BOOKKEEPING PRACTICES FOR AN INSTITUTIONAL HERD AT EANNA

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Introduction

NBC 4897 is a two-dimensional ledger[1] summarizing the annual growth of an institutional herd of sheep and goats, their respective yields of wool and goat hair, and the number of hides and the number of animals given as wages, from the thirty-seventh year of Nebuchadnezzar II to first year of Neriglissar.[2] The tablet, dated to 559 B.C., the first year of Neriglissar, is from the Eanna archive and measures 122 × 188 × 32 mm; it is essentially complete and in good condition though it has been repaired and a piece of the reverse is missing. We are grateful to Professor W. W. Hallo, Curator of the Yale Babylonian Collection, for permission to publish this tablet.

NBC 4897 is a product of administrative routine but its interpretation is hampered by miscalculations and mistakes in the text. If we had the complete file to which such texts belong, we would have a better understanding of the policies and practices of sheep and goat husbandry of the Eanna temple in Uruk in the Neo-Babylonian—Achaemenid period. The colophon shows that the tablet deals with the accounts of herdsmen responsible to administrators of the Eanna temple. The text, dated to Simânu, is part of the accounting related to the *amirtu* 'inspection', occasioned by the sheepshearing in the spring of 559 B.C. (Kraus 1966: 47; Postgate and Payne 1975: 4). An inventory of the number of animals in the herd belonging to Eanna was stipulated and agreed to by the temple authorities and the *nāqidu* 'herdsman (contractor)' (Finkelstein 1968: 31; Postgate and Payne 1975: 8–9; Postgate 1992: 159–61; see San Nicolò 1949: 302–6).

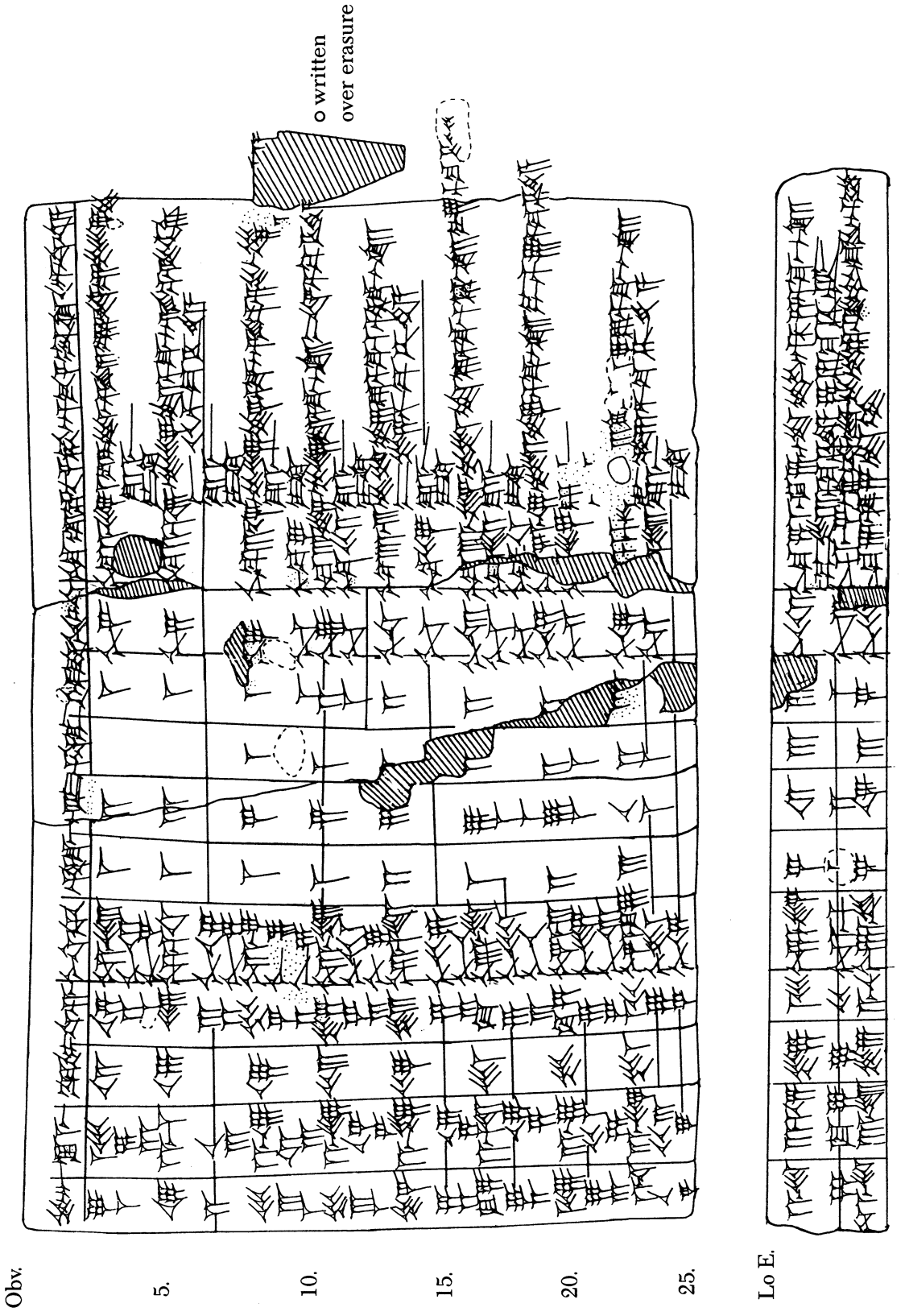
Growth of the Herd

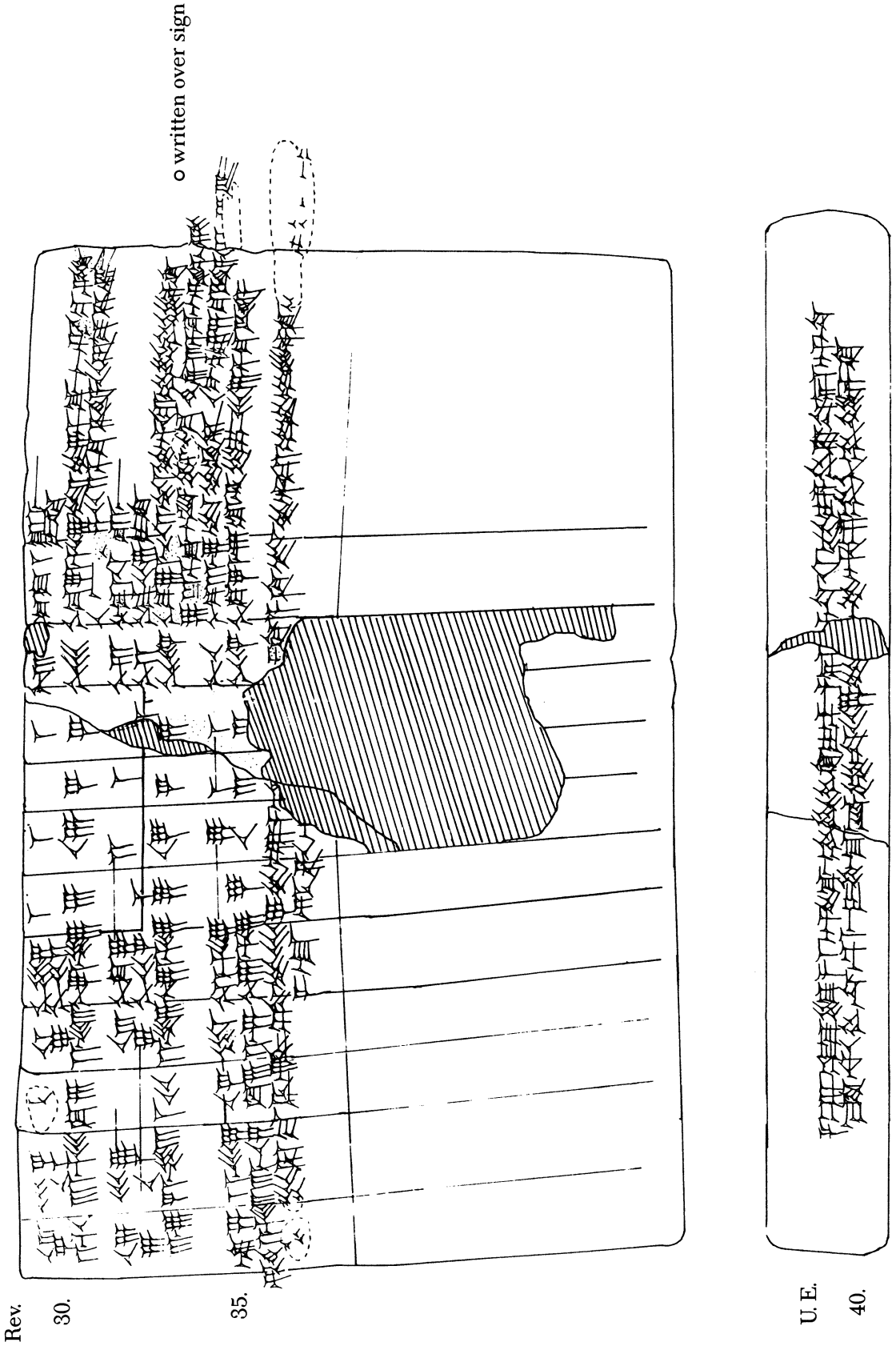
The text shows that Nabû-aḫḫē-šullim, the descendant of Nabû-šum-iškun, the herdsman, enlarged a small herd of 137 sheep and goats into 922 animals, which in practice could only have been herded by several shepherds (*rēʾû*).[3] Though he is mentioned only in the first dated entry, we may assume that all further evidence also refers to his responsibilities. The tablet deals with the regular growth of a herd from one year to the next (see Postgate and Payne 1975: 2–3); however, in the accession year of Amēl-Marduk, the size of

1. Sol Hartman (C.P.A.) noted in private communication that this form of record-keeping involves accumulating data with cross-footing the accounts in order to prove that all entries are accounted therein.

2. The text was first published by Sack 1979. Van Driel presented a preliminary version of NBC 4897 at the meeting of the Sumerian Agriculture Group on sheep and goats at Barcelona in 1990. Nemet-Nejat, in preparing *YOS* 16, provided a new copy with transcription and translation to which she added the introductory material, references and notes for this article. van Driel explained the bookkeeping practices and calculations for herd growth and wool production in this joint project. Since the authors' interpretation differs considerably from the pioneering efforts of Sack, a new edition was warranted.

3. Old Babylonian contracts between owner and shepherd described the composition of the flocks and the conditions of employment. The actual size of a herd varied from 4 to over 200 animals (Postgate 1992, 159).





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pu-ḫal	ʳU$_8$.ʾME	ka-lum	par-rat	PAB BAB-BAR-ti	MÁŠ.GAL	ÙZ	MÁŠ.TUR	munusÁŠ. GÀR	PAB GE$_6$-ti	PAB-ma ṣe-e-nu NÍG.GA ^{d}GAŠAN šá UNUG.KI u ^{d}Na-na-a
7	90	12	15	PAB 133	1	2		1	PAB 4	PAB-ma 137 ^{Id}AG.ŠEŠ.ME.GI A ^{Id}AG.MU.GAR-un MU.37.KAM
1	6		2	PAB 12						KUŠ.ME
	3		1	PAB 4						i-di
18	101	16	36	PAB 171	1	3		1	PAB 5	PAB-ma 176 MU.37.KAM 2 BAR.GAL ina gi-iz-zi IGI-ir 1 (GÚ) 20½ MA SÍK.ḪI.A
2	10		3	PAB 15						KUŠ.ME
	3		2	PAB 5						i-di
30	119	18	40	PAB 207	1	4	1	1	PAB 7	PAB-ma 214 MU.38.KAM 4 BAR.GAL ina gi-iz-zi 1 (GÚ) 50 [MA SÍK.Ḫ]I.A
3	12		4	PAB [1]9						KUŠ.ME
1	3		2	PAB 6				1	PAB 1	PAB-ma 7 i-di
40	138	23	45	PAB 246	1	5	1	2	PAB 9	PAB-ma 255 MU.38.KAM! 2 BAR.GAL ina KI.MIN 2 (GÚ) 24½ MA SÍK.ḪI.A
3	14		4	PAB 21				1	PAB 1	PAB-ma 22 KUŠ.ME
1	4		3	PAB 8						i-di
54	158	27	53	PAB 292	2	6	1	2	PAB 11	PAB-ma 303 MU.41.KAM 6 ^{UDU}BAR.GAL 1 MÁŠ.GAL ina KI.MIN 2 (GÚ) 45½ MA SÍK.ḪI.A
5	16		5	PAB 26			[1]		PAB 1	PAB-ma 27 KUŠ.ME
2	5		3	PAB 10						i-di
68	182	31	60	PAB 341	1	8	2	2	PAB 13	PAB-ma 354 MU.41.KAM 1 ^{UDU}BAR.GAL 1 U$_8$ ina KI.MIN 4 (GÚ) 8½ MA <SÍK.ḪI.A>
7	18		6	PAB 31		1			PAB 1	PAB-ma 32 KUŠ.ME
2	5		3	PAB 10		1			PAB 1	PAB-[m]a 11 i-di
89	209	40	65	PAB 403	2	9	2	2	PAB 15	PAB-[m]a 418 MU.42.KAM 7 BAR.GAL ina KI.MIN 5½ (GÚ) 9½ MA SÍK.ḪI.A
8	21		6	PAB 35		1	1		PAB 2	PAB-ma 37 KUŠ.ME
3	6		4	PAB 13						[i-di]

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111	237	41	80	PAB 469	3	10	2	[3]	PAB 18	[PAB-ma 487 MU.43.KAM] 3 UDU {erasure} 7 ^{UDU}BAR.GAL ina KI.MIN 7 GUN 1½ MA SÍK.ḪI.A
10	23		8	PAB 41		1	1		PAB 2	[PAB-m]a 43 KUŠ.ME
4	7		4	PAB 15						i-di
131	275	48	90	PAB 544	4	12	3	3	PAB 22	PAB-ma 566 MU.1.KAM LÚ.^{d}ŠÚ 5 BAR.GAL ina KI.MIN 8 (GÚ) 43½ MA SÍK.ḪI.A 8⅚ MA SÍK.ÙZ
5	68	8	20	PAB 101		2		1	PAB 3	PAB 104 ina ir-bi šá ITI ŠE MU SAG NAM.LUGAL.LA LÚ.^{d}AMAR.UTU
PAB: 131	343	56	110	PAB 640	4	14	3	4	PAB 2[5]	PAB-ma 665 MU.1.KAM
13	34		11	PAB 55	1	1		1	PAB 3	PAB-ma 61 KUŠ.ME
4	11		7	PAB 22						i-di
170	390	66	193	PAB 759	6	16	4	4	PAB 30	PAB-ma 789 MU.2.KAM 5 BAR.GAL ina gi-iz-zi {KI.[MIN]} 11 [GU]N 22½ MA SÍK.ḪI.A 20⅚ MA SÍK.ÙZ
16	39		13	PAB 68		2	1		PAB 3	PAB-ma 71 KUŠ.ME
6	11		7	PAB 24	1			1	PAB 2	PAB-ma 26 i-di
209	453	80	146	PAB 888	8	17	4	5	PAB 34	PAB-ma 922 MU.1.KAM ^{d}UGUR.LUGAL.URÙ LUGAL TIN.TIR.KI 9 ^{UDU}BAR.GAL ina UNUG.KI! ma-ḫi-ir 3 BAR.GAL ina gi-iz-zi
ina ŠÀ 5	198	14	51	PAB 198		8	1	1	PAB 10	PAB-ma 208 MU.1.KAM am-ru 14 GUN 5 MA SÍK.ḪI.A 1[0 MA SÍ]K.ÙZ
re-ḫi 193	315	66	105	PAB 679	7	10	3	⌜4⌝	PAB 24	PAB-ma 703 ṣe-en 58 (GÚ) 36½ MA SÍK.ḪI.A

40⅚ MA SÍK.ÙZ TA MU.37.KAM ^{d}AG.NÍ.D[U.URÙ LUGAL TIN.TI]R.KI! a-di MU.1.KAM ^{d}UGUR.LUGAL.URÙ LUGAL TIN.TIR.KI
šá la re-ḫa-n[u . . .]

U.E. NÍG.ŠID ép-šu-tu šá ^{Id}KUR.GAL.LUGAL.URÙ LÚ.qí-i-pi šá É.[A]N.NA u ^{I}NUMUN(!)-ya LÚ.ŠÀ.TAM É.AN.NA
it-ti LÚ.na-GAD.ME i-pu-šu ITI.SIG$_4$ U$_4$.28.KAM [MU].1.KAM ^{d}UGUR.LUGAL.PAP LUGAL TIN.TIR.KI

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rams	ewes	male lambs	young ewes	total: white animals	full-grown he-goats	she-goats	male kids	female kids	Total: black animals	Grand total: sheep and goats, the property of the Lady-of-Uruk and Nanâ
7	90	12	15	total: 133 **124**	1	2		1	Total: 4	Grand total: 137, Nabû-aḫḫē-šullim, the descendant of Nabû-šum-iškun, the 37th year.
1	6		2	total: 12 **9**						hides,
	3		1	total: 4						wages.
18	101	16	36	total: 171	1	3		1	total: 5	Grand total: 176, the 37th year, he received 2 lambs with shearings of 1 talent 20½ minas of wool.
2	10		3	total: 15						Hides, wages.
	3		2	total: 5						
30	119	18	40	total: 207	1	4	1	1	total: 7	Grand total: 214, the 38th year, 4 lambs with shearings of 1 talent 50 [minas of wool]
3	12		4	total: [1]9						Hides
1	3		2	total: 6				1	total: 1	Grand total: 7, wages.
40	138	23	45	total: 246	1	5	1	2	total: 9	Grand total: 255, the 38th year, 2 lambs, likewise, 2 talents 24½ minas of wool.
3	14		4	total: 21				1	total: 1	Grand total: 22 hides, wages.
1	4		3	total: 8						
54	158	27	53	total: 292	2	6	1	2	total: 11	Grand total: 303, the 41st year, 6 lambs, 1 full-grown he-goat, likewise, 2 talents 45½ minas of wool.
5	16		5	total: 26			[1]		total: 1	Grand total: 27 hides, wages.
2	5		3	total: 10						
68	182	31	60	total: 341	1	8	2	2	total: 13	Grand total: 354, the 41st year, 1 lamb (and) 1 ewe, likewise, 4 talents 8½ minas ⟨of wool⟩
7	18		6	total: 31		1			total: 1	Grand total: 32 hides
2	5		3	total: 10		1			total: 1	Grand total: 11, wages.
89	209	40	65	total: 403	2	9	2	2	total: 15	Grand total: 418, the 42nd year, 7 lambs, likewise, 5½ talents 9½ minas of wool.
8	21		6	total: 35		1	1		total: 2	Grand total: 37 hides
3	6		4	total: 13						wages.

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111	237	41	80	total: 469	3	10	2	[3]	total: 18	Grand total: 487, the 43rd year, 3 ⟨ewes⟩ (and) 7 lambs, likewise, 7 talents 1½ minas of wool.
10	23		8	total: 41		1	1		total: 2	Grand total: 43 hides,
4	7		4	total: 15						wages.
131	275	48	90	total: 544	4	12	3	3	total: 22	Grand total: 566, the 1st year of Amēl-Marduk, 5 lambs, likewise, 8 talents, 43½ minas of wool (and) 8⅚ minas of goat hair.
5	68	8	20	total: 101		2		1	total: 3	Total: 104 as income from the month of Addaru, the accession year of Amēl-Marduk
Total: 131	343	56	110	total: 640	4	14	3	4	total: 2[5]	Grand total: 665, the 1st year.
13	34		11	total: 55 **58**	1	1		1	total: 3	Grand total: 61 hides, wages.
4	11		7	total: 22						
170	390	66	193	total: 759 **819**	6	16	4	4	total: 30	Grand total: 789, the 2nd year, 5 lambs with shearings, {likewise}, 11 talents, 22½ minas of wool (and) 20⅚ minas of goat hair.
16	39		13	total: 68		2	1		total: 3	Grand total: 71 hides.
6	11		7	total: 24	1			1	total: 2	Grand total: 26, wages.
209	453	80	146	total: 888	8	17	4	5	total: 34	Grand total: 922, the 1st year of Nergal-šarra-uṣur, king of Babylon, 9 lambs in Uruk were received (and) 3 lambs for shearing.
among them: 5	198	14	51	total: 198 **268**		8	1	1	total: 10	Grand total: 208, the first year were accounted for (and) 14 talents 5 minas of wool and 10 minas of goat hair
remains: 193	315	66	105	total: 679	7	10	3	⌜4⌝	total: 24	Grand total: 703 sheep and goats, 58 talents, 36½ minas of wool.

40⅚ minas of goat hair from the 37th year of Nabû-kudurri-uṣur, king of Babylon until the 1st year of Nergal-šarra-uṣur, king of Babylon.
As for the remainder [. . .]

U.E. Balanced account which Enlil-šarra-uṣur, the qīpu of Eanna, and Zēriya, the šatammu of Eanna, settled with the herdsmen.
The month of Simânu, the 28th day, the 1st year of Nergal-šarra-uṣur, king of Babylon.

the herd is augmented by 104 animals, described as *irbu* 'income' collected in the month of Addaru.

For accounting purposes both sheep and goats are differentiated by sex, color and age (Sack 1979: 214). The customary terminology of Uruk is used: *puḫālu* 'full-grown male sheep', U_8 'full-grown female sheep', *kalūmu* 'male lamb', *parratu* 'young ewe', MÁŠ.GAL 'full-grown male goat', ÙZ 'full-grown female goat', MÁŠ.TUR 'male kid', munusÁŠ.GÀR 'female kid'; the total number of sheep are described as BABBAR-*ti* 'white' and the total number of goats as GE_6-ti 'black'. This terminology is used for the column headings, though many blanks occur in each year's accounting.

The scribe supplies two entries for the thirty-seventh (lines 2 and 5), thirty-eighth (lines 8 and 11), forty-first (lines 14 and 17) and possibly forty-second (lines 20 and 23) years of Nebuchadnezzar II; these errors can be easily explained: the outcome of the count for the previous year is the starting point for the inventory of the next year. That is, if the "accountant" had a complete file, he would find the same data in tablets dealing with consecutive years: once at the end of one text and again at the beginning of the succeeding text.

The numbers in the grand total for each year show the "agreed" number of animals in the herd. The actual birth rate, death rate or the number of (young) animals removed by the owner are not reflected in the total. In order to explain the accounting procedures used in computing the grand total of animals for each year (in the last column of the text), we refer to calculations in forty-first and forty-second years of Nebuchadnezzar II as an example:

(1) 354, the grand total in the forty-first year of Nebuchadnezzar II (line 17), is reduced by 32, the number of KUŠ.ME 'hides' (line 18), and 11, the number of animals given as *idī* 'wages' (line 19), resulting in 311 animals, an interim result not cited in the text.

KUŠ.ME probably refers to those animals whose death is accepted by the owner as a result of losses caused by disease (*lipit ilim* 'plague') or by a lion and not caused by negligence of the herdsman (CH §266). Neo-Babylonian contracts allow 10% annual death rate (based on the entire herd) but require the carcasses be accounted for by presenting the skin (with its wool) and *gīdātu*/SA.MEŠ 'tendons' (*YOS* 6: 155; Kraus 1966: 132; Finkelstein 1968: 34; Postgate and Payne 1975: 6; Postgate 1992: 160 and n. 246; cf. San Nicolò 1954: 355–56). However, such losses never reach 10% in NBC 4897.

The owner expected a guaranteed increase of 66⅔% lambs per 100 ewes per annum and one kid per she-goat (*YOS* 6: 155; Kraus 1966: 132; cf. Finkelstein 1968: 34–35).[4] The herdsman usually kept a proportion from the increase of the flock, its dairy products and wool as his wages (Finkelstein 1968: 33–35; Postgate and Payne 1975: 5, 9–10; Postgate 1992: 160).[5] Unfortunately, the small number of goats in the text affords little information. However, it is striking that in NBC 4897

4. In a group of texts from Old Babylonian Larsa, the lambing percentages are 75% or 80% of the herd (Kraus 1966, 126–27, 139–40). Old Babylonian mathematical problems corroborate the lambing percentages in Mesopotamian administrative documents and show a growth rate of 70% to 80% for sheep [VAT 8522 #3 (*MKT* I, 367–73); YBC 4669 #B7 (*MKT* I, 514–16; *MKT* III, 26–29), #B8; YBC 7273 (*MCT*, 131); YBC 7326 (*MCT*, 130–31); see Nemet-Nejat 1993, 78–81].

YOS 6:155 is the only known herding contract from the Neo-Babylonian period which deals with norms for herd growth and wool production. However, the same quantities appear later in an archive of contracts recording leases of larger herds of sheep and goats by Enlil-suppe-muḫur, the 'bailiff' (*paqdu*) of the Achaemenid prince Aršam (Stolper 1985: 22–23); these documents show lambing percentages to be 66⅔% (*BE* 9 1:7; *BE* 10 130:[6], 131:6, 132:6; *PBS* 2/1 144:7, 145:6, 146:6, 147:6–7, 148:6) and the wool norm as 1½ minas per sheep (*BE* 9 1:8; *BE* 10 130:[7], 131:7, 132:7; *PBS* 2/1 144:8, 145:7, 146:7 sic, 147:[8], 17, 148:7).

Sheep breed as early as nineteen months old, with a gestation period of approximately five months, depending on the species. Generally, a ewe gives birth to one lamb, but twins sometimes occur. Shortly before giving birth the ewes chase off their previous year's offspring because they have only two working teats. In modern times lambing percentages can exceed 100% in farm flocks (see Grizmek 1972, 501–4).

5. In the Old Babylonian period contracts between owner and shepherd detail the responsibilities of the shepherd and his compensation, which often include a fixed share of the flock, milk-products and wool and sometimes wages and a clothing allowance (Finkelstein 1968, 35; Postgate 1992, 159–60; Postgate and Payne 1975, 9–10; CH §261–67). However, in Neo-Babylonian contracts no wages are stipulated for the shepherd (Finkelstein 1968, 35).

young male sheep are neither given as wages nor do they die (that is, no hides are recorded). Therefore, we may conclude that one of the purposes of the institutional herds is to provide male animals for sacrifice. The term *idī* may refer to an (additional) allowance for the herdsman or his shepherd sub-contractors. *idī* is not found in other Uruk herding texts (Finkelstein 1968: 35).

(2) The number of male and female lambs and kids, 109 (40 male lambs + 65 young ewes + 2 male kids + 2 female kids; line 20), is added to 311, the total of full grown animals (calculated in step 1), resulting in 420 animals, an interim result not cited in the text (see Postgate and Payne 1975: 12–13, 19–21; Kraus 1966: 24–26).[6]

There is no relationship between the numbers given for the young animals in a given year and the total herd size for that year or the following year. These numbers are much too low to represent either the total production of young animals or the animals belonging to the herdsmen; rather, these numbers may refer to the animals left in the herd as a matter of policy by the owner.[7]

(3) The number of animals, 2 (that is, 1 lamb + 1 ewe; line 17), listed after the grand total of the forty-first year of Nebuchadnezzar II is subtracted from 420 (calculated in step 2), resulting in 418, the grand total of animals also recorded in the forty-second year of Nebuchadnezzar II (line 20). Additional deliveries of small animals take place *ina gizzi* 'at shearing (time)', when the inspection of the herd occurs. Most of the animals delivered are qualified as BAR.GAL = *pargallu* '(male) lambs in possession of their (first) full fleece' and are subtracted from the *kalūmu* 'male lambs'. Occasionally other animals are transferred, for example, MÁŠ.GAL 'billy goat' (line 14) in the fortieth year of Nebuchadnezzar II (emended from 41)[8] and U_8 'ewe' (line 17) in the forty-first year of Nebuchadnezzar II. According to the calculations, the erasure in the grand total for the forty-third year of Nebuchadnezzar II concerns a statement related to 3 UDU, which are not subtracted (and probably considered entirely erased); however, 7 BAR.GAL are deducted as described above (line 23).

Production of Wool and Goat Hair

The text records 922 animals for the first year of Neriglissar (line 34). *ina* ŠÀ 'of these' only 208 were *amru* 'seen' (line 25), leaving a negative balance of 714 animals. We must not assume that these animals were really missing, but, rather, only one herd managed by Nabû-aḫḫē-šullim had been presented for inspection. This conclusion can safely be drawn from the statement about the wool in the last column following the *ina* ŠÀ numbers (line 35). In the Neo-Babylonian period the quota of wool per sheep is 1½ minas (*YOS* 6: 155; Kraus 1966: 132).[9] 14 GUN 5 MA(.NA) of wool represents the yield of 563⅓ sheep; therefore, we can reasonably assume that more than the sheep inspected were ultimately present. However, *rēḫi* 'remainder, balance' of 58 GUN 36½ MA(.NA) wool for that year (line 36), added to the 14 GUN 5 MA(.NA) of wool already delivered, results in a total of 72 GUN 41½ MA(.NA) of wool, which represents the yield of approximately 2900 sheep, a number which cannot be explained by our text. The solution might be found in adding up all the amounts of wool listed for the previous years and regarding the total as an accumulated deficit, that is:

6. We know of no instance where *kalūmu*, *parratu*, MÁŠ.TUR and ^{munus}ÁŠ.GÀR are qualified as being two-years old or more, see Postgate and Payne 1975, 13–14; 20.

7. In both institutional and private herds the numbers of male and female sheep were about equal. Males (usually castrated) were intended for slaughter. Ethnological data varies widely, but castration is generally regarded as a necessity for management, meat and wool production. Animals were given as offerings and large gifts however, religious practice may have required intact animals (see Postgate 1992, 161). For a discussion of the high numbers of full grown male animals in the herd, see van Driel 1993.

8. The transliteration appears without emendations; the authors allude to emendations in discussion of the text.

9. In a group of texts from Old Babylonian Larsa, the production of wool is 2 minas (c. 1 kg.) per sheep (Kraus 1966, 121–24). In modern times farm flocks produce from 2 kg.–9 kg. of wool, depending on the species (Grizmek 1972, 501–4).

Nbk II	37	1	GUN	20½	MA(.NA)
	38	1	GUN	50	MA(.NA)
	39	2	GUN	24½	MA(.NA)
	40	2	GUN	45½	MA(.NA)
	41	4	GUN	8½	MA(.NA)
	42	5	GUN	39½	MA(.NA)
	43	7	GUN	1½	MA(.NA)
AM	1	8	GUN	43½	MA(.NA)
	2	11	GUN	22	MA(.NA)
Total		45	GUN	16	MA(.NA)

Therefore, the expected wool production for the first year of Neriglissar would be 72 GUN 41½ MA(.NA) less 45 GUN 16 MA(.NA), resulting in 27 GUN 25½ MA(.NA) and representing the yield of 1097 sheep according to the norm of 1½ minas per sheep. If we assume that young animals contributed fully, 27 GUN 25½ MA(.NA) divided by 947 animals (see Appendix) results in 1.74 minas of wool per animal.[10]

The amounts of goat hair due are listed as follows:

AM	1	8⅚ MA(.NA)
	2	20⅚ MA(.NA)
Ner	1	10 (?) MA(.NA)

The texts shows that 40⅚ MA(.NA) of goat hair remains outstanding. In the Neo-Babylonian period the quota of goat hair per animals is ⅚ mina (*YOS* 6: 155; Kraus 1966: 132).

As with wool, the total amount of goat hair in the first year of Neriglissar probably represents the accumulated total amount still outstanding. The quantities of wool noted for each year show a steady increase, representing a slow increase in the accumulated deficit over the years. However, the amount of wool recorded for Ner 1 represents a sudden and considerable increase in the amount due. Therefore, the amounts given for each year probably do not represent the accumulated backlog but the amount outstanding for the year. Only the amounts shown in Ner 1 represent the total amount of wool and goat hair due. Though there is no complete fit between the numbers given by the text and known Uruk wool norms, a motive for the drafting of the document begins to emerge; that is, the accumulating deficit in wool deliveries must have worried authorities.

The numbers provided by NBC 4897 do not correspond with known norms. Therefore, we find difficulty in drawing conclusions from this text. Records of wool delivered and wool produced were probably not one and the same (see Kraus 1966: 18–19, 29–31; Postgate and Payne 1975: 5). Perhaps, Nabû-aḫḫē-šullim was responsible for the yield in wool for more flocks than his own. We must wait until we have more information about him.

Appendix

The following difficulties in the text require further explanation:

(1) In the thirty-sixth year (sic) of Nebuchadnezzar II the total number of sheep is 124,[11] not 133 (line 2). The mistake probably occurs in the ewe section; that is, 90 ewes (line 2) are reduced by 6, the number of hides (line 3), and 3, the number of animals given as wages (line 4), resulting in 81, to which 12 young ewes (15 young ewes [line 2] less 2 listed as hides [line 3] and 1 as wages [line 3]) are added to equal 93, not 101 (line 5; a calculation which nearly cancels the deficit created by the difference between 133 and 124 as the total number of sheep in line 2). The text continues to be based on 101.

(2) In the fortieth year (sic) of Nebuchadnezzar II the text shows 54 rams (line 14); however, in the thirty-ninth year (sic) of Nebuchadnezzar II, 40 rams (line 11) are reduced by 4 (3 as hides [line 12] + 1 as wages [line 13]), resulting in 36, to which 23 male lambs (line 11) are added and

10. Whether lambs contributed and to what degree depended on when they were born; see Postgate and Payne 1975, 4, 19.

11. Corrected horizontal totals appear in boldface in the translation only. Corrected vertical totals and the problems in calculations for the first year of Neriglissar are explained in the paper and its appendix.

2 lambs (line 11; recorded in the grand total of the thirty-ninth year of Nebuchadnezzar II) are subtracted, to equal 57, not 54 (see line 14), on which further calculations are based.

(3) The total number of sheep for the second year of Amēl-Marduk is given as 759 (line 31), but should be 819, a mistake which continues to be used in the calculations for the year. 819 is reduced by 68, the number of hides (line 32), and 24, the number of animals given as wages (line 33), resulting in 727 sheep for the first year of Neriglissar (the wrong number is 667). The text records 662 (209 rams + 453 ewes in line 34) as the number of full grown sheep.

The calculated number is 209 rams; that is, 170 rams (line 31) are reduced by 16, the number of hides (line 32), and 6, the number of animals given as wages (line 33), resulting in 148, to which is added 66 male lambs (line 31) to equal 214, from which finally 5 lambs are subtracted (line 26; recorded in the grand total of the first year of Amēl-Marduk), resulting in 209 rams. The 513 ewes are calculated as follows: 390 ewes (line 31), reduced by 50 (39 as hides [line 32] + 11 as wages [line 33]), resulting in 340, to which 193 young ewes (line 31) are added to equal 533; and 533 is reduced by 20 young ewes (13 as hides [line 32] + 7 as wages [line 33]) to equal 513. As for 209 rams, 5 present (line 35) added to 193 outstanding (line 36) resulting in 198, to which are added 12 lambs (line 34; listed after the grand total in the first year of Neriglissar) to equal 210 (not 209). The record of 513 ewes is further confirmed by adding 198 present (line 35) to 315 outstanding (line 36).

The totals for the first year of Neriglissar are in disarray. Calculation confirms the 209 rams (line 34) added to 513 ewes (not 453 in line 34) equals 722 (not 662) adult sheep, to which, in turn, must be added 80 male lambs (line 14; that is, 14 present [line 35] + 66 outstanding [line 36]) and 156 young ewes (51 present [line 35] + 105 outstanding [line 36]), resulting in a total of 958 (not 888 as stated in the text).

The problems are compounded by a mistake in the addition of the animals present: the total number of sheep is 268 (line 35; not 198, which is probably a repetition of the number of ewes); 268 added to the 679 outstanding results in 947 sheep.

For the most part, mistakes occur in the totals. The scribes probably had difficulties similar to ours in reading the numbers in their ledgers. We can understand small mistakes of a single digit, but the mistakes occurring in the crucial final section of NBC 4897 again raise the question of how the administration could work with this kind of accounting.

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