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Proto-Cuneiform Account-Books and Journals

Robert K. Englund
University of California, Los Angeles

Historians of ancient Babylonia are confronted with a myriad of hurdles in their work. First and foremost is the fact that they deal with a long-dead civilization, so that in the absence of informants they must interpret the material remains from Near Eastern excavations as best they can, often with very limited tools.

More daunting is the task for those who want to make sense of the social system that produced the documents from the Late Uruk period. Associates of the Berlin research project *Archaische Texte aus Uruk*,[1] to whom I owe most of my understanding of the earliest written records in Mesopotamia, are often forced to oversimplify archaeological and epigraphic data from Uruk and the other late fourth millennium BC settlements of the Near East, and in a sense to falsify into apparent meaningfulness what remains a disturbingly unclear picture. We may apply to our data the models developed in the social, above all ethnographic sciences, yet we should remember that with the onset of urbanization in the mid-fourth millennium we are dealing with an historical,

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[1] The working constellation of this long-term research project was described by its founder and director Hans Nissen in R. Englund and H. Nissen (2001):9-10. Primary contributors to the decipherment of the archaic (now generally called "proto-cuneiform") texts include, beyond the original editors Falkenstein and Nissen, the following (in the order of their work on the archaic texts and on Late Uruk cylinder seal function and iconography): R.M. Boehmer, M.W. Green, K.-H. Deller, J. Friberg, R.K. Englund, P. Damerow, J.-P. Grégoire, A. Cavigneaux, R. Matthews. The publication of the Uruk exemplars of the archaic corpora will continue with a second volume on the texts of the Vorderasiatisches Museum (ATU 6, forthcoming) and two volumes on those in the collection of the Iraq Museum, for understandable reasons currently on hold (ATU 8-9). A revised Late Uruk sign list will be reserved for the pages of the *Cuneiform Digital Library Initiative* (http://cdli.ucla.edu/).

developed society in Babylonia; there is a danger of ascribing to this historically distinct period the same ahistorical nature that characterizes most general histories of Mesopotamia.[2]

Control of the movement of goods and services is a critical element in the economic dimension of social power.[3] As is clear from a review of the emergence of proto-cuneiform in the latter half of the fourth millennium BC, it was an ever-present component of urbanization in the ancient Near East. M. Hudson has offered in the introduction to this volume a concise description of most of the salient elements of early accounting in Babylonia, elements that most Assyriologists have considered in working on their specific periods of specialization, and to a lesser degree in terms of general developments in Mesopotamia. Among these is the development of writing itself; a system of calendrical metrology; and systems of quantification and bookkeeping that led to the formation of equivalence values based on the commodity silver.

Considering the importance of precious metals in most early civilizations, it might seem surprising to learn that we have no clear evidence in the archaic texts of the use of weights, nor any evidence that silver was in any way used in early households in a manner comparable to later, third millennium usage. We indeed are hard pressed to cite evidence for the utilization of equivalence values in the Late Uruk period, with the possible exception of ration days.

An attempt is made in the following pages to give a general impression of the little we know about the accounting methods in the archaic period, with occasionally formalistic information culled from early texts, starting with a review of the development of writing; discussing in short fashion the importance of archaic numerical and metrological systems as elements of social control; illuminating the use of writing with some examples drawn from grain administration archives; touching on the matter of labor management; and closing with a tentative discussion of the implications the labor accounts have for our understanding of archaic ideology of class.

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[2] This is a criticism of most integrative treatments of early Mesopotamia. For a recent example see R. Bernbeck's 1999 review of M. Van De Mieroop's *The Ancient Mesopotamian City*, in which he describes the author's proclivity of distilling into a homogeneous Babylonian community what must have been a developing social construct through time and space.

[3] See the discussion by M. Mann (1986).

Account-keeping and the emergence of writing

More so than other writing systems, cuneiform has been described as a script based on a long history of preliterate accounting devices. Most who have studied the matter have considered early writing to be a collateral development from the exploitation of an increasingly complex method of fixing quantitative data.

Urbanization in southern Babylonia during the Middle and Late Uruk periods resulted in the growth of the settlement of southern Mesopotamian Uruk into an expanse of 200 hectares, with a population estimated to have approached 40,000 or more. Very large numbers of this population evidently were available for the construction and maintenance of the massive public district known as Eanna, with its monumental architecture surely the clearest testimony to the extraordinary new surplus economy supporting Uruk.

Hand in hand with these urban developments are found in the archaeological record a series of accounting devices known popularly as “tokens” since the publications of Schmandt-Besserat. While the Texas

	Period	Writing Phase	Historical Developments
		Clay bullae and numerical tablets	
3400			Beginning of large-scale settlement of Babylonia
3300	Late Uruk	Archaic texts from Uruk: Writing Phase Uruk IV, Writing Phase Uruk III	
3200			First urban centers
3100			Age of early civilization
3000	Jemdet Nasr		
2900	Early Dynastic I		
2800		Archaic texts from Ur	
2700	Early Dynastic II		Formation of large irrigation networks
2600		Texts from Fara	
2500	Early Dynastic III		Rival city-states
2400		Old Sumerian texts	

Figure 1: An overview of the chronology and historical developments of the earliest literate periods in Babylonia.

archaeologist has been faulted for over-interpreting both the systematization and the iconic differentiation of these small clay objects,[4] there can be little doubt that at least a subset consisting of many of her simple geometrical artifacts represents the precursors of writing in Mesopotamia, and therefore that cuneiform began with numerical signs.

This assertion is based on two phenomena. First, the simple tokens were gathered in discrete assemblages and encased in clay balls in the periods immediately before the emergence of proto-cuneiform ca. 3300 BC, and these balls were then sealed with impressions from cylinder seals—the hallmark of 3000 years of Babylonian administrative history. Second, the plastic tokens were themselves impressed on the outer surfaces of some balls, leaving marks which, both physically and also in their context, conform exactly to the impressed numerical signs of the early so-called numerical tablets and the curvilinear tradition of Babylonian accounts down to the Ur III period at the end of the third millennium. We have little doubt that a statistical analysis of the overbearing numbers of tokens still encased within clay envelopes would lead even further, to the establishment of the preliterate use of numerical sign systems with the same abstraction of unit bundling as has been shown for proto-cuneiform numerical notations. We should anticipate that we will find the two most important numerical systems in these tokens, one used to count discrete objects and one used to quantify capacity measures.

It is of historical interest that the so-called Uruk expansion continued down through the use of bullae and sealed numerical tablets. Further, as R. Dittmann demonstrated at the Tübingen conference on the Jemdet Nasr period, this contact continued into the earliest phase of "ideographic" inscriptions of the Late Uruk period, those that I have called the numero-ideographic tablets.[5] These texts from the Susa level

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4 Her publications have been conveniently consolidated into a two-volume work *Before Writing* (Austin 1992), itself reprinted in an abbreviated version, *How Writing Came About* (Austin 1996). Specialist reviewers from the fields of Near Eastern archaeology and Assyriology have not been kind to the scholarship represented by this work, while it has received a generally positive press from non-specialists, and as is evident from its wide publicity, from science editors of leading media organizations.

5 R. Dittmann (1986): 332-66; R. Englund (1998): 51-56.

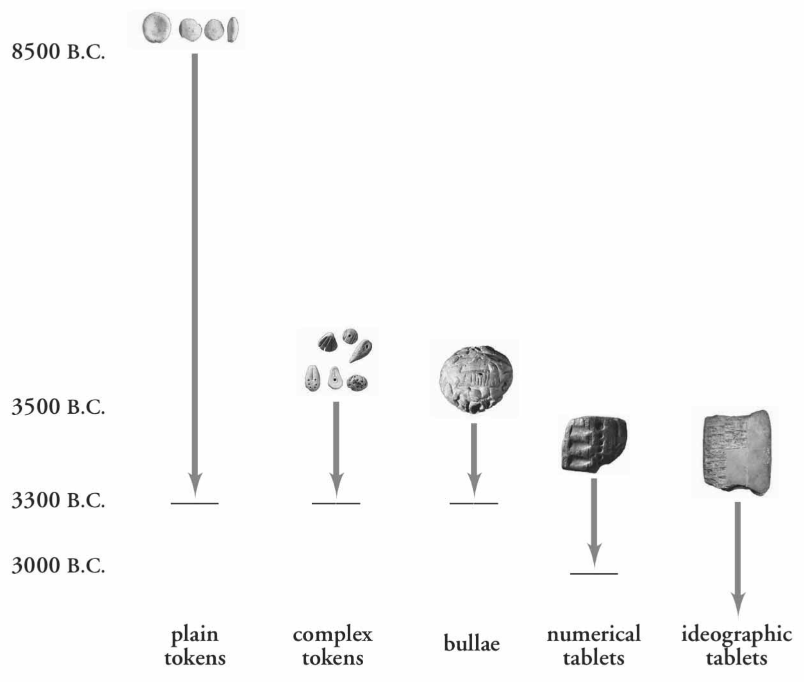

Figure 2: Schmandt-Besserat's writing history

17Ax "contact"[6] correspond nicely with texts found in the area of the Red Temple at Uruk, characterized by their inclusion of seal impressions, numerical notations and one or at most two apparent ideograms representing the basic agricultural commodities: butter oil, textiles and small cattle.

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[6] See P. Damerow and R. Englund (1989): 15 n. 37. This artificial stratigraphic construct of Dyson, Le Brun and Dittmann has not been proven by excavations of Susa, nor evidently can the epigraphic finds from the area of the Red Temple in Uruk serve to strengthen the argument for a linear development, from numerical through numero-ideographic to ideographic tablets, in either center of early writing (cf. R. Englund, *ATU* 5, pp. 13-16). Renewed excavations of Susa are required, although recent discoveries of very early tablets from Iraqi sites might point archaeologists to native Mesopotamian sources for a sound Late Uruk stratigraphy so painfully absent in the Uruk data. See the following footnote.

At this point there is an abrupt conclusion of interregional Uruk influence, with a continuation of development of writing in Uruk alone.[7] The archives from Uruk consist above all of administrative documents, accompanied by a group of texts generally known as lexical lists, although there is good reason to assert that we have among these lists the earliest known example of literature.[8] It should be remembered that the numbers generally cited in this connection, 85% administrative and 15% lexical texts, represent averages; less than one percent of the earliest, the Uruk IV tablets, are of the lexical genre, while close to 20% of the following Uruk III tablets belong to this type of document. Whereas Uruk IV documents known to us derive without apparent exception from Uruk, those of the Uruk III (also called Jemdet Nasr) period come from a number of Babylonian sites, including Jemdet Nasr, Kish, Uqair, Larsa, from transtigridian Tell Asmar, and as post-Kuwait excavations streaming through London have shown, from Umma and from Adab.[9] We should include here too the c. 1500 tablets and fragments of the so-called proto-Elamite phase in the Susiana and regions to the east.

The categories of administrative documents

We can divide proto-cuneiform administrative documentation into the two major bookkeeping types known from later periods in Babylonia, namely into primary and secondary documents. The easiest way to recognize the former type, consisting of receipts, bills and simple transfers, etc., is by the physical size and the spatial format of the tablets. As a rule these are quite small, perhaps up to c. 8 × 8 cm, and might be divided into at most several cases. At present we can only anticipate that these sorts of simple documents contain no more than the most basic elements of a transaction or inventory record, as a rule including desig-

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[7] It appears from some recently excavated but as yet unpublished tablets from Iraq that a revision of this monogenesis theory is immanent. Although these artifacts are moving through the antiquities markets and are therefore unprovenienced, there is reason to identify the ancient cities of Umma (Jokha and/or al-Aqirib) and possibly Adab as their sites of origin, and thus as further centers of Uruk IV proto-cuneiform. Based on paleographic analysis, both MS 2963 and MS 4485 of the Oslo Schøyen Collection appear to predate Uruk III.

[8] R. Englund and H. Nissen (1993): 25-9.

[9] See above, n. 7.

nations of quantified objects and of one or more actors involved in a relationship of some sort with those objects, often together with an indication of the administrative positions of these actors, as well as their geographical affiliations. In less frequent cases these simple texts would appear to include predicate information in the form of transaction qualifications, for instance, the signs BA or GI, which qualify, evidently for purposes of accounting clarity, the nature of the movement or storage of goods, including parcels of agricultural land.

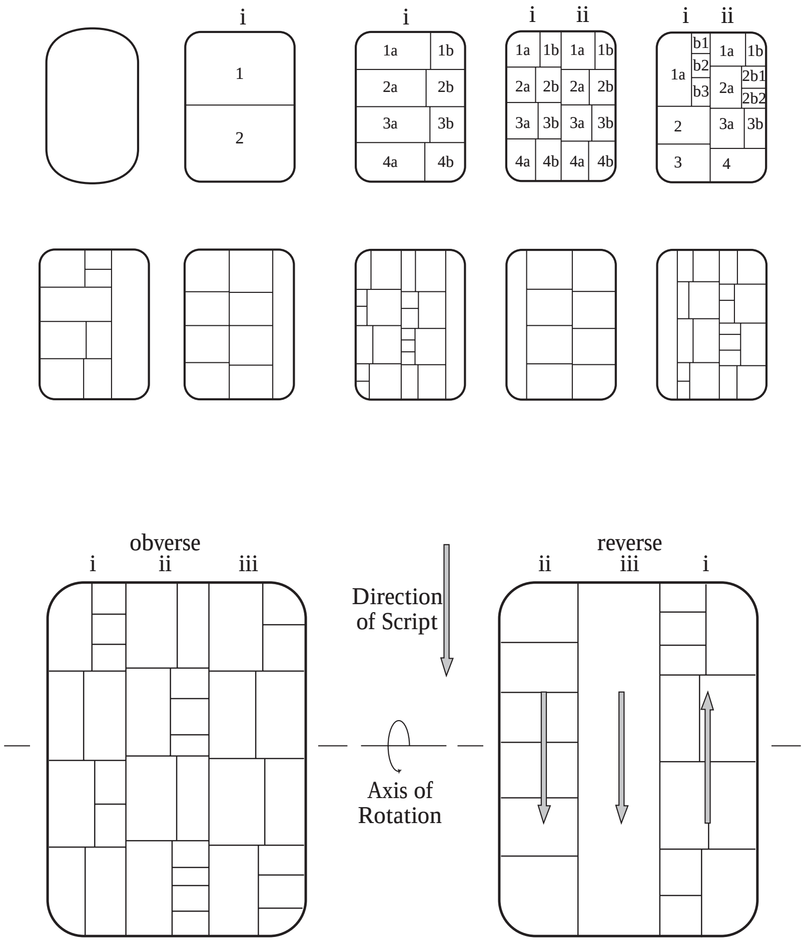

Figure 3: Formats of the proto-cuneiform texts.
The two upper rows represent primary, the lower row a secondary document.

The more interesting but rarer secondary documents can be twice or three times as large. They contain relatively large numbers of entries, and their surfaces often are divided into a complex format. As has been stated in numerous publications, this tablet format may be presumed to fulfill the syntactical functions of the more developed language representation found in later texts, particularly those of the Fara period and thereafter.

While we should be circumspect in our judgment of the syntactical force of the archaic ideographic record, there can be little doubt that the highly formalized system of numerical notations, with its roots in the token assemblages found in clay envelopes in Persia, Babylonia and Syria, followed a wholly conventionalized internal syntax, and represented concrete facts in the archaic record that have played an imposing role in our partial decipherment of proto-cuneiform and of proto-Elamite.

Numerical and metrological systems

P. Damerow of the Max Planck Institute for the History of Science in Berlin, and J. Friberg of the Chalmers University of Technology in Göteborg must be credited with having early on discovered the importance of the numerical signs in the archaic record and making progress in this decipherment. It should be obvious that accounts deal with numbers and measures; however, the treatment by Assyriologists of numerical notations in cuneiform texts has been one of the worst blemishes in a field otherwise marked by close attention to detail. Friberg was so vexed by the copies and interpretations of the important Jemdet Nasr texts by S. Langdon[10] that, in preparation of his groundbreaking re-edition of a number of these, together with archaic texts from other European collections,[11] he made and exploited Xerox copies of the physical tablets in Oxford to aid in his work.

Langdon's *Pictographic Inscriptions from Jemdet Nasr* must be the worst example of cuneiform text editions on record. But a tradition of cavalierly dispensing with numerical notations in editions of administrative documents continues today in transliteration publications of primary sources with decimally interpreted sexagesimal notations, despite the appeals of the associates of the Cuneiform Digital Library Initiative[12] to adhere to a system of transliteration that reflects in a strict fashion the physical realities of the cuneiform inscriptions. This should be a basic convention in text-analytical treatments of Babylonian literature.

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[10] *OECT* 7 (Oxford 1928). [11] Friberg (1978-1979).

[12] http://cdli.ucla.edu/cdli_methods.html.

In considering proto-cuneiform accounts, the first signs that command one's attention must be the numerical signs. These were deeply impressed in the clay surface with the butt ends of two round styli of different diameters. As a rule, impressions of the larger stylus represent larger numbers or measures, those of the smaller styli numbers and measures from the lower scale of the numerical systems they represented. In most cases these numerical notations come first, followed by some designation of the objects they qualify, then by representations of persons or offices. Although within discrete notations the signs were, with some few exceptions, entirely unambiguous and therefore might have been inscribed in free order,[13] numerical notations conformed to a rigid syntactical sequence, from signs representing the largest to those representing the smallest order of quantity or measure.

The rigidity of these notational sequences can be explained partly by the fact that many of the signs were ambiguous across system borders. Dependent on the object quantified by numerical notations, the sign N_{14} (a simple small circular impression) can represent ten clay pots of butter oil, a measure of grain corresponding to about 150 liters of barley, or a field of about 6 hectares. The real power of a clear understanding of the array of archaic numerical systems was first exploited by Friberg, who in 1978-1979 published in preprint form an analysis of the Uruk III period texts from Jemdet Nasr and other sites, in part made accessible to him by the Ashmolean Museum.[14] Friberg's correction of an age-old misinterpretation of the structure of the archaic capacity system led to the partial decipherment of large numbers of accounts. Based in part on his work, Damerow and I were in the 1980s and 1990s able to abstract the systems in figure 4 from a data set including the large numbers of texts from the German Uruk excavations.[15]

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[13] The few exceptions involve the second use of signs representing irregularly high quantities. For instance, the text W 19726,a has been cited in the literature (*ATU* 2, 140; *Spektrum der Wissenschaft*, March 1988, 47; *Archaic Bookkeeping*, 32-5) as an example of the ambiguous use of the sign N_{46} to represent both 60 and 10,800 of the basic units N_4 of emmer wheat (N_4 corresponds to N_1 in the basic grain capacity system, see fig. 4). This practice corresponds closely to the attachment of Sumerian gal, "large," to the sign šar$_2$ to signify the sexagesimal step above what would have otherwise been the largest commonly known number (šar$_2$, "3600"; thus šar$_2$ gal represents 216,000 in the sexagesimal system, 3600 bur$_3$ in the surface metrology system).

[14] See n11.

[15] An English update of the German publication that derived from that early effort (Damerow and Englund 1987) will appear in our edition of the Erlenmeyer collection in *MSVO* 3 (in preparation).

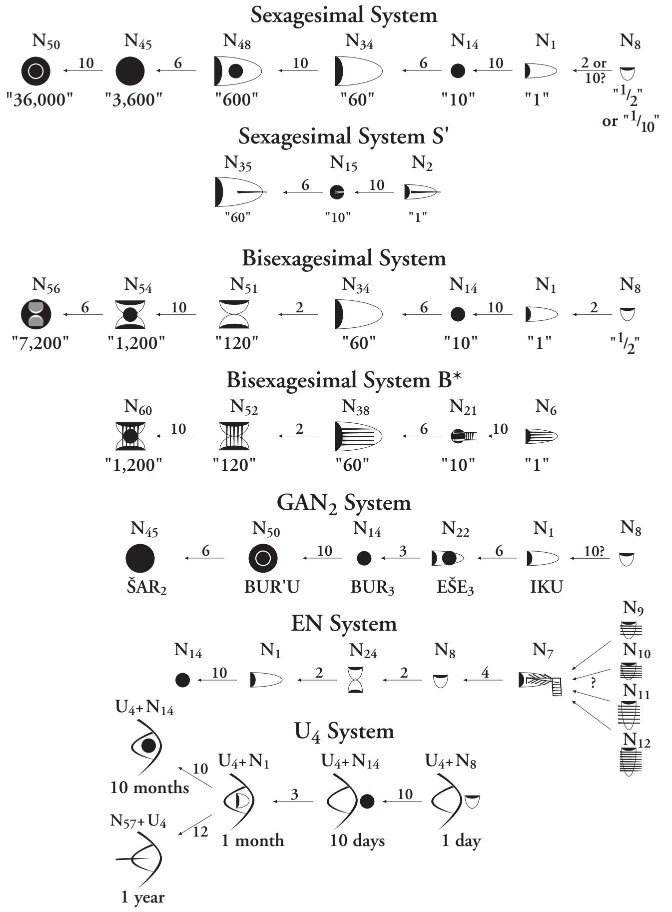

Figure 4a: Proto-cuneiform numerical sign systems.
Several systems of numerical signs served to qualify discrete objects (Fig. 4a), while others qualified measures of grains, (semi-)liquids and time (Fig. 4a and 4b).

The standardization of time in grain administration archives

These numerical representations afforded those working on the problem sufficient evidence to make a number of advances in the decipherment of proto-cuneiform, including the observation that already in the archaic period household administrators had imposed on the natural cycle of time an artificial year consisting of 12 months, each month of

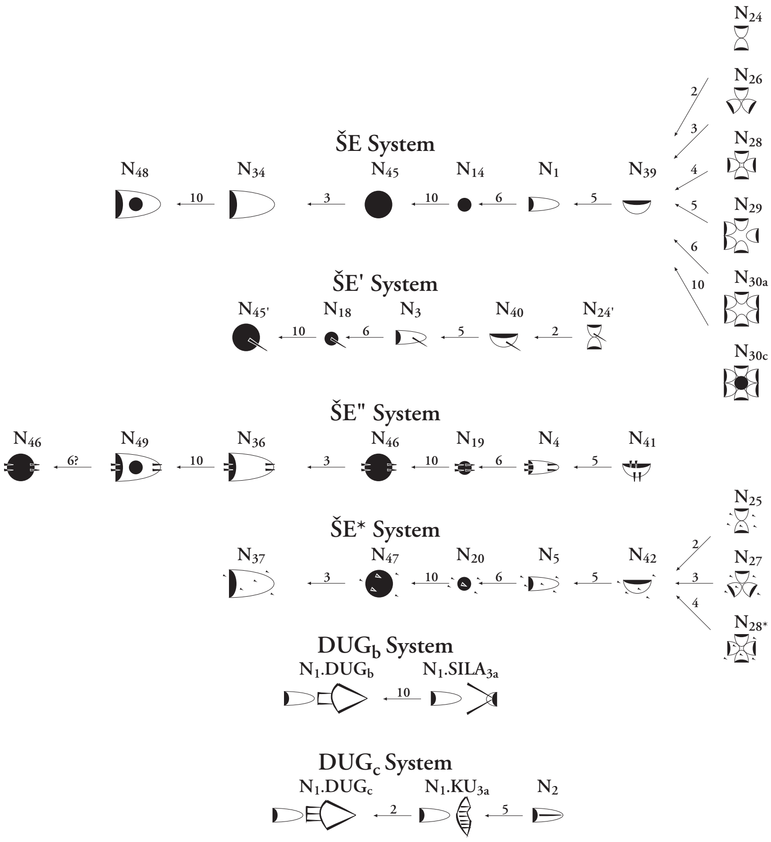

Figure 4b: Proto-cuneiform numerical sign systems

30 days.[16] This realization and the subsequent discovery of the wide-spread use of time calculations in apparent rationing texts led to a fruitful exchange between Friberg and myself that identified a number of different grain measure sizes employed in this rationing system, and to the plausible interpretation first advanced by Friberg that texts such as *MSVO* 1, 89 and 90,[17] recording the daily disbursement of an amount of grain corresponding to the measure N_{24} (c. 2½ liters) or N_{39} (ca. 5 liters) over a span of three years, might document a system of long-term temple offerings. It is hard to understand why an account should reckon through several years the daily disbursement of a small amount of grain if this were not meant as regular alimentation for a cult figure or for a person dedicated to serve the donor in the cult.

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[16] R. Englund (1988): 121-85. [17] R. Englund (1988): 138.

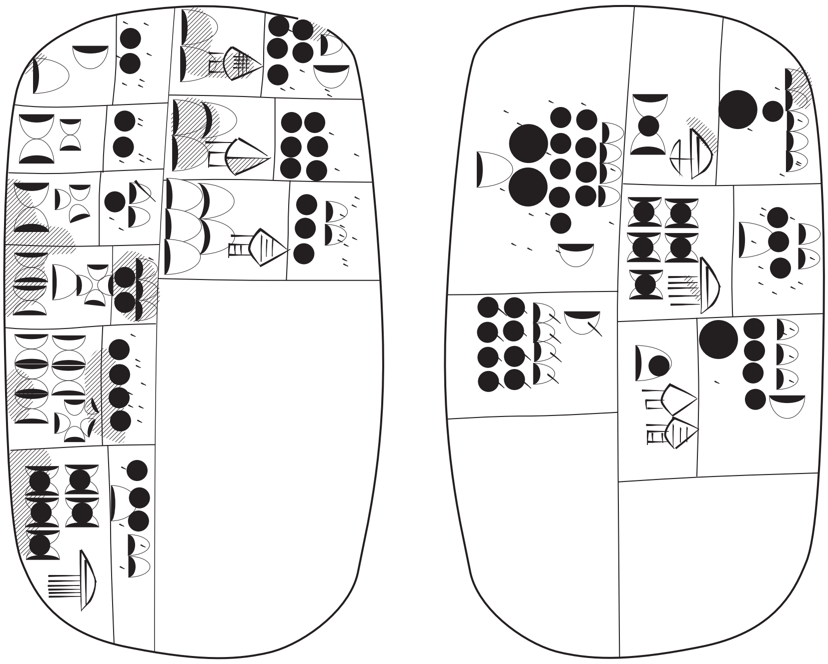


Figure 5: The administrative exercise tablet MSVO 4, 66.
This text formed the basis for Friberg's identification of the structure of the archaic metrological system used to count grain measures, in particular the relationship of 1:6 between the two signs N_{14} and N_1, earlier believed to be 1:10.

The strengths and limitations of numerical analyses of archaic texts can be demonstrated using a group of documents from the Uruk III period recording the dispensation of agricultural products, above all dry and liquid grain products.

The key to understanding the important grain texts is in fact an artificial account, one of a number of school exercises known from the archaic period. Examples from later periods have received little attention. The text *MSVO* 4, 66 (figure 5), possibly from Larsa, is something of a Rosetta stone in the decipherment of proto-cuneiform. In terms of both text format and sign meaning, this text resolved nearly all questions concerning a complex accounting mechanism. The individual entries of the text consist of notations that represent on the one hand discrete numbers of grain products—if dry products in the bisexagesimal; if liquid products in the sexagesimal system—and on the other hand notations that represent measures of grain equivalent to the amount necessary to produce the individually recorded products.

The calculations implicit in the text MSVO 4, 66
(*see fig. 4 for sign designations*):

obv. i 1	$60\times \frac{1}{5} N_1$		$= 12\times N_5$	$= 2\times N_{20}$
2	$120\times \frac{1}{10} N_1$		$= 12\times N_5$	$= 2\times N_{20}$
3	$120\times \frac{1}{15} N_1$		$= 8\times N_5$	$= 1\times N_{20}$ $2\times N_5$
4	$300\times \frac{1}{20} N_1$		$= 15\times N_5$	$= 2\times N_{20}$ $3\times N_5$
5	$600\times \frac{1}{25} N_1$		$= 24\times N_5$	$= 4\times N_{20}$
rev. i 1	1200			$1\times N_{47}$ $1\times N_{20}$ $5\times N_5$
obv. i 6	$6000\times \frac{1}{30} N_1$	(GAR+6N_{57})	$= 200\times N_5 = 1\times N_{37}$	$3\times N_{20}$ $2\times N_5$
ii 1	$120\times \sim\frac{1}{4} N_1$	(DUG$_a$+U$_{2a}$)	$\times\ 30\times N_5 =$	$5\times N_{20}$ $1\times N_5$ $1\times N_{42}$
2	$180\times \frac{1}{5} N_1$	(DUG+AŠ$_a$)	$= 36\times N_5 =$	$6\times N_{20}$
3	$300\times \frac{1}{15} N_1$	(KAŠ$_a$)	$= 20\times N_5 =$	$3\times N_{20}$ $2\times N_5$
rev. i 3	600			$1\times N_{47}$ $4\times N_{20}$ $3\times N_5$ $1\times N_{42}$

		$1\times N_{47}$	$1\times N_{20}$	$5\times N_5$	
		$1\times N_{37}$	$3\times N_{20}$	$2\times N_5$	
		$1\times N_{47}$	$4\times N_{20}$	$3\times N_5$	$1\times N_{42}$
Grand total of flour used:	$1\times N_{37}$	$2\times N_{47}$	$9\times N_{20}$	$4\times N_5$	$1\times N_{42}$

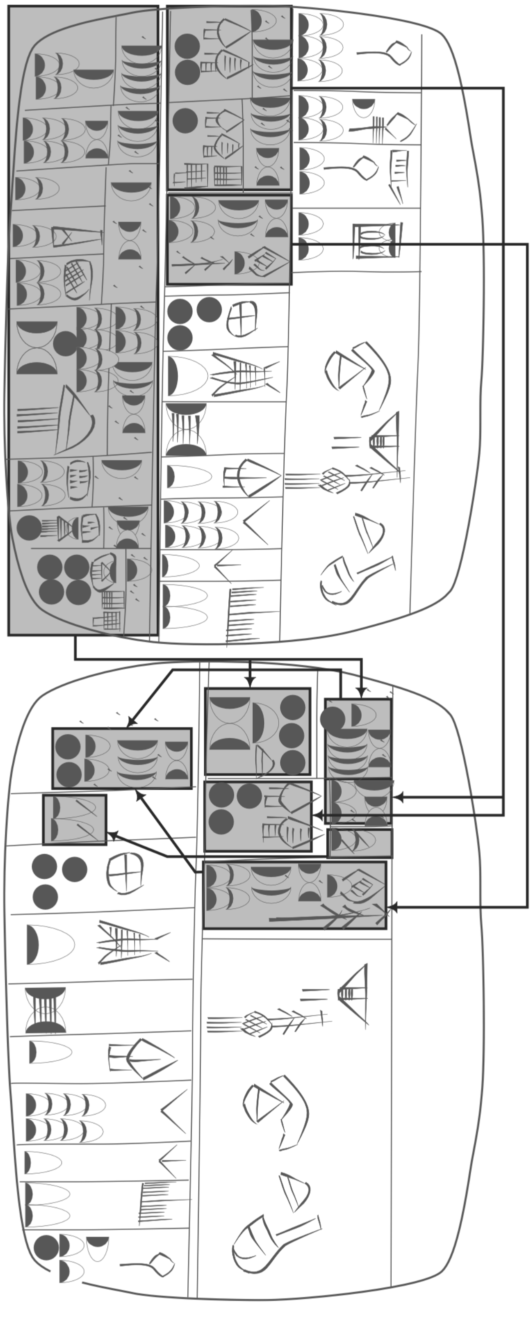
Grand total of malt used:

$1N_{47}$ $4N_{20}$ $3N_5$ $1N_{42a}$ (rev. i 3) $\times \frac{3}{5} \approx 8\times N_{18}$ $4\times N_3$ $1\times N_{40}$

Once the information from *MSVO* 4, 66, could be marshaled, numbers of other complex accounts from the Uruk III period became clear to us, at least in their bookkeeping form. For instance, the Jemdet Nasr text *MSVO* 1, 93 (figure 6 with reconstructions), shares much of its form and content with *MSVO* 4, 66.[18] The obverse face of the tablet records in successive cases numbers of grain products together with notations that represent the amount of grain required for their production. As seems obvious based both on sign identifications and on production technology implicit in the types of cereals used, the first column lists dry goods—probably rough-ground flour and types of breads—while the first half of the second column lists liquid goods, certainly a type of beer represented by pictograms of ceramic vessels.[19]

[18] R. Englund (2001): 1-35.

[19] See H. Nissen, P. Damerow and R. Englund (1993), in particular 43-46.



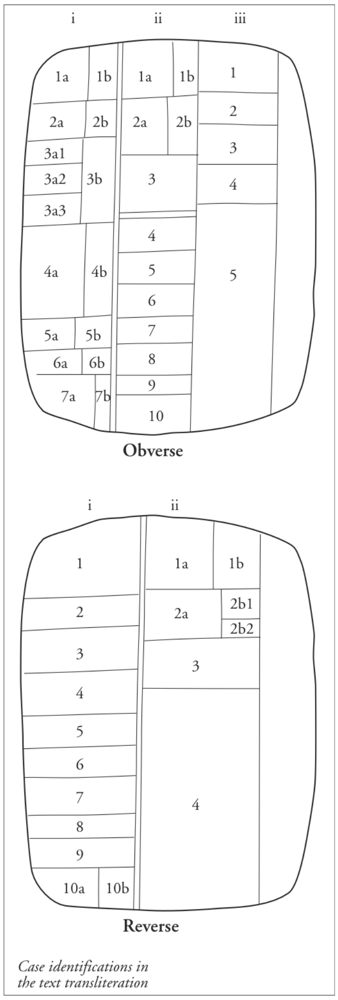


Figure 6: MSVO 1, 93.

The account from Jemdet Nasr demonstrates many of the equivalencies, and the bookkeeping format of the exercise MSVO 4, 66, but including ideographic notations representing agents, actions and time spans connected with the account.

Following a double dividing-line, and therefore an accounting format device employed to indicate information derived from different primary sources, the scribe registers varying numbers of animals, animal products (butter oil, textiles, processed fish), and strings of dried fruit. Both sections are qualified, finally, with a set of ideograms representing the type of transaction recorded ("ration", GU_7), the originating place or office of the account (NI+RU, possibly representing the small settlement Jemdet Nasr itself), and the period of time covered in the account.[20]

The ration system

The basic format of those entries recording dry goods is straightforward. In the first of two sub-cases of each entry, discrete objects were counted using what we have, due to its continuation past the bundling phases of the more common sexagesimal system into units representing 120, 1200, and, probably, 7200 units (see figure 4), designated the bisexagesimal system.[21] The second sub-case records a notation corresponding to the amount of grain requisite for the production of the units recorded. The system used in this case corresponds in its numerical structure to the common grain capacity sign system, but is qualified by the addition of an arbitrary number of impressed dots that seem to graphically represent the ground barley used in the grain products.

Grain equivalencies

As is usually the case with proto-cuneiform accounts, eventual subtotals and totals are inscribed on the reverse face. Here too, the categories of goods are treated differently, with a full tally of products in a first sub-case of the right column. The second sub-case was used here to tally all grain products with grain equivalencies. These equivalencies evidently represent the final value of these goods and thus alone included in the grand total of the left column.

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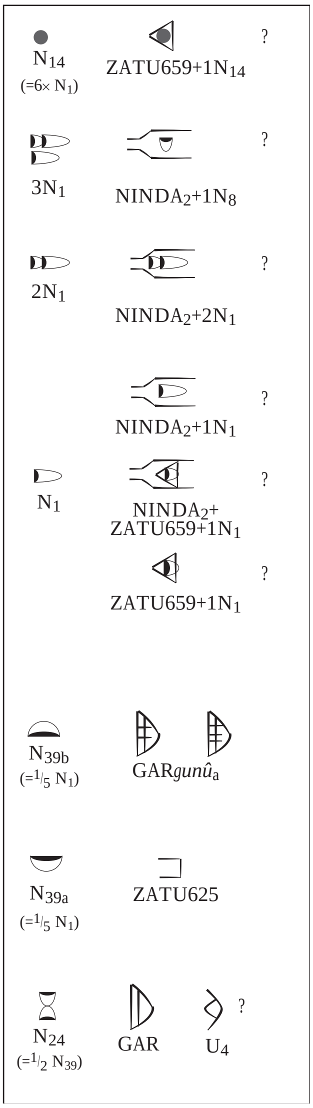
[20] Englund (2001): 18-21.

[21] No compelling explanation has been advanced for the numerical structure of the sexagesimal or the bisexagesimal system. It should nonetheless be noted that the only factors that make sense in compounding an original primitive counting system with a first limit at either ten ("Euphratic," the unknown first users of the sexagesimal system) or twenty (probable original Sumerian vigesimal counting system) to limits of both 60 and 120 are those of the artificial calendrical system of strictly 30-day months (see n16). A mix of discrete rations or meals and monthly accounts would result in counting units of 60 or 120 based on the daily rations involved.

This formation and use of grain product equivalencies as exemplified by the texts *MSVO* 1, 93 and *MSVO* 4, 66, must be considered an important step in the direction of general value equivalencies best attested in the Ur III period for silver, but then still generally applicable for other commodities such as grain or fish, including finally also labor time. It is not possible to determine whether, as would seem intuitively likely, these equivalencies simply describe the amount of grain expended in producing different types of bread, beer, and other cereal products. But even if this is the case and the accounts presume no value equivalencies for products that might, for instance, require in their processing more labor or different ingredients than would be represented by a one-to-one relationship between the capacity of the finished product and the amount of barley corresponding to the product's grain capacity, still the *seeds* of value equivalencies among disparate goods may have been sown in these accounting procedures. The concept of value equivalency was a secure element in Babylonian accounting by at least the time of the sales contracts of the ED IIIa (Fara) period, c. 2600 BC.[22]



[22] We do not clearly understand the function of those early "kudurrus" in I. Gelb, P. Steinkeller and R. Whiting (1991): 27-43, and see Steinkeller (1987): 11-27, in particular the mechanism through which prices might have been calculated and expressed in the accounts (*OIP* 104, nos. 1-11, in any case, are in all likelihood to be dated to no earlier than the period of the archaic texts from Ur, either ED I or II; see *ATU* 5, 12, n. 7). The sign that in the third millennium represented "value equivalence," "exchange amount," was sa$_{10}$. Its pictographic correspondence in the proto-cuneiform corpus, possibly representing some sort of grain scoop and containing the sign for "barley," is with 60 attestations not uncommon in these texts, yet in no instance is it found in a context suggestive of equivalency values, including the ED I/II texts.

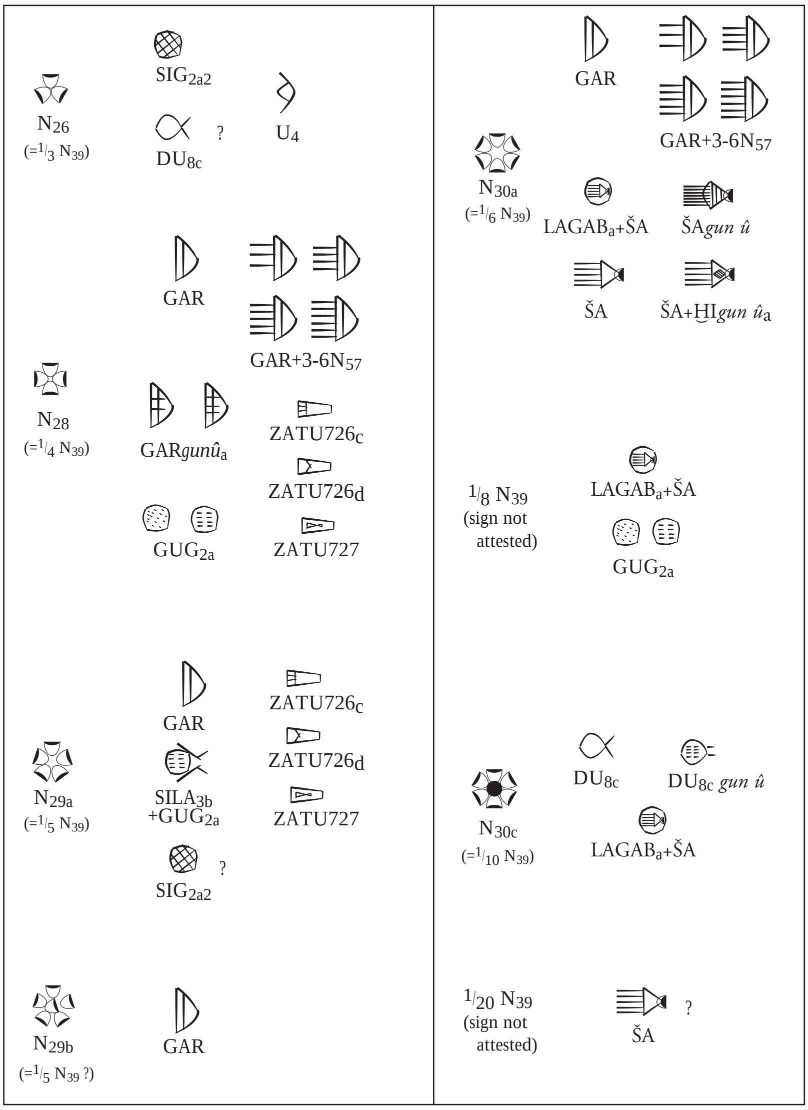


Figure 7: Equivalencies in grain accounts.
The table lists, in order from largest to smallest attested values, the grain equivalences of products found in the proto-cuneiform record together with their respective ideographic correspondences (ideographic correspondence of the same numerical signs is not included).

While there are no evident notations in the archaic texts which exhibit the level of labor time and production norm complexity of the Ur III period, still at least two components of archaic accounts are instructive about the accounting procedures at the dawn of literacy. In the first place there appears to have been a close connection between the graphic system employed to record calendrical units and that used to quantify measures of grain. In both cases the unit month played a central role. Only those calendrical notations representing one or more months employed the standard forms of the sexagesimal system, with the sexagesimal unit representing the discrete unit "one." Notations for days and years alike employed derivative numerical signs (N_8 and N_{57}, respectively). At the same time the capacity system centers on this same unit sign N_1, yet with diverging relationships between this and other signs in the system.

In particular the signs representing lower values in the system are arranged in a sequence that successively divides the basic unit into fifths, and further on down to the sign N_{30a}, which represents a measure of grain ⅟30 the size of the basic unit. It cannot be a coincidence that this sign so regularly corresponds in the archaic accounts to the ideogram GAR. This latter sign is the pictographic representation of the beveled-rim bowl, a clay vessel with a capacity equal to a standardized daily ration in Mesopotamia. It therefore seems reasonable to assume that the numerical sign N_1 represents one month-ration for one laborer in the archaic period.

In the second place we find in the archaic accounts good evidence for the quantification of household-dependent labor entirely compatible with later tradition. The Jemdet Nasr accounts *MSVO* 1, 212-214, belong together in a relationship of secondary and primary documents and represent an accounting transfer without any gaps.[23]

[23] Note that the treatment of this complex in Nissen, Damerow and Englund (1993):72-75, and in particular figure 62, suffered a certain "graphic overload"; text *MSVO* 1, 213 (62b) rev. i 1-2 was entered into text *MSVO* 1, 212 (62a) obv. i 8-9, 213 obv. ii 2-4 into 212 rev. i 3-5, 213 rev. ii 7-8 into 212 rev. 1-2. The primary entry column of text 212 reverse was evidently reserved for the dependent laborers qualified with the sign N_2 and thus, according to our interpretation, probably "dead slaves" that would disappear from subsequent accounts. The large account *MSVO* 1, 212, incidentally, also presents a good example of what is referred to as a complex tablet rotation, whereby the tablet is flipped on its vertical axis to continue low-level individual entries, but then on its horizontal axis to inscribe subtotals and totals. Comparable accounts with complex rotations and/or evidence of primary document entries are not common in the archaic corpus, but are well enough attested to justify the claim that account consolidation was a regularly used technique by the time of the Uruk III period ca. 3100-3000 BC (see for instance the accounts *MSVO* 3, nos. 11 and 6; Nissen, Damerow and Englund [1993]:43-46).

It should be noted that the ideographic qualifications of those persons recorded by name in the individual entries of *MSVO* 1, 212-214—namely, with the sign combinations SAL+KUR and SAG+MA, and with ERIN_2 —are designations of dependent laborers, probably slaves taken as plunder in violent actions against Babylonian neighbors. The 27 individuals so qualified do not constitute a large number of slaves, but other accounts are suggestive of larger groups, for instance W 9827 with a minimum of 211 such individuals.[24]

Accounting for labor

The method of bookkeeping employed by archaic scribes to record groups of laborers is not particularly complex. We have approximately a dozen recognizable accounts of this sort with numbers qualified by sign combinations that represent "laborer" and including sign combinations evidently representing personal names. These persons are also qualified according to gender and age. For instance, the text W 23999,1[25] in figure 8 distinguishes subgroups of 5 female and 3 male humans, these subgroups in each case further divided according to age, whereby presumable infants are qualified with sign combinations that might be translated as "womb-suckling." It is noteworthy that precisely the same

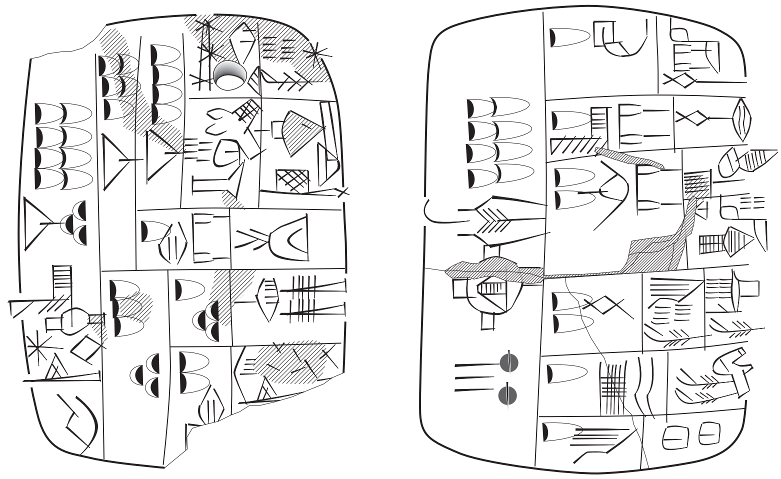


Figure 8: Accounts of domestic "herds" of slaves. Formal accounting practices suggest that these two Uruk III period accounts from Uruk record the make-up of two eight-member "herds" of human laborers.

[24] R. Englund, *ATU* 5, pl. 118.

[25] A. Cavigneaux (1991): 74.

accounting format is employed in the records of animals. Here too, pigs are separated according to age, and in the case of small and large cattle, animals are divided according to sex. The gender qualifications for the young of these animals are represented by SAL and KUR, the same signs that generally describe men and women. Furthermore, as A. Vaiman has shown,[26] Uruk accounts record young animals and young "slaves" with the same derived numerical sign N_8 (see figure 9), which generally qualifies a half (in some limited applications one-tenth) of some unit counted in the sexagesimal and bisexagesimal systems. This may derive from an apportioning of rations to children of productive age of approximately half that of adults, as was administrative labor practice in later periods.

Labor and slavery

We cannot be certain that the taxonomic differentiation in archaic Babylonia between higher-status humans on the one hand, and lower-status humans and animals on the other, is a meaningful one. Still it might be of interest to compare Babylonian with archaic Persian data. The sadly neglected field of proto-Elamite studies has demonstrated the use of the same numero-metrological systems as those known in archaic Babylonia, with the addition of a purely decimal system. As far as we can tell, the sexagesimal system qualifies discrete goods in the same field of application as that of Babylonia, except that some objects were qualified specifically with the decimal system. This decimal system, employing signs borrowed from the bisexagesimal system, qualifies what apparently are domestic animals, but also what we believe are lower-status humans. It appears that high-status humans—foremen and high officials—were, as all humans in Babylonia, qualified sexagesimally. If as we suspect these unusual numerical systems were introduced into Persia during the period of the Uruk expansion, then we can speculate that the inclusion of high-status humans in the Babylonian sexagesimal system represents a vestige of a two-tiered taxonomy of living beings practiced in Babylonia, including domestic laborers with domestic animals. The concept of *homo sapiens sapiens*, seen relatively in different populations even today, must well have been a much more fluid concept in prehistoric times.

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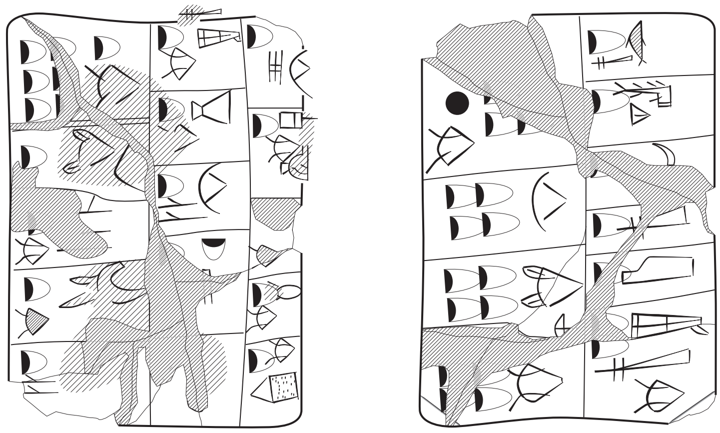
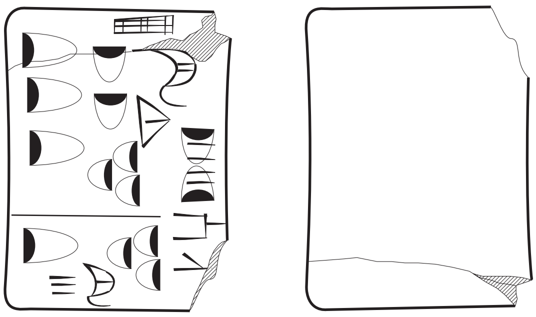
[26] In German translation from the Russian original: Vaiman (1991): 121-33.



W 9656,ex

Figure 9a: Numerical qualification of young animals.
The Uruk IV period texts record numbers of cattle (Fig. 9a, top) and humans (Fig 9b, bottom), in both cases including the numerical sign N_8 designating young animals.

Figure 9b: Numerical qualification of humans



W 9655,t

Can we call the proposed taxonomy of the Late Uruk "slave" = "animal" an ideological perspective? It may be that we are looking at the enslavement and exploitation of foreign populations, reflecting a deep element of the earliest native Babylonian population.

But it may also reflect a developing class consciousness. G. Algaze has stated in a recent paper that the identification of humans with domestic animals is even a *necessary stage* in the formation of early states.[27] Certainly when we speak of "work force," "farm hands" or "factory hands" we abstract laborers little less than Babylonian scribes who recorded pigs and laborers in similar fashion, both serving the community of man. Our archaic accountants may have forgotten how close they were to membership in the same fraternity.

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27 Algaze (2001), esp. 211-13 (comments pp. 215-28 and 415-18). The author states that this primitive categorization represents "a new paradigm of the nature of social relationships in human societies."

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Cornelia Wunsch

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COVER ART: Mycenaean Linear B tablet from Pylos (Jn 829, obverse) listing expected contributions of recycled 'temple' bronze from the 16 major administrative districts of the kingdom of Pylos; see page 290f. for transliteration and discussion.
This photograph is reproduced from the archives of the Program in Aegean Scripts and Prehistory, University of Texas at Austin, with the kind permission of the Department of Classics, University of Cincinnati.

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