

Reexamination of the Susa Mathematical Text No. 12: A System of Quartic Equations

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I Introduction

The Susa mathematical text No. 12, which was published by E. M. Bruins and M. Rutten, deals with a certain system of simultaneous equations.¹ The problem treated there clearly shows one of the characteristic features of Babylonian mathematics, that is, the algebraic character. In the text a complicated system of quartic equations is solved without using any mathematical symbols. It is regrettable, however, that the statement of the problem has not been completely understood as yet, although it is well preserved on the tablet. Moreover, the mathematical interpretation proposed by Bruins and followed by J. Friberg² does not agree with the text itself. In addition, there are several mistakes in the transliteration by Bruins and Rutten. Therefore I shall present in this paper a new interpretation of the problem with my own transliteration and translation.

II The technical term, *manâtum*

The Akkadian word, *manâtum*, is the plural form of *manîtum* meaning “amount, number, length, accounting”³ and is used in the sense of “numbers” in the mathematical text IM 52301, obverse, lines 19 and 20:⁴

5 ša e-te-ru / 10 ša tu-iš-bu 40 ši-ni-pé-tim a-ra^{sic} ma-ni-a-ti-a lu-pu-ut-ma

¹E. M. Bruins and M. Rutten, *Textes mathématiques de Suse* [= TMS], 1961, pp. 78–81. Cf. The review of TMS by W. von Soden, *Bibliotheca Orientalis* 21 (1964), pp. 44–50. See further, K. Muroi, Quadratic Equations in the Susa Mathematical Text No. 21, *SCIAMVS*, vol. 1, 2000, pp. 3–10.

²J. Friberg, *A Survey of Publications on Sumero-Akkadian Mathematics, Metrology and Related Matters (1854–1982)*, 1982, p. 89. D. O. Edzard, ed., *Reallexikon der Assyriologie und Vorderasiatischen Archäologie*, Band 7 (1990), p. 576.

³A. L. Oppenheim and E. Reiner, *The Assyrian Dictionary* [= CAD], vol. 10, MII, 1977, p. 86.

⁴Taha Baqir, Another Important Mathematical Text from Tell Harmal, *Sumer* 6 (1950), pp. 130–148. Cf. CAD, vol. 1, AI, p. 227; *aramanîtu* (a mathematical term).