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TALLYING IN THE EANNA

By YUVAL LEVAVI

The present contribution presents a previously unidentified and unique tallying system found on Late-Babylonian tablets from the Eanna temple archive. The tallies are composed of a series of nine vertical wedges, grouped in triplets, followed by a Winkelhaken. The vertical wedges can stand for either 1 or 10, and the Winkelhaken concludes the series as either 10 or 100, respectively. So far, this system is attested only on administrative tablets from the Eanna from the first two decades of Nebuchadnezzar II's reign (ca. 604–585 BCE). While the tally system itself is unique, the grouping, or chunking, of verticals in triplets suggests Aramaic influence.

Introduction

The present contribution discusses a previously unidentified unique tallying system practiced by clerks of Eanna, the temple of Ištar in the southern Babylonian city of Uruk.[1] The peculiar notation was first observed and "deciphered" in YOS 24, 202 and affirmed by YOS 24, 213. Further exploration revealed similar cases in GC 2, 364, GC 2, 187, UCP 9/1 I, 13, UCP 9/1 II, 10, and the previously unpublished tablet NBC 4783. All tablets stem from the Eanna archive during the reign of Nebuchadnezzar II.[2]

I first present the basic terminology and the principles of the tally system. This is followed by short discussions of the individual cases. Apart from the two YOS 24 texts, in the forthcoming editions of which I address the issue at hand, editions of the remaining five texts are included below (three with accompanying hand-copies). This is followed by a discussion and conclusions.

The notation-related terminology used in this paper is based on the following definitions, presented in Chrisomalis 2010:

- "**Tallying**: The practice of making a series of relatively permanent marks to indicate an ongoing total of some objects" (Chrisomalis 2010: 437).[3]
- "**One-to-one correspondence**: The association of a collection of discrete sets of identical marks with a set of objects of the same quantity (e.g., IIIIIII = 7)" (Chrisomalis 2010: 436).[4]

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[1] For an overview of the "Eanna archive"—to which scholars can assign about 8000 tablets and fragments spanning from the final years of the Neo-Assyrian period to the Neo-Babylonian and Achaemenid periods—see Levavi 2018: 23–25.

[2] Nos. 1 and 2 below can be dated to early Nbk based on prosopography. No. 3 is dated to year fifteen of an unmentioned king, who can be identified as Nebuchadnezzar based on prosopography as well. No. 4 was written in the ninth year of an unnamed king. Though it cannot be dated, either directly or by prosopography, there is no reason to assume that its chronological horizon differs from the other cases. No. 5 is dated to [x] Nbk, No. 6 to 7 Nbk, and No. 7 to 1 Nbk. After completion of the manuscript, Michael Jursa alerted me to an eighth possible exemplar found in the Spurlock Museum, Illinois. Indeed, a survey of the images in the CDLI resulted in the identification of SMUI 1913.14.1650 (P421501) as another case of the tally system discussed in this paper. The tablet's surface, however, is heavily eroded and not much can be extracted from the available image. A survey of the Spurlock Museum tablets brought forth another interesting tablet, SMUI 1913.14.1727 (P421578), in which we find a notation similar to that discussed in appendix A of this paper. SMUI 1913.14.1650 was added as No.8* and SMUI 1913.14.1727 as appendix B. These two tablets are mentioned in the relevant sections below but are not discussed otherwise.

[3] See also Adkins 1956: 14–45 for the different kinds of tally systems.

[4] While this usually means one mark equals one object, it may also be that one mark represented a fixed number of objects, say ten; see Adkins 1956: 15.

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- "**Chunking**: The structuring of long strings of information in groups, *usually of three to five elements*, to aid in comprehension" (Chrisomalis 2010: 435, emphasis mine).[5]

Graphically, the basic principle in all the cases presented here is the sequence of three triplets of vertical wedges followed by a Winkelhaken. To illustrate, figure 1 presents the first two lines of GC 2, 364 as copied by Dougherty,[6] and an image of the tablet itself:[7]



Fig. 1. GC 2, 364, hand-copy and photo

Since, as will be seen below, the vertical wedges (𒁹) and the Winkelhaken (𒌋) do not necessarily represent the expected numerical values of 1 and 10 (respectively), it is better to transliterate the above sequence as follows:

||| ||| |||<
||| ||| |||<

First to be discussed are the two YOS 24 tablets, in both of which the numerical values of | and < correspond to the 1 and 10 (respectively).[8] This will establish the basic principle behind the system and allow us to further examine additional cases and variants of this practice.

Texts

1. YOS 24, 202 (NCBT 948)

This administrative tablet is an undated accounting inventory,[9] recording sums of outgoing silver. The tablet can be roughly dated to the first half of the reign of Nebuchadnezzar based on prosopography.[10] At the top of the tablet, we find the following underlined heading:

1. kù.babbar *šá a-na su-uʾ-ut-ʳti¹*
2. *a-na* ^{lú}gal 10^{meš} *šá a-na* [×]
3. *šá* ^{uru}é-^{I}*da-ku-ru il-l*[*i-ku*]

Silver for the support (money given) to the decurions, who went to Bīt-Dakūri:

The main part of the text, lines 4–30, lists each of the 27 decurions with their respective quantities of silver: 10 gín (shekels) PN.[11] This is followed by a common *napḫaru* note:

31. ʳpap 27¹ ^{lú}gal 10^{meš}
Total of 27 decurions

In the final line (32, figure 2) of the tablet we find the following sequence:[12]

[5] See also Chrisomalis 2020: 49–52.

[6] As will be seen below, Dougherty's copy is inaccurate in several places, and thus a new hand-copy of the tablet is presented below.

[7] The photo is available at https://collections.peabody.yale.edu/search/Record/YPM-BC-034424.

[8] For the full editions, see Levavi/Payne forthcoming (YOS 24).

[9] An accounting inventory is an "extended" inventorial note, containing additional information regarding origin, destination, or more elaborate calculations (compared to a simple inventory note) of listed items; see Levavi/Payne forthcoming.

[10] Note, for example, the (dateable) attestations of the following individuals among the decurions listed in our text: Aḫu-lūmur/Nabû-aḫu-ēreš: PTS 2267 (17 Npl), YBC 9407 (17 Nbk); Nanāya-uṣalli/Ṭāb-Uruk: YBC 9407 (17 Nbk), UCP 9/2, 25 (28 Nbk), YBC 4119 (34 Nbk), PTS 2035 (36 Nbk); Nergal-ēṭir/Nabû-erība: PTS 2267 (17 Npl), NCBT 995 (18 Npl); Rēmūtu/Aḫu-ēreš: YBC 9407 (17 Nbk); and see commentary in Levavi/Payne forthcoming.

[11] Only twenty-one of the lines are preserved. The precise reconstruction of twenty-seven is based on the clear total given in line 30, and further validated by the tally in line 31; see below.

[12] This hand-copy, prepared by the author, is not the one presented in YOS 24 (no. 202), which was prepared by E. Payne. The two copies differ *only* in stylistic choices.

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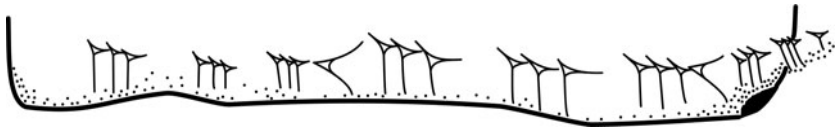


Fig. 2. YOS 24, 202: 32

As noted above, we can transliterate line 32 as follows: 𒐗 𒐗 𒐗 < 𒐗 𒐗 𒐗 < 𒐗 𒐗 𒐕. If we read vertical wedges as 1's and Winkelhakens as 10's, adding it all up comes out as 45. This is clearly nonsensical since only 27 decurions are totalled in the tablet. It also does not correspond to the 270 shekels of silver distributed to these men. In order to get 27 from this sequence of wedges and Winkelhakens, we should read this notation as a base-10 tally. The vertical wedges are chunked in triplets in a one-to-one correspondence. Then, a Winkelhaken "closes" each such sequence marking 10. Importantly, this is not followed by 11, 12, etc., but rather by another such series (full or partial), all of which add up to the final sum. The rationale behind this method is the same as the well-known and often used base-5 clustering: 𒐕 = 1, 𒐖 = 2, 𒐗 = 3, 𒐘 = 4, 𒐙 = 5. Read this way, we count: ten (111 111 111 10), plus ten (111 111 111 10), plus seven (111 111 1) = 27. Note that the scribe continues chunking in threes for the last seven wedges even though this last series does not reach ten. While this reading works for YOS 24, 202, the tablet presents us with just one such summary line, and the correspondence may be argued to be coincidental. The additional cases discussed below, however, confirm the reading of a base-10 tallying system.

2. YOS 24, 213 (NCBT 529)

The second tablet to be discussed, YOS 24, 213, is another accounting inventory, listing multiple transactions in silver, gold, and wool. Prosopography points to a chronological horizon similar to that of YOS 24, 202, early–mid Nebuchadnezzar.[13] Several transactions concerning quantities of wool are summarised with the help of our tallying method. Here are the relevant lines:

3'. ⌜𒐗⌝ 𒐗 𒐗 < 𒐗 𒐗 𒐗 <
4'. ⌜𒐗⌝ 𒐗 𒐗 < pap 30 gun sík.ḫi.a
111 111 111 10, 111 111 111 10, 111 111 111 10; total of 30 talents of wool

15'. 𒐗 𒐗 𒐕½ pap 7 ½ gun
111 111 1½, total of 7½ talents

21'. 𒐗 𒐕 pap 4 gun …
111 1; total of 4 talents …

23'. 𒐗 𒐖 pap 5 gun …
111 11; total of 5 talents …
25'. 𒐗 𒐖 pap 5 gun …
111 11; total of 5 talents …

In the first case, lines 3'–4', we find three series, each made out of three triplets plus a Winkelhaken; and indeed, the total which follows counts 30 talents (of wool). None of the other tallies reach ten, so no Winkelhakens are used, but there is still clear chunking in triplets in all cases. In the case of line 15', we see seven wedges arranged in two triplets plus one single, and then a ½ is added to count a total of 7½. In line 21' we have one triplet plus one for a total of four, and lines 23' and 25' each have a triplet plus a pair to mark five.

3. GC 2, 187 ([x].VII.15, no RN)

The text is a memorandum, as is clear from the use of the first person plural *nindašaḫ* 'we have measured' in line 5. It is dated to year 15 of an unnamed king. If Nabû-zēru-iddin/Ša-Nabû-šū is to be identified as the farmer (*ikkaru*) listed in YBC 4000 (edited in Janković 2005: 169–170),

[13] Note especially Nādinu/Marduk, the goldsmith, who is attested between 20 Npl (GC 2, 39) and 35 Nbk (PTS 2792), and possibly Nabû-erība/Bullutāya who may be identified in YOS 17, 41 (12 Nbk); see commentary in Levavi/Payne forthcoming.

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dated to 34 Nbk, then it would be reasonable to date the present text to the reign of Nebuchadnezzar as well. An individual by that name is also attested in FLP 623 (unpublished), which is dated to late Npl–early Nbk, based on prosopography.[14] Although Dougherty's copy is accurate regarding the signs themselves, it does not properly present the layout of the text on the tablet, especially as regards the gap between lines 1 and 2, the significance of which is discussed below. A new copy of the obverse and the lower edge is therefore presented below (figure 3); the uninscribed reverse is omitted.[15]

Obv	||| ||| ||| <
	(gap)
	3[sic] gur še.bar *maš-šiḫ-ḫi*
	šá $^{\text{Id}}$+ag-numun-mu
	a $^{\text{I}}$*šá*-$^{\text{d}}$pa-*šú-u*
5.	*ni-in-da-šaḫ*
	$^{\text{iti}}$du$_6$ ud.[x.kam]
Lo.E	mu.15.[kam]

(1) ||| ||| ||| <

(2–7) We have measured *3* kors in the *maštḫu*-measure of Nabû-zēru-iddin/Ša-Nabû-šū. [x].VII.15.



Fig. 3. GC 2, 187

The tally system at the head of the tablet clearly parallels the above cases. The problem, however, is its relation to the rest of the text, which is clearly dealing with only 3 kors of barley. It seems that the way to address the problem must be to disassociate line 1 from the rest of the text. This can be supported by two arguments. First, the clear gap between lines 1 and 2 should probably be taken as the scribe's way of disassociating the tally from the measured barley. Second, and perhaps of greater weight, is the fact that, unlike all other cases discussed in this paper, the three kors which follow the tally are not presented as the total (pap, *napḫaru*) of anything else. As an ephemeral and brief "note-to-self", the existence of two unrelated entries, or at least not co-dependent ones, is neither uncommon nor problematic in the administrative context of the tablet.

4. GC 2, 364 (27.III.09 no RN)

The next tablet presents us with a variation to the tally system seen so far: each series adds up to 100 (rather than to 10). A quick glance at Dougherty's copy in GC 2 makes it clear that the same tally system was used on this tablet; it is easy to identify the rows of three triplets followed by a Winkelhaken. On further inspection of Dougherty's copy, however, several unexpected figures and signs are detected. This is especially true for the obverse, where our familiar tally system is immediately recognisable, but is accompanied by several "additions", signs which seem to make little sense. Collation of the tablet proves unequivocally that *all* of these cases are in fact erasures,

[14] Another Nabû-zēru-iddin/Ša-Nabû-šū is attested in BaM 5, 4, dated to the reign of Šamaš-šumu-ukīn. This must be a different individual.

[15] A photo of GC 2, 187 is available at ypm/nat/1850754 (m3) (yale.edu).

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some of which were half-heartedly executed.[16] This is especially true for those on the edges, where the scribe barely tried to erase the previous text. Even in these less successful erasure attempts, however, it is clear that the signs that raised our suspicion in Dougherty's copy are smaller, and do not properly align with the rest of the text. Given that collation of the text has resulted in several crucial corrections to the Dougherty's copy, a new hand-copy is presented below in order to make the new readings as clear as possible (figure 4).[17] While collation did resolve some textual matters, it should be noted that there are still problems with the text.

Obv.
|||| |||| |||| <
|||| |||| |||| <
|||| |||| |||| <
|||| |||| |||| <
5.
||| ||| ||| <
||| ||| ||| < {pap 1 me 40}
||| ||| ||| <
||| ||| ||| < {3 *ma-nu-ú*}
||| ||| ||| < {75}
10.
||| ||| ||| <
[]||| {x} ||| {x x} ||| <
[|||] {x} ||| ||| < {3 me}
LoE [|||] {pap} ||| ||| <
14. [|||] ||| ||| <
Rev [|||] ||| ||| <
[|||] ||| ||| <
˹|||˺ | {6 *ma-nu-ú*}
pap 1 lim ˹6*˺ me {2}
pap 4 me 11 (gur) 2 (pi) 3 (bán) še.bar
20. ˹*ḫaš-di-ia*
||| ||| ||| {6 *ma-nu-˹ú˺*}
^{itu}sig$_4$ ud.27.kam mu.9.kam

(1–16) (tallies) 100 (x16)
(17) (tally) *400*?
(18) Total of 1600.
(19) Total of 411;2.3 (kors) of barley.
(20) Ḫašdia.
(21) (tally) *90*(*0*)?
(22) 27.III.09

Commentary

17. This tally is separated from the preceding 16 lines based on the two summaries which follow. The figure 1600, line 18, clearly relates to lines 1–16. The four wedges of line 17, then, might be referred to in the sum given in line 19, just over four-hundred kors of barley; see below. This somewhat unclear notation should probably be seen in the context of the ephemeral and pragmatic nature of the text; it was meant for the scribe, and probably only the scribe, to make sense of it.

18. The sum of 1600 must refer to the sixteen series tallied above at lines 1–16.

19. The reason for the separation into two sums is unclear. Given that this second total is just above 400, it may be speculated that it correlates with the four wedges tallied in line 17. If this is indeed the case, however, it would mean that each wedge stands for 100, rather than 10 as in the previous lines of this tablet. While not impossible, this solution admittedly feels forced.

21. The nine wedges are not followed by a Winkelhaken. The chunking of the wedges in triplets suggests that this is tallying as well, though it does not seem to correspond to any other notation on the tablet.

[16] These are marked in {braces} in the copy below (figure 4), but with no *, which marks new *readings* based on the collation.

[17] My copy is based on the photo of the tablet taken by Klaus Wagensonner, which is available at https://collections.peabody.yale.edu/search/Record/YPM-BC-034424.

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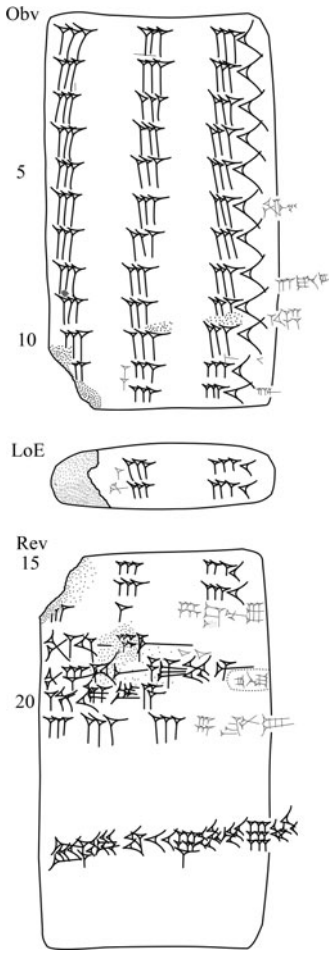


Fig. 4. GC 2, 364

5. NBC 4783 (20.I.[x] Nbk)

This previously unpublished tablet is a witnessed record of either the withdrawal or the delivery of dates (the verb in line 8 is broken) in lieu of barley; see figure 5 below. While the entire left side of the tablet is missing, the rows of triplets leave little doubt that we are dealing with the same tally system, and that each of the first five lines ended with a Winkelhaken.

As in the case of GC 2, 364 (no. 4 above), each of the five series add up to 100. This is established by the total of 498 (line 6), summarising the five lines of tallies above it; the minor difference between 500 (lines 1–5) and the total of 498 was presumably insignificant for the scribe (and for the witnesses for that matter).

Obv.	|||	|||	⌜||⌝[| <]
	|||	|||	⌜|⌝[|| <]
	|||	|||	||⌜|⌝	[<]
	|||	|||	|⌜||⌝	[<]
5.	|||	|||	|||	[(<)]
	pap 4 me 98 ⌜gur ⌜zú⌝.[lum.ma]			
	šá še.giš.ì *ina* šà-*bi šá* ⌜x⌝ […]			
	ᴵsum-*na-a* a ᴵ*ne-*⌜*e*⌝-[*šú* giš/igi-*ir*]			
Rev.	*i-na* gub ᴵ*ta-qi*[š-ᵈ*gu-la*]			
10.	a-*šú šá* ᴵ*ki-*⌜*rib*⌝-*t*[*u*]			
	ᴵ*e-an-na-li-pi*-pap			
	a ᴵ*ri-mut*			

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[d]u.gur-tin-*iṭ*[ⁱ] a [I]ba-[*šá-a*]
[d]+ag-gi a [I]*šu-zu*-[*bu*]
15. [I]mu-du a [Id]+ag-gi
[iti]bár ud.20.kam mu.[x.kam]
[d]+ag-níg.du-pap lugal ⌜tin⌝.[tir[ki]]

(1–5) 𒐖 𒐖 𒐖 < (×5, tallies)
(6–8) Total of 498 kors of dates for sesame, of which …; Iddināya/Nēšu [withdrew/received].
(9–17) (Written) in the presence of: Taqīš-Gula/Kiribtu, Eanna-līpu-uṣur/Rīmūt, Nergal-uballiṭ/Iqīšā[ya], Nabû-ušallim/Šūzu[bu], Šumu-ukīn/Nabû-ušallim. 20.I.[x] Nebuchadnezzar, king of Babylon.

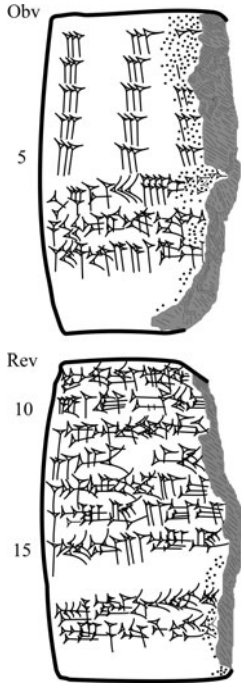


Fig. 5. NBC 4783

Commentary
8. For Iddināya/Nēšu see e.g., YOS 24, 55 (NCBT 147, 17 Nbk), VS 2, 37 (39 Nbk).
9–10. Taqīš-Gula/Kiribtu is further attested in e.g., UCP 9/1, 15 (2 Nbk), NCBT 93 (2 (Nbk[?])).
11–12. Eanna-līpu-uṣur/Rīmūt is further attested in e.g., YOS 17, 122 (3 Nbk), YBC 3525 (7 Nbk), YOS 17, 350 (12 Nbk), PTS 2491 (14 Nbk), PTS 2283 (21 Nbk).
13. Nergal-uballiṭ/Iqīšā[ya] is further attested in e.g., YOS 17, 306 (3 Nbk), NBC 4932 (6 (Nbk[?])).

6. UCP 9/1 II, 10 (14.VI[II].7 Nbk)
This is another tablet in which we find the same tally in a series of 100. For the problem of the sum listed in line 8 see commentary below.

Obv 𒐖 𒐖 𒐖 <
𒐖 𒐖 𒐖 <
𒐖 𒐖 𒐖 <
𒐖 𒐖 𒐖 <
5. 𒐖 𒐖 𒐖 <
𒐖 𒐖 𒐖 <
𒐖 𒐖 𒐖 <
pap 7[?]* me [giš]*ma-ši-ḫu*

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[…] ^{Id}+ag-[…]
10. [igi$^{?}$-*ir*$^{?}$]
Rev (upper part of the reverse was left blank)
^{iti}kin^{II}.kam ud.14.kam
mu.7.kam ^{d}+ag-níg.du-pap
lugal e^{ki}

(1–7) (tallies)
(8–10) Total of 700$^{!}$ measures, [*received from*] Nabû-[…].
(11–13) 14.VI^{II}.7 Nebuchadnezzar, king of Babylon.

Commentary
l. 8 Lutz's copy reads: pap 6 me. The tallies above, however, add up to 700 (rather than 600). Collation of the tablet's photo in the CDLI (P248210) suggests that some additional damage to the tablet has occurred since Lutz's copy was made. The signs in question were at the edge of the damaged part, and it is reasonable to assume that some further clay has crumbled with time. As such, although the reading 7 is possible, it is difficult to offer a solid reading. If Lutz's copy was indeed accurate, then it should probably be seen as scribal error. Given that the relationship between the tallies and the sum in line 8 was not clear at the time, however, a copyist mistake is slightly more probable.

7. UCP 9/1 I, 13 (27.V.01 Nbk)

The last tablet to be discussed undoubtedly contains the by now familiar tally system, though there are several textual difficulties which could not be resolved even after collation; see commentary below.[18] Despite these problems, this is another example of our tally system in which each series adds up to 100.

Obv. 𒌋 𒌋 𒌋 <
𒌋*$^{?}$ 𒌋 𒌋 <
𒌋 𒌋 𒌋 <
𒌋 𒌋 𒌋 <
5. 𒌋 𒌋 𒌋 <
𒌋 pap 5 me 25
^{dug}*ma-šiḫ šá* še.bar
Rev. ^{Id}+ag-mu-dù
a-*šú šá* ^{Id}+en-dù-*uš*
10. igi-*ir*
^{iti}ne
ud.27.kam
mu.1.kam
^{d}+ag-níg.du-pab
15. lugal e^{ki}

(1–6a) (tallies)
(6b–10) Total of 525 measures of barley were received from Nabû-šumu-ibni/Bēl-īpuš.
(11–15) 27.V.01 Nebuchadnezzar, king of Babylon.

Commentary
l. 2, 4. Lutz's copy has two wedges (rather than three) in the first batch of each line. Collation shows that while in line 2 the reading 𒌋 (rather than 𒌋) is possible, line 4 does seem to have two vertical wedges and not the expected three. However, collation also shows that each of these first batches is aligned to the right rather than to the left (as represented in the transliteration above). This is not to argue for a positional value, rather whatever the reason for the omission of the wedge, the tally in this line was still concluded and calculated in the same way as were the preceding and following tallies.

[18] A photo of the tablet is available in the CDLI s.v. P248182.

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l. 6 Assuming that the two vertical wedges, like the ones above, stand for 10 each, then the total of the tallying comes out 520; only five less than the actual recorded total of 525. Note that unlike the two verticals at the beginning of line 4, and possibly line 2, the two verticals in line 6 are clearly aligned to the left (as represented in the transliteration above).

8. SMUI 1913.14.1650*

As in all of the above cases, the tablet is written in a portrait format; see figure 6 below. Its bottom is broken and about 1–3 lines are missing. The obverse of the tablet is heavily eroded but it seems that it was filled with about 15 rows of our tally system. It is unknown whether the (now broken) bottom edge was inscribed. The tally rows, at any rate, continue on to the reverse. After nine tally rows on the reverse, a total is given followed by three more or less illegible lines of text. Then another two rows of tallies plus three verticals, and again a total is given. Due to the poor preservation of crucial parts of the text and the limited available image, the following copy is meant merely to present the overall layout of the tablet.

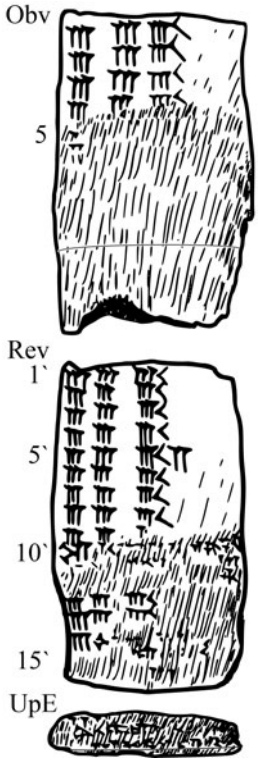


Fig. 6. SMUI 1913.14.1650

Discussion

The notation system identified in the cases above clearly differs from the well-known practices of first millennium Babylonia. While the cases are not identical to one another, all were written in portrait format, and there are several shared characteristics that clearly tie these tablets together in regard to content and context. In terms of context, all known cases stem from the Eanna archive, and all of the dateable tablets, whether dated directly or based on prosopography, point to the first half of Nebuchadnezzar's reign. Thus, while we cannot identify specific scribes, all of these tablets come from a relatively narrow bureaucratic context, whether they were produced by a single hand or multiple hands.

As for the tallied items, these are typical and commonly recorded items in the Eanna administrative apparatus: men (YOS 24, 202), wool (YOS 24, 213), dates (No. 5), and barley (GC 2, 187, GC 2, 364,

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UCP 9/1 II, 10(?),[19] UCP 9/1 I, 13). While some of the quantities of these items are certainly high (e.g., 30 talents of wool in YOS 24, 213 and 1600 (kors?) of barley in GC 2, 364), they are not unheard of in the Eanna archive. The tally system was thus *neither* meant (specifically) to deal with large quantities, *nor* was it used for a particular item. Overall, apart from the tally system itself, there is no clear exceptional administrative aspect connecting these tablets to one another. In fact, from an accounting perspective, these notations are redundant. They not only duplicate information that is registered on the tablet,[20] they also lack any specific data (names, dates, location, etc.).[21] In this respect, the tally has practically no value for future accounting. Added to this, the fact that, when compared to the given totals, some cases appear to be rough assessments rather than accurate figures raises the question of the added value and practicality of the system.

Yet it is precisely practicality which is the added value of the tally system. It allows the scribe to record multiple large figures quickly, which could then be easily calculated and summed up if necessary. The use of tallies of 10's or 100's allowed the scribe to evaluate totals quickly, while within each tally, the repeated use of chunking in triplets had a similar function. The triplets were used even in cases of lower totals, where the recorded items did not require several series; see YOS 24, 213: 15', 21', 23', 25'.[22]

This chunking in triplets clearly differs from the standard Babylonian notation system of the first millennium, in which groups of either three or four wedges are normally stacked vertically (in one, two, or three rows) to express the numbers 1–9.[23] In fact, given this standard notation system, it is surprising that such groupings of 3×3 "cubes", i.e. the notation for 9, are not used instead of the series of 𒐗 triplets.[24] Significant in this respect is that, notwithstanding writing apparatus and medium, a basically identical series of chunked triplets can be found in the Aramaic numeral notation system. Aramaic scribes used a series of vertical strokes, paralleling the Akkadian wedges, for the notation of 1–9; see Chrisomalis 2010: 70. It seems most likely, therefore, that the unique notation practice found in our tallies was the result of Aramaic influence.[25] Although not necessary for the argument, Aramaic chunking in triplets can even be found on clay tablets containing Aramaic dockets; e.g., YOS 6, 164 (6 Nbn, Lasūtu),[26] TCL 13, 139 (6 Cyr, Bīt-alpi), IMT 65 (27 Art I, Nippur), and BE 9, 47 (36 Art I, Nippur).[27] Given that chunking in triplets seems to be an Aramaic characteristic, it may be argued that the tallied figures were extracted from an Aramaic original, and the chunking is in fact the result of this copying. The practice of extracting data from Aramaic parchments to clay tablets is recorded, for example, in YBC 3504, *ul-tu* ^{kuš}*na-a-a-ru šá* ^{lú}*se-pir šu-bal-kut* "copied from the parchment of the alphabet scribe" (lower edge, see Pirngruber 2017). While this scenario cannot be disproved, I find it less likely. First, none of the cases hint at an Aramaic document or an alphabet scribe. Second, while the above seven cases were not necessarily written by the same scribe, if the chunking in triplets was indeed the result of copying, we would expect to find these cases scattered chronologically and geographically wherever Aramaic was

[19] Barley is not mentioned in the surviving text, only the *maštḫu* measure.

[20] In all but one case, the tallies are accompanied by a total (*napḫaru*) recorded by the scribe. In the one case in which we do not find a separate total, GC 2, 187, it is assumed that the tally is unrelated, or at least not directly related, to the measured barley; see above.

[21] This lack of specificity is characteristic of tallying systems in general; see Henkelman and Folmer 2016: 158 in the context of the Bactrian tally sticks.

[22] The fact that humans (and other species) are able instantly to recognise groups of up to around four items without the need for actual counting is the basis of many tallying and numerical notation systems; see Chrisomalis 2020: 49–52 for literature and further examples.

[23] For an overview of the Babylonian notation system, see Chrisomalis 2010: 247–254.

[24] One tablet that may reflect such thinking is GC 2, 379; see appendix A below.

[25] The same is true for Phoenician, Egyptian hieroglyphic, and later also Nabataean (Chrisomalis 2010: 74, 79). The prominent status of Aramaic in the historical context of mid-first millennium Babylonia, however, makes it the most relevant in this respect.

[26] Dougherty's copy has 5 (kors), written /// //, though the Akkadian text clearly has 6. Zadok (2005: 561) indeed reads the Aramaic figure as 6, and he is followed by Streck 2017: 171, no. 45. An examination of the photo did not solve the issue, as it is difficult to separate the Aramaic numerals from some scratches on the tablet. While it seems the reading 6 should indeed be preferred, the important fact for present purposes is that the lines are clearly grouped in triplets.

[27] Note BE 8, 17 (34 Nbk, Immallat), in which we find another case of an Aramaic docket with numerical notation, though there is *no* chunking used by the scribe. I thank Rieneke Sonnevelt who collated the tablet.

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in use in first millennium Babylonia; i.e., more or less all over. Third, the practice of chunking cannot be disassociated from the tally system as a whole, as both the chunking and the tallying are unique.

Two interesting text groups in which we find "Aramaic tallying" should be mentioned here: the (earlier) Arameo-Assyrian lion-weights from Nineveh and the (later) Bactrian tally sticks.[28] Fourteen bilingual Arameo-Assyrian inscriptions are found on a group of lion-weights from 8th–7th century BCE Nineveh.[29] Note, for example, BM 91220 (Fales 1995 no. 1), in which we find the Aramaic numerical notation for 15 on its right flank clearly using chunking in triplets. Interestingly, no chunking is used in the corresponding 15 vertical strokes found on the left side of the same object.[30] A group of eighteen wooden tally sticks, some with accompanying Aramaic notes on them, were first published by Naveh and Shaked (2012) and extensively discussed by Henkelman and Folmer (2016). The tally marks are made of a series of notches which were incised into the wood (Henkelman and Folmer 2016: 161). As in the case of the Assyrian lion-weights, while the accompanying Aramaic notations kept the expected chunking in threes, no such grouping was used for the tally marks.

As interesting as these two cases are, it must be stressed that they are fundamentally different from the tallies used in the Eanna tablets discussed above. To the best of our understanding, both the lion-weights and the Bactrian tally sticks form a much more coherent group with a uniform format and purpose. That is, even if the lion-weights were not considered to be a single set, they certainly had the same function as one another, and this would be obvious to the clerks who used them. Similarly, Bactrian tally sticks, while certainly used for different counting events, would be identified as tally sticks (notwithstanding the obvious anachronism) by their contemporary bureaucrats. The cuneiform tablets discussed above, on the other hand, certainly share the general administrative context, but were never meant, or seen by their scribe(s), as a specific and coherent administrative dossier.

Conclusions

This paper identified and discussed a unique tally system, composed of a base series of nine vertical wedges, grouped in triplets, followed by a Winkelhaken: ||| ||| ||| <. The vertical wedges can stand for either 1 or 10, and the Winkelhaken concludes the series as either 10 or 100, respectively. The series is then repeated according to need, without change or indication of the running total. The distinctive chunking in triplets is a key aspect of our tally system, and it is kept even in tallies lower than ten. This feature should probably be seen as the result of influence from the Aramaic notation system, which uses parallel triplets of strokes (instead of the Akkadian wedges). This system is so far attested only in administrative tablets from the Eanna from the first two decades of the reign of Nebuchadnezzar. It cannot be said whether all texts were written by a single scribe, but it is clear that all known examples come from the same administrative milieu. The attested cases concern a variety of mundane day-to-day temple dealings, and there is no specific/unique administrative context that can be assigned to our tally system. It seems that it did not serve a specific function in the Eanna archive, but was rather the ad hoc solution of a creative scribe.

Administrative texts are often thought of as merely a source of quantifiable data. More often than not we cannot pinpoint their context and a solid comprehension of the tablets seem to be floating always slightly out of our reach. They lack the lively narrative aspect that may be easier to associate with legal texts and letters, but beyond the data, administrative texts reveal how the scribes organised their world. They illustrate how they dealt with and resolved abstract problems from a very practical perspective. The tally system discussed above was helpful in various scenarios a scribe could face. It is a flexible system which was useful for large estimations (1600, GC 2, 364) but could also be adopted for smaller accurate figures (7½, YOS 24, 213), all simple to mark and

[28] For a discussion of both groups in the context of tallying and numeral notation systems, see Chrisomalis 2020: 170–174.

[29] See Fales 1995 with previous literature. Two additional lion-weights complete a total of sixteen items belonging to this group. Of the two additional weights, BM 91224 (Fales 1995 no. 15) has two vertical strokes on its left flank, which correspond to the two minas mentioned in the accompanying Akkadian inscription. The second weight, BM 91225 (Fales 1995 no. 16), bears no writing or marks at all.

[30] Fales' drawing includes the Aramaic version on the right side (1995 fig. 1) but not the 15 strokes on the left (the same holds for Chrisomalis 2020 Fig. 6.13); these can be seen in the image available on the British Museum webpage (https://www.britishmuseum.org/collection/object/W_1848-1104-66).

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quickly recognisable. While further examples are very likely to be recognised in the future, it seems that this clever practical trick did not catch on, and was only a local and short-lived episode.

Appendix A: GC 2, 379

This undated Eanna tablet first drew the present writer's attention due to its unique, and still unclear, notation marks. It quickly became clear, however, that it is not part of the small dossier discussed in this paper. Whatever notation or tallying is used in GC 2, 379, it differs from the cases above. Nonetheless, due to its uniqueness, and the hope that it may spark further discussion, the tablet is presented below with a few added notes.

Dougherty's copy is not too inaccurate concerning the signs on the obverse, which is where we find the peculiar notation, but the overall layout of the tablet is misrepresented. A new copy is thus presented below (alongside the original); figure 7. Despite first impressions, both the obverse and the reverse of the tablet are copied by Dougherty in GC 2, though only half of each is represented. Additionally, the copy fails to indicate that the tablet is not flipped vertically as is the standard, but the reverse is written at a 90° angle to the obverse. On the obverse, above and below the text, there are faint scratches that were caused after the clay was dry. The edges of the tablet appear slightly flattened, as if the tablet was rolled like a wheel along a hard surface. The reverse appears to have been erased, and is in any case not related to the obverse. A comparison of Dougherty's copy with the new, collated, copy below will show this most clearly.[31]

As noted, this tablet clearly differs from the ones discussed above. Here we have three rows of three verticals stacked upon each other, a 3×3 "cube", with a closing horizontal at the bottom (rather than a row of three triplets followed by a Winkelhaken). I suggest a tentative transliteration of the obverse as:

Obv. 

pap 1 me še.bar *a-na* ^{lú}sipa mušen$^{ḫi.a}$

Translation:

(1–2) tallies

(3) Total of 100 (kors$^{?}$) for the bird-herder.

The understanding of the four clusters in lines 1–2 as tallies is, at least partially, intuitive, as I am not aware of a similar contemporary parallel.[32] Additionally, it is difficult to see how these four clusters could be reconciled with the sum of 100 in line 3. I would argue, we are indeed dealing here with tallying, even though it may not correspond to the following total of 100.[33]

First, regardless of whether these are tallies, it is clear that the four clusters do not conform to any contemporary notation practice. Whatever, and however, the scribe was counting on this tablet, he was not following standard notation. Surprisingly, striking parallels, at least graphically speaking, are found in a group of Middle-Assyrian texts recording daily offerings;[34] Postgate (2013: 101, notes 32 and 33) lists MARV 7.46, MARV 5.57, 7.22, 7.61, 8.13, 8.27, 8.30, 9.16, 10.86, 10.88.[35]

[31] A photo of the tablet is available at https://collections.peabody.yale.edu/search/Record/YPM-BC-034427

[32] As noted, the tablet is undated, and there is no prosopography to narrow down its chronological horizon beyond Long-sixth-century Eanna; the only clear piece of information regards the 100 (kors?) given to the bird-herder(s) in line 3. The same amount of barley is reported to have been given as fodder to bird-herders in Bīr-bārî in 2 Cyr (537 BCE): (15) $^{I.d}$+ag-šeš-mu a ^{I}*ḫar-ra-ṣu iq-bi um-ma* (16) 100 gur še.bar *ina* šu^{II} ^{I}dù-*ia* a ^{I}*bul-luṭ-a* (17) *ina* ^{uru}é-^{lú}ḫal *ki-i am-šu-hu a-na ki-is-sa-ti* (18) *a-na* ^{lú}sipa^{meš} *šá* mušen$^{ḫi.a}$ *at-ta-din* (YOS 7, 22, written in Uruk, 29.IX.02 Cyr). This rather general and random correlation is of insufficient weight to use as proof and there is no reason to assume that the same transaction is meant.

[33] The simplest assumption would be that each cluster stands for 10 units, thus altogether 40, and that it counts the same units as the 100 in line 3, hence the two figures are in conflict with one another. It must be stressed, however, that this is by no means the only way to read the tablet. It is certainly possible, for example, that lines 1–2 count one unit, while line three refers to another unit. Given that barley is measured, *kurru* and *mašīḫu* are the obvious suspects; the standard *mašīḫu* in Uruk was of 1 *pānu* (36 liters), i.e. 1 *kurru* (180 liters) = 5 *mašīḫu*. Additionally, as in the case of the tally system discussed in this paper, each cluster might represent 100 rather than 10. If lines 1–2 add up to 400 *mašīḫu*s, then it would only be one cluster short of the 100 in line 3, counting *kurru*s. This is certainly not an elegant solution, but it is a reminder that the administrative and practical rational behind many short laconic records is often out of our reach.

[34] I am in debt to S. Chrisomalis for pointing out these cases to me.

[35] Images of VAT 15426 and MARV 7.46 are included in Maul 2013: 567; a hand-copy of the latter is included in Postgate 2013: 100 (Fig. 4.7).

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TABLE 1. Summary of data in the texts discussed.

	Counting	*Amount*	𒐕 =	𒌋 =	*Date*	*Hand-copy included*
1. YOS 24, 202	men	27	1	10	early-mid Nbk	no
2. YOS 24, 213	wool	multiple cases max 30 talents	1	10	late Npl–mid Nbk	no
3. GC 2, 187	barley(?)	uncertain	1?	10?	15 (Nbk)	yes
4. GC 2, 364	barley	1600 + (kors)	10	100	9 (*Nbk*)	yes
5. NBC 4783	dates	498 kors	10	100	20.I.[x] Nbk	yes
6. UCP 9/1 II, 10	barley(?)	700	10	100	14.VI^{II}.7 Nbk	no
7. UCP 9/1 I, 13	barley	525 kors	10	100	27.V.01 Nbk	no
8* SMUI 1913.14.1650	?	?	?	?	?	preliminary

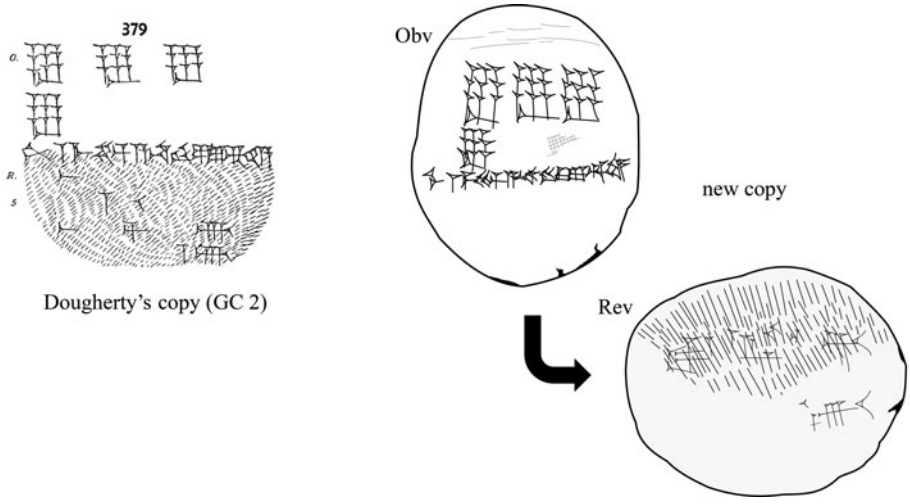


Fig. 7. GC 2, 379

Given the hundreds of years separating these texts from GC 2, 379, as well as the fact that these are Assyrian rather than Babylonian tablets, no direct connection can be made between the cases. Nonetheless, this Middle Assyrian tally system does demonstrate that such systems were a repeatedly developed innovation in cuneiform, thereby lending support to our interpretation of the Late Babylonian Uruk text as such a development. As in the case of the main tally system discussed in this paper, the identification of additional exemplars will potentially widen the currently narrow chronological horizon and allow us a better understanding of these practices and their administrative context.

Appendix B: SMUI 1913.14.1727

As noted above, after submission of the manuscript, a similar notation practice was identified on another tablet, SMUI 1913.14.1727 (P421578) from the Spurlock Museum. A preliminary copy and the basic notes below are not to be taken as a proper edition.

Obv. 𒐐𒐐 𒐐𒐐 𒐐𒐐 𒐐𒐐 𒐐𒐐
𒐐𒐐 𒐐𒐐 𒐐𒐐 𒐐𒐐 𒐐𒐐
𒐐𒐐 𒐐𒐐 𒐐𒐐 𒐐𒐐 𒐐𒐐

Rev. [(x)] {*10 3 1 2*} ⌜1⌝ me 8 gur še.bar *ina* 2 gur RA AM
[x] me 60-*šu* 3 gur *ul-tu* é
[x] me 50 gur 1 ban 3 qa ^{I}*kal-ba-a*

Commentary

2. Note that the last group has only six verticals.
2a. The small wedges below line 2 are smaller than the rest of the signs, but there is no sign of erasure.
3–4. The text deals with quantities of barley probably taken from the temple.
5. The only personal name attested on the tablet is Kalbāya.

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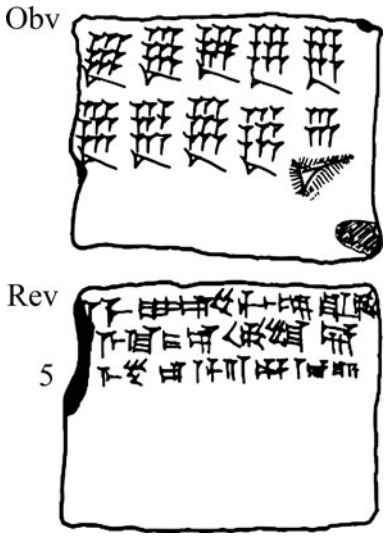


Fig. 8. SMUI 1913.14.1727

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نظام العد في إينا Eanna
يوفال ليفافي
جامعة فيينا

الملخص
تصف المساهمة الحالية نظام عد وفرز فريد من نوعه لم يتم التعرف عليه من قبل موجود على الرقم البابلية المتأخرة من أرشيف معبد إينا Eanna. تتكون الأرقام من سلسلة من تسعة أسافين عمودية ، منظمة بمجموعات ثلاثية يليها اسفين معقوف Winkelhaken. يمكن أن تمثل الأسافين الرأسية إما رقم 1 أو 10 ، ويختتم الأسفين المعقوف Winkelhaken كل سلسلة إما كرقم 10 أو 100 على التوالي. هذا ولقد تم لحد الآن توثيق هذا النظام فقط على الرقم الإدارية من إينا Eanna من العقدين الأولين من حكم نبوخذنصر الثاني (حوالي 604–585 قبل الميلاد). وفي حين أن نظام العد نفسه فريد من نوعه ، فإن التجميع أو التقسيم الرأسي في مجاميع ثلاثية يشير إلى تأثير آرامي.

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