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## BM 110450, a scratch pad on a clod of clay?

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Preprint

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I thank Jeanette Fincke who kindly communicated me the photos of BM 110450, and encouraged me to write some words about this small clod of clay with numerical inscriptions, as well as Cécile Michel, Xiaoli Ouyang and Christopher Walker for their help and suggestions.

### BM 110450

Tablet BM 110450 was acquired by the British Museum in 1914 and registered under the number 1914-4-4, 516. It is part of a collection purchased from Elias Géjou, the Parisian antiquarian who was one of the most important supplier of tablets for European and American museums in the first decades of the 20th century. The tablet measures 8.5 cm wide, 5.3 cm high and 2.5 cm thick.

[fig. 1]

### Fig. 1 BM 110450. Taken courtesy of the Trustees of the British Museum, photos J. C. Fincke

At first sight, the object is not spectacular. The aspect of the edges gives the impression that a small rectangular tablet has been folded in two or three layers and crushed to form an oblong block with a flat side, say the obverse, and a convex side, say the reverse. On the reverse, a round depression might indicate that the block of clay was intended to be reused as a candle holder, according to Christopher Walker. The surface of the obverse exhibits traces of erasure and signs partially erased. Above these erasures, two lines of numerical signs are inscribed.

This inscription is of high interest because it employs the same graphical system as notations found in the margins of administrative texts from the Ur III period that we studied with Xiaoli Ouyang (Ouyang Proust forthcoming). This graphical system is neither that found in the Ur III or OB administrative texts, nor that found in mathematical texts, but specific to "scratch pads". In the transliteration below, I use the conventions we adopted with Xiaoli Ouyang for this graphical system: the specification (aš) is indicated when the wedges are horizontal; the sexagesimal digits are separated by the colon ":".

Transliteration

5(aš) 1:30

34:34(aš) 1:55

### Marginal numbers

In our paper on marginal numbers, Xiaoli Ouyang and I identify about twenty administrative texts dated to the Ur III period which bear numerical notations in marginal zones of the tablet (edges or special boxes). These marginal notations share the following features:

- The systems used are either sexagesimal place value notation, or place value notation partially sexagesimal, or sexagesimal notation partially place valued.
- The paleography is normalized (the wedges and the *winkelhaken* are always arranged in rows of three elements).

- The numbers are isolated (never followed by the measurement units and name of the good quantified).
- The margins generally exhibit traces of erasures.

These features contrast with those of the quantities recorded in the main text, in which the systems used are the standard metrological notations, the paleography is not normalized and the numbers are always followed by the measurement units and the name of the good quantified.

For instance, in the Ur III balanced account from Umma YBC 4179 (P111807, copy in Ellis, 1970, complete edition in Ouyang Proust forthcoming, text 3) we see the same amount of grain noted in metrological notations in the main text (rev. col. *i*, line 5), and in partial sexagesimal place value notation on the upper edge.

Main text (rev. col. <i>i</i> , line 5)	Margins (upper edge)
[fig. 2] 7(aš) 1(barig) 4(ban <sub>2</sub> ) 6(diš) 1/2 sila <sub>3</sub> še	[fig. 3] 7(aš) 1:46:30

Note the specific features of marginal notations:

- The first number, 7, is written with two rows of wedges in the main text (non-normalized paleography), and with three rows of wedges in the margins (normalized paleography).
- The measuring unit (sila<sub>3</sub>) and the name of the good (še, that is, barley) appear in the main text, not in the margin.

The sexagesimal place value notation is used in the margin to represent the numbers of *barig*, *ban*, and *sila*.

We suggested in our paper that the numbers noted in the margins reflect a process of calculation. The quantities recorded in the main text would be transformed into a format that could be used easily for calculation. The quantities in such format would be noted in the margins which serve as a scratch pad, and could be represented by objects constituting a calculation device (abacus or token). The calculations would be performed on these objects. Then the result displayed on the calculation device would be transformed backwards into “marginal notations”, and then into metrological notations registered in the main text. After each transformation, the scratch pad would be erased.

Note that marginal numbers are found too in some Old Babylonian administrative texts, and that the process described above may have continued to be applied in later periods; this would deserve further investigation.

### BM 110450 as a scratch pad

The graphical system used in BM 110450 is similar to that found in margins of Ur III administrative texts. If we follow the process just described, we can suppose that our clod of clay had served as scratch pad associated to an administrative text. This administrative text is unknown, but is it possible to reconstruct some of the metrological notations the inscription on BM 110450 refers to.

Supposed main text (unknown)	BM 110450, obverse
 5(aš) 1(barig) 3(ban <sub>2</sub> )	Line 1 [fig. 4] 5(aš) 1:30

 <p data-bbox="236 286 654 353">3(geš'u) 4(geš<sub>2</sub>) 3(u) 4(aš) 1(barig) 5(ban<sub>2</sub>) 5 sila<sub>3</sub></p>	<p data-bbox="965 219 1141 324">Line 2 [fig. 5] 34:34(aš) 1:55</p>
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**Fig. 2 Lines 1 and 2 of BM 110450. Taken courtesy of the Trustees of the British Museum, photos J. C. Fincke**

In conclusion, BM 110450 might be the scratch pad of an administrative text, possibly from the Ur III period.

## Bibliography

Ellis, Maria de Jong (1970), "A note on the "chariot's crescent"." *Journal of the American Oriental Society* 90: 266-69, p. 268.

Ouyang, Xiaoli and Christine Proust (forthcoming), "Place value notations in the Ur III period: marginal numbers in administrative texts." in *Cultures of computation and quantification*, edited by K. Chemla, A. Keller, and C. Proust: Springer.