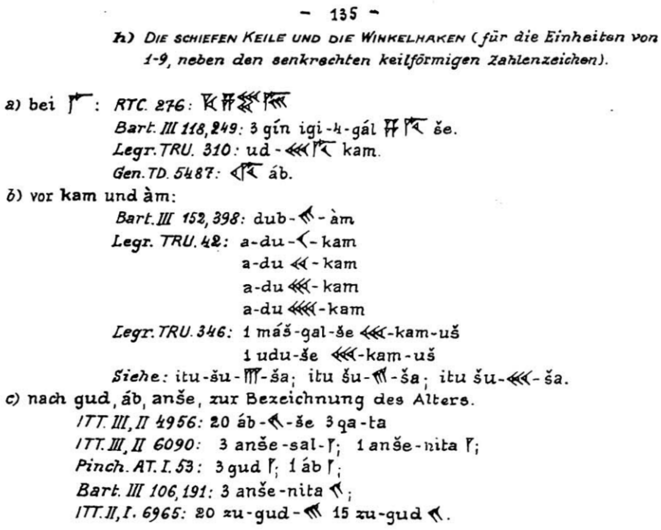
[7]As noted in [L2/24-210R, p. 25 n. 40], the sign 𒇲 (lal, "minus") is often ligated with the following numerals, with the subtrahend placed under a sometimes considerably enlarged 𒇲, similar to the layout of the radical in modern mathematical notation, see, *e.g.*, [P020092, rev. 3 1, 2]. The font used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

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

[9]1583 out of 3304 occurrences are n𒀹𒄰 n(`disz@t`)`-kam`, including 647 after 𒇲

[10]203 occurrences of `gu4`, `ab2`, `ansze`, or `dur3` n(`disz@t`)

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



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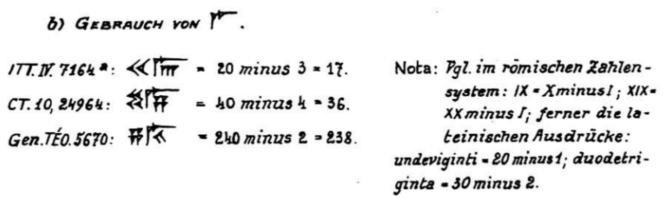
h) DIE SCHIEFEN KEILE UND DIE WINKELHAKEN (für die Einheiten von 1-9, neben den senkrechten keilförmigen Zahlenzeichen).

a) bei : 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 -kam
a-du -kam
a-du -kam
Legr. TRU. 346: 1 máš-gal-še -kam-uš
1 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]



b) GEBRAUCH VON .

ITT. IV. 7164 a: = 20 minus 3 = 17.
CT. 10, 24964: = 40 minus 4 = 36.
Gen. TÉO. 5670: = 240 minus 2 = 238.

Nota: Vgl. im römischen Zahlensystem: IX = X minus I; XIX = XX minus I; ferner die lateinischen Ausdrücke: undeviginti = 20 minus 1; duodetriginta = 30 minus 2.

Figure 2: [Sch35, p. 132]

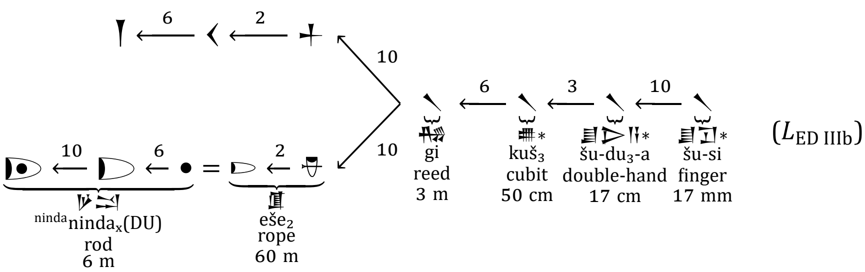
which would otherwise be written 𒐈𒑚𒂆𒐏𒐈𒊺 "3 + $\frac{2}{3}$ shekels and 53 grains", as 180𒊺 = 1𒂆.

Ordinals with 𒀹 numerals are also typically limited to small numbers or subtractive notation: many of the attestations of n𒀹𒄰 "nth" are in year names[12], such as 𒈬 𒆚𒄯𒆠 𒀀𒁺 𒀹𒄰𒀾 𒁀𒅆𒌨 mu kar₂-ḫar^ki a-ra₂ 2𒀹-kam-aš ba-ḫul "year Karhar was destroyed for the second time" (31st year of Šulgi's reign), 𒈬 𒋛𒈬𒊒𒌝𒆠 𒀀𒁺 𒀹𒄰𒀾 𒁀𒅆𒌨 mu si-mu-ru-um^ki a-ra₂ 3𒀹-kam-aš ba-ḫul "year Simurrum was destroyed for the third time" (32nd year of Šulgi's reign), or 𒈬 𒋛𒈬𒊒𒌝𒆠 𒅇 𒇻𒇻𒁍𒌝𒆠 𒀀𒁺 𒌋𒇲𒀹𒄰𒀾 𒁀𒅆𒌨 mu si-mu-ru-um^ki u₃ lu-lu-bu-um^ki a-ra₂ 1𒌋 lal 1𒀹-kam-aš ba-ḫul "year Simurrum and Lullubum were destroyed for the ninth time" (44th year of Šulgi's reign). Larger ordinals are frequent, in particular for the day of the month, but these are written with 𒁹 numerals, thus 𒌓𒐌𒄰 for "the 7th day" or 𒌓𒌋𒌋𒐍𒄰 for "the 28th day".

The rarity of the higher 𒀹 numerals in the Ur III corpus likely explains the absence of 7𒀹–9𒀹 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], 𒀹 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.

While this system has a unit 1 𒁺 = 2 𒄀, lengths above 1 𒄀 are only expressed in 𒂠, or equivalently in tens of 𒁺, and in half-𒂠 equal to 10 𒄀. We can therefore expect 7–9 𒄀 to occur, expressed using 𒀹 numerals. Indeed, 37 texts in the transliterated ED IIIb corpus on [CDLI] contain undamaged attestations of either 7𒀹𒄀 or 8𒀹𒄀[13]; some of these attestations are shown in Figures 3–6. However, 9𒀹𒄀 is not attested, since instead subtractive notation is used, as in 𒑊𒑊𒑊𒐝𒂠𒇲𒄀 in [P020129, obv. 3 3], 𒑊𒐞𒁺𒇲𒄀𒌑𒀹 in [P221272, rev. 2 2], or 𒌋𒇲𒄀 in [P020304, obv. 3 8].

A similar situation occurs in some systems of capacity with 𒀹 numerals counting 𒋡 sila₃, so that 7𒀹𒋡 and 8𒀹𒋡 are attested, see Figures 7 and 8.

The use of 𒀹 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

[12] 430 occurrences of `n(disz@t)-kam` are on lines starting with `mu`, of which 308 are in 𒌋𒇲.

[13] Of those, 34 have 7𒀹𒄀 and 9 have 8𒀹𒄀.

is less frequent[14]. in these numbers. We therefore find attestations of [cuneiform]–[cuneiform] in "*n*th day", some of which are shown in Figures 9–13.

In Ebla, the [cuneiform] 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, [cuneiform] numerals remain used for large subtrahends, thus [Gor24, p. 101 n. 355] cites occurrences of [cuneiform] for 36 and [cuneiform][15] for 94. In particular, [Gor24, pp. 129 sq.] cites occurrences of [cuneiform] 9 [cuneiform] in Ebla, shown in Figure 14.

Figure 3: [cuneiform][16] [cuneiform] "501 m (first) width" (of a field) in [P221254, obv. 3 7] from Ŋirsu, dated to the reign of [cuneiform]. Left: Copy from [**AllottedelaFuÿe1920**]. Right: [CDLI] photograph.

Figure 4: [cuneiform] "21 m of reed-bed dyke" (attributed to [cuneiform] the farmer) in [P221266, obv. 1 1] from Ŋirsu, dated to the reign of [cuneiform]. Left: Copy from [**AllottedelaFuÿe1920**]. Right: [**LouvreCollections**] photograph.

14 Although also attested, see, *e.g.*, [P221346, rev. 3 6] [cuneiform], [P221006, rev. 2 1] [cuneiform]

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

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

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

Figure 6: [cuneiform] "444 m equal widths" (of a field) in [P221254, obv. 1 2]. Left: Copy from [**AllottedelaFuÿe1920**]. Right: [CDLI] photograph.

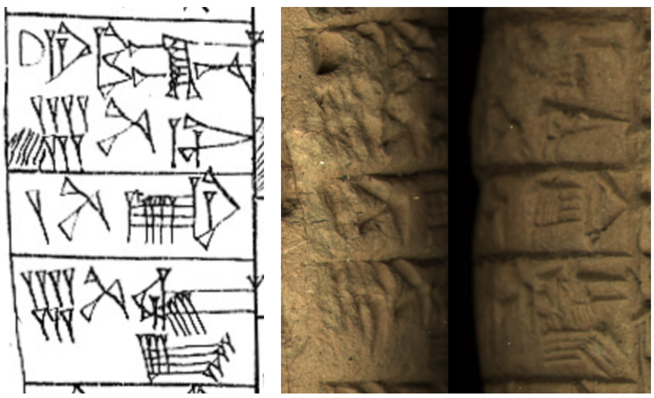


Figure 7: [cuneiform] / [cuneiform] / [cuneiform] "1 niŋbanda 7 sila of butter, 1 sila of cream, 7 sila of dates" in [P020182, rev. 3 5–7] from Ŋirsu, dated to the reign of [cuneiform]. Left: Copy from [För16]. Right: [CDLI] photograph.

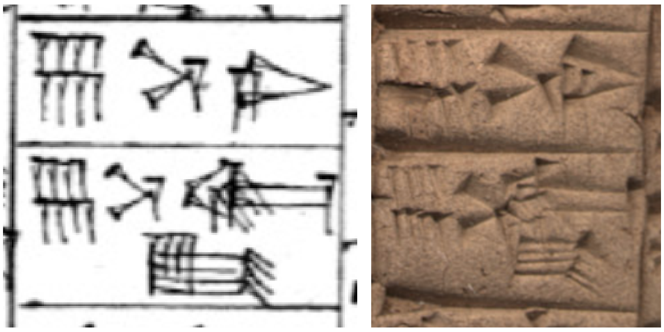


Figure 8: 𒐍𒋡 𒉌𒉣 / 𒐍𒋡 𒍪𒈝 “8 sila of butter, 8 sila of dates” in [P221730, rev. 2 5–6] from Ŋirsu, dated to the reign of 𒀀𒈠𒀫𒀭𒂗𒍪. Left: Copy from [**Никольский1908**]. Right: [CDLI] photograph.

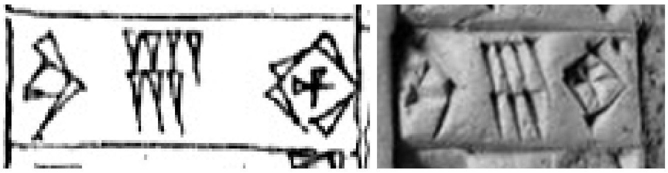


Figure 9: 𒌓𒐌𒄰 “seventh day” in [P220703, rev. 2 7] from Ŋirsu, dated to the 3rd year of the reign of 𒀀𒈠𒀫𒀭𒂗𒍪. Left: Copy from [**AllottedelaFuÿe1918**]. Right: [**LouvreCollections**] photograph.

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

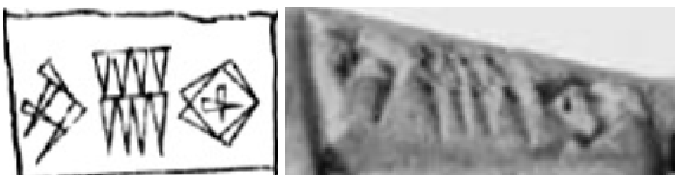


Figure 11: 𒌓𒐍𒄰 “eighth day” in [P220703, rev. 3 1]. Left: Copy from [**AllottedelaFuÿe1918**]. Right: [**LouvreCollections**] photograph.

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

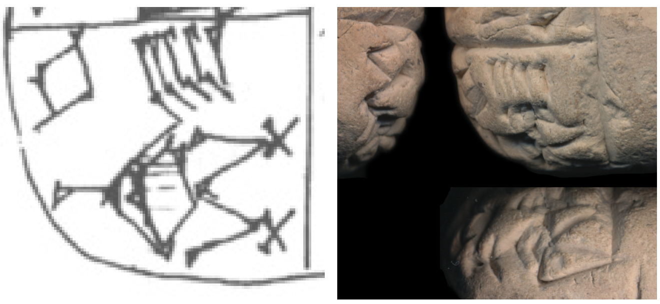


Figure 13: “ninth day” in [P222129, obv. 1 2] from Šuruppag, dated to the ED IIIa period. Left: Copy from [**Martin2001**]. Right: [CDLI] photograph.

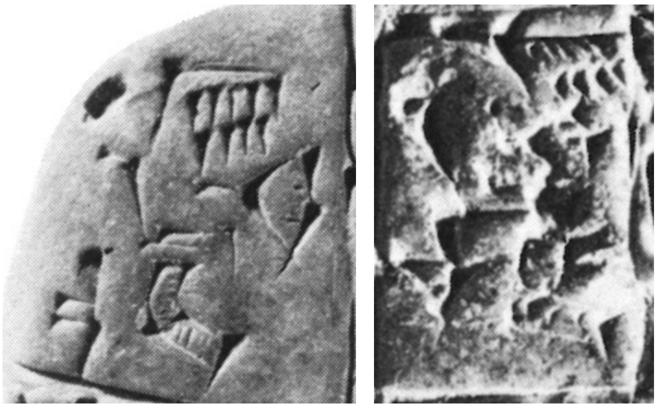


Figure 14: Left: “9 minas and 51 shekels of silver” in [P241283, *recto* 1 1]; right: “1 mina and 51 shekels of silver” in [P241325, *verso* 3 2], both from Ebla. Photographs from [EbDA].

3.4 Glyphs

As illustrated in the above figures, the angle of the 𒁺 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 𒁹 and 𒀸 numerals needed to have their stacking patterns disunified for compatibility with [Bor10], this practice should not be extended to 𒁺 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 𒀹 numeral. Their ATF name is n(|ASZ×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 *tenû*, so we follow [CDLI] and [OSL] terminology instead of attempting consistency with the names of the 𒀹 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 Ŋirsu, and most of them are in regnal years of 𒌷𒅗𒄀𒈾 and his predecessor 𒈗𒀭𒁕, 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 𒂗𒂗𒋻𒍣, [P247594] possibly[17] dated to the reign of 𒂗𒀭𒈾𒁺 the second, [P222224] to the reign of 𒂗𒋼𒈨𒈾, and [P221783] from Lagaš to the reign of 𒂗𒀭𒈾𒁺 the first.

Where attested[18], regnal years beyond the ninth are written differently: 𒌋 for the 10th year of 𒌷𒅗𒄀𒈾 in [P222640], and with subtractive subtraction for the 17th[19] written 𒌋𒌋𒇲 in [P221483, rev. 4 12] and the 19th year of 𒂗𒋼𒈨𒈾 written 𒌋𒌋𒇲 in [P221413, rev. 3 3; P222223, rev. 3 3]. The numeral series therefore stops at 𒀸×9𒀹. Figures 15–21 show these numerals used in ancient and modern text.

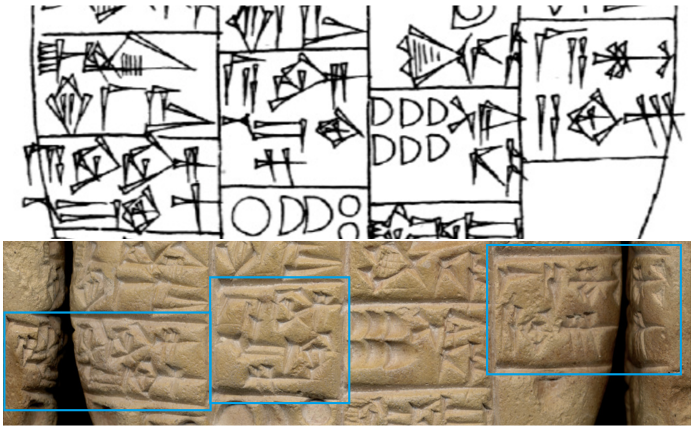


Figure 15: Obverse of [P220930], showing 𒇲𒉌 𒈬𒁀 𒈬𒁀 𒆠𒉌 𒀸 “arrears of the year before last 1 (of the reign of 𒌷𒅗𒄀𒈾)”, 𒇲𒉌 𒈬𒁀 𒆠𒉌 𒀸 “arrears of last year 2”, 𒇲𒉌 𒈬𒉌 𒀸 “arrears of this year 3”. The arrears in question consist of fish and turtles. Top: Copy from [**AllottedelaFuÿe1918**]. Bottom: [CDLI] photograph.

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

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

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

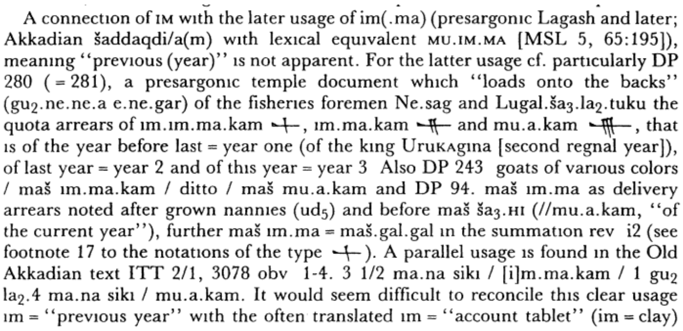

A connection of IM with the later usage of im(.ma) (presargonic Lagash and later; Akkadian šaddaqdi/a(m) with lexical equivalent MU.IM.MA [MSL 5, 65:195]), meaning "previous (year)" is not apparent. For the latter usage cf. particularly DP 280 (= 281), a presargonic temple document which "loads onto the backs" (gu_2.ne.ne.a e.ne.gar) of the fisheries foremen Ne.sag and Lugal.$ša_3$.la_2.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 (ud_5) and before maš $ša_3$.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_2 la_2.4 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.

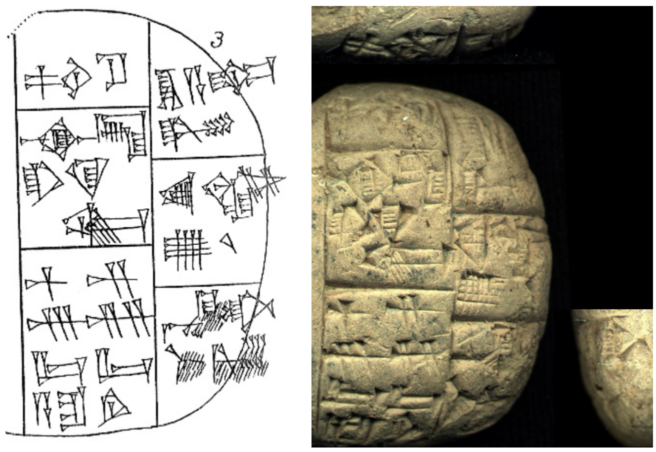


Figure 17: "Enentarzi was ensik of Lagaš. 1st 2nd 3rd 4th (years) consolidated" in [P020133, rev. 1 3 sqq.]. Left: Copy from [**AllottedelaFuÿe1918**]. Right: [CDLI] photograph.

Figure 18: “Silver payment 5th and 6th (years of Lugalanda)” in [P221169, rev. 3 2], dated to the 1st year of . Left: Copy from [**AllottedelaFuÿe1918**]. Right: [CDLI] photograph.

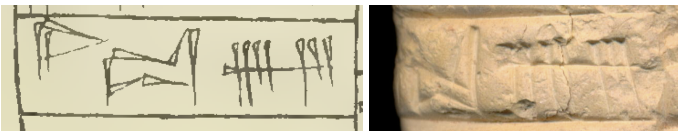


Figure 19: “delivered, 7th (year of Lugalanda)” in [P221034, rev. 2 5], dated to the 1st year of . Left: Copy from [**AllottedelaFuÿe1918**]. Right: [CDLI] photograph.

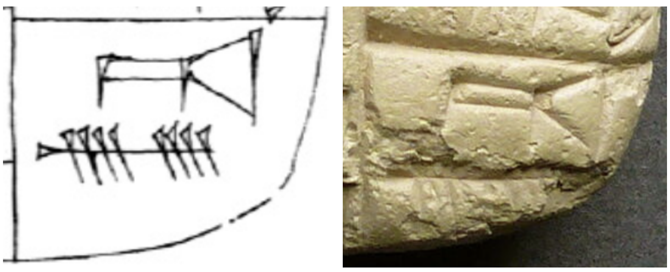


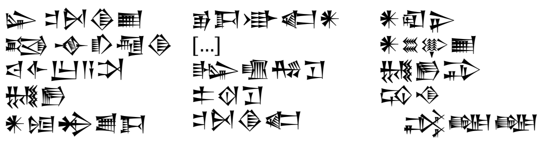
Figure 20: (referencing the 8th year of) in [P222224, rev. 2 4]. Left: Copy from [**CrosThureau-Dangin1910**]. Right: [**LouvreCollections**] photograph.

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

4.3 Glyphs

The [cuneiform] wedges in these numerals are consistently grouped for numbers above [cuneiform]: [cuneiform] 2-2, [cuneiform] 3-2, [cuneiform] 3-3, [cuneiform] 4-3, [cuneiform] 4-4, and [cuneiform] 3-3-3. The representative glyphs follow this grouping. [cuneiform] 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 [cuneiform] wedges are not stacked until the reign of [cuneiform], 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 Ninŋirsu! [...] 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 [cuneiform], sometimes involving numerals of the form [cuneiform]. 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 former. These numerals are not being proposed at this time.

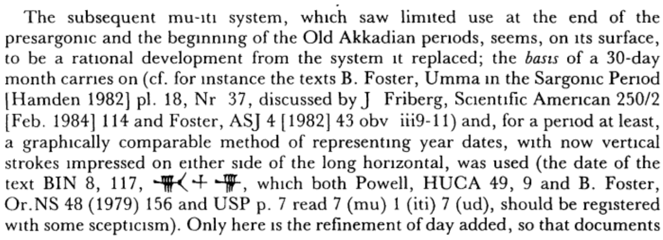

The subsequent mu-iti system, which saw limited use at the end of the presargonic and the beginning of the Old Akkadian periods, seems, on its surface, to be a rational development from the system it replaced; the *basis* of a 30-day month carries on (cf. for instance the texts B. Foster, Umma in the 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$_2$, corrected glyphs for UN and KALAM per [Uni16], alternate glyph for , ligatures and kerning of). 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.

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Artefacts

[P010787] Ist Š 0251.
CDLI: P010787.
ORACC: dccmt/P010787.

[P010896] Ist Š 0752.
CDLI: P010896.
ORACC: epsd2/P010896.

[P010928] Ist Š 0878.
CDLI: P010928.
ORACC: epsd2/P010928.

[P020092] VAT 04428. Berlin, Germany: Vorderasiatisches Museum.
CDLI: P020092.
ORACC: epsd2/P020092.

[P020129] VAT 04713. Berlin, Germany: Vorderasiatisches Museum.
CDLI: P020129.
ORACC: epsd2/P020129.

[P020133] VAT 04884.
CDLI: P020133.
ORACC: epsd2/P020133.

[P020182] VAT 04405. Berlin, Germany: Vorderasiatisches Museum.
CDLI: P020182.
ORACC: epsd2/P020182.

[P020303] VAT 04852.
CDLI: P020303.
ORACC: epsd2/P020303.

[P020304] VAT 04855.
CDLI: P020304.
ORACC: epsd2/P020304.

[P109346] FLP 0558.
CDLI: P109346.
ORACC: epsd2/P109346.

[P131747] AO 05676. Paris, France: Musée du Louvre.
CDLI: P131747.
ORACC: epsd2/P131747.

[P220703] AO 13261. Paris, France: Musée du Louvre.
CDLI: P220703.
ORACC: epsd2/P220703.

[P220930] AO 13488. Paris, France: Musée du Louvre.
CDLI: P220930.
ORACC: epsd2/P220930.

[P221006] AO 13562. Paris, France: Musée du Louvre.
CDLI: P221006.
ORACC: epsd2/P221006.

[P221034] AO 13590. Paris, France: Musée du Louvre.
CDLI: P221034.
ORACC: epsd2/P221034.

[P221075] AO 13631. Paris, France: Musée du Louvre.
CDLI: P221075.
ORACC: epsd2/P221075.

[P221169] AO 13726. Paris, France: Musée du Louvre.
CDLI: P221169.
ORACC: epsd2/P221169.

[P221254] AO 13812. Paris, France: Musée du Louvre.
CDLI: P221254.
ORACC: epsd2/P221254.

[P221266] AO 13825. Paris, France: Musée du Louvre.
CDLI: P221266.
ORACC: epsd2/P221266.
Louvre Collections: ark:/53355/cl010138527.

[P221272] AO 13831. Paris, France: Musée du Louvre.
CDLI: P221272.
ORACC: epsd2/P221272.

[P221346] SM 1904.07.004.
CDLI: P221346.
ORACC: epsd2/P221346.

[P221413] AO 04037. Paris, France: Musée du Louvre.
CDLI: P221413.
ORACC: epsd2/P221413.

[P221483] MLC 01497.
CDLI: P221483.
ORACC: epsd2/P221483.

[P221534] NBC 05930.
CDLI: P221534.
ORACC: epsd2/P221534.

[P221590] CBS 04700.
CDLI: P221590.
ORACC: epsd2/P221590.

[P221730] Erm 14023.
CDLI: P221730.
ORACC: epsd2/P221730.

[P221783] Excavation 2 H-T 012.
CDLI: P221783.
ORACC: epsd2/P221783.

[P221906] Erm 14137.
CDLI: P221906.
ORACC: epsd2/P221906.

[P222129] UM 33-59-029.
CDLI: P222129.
ORACC: epsd2/P222129.

[P222223] AO 04156. Paris, France: Musée du Louvre.
CDLI: P222223.
ORACC: epsd2/P222223.

[P222224] AO 04155. Paris, France: Musée du Louvre.
CDLI: P222224.
ORACC: epsd2/P222224.

[P222618] AO 04162. Paris, France: Musée du Louvre.
CDLI: P222618.

[P222640] AO 00402. Paris, France: Musée du Louvre.
CDLI: P222640.

[P241283] Excavation TM.75.G.01710.
CDLI: P241283.

[P241325] Excavation TM.75.G.01752.
CDLI: P241325.

[P247594] AO 04238. Paris, France: Musée du Louvre.
CDLI: P247594.
ORACC: epsd2/P247594.

[P345960] VAT 09541.
CDLI: P345960.
ORACC: dcclt/P345960.

[P365233] Accession DT 040.
CDLI: P365233.
ORACC: dcclt/P365233.

[P365267] BM 093068.
CDLI: P365267.
ORACC: dcclt/P365267.

[P391514] OIM A02480.
CDLI: P391514.
ORACC: dcclt/P391514.

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CDLI: P452986.
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