

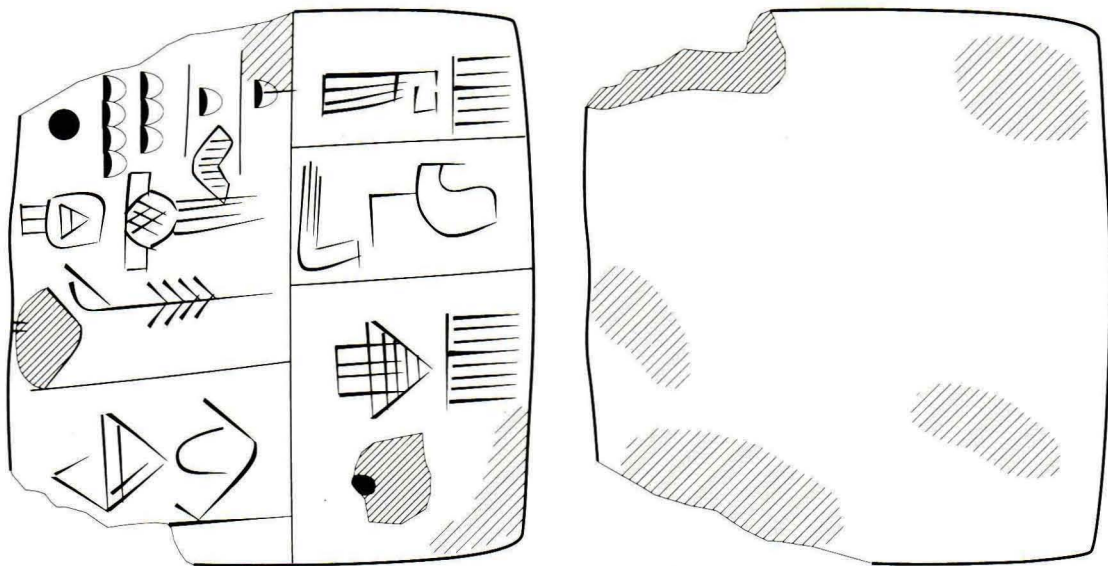
ARCHAIC DAIRY METROLOGY

By ROBERT K. ENGLUND

The archaic tablet made available in the present note is now in a private collection in Belgium.¹

The well preserved proto-cuneiform tablet, measuring 73 × 69 × 18 mm (height × width × thickness), was copied from photographs in the early spring of 1989, and subsequently collated with the original in May of the same year in London. Although the exact provenience of the tablet, which came to Europe some decades ago via the antiquities market, is not secure, format, contents and personal designations point to its probable origin at Uruk/Warka. A conventional transliteration² of the text reads:

Obv. ii 1N₁₄ 7N₁/1N₁ KU_{3a}/1N₂
 šAKIR_c ZATU752 GI [U₄ + 2N₅₇]³
 i2 PAD U₄ PAP
 ii1 SANGA_a ZATU753
 ii2 IB_a LA_{2a} SUG₅
 ii3 GA_a + ZATU753



Close parallels to this text from the Uruk text corpus include W(ar)ka 20274,4,³ W 20274,42 (unpublished), W 20274,51,⁴ W 20274,53 (unpublished), W 20274,80 + 127 + 136 (unpublished⁵), W 20274,134 (unpublished) and W 20511,6.⁶ All texts with the exception of W 20274,80+, seem to record exclusively measures of liquid goods, in all likelihood animal fats and milk products. The sign GARA₂, inscribed immediately before a

¹ My sincere thanks go to J. Carré for his permission to publish the text here.

² According to the newly edited sign-list M. Green and H. Nissen, *Zeichenliste der Archaischen Texte aus Uruk* (= *Archaische Texte aus Uruk* 2; Berlin, 1987). I have stated there p. 347 and elsewhere reasons for a greater differentiation of sign-forms than that found in *ATU* 2, here for example GA_a or LA_{2a} instead of simply GA or LA₂. The cumbersome system of numerical transliterations is explained *op.cit.*, p. 125 by P. Damerow and the author. See most recently H. Nissen, P. Damerow and R. Englund, *Frühe Schrift und Techniken der Wirtschaftsverwaltung im alten Vorderen Orient* (Berlin, 1990), in particular pp. 61–5, 131–46 and 176–80.

³ Cf. the photograph and (defective) copy of the tablet's obverse in *ATU* 2, pl. 19.

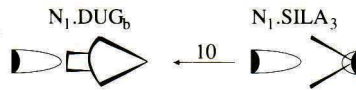
⁴ Cf. the (defective) copy of the tablet's obverse in M. Green, *Visible Language* 15 (1981) 358, incorrectly identified as W 20274,5. The first numerical notation is in fact an undisturbed 9N₁/1N₁ KU_{3a}; obv. ii 1 reads not NUNUZ_{a1} KISIM_a EN_a ZATU752 but 2N₁₄ KISIM_a EN_a ZATU752.

⁵ The tablet contains a large account of the disbursement of textiles to a number of the same persons as are mentioned in the present text.

⁶ Cf. the photograph of the tablet's obverse in P. Damerow, R. Englund and H. Nissen, *Spektrum der Wissenschaft*, February 1988, p. 75.

notation including $\text{\textcircled{S}}\text{AKIR}_c$ in the text W 20511,6, for instance, is according to the account W 21682⁷ clearly a representation of a particular sort of dairy product, since the latter text records 5 SILA_3 both of GARA_2 and GA_a , which combined resulted in a sum of 1 DUG_b . The sign DUG_b is, as we know from such texts as those published by M. Green in *JNES* 39 (1980), 1–35, the representation of a jar of milk fat or cream to be delivered by herders of cows in Uruk. According to the texts published by Green, 1 DUG_b should represent the yearly delivery of this product for 1–2 of the milk cows under the care of the named herders.⁸ Since SILA_3 is evidently a pictographic representation of the Uruk III period conical bowls cut from rotating wheels (“Blumentöpfe”), which as a replacement of or possibly supplement to the older bevelled-rim bowls (“Glockentöpfe”) had, based on measurements of both containers from Warka made by Hans Nissen, a mode capacity of c. 0.8 litres, the jar DUG_b would have held about 8 litres. One may compare this quantity with the quota reckoned per milk cow in the presargonic Lagash and the Ur III periods of 10 (Old Sumerian) and 5 (Ur III) sila of the products called $\text{i.s}\bar{\text{e}}.\text{ga}$, “churned (lit. ‘beaten’) fat,” and i.nun , “risen fat,” respectively.⁹ We may thus feel confident in identifying the sign SILA_3 in W 21682 with the unit sila of approximately 1 litre in later tradition.

A schematic representation of the metrology evidenced by W 21682 would be the following¹⁰:



The metrology of the text published here is somewhat more involved, although it seems that the product measured, $\text{\textcircled{S}}\text{AKIR}_c$, comes also from the Uruk dairies. This sign $\text{\textcircled{S}}\text{AKIR}_c$ would be better read as the sign combination that it is, namely $\text{UKKIN}_b + \text{NI}_a$, since the sign UKKIN_a/b simply represents a jar with a rounded base and a thick neck.¹¹ The inscribed sign NI_a is that form of this sign under the entry NI in *ATU* 2 which represents a dairy product and which based on later usage of the sign NI/i , Akkadian *šammu*, has been conventionally identified with “oil” or “fat”.¹²

This product is preceded in the text by the involved numerical notation $1\text{N}_{14} 7\text{N}_1/1\text{N}_1 \text{KU}_{3a}/1\text{N}_2$. As P. Damerow and I have stated elsewhere,¹³ this notation is to be understood as 17 of the units N_1 (counting in the sexagesimal system) plus $\frac{1}{2} \text{N}_1$ ($1\text{N}_1 \text{KU}_{3a}$) plus $\frac{1}{10} \text{N}_1$ (1N_2), for a total of $17\frac{6}{10}$ of the jars $\text{\textcircled{S}}\text{AKIR}_c$.

We have heretofore assumed that this metrological system applied only to the product qualified by the sign DUG_c (see diagram below), which may represent a jar containing a milk

⁷ Cf. the copy of the text in *ATU* 2, pl. 54, and P. Damerow, R. Englund and H. Nissen, *Spektrum der Wissenschaft*, February 1988, p. 80. See now *Frühe Schrift*, 178–80.

⁸ Cf. also *Frühe Schrift*, 131–7.

⁹ The identification of these milk products was an object of discussion at the 1990 meeting of the Sumerian Agriculture Group on sheep and goats headed by J. N. Postgate and M. Powell and will be discussed more fully at the next meeting on cattle and pigs. Dr. M. Teuber of the Bundesanstalt für Milchwirtschaft, Kiel, has in his very helpful discussions of these problems with us indicated that $\text{i.s}\bar{\text{e}}.\text{ga}/\text{i.nun}$ should in all likelihood represent the product clarified (run) butter (“ghee”), as has been previously suggested. Cf. M. Stol, “Dairy products in Babylonia”, *Bulletin of Sumerian Agriculture* (forthcoming).

¹⁰ Cf. *ATU* 2, 129–30 with footnotes and *Frühe Schrift*, p. 65.

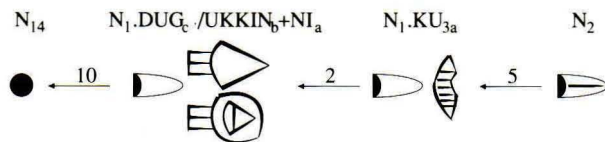
¹¹ Very highly speculative is the occasionally seen translation “assembly” or the like of this sign in the archaic period, since texts cited here define explicitly the function of this sign as one corresponding to its pictographic representation of a vat. This accords well with the later meaning of the sign $\text{\textcircled{S}}\text{AKIR}$

(Fara form still $\text{UKKIN} \times \text{NI}$, developing into $\text{URU} \times \text{GU}/\text{GA}/\text{GÁRA}$, with Sum. reading *šakir*, Akk. *namāšu/nimēšu* and *šakirru*), “churn,” first identified by B. Landsberger *apud* T. Jacobsen, *JNES* 12 (1953), 166²⁰; cf. *OIP* 99, 392 v’ 6’–7’ (*šakir kù/ga du₁₀ si*; Fara period, cp. Enmerkar and Ensuĥkešda’ana I. 205) and A. Salonen, *Die Hausgeräte de alten Mesopotamier . . . II* (= *ASAF* B 144; Helsinki 1966), 358–60.

¹² The form of the sign in line 5 of the archaic vessels list is in fact in three of the four well preserved witnesses $\text{UKKIN}_b + \text{NI}_a$ (W 20266,35 [unpublished], W 24157 and W 24158 [A. Cavigneau, *BagM* 22 (1991), and *ATU* 3, both forthcoming]), in only one text $\text{UKKIN}_b + \text{NI}_b$ (W 20521,1 [unpublished]; the tablet had however been erased in antiquity). This suggests that a careful rendering of the sign $\text{\textcircled{S}}\text{AKIR}$, required use of the form NI_a and that the form NI_b (= vessels list line 1) and not NI_b (= vessels list line 9) is to be understood in all administrative attestations, including the present text. Cf. the copies of the cited texts in *ATU* 3 and the treatment of these forms in the commentary to the lists in *Materialien zu den frühen Schriftzeugnissen des Vorderen Orients* (= *MSVO* (both forthcoming)).

¹³ *ATU* 2, 131.

product.¹⁴ It seems however clear from the text published here, from W 17586¹⁵ with the notation reverse i 1: 9N₁/1N₁ KU_{3a}/4N₂ ŠAKIR_c ZATU752 . . . , from W 20274,51¹⁶ with the notation obverse i 1: 9N₁/1N₁ KU_{3a} ŠAKIR_c ZATU752 . . . and from W 20511,6¹⁷ obverse ii 3 with: []/1N₁ KU_{3a} ŠAKIR_c ZATU752, that the same system obtains for the counting of the product ŠAKIR_c (= UKKIN_b + NI_a). We thus have the following diagram of this metrological system:



The numerical sign N₂ in this system would clearly correspond to the combination N₁ SILA₃ in the system “DUG_b”, and 1N₁ KU_{3a} would correspond to the use of the sign N₁ turned 90° clockwise (= N₈) to represent $\frac{1}{2}$ N₁ in the sexagesimal and bisexagesimal systems of counting.¹⁸ The use of 1N₈ to qualify amounts of DUG_c in such texts as W 20274,8,¹⁹ W 20274,39,²⁰ W 20511,12²¹ and W 23951²² seems in fact to indicate that this sign and 1N₁ KU_{3a} were free variants. I am unable to explain the use of the ideogram KU_{3a} in notations employing this metrological system; it may be that it already at this stage represented a phonetic complement of the sign for $\frac{1}{2}$, since KU_{3a}, conventionally identified with “silver,” is not attested functioning as a designation of a vessl.²³ The language behind this possible complementation remains undeciphered.

ZATU752, GI and ^rU₄ + 2N₅₇¹² in the first case of the account published here are signs often found in functional context in proto-cuneiform texts. U₄ + 2N₅₇, assuming the reconstruction is correct,²⁴ would represent in the archaic notational system of time-reckoning two years and thus indicate the timespan covered by the text.²⁵ ZATU752 seems to indicate the completion of a book-keeping process otherwise unclear to us, and GI might, in accordance with its usage in later cuneiform tradition, record the nature of the movement of goods, possibly towards the central administration.

The second case of the first column and the three cases of the second column of the text consist entirely of ideograms, the meaning of which remains open to speculation. Based on the structure evident in other archaic texts, it may be expected that these cases contain the names and professions of handling officials responsible for the entire transaction. The first person would thus have carried the name PAD U₄ PAP and have been a scribe (SANGA_a) for the administrative unit ZATU753; a second would consequently have been called IB_a LA_{2a} SUG₅ with the profession GA_a + ZATU753.

The reverse of the tablet, where one might have expected individual entries of which the numerical notation of the obverse would have been a summation, was unscribed; the

¹⁴ Two usages of the sign support this identification. First, the qualification in W 20274,53 (unpublished) obv. i 1 of the sign DUG_c with the sign GARA₂, which clearly represents a dairy product, places the former product in a corresponding context. Second, the sign itself seems to assume the same function as DUG_c, in the text W 20511,2 (unpublished) obv. iii 2 with the addition of presumably 10 SILA₃ of GARA₂ and GA_a (first notation damaged) resulting in 1 DUG_c. The use of DUG_c after DUG_b and before textile products in the text R. Englund and J.-P. Grégoire, *MSVO* 1 (Berlin, 1991), no. 109 obv. i 4, moreover, is suggestive of its similar semantic range in the Jemdet Nasr texts. The same text records in a separate section the amount of grain necessary for the production of beer contained in forty five of the jars DUG_a. Thus DUG_c will not have represented a kind of beer or other grain-based drink, as was implied by the precipitate system identification in *Frühe Schrift*, pp. 63 and 65.

¹⁵ Cf. the photograph and (defective) copy of the tablet in *ATU* 2, pl. 51. The entry “ŠE₃+1” in *ATU* 2 based on this

notation is, incidentally, to be deleted (= N₁ KU_{3a}).

¹⁶ Cf. n. 4 above.

¹⁷ Cf. n. 6 above.

¹⁸ Cf. *ATU* 2, 128–33.

¹⁹ Cf. the copy of the tablet’s obverse in *ATU* 2, pl. 20.

²⁰ Cf. the photograph of the tablet in *ATU* 2, pl. 31.

²¹ Cf. the copy of the tablet’s obverse in *ATU* 2, pl. 60, middle left.

²² Cf. the copy of the tablet in A. Cavigneaux, *BagM* 22 (1991, forthcoming).

²³ It seems unlikely that the sign should represent a rebus writing of the word for a vessel half the size of DUG_c/UKKIN_b, since no sign variants occur in its position.

²⁴ Cf. W 20274,53 (unpublished) rev. i 3 with U₄ + 2N₅₇ U₄ PAD PAP BA, together with notations of amounts of DUG_c and SAKIR_c, ZATU752.

²⁵ Cf. R. Englund, “Administrative Timekeeping in Ancient Mesopotamia,” *JESHO* 31 (1988), 121–85.

format of the obverse makes likely that it was just the same a summation, however of individual entries drawn from other sources. Some of these may be among the fragments of the archive including W 20274,1-156, which was unearthed in Warka in the winter of 1960-1.