

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[^]–9[^], where 1[^] = [^] through 6[^] = [^] are already encoded. Their glyphic range and usage, as well as possible reasons for their absence in the current version of the Standard, are discussed in §??.

The other proposed characters constitute a new series of numerals, formed by [^] numerals crossing an — wedge. They are discussed in §4.

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

2.3.4 Script_Extensions

2.3.5 Block

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.








































- 135 -
- 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]

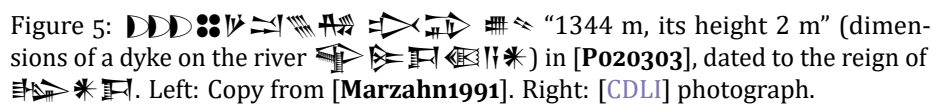
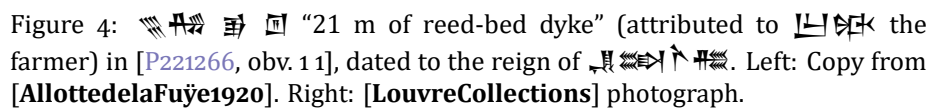
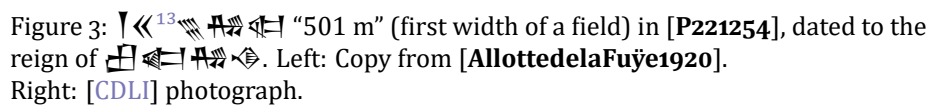
Some¹ technical terms used in cuneiform character names are derived originate from the structural descriptions of cuneiform signs by Akkadian-speaking scribes in late second and first millennium lexical texts. [TODO(egg): Cite Yushu Gong on tenu itself] In particular, the word *tenû* is used to describe slanted signs or parts of signs: thus  is described as  *tenû* in [P365233]²,  as  *tenû* in [P391514; P467315],  as  *tenû* in [P391514],  as  (containing)  *tenû* in [P365267]³. 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 common⁴. 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*.



Ordinals with ʾ numerals are also typically limited to small numbers or subtractive notation: many of the attestations of $n \backslash \diamond$ “*n*th” are in year names¹⁰, such as 𐎶𐎵𐎲𐎠𐎧𐎺𐎠𐎫𐎼𐎡𐏁𐎢𐎽𐎠𐎪𐎠𐎥𐎴 mu kar₂-ḫar^{ki} a-ra₂ 2 ʾ-kam-aš ba-ḫul “year Karhar was destroyed for the second time” (31st year of Šulgi’s reign), 𐎶𐎵𐎲𐎠𐎧𐎺𐎠𐎫𐎼𐎡𐏁𐎢𐎽𐎠𐎪𐎠𐎥𐎴𐎶𐎵𐎲𐎠𐎧𐎺𐎠𐎫𐎼𐎡𐏁𐎢𐎽𐎠𐎪𐎠𐎥𐎴 mu si-mu-ru-um^{ki} a-ra₂ 3 ʾ-kam-aš ba-ḫul “year Simurrum was destroyed for the third time” (32nd year of Šulgi’s reign), or 𐎶𐎵𐎲𐎠𐎧𐎺𐎠𐎫𐎼𐎡𐏁𐎢𐎽𐎠𐎪𐎠𐎥𐎴𐎶𐎵𐎲𐎠𐎧𐎺𐎠𐎫𐎼𐎡𐏁𐎢𐎽𐎠𐎪𐎠𐎥𐎴𐎶𐎵𐎲𐎠𐎧𐎺𐎠𐎫𐎼𐎡𐏁𐎢𐎽𐎠𐎪𐎠𐎥𐎴 mu si-mu-ru-um^{ki} u₃ lu-lu-bu-um^{ki} a-ra₂ 1 𐎶𐎵𐎲𐎠𐎧𐎺𐎠𐎫𐎼𐎡𐏁𐎢𐎽𐎠𐎪𐎠𐎥𐎴 1 ʾ-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 ʿ numerals,

¹⁰ 430 occurrences of *n(disz@t)-kam* are on lines starting with *mu*, of which 308 are in $\langle \mathbf{R} \rangle$.



¹³TODO something about rhomboidal numerals, cite [Gor24].

3.4 Stacking patterns

4 AŠ×(DIŠ *tenû*) numerals

<https://cdli.mpiwg-berlin.mpg.de/artifacts/452986/reader/209489> <https://cdli.mpiwg-berlin.mpg.de/artifacts/467743/reader/213564>

4.1 Stacking patterns


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 6: TODO note that this should cite BIN 8, 116, not 117.










A connection of im with the later usage of im(.ma) (presargonic Lagash and later; Akkadian šaddaqli/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 , 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 (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 ). 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 7: TODO

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 , corrected glyphs for  UN and  KALAM per [Uni16], alternate glyph  for ). 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](#).
- [P221266] AO 13825. Paris, France: Musée du Louvre.
CDLI: [P221266](#).
ORACC: [epsd2/P221266](#).
Louvre Collections: [ark:/53355/cl010138527](#).

ISO and Unicode documents

- [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>.

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](#).
- [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.
- [Rob08] E. Robson. *Mathematics in Ancient Iraq. A Social History*. Princeton University Press, 2008.
ISBN: 978-0-691-09182-2.
- [Sch35] N. Schneider. *Die Keilschriftzeichen der Wirtschaftsurkunden von Ur III*. Editrice Pontificio Istituto Biblico, 1935.