

# **New Perspectives on the Dawn of Writing in the Ancient Near East: The Study of Proto-Literate Clay Envelopes from Choga Mish, Iran, Using State-of-the-Art Computed Tomography (CT) Technology**

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Small, unassuming clay balls have come to play a central role in the debate over the origins of writing, having been made famous by Denise Schmandt-Besserat and her theory of the origins of writing. The balls, which range from the size of golf balls to baseballs, are better described as envelopes, as they are hollow and contain small clay artifacts commonly referred to as clay counters, or “tokens.” The envelopes with their associated tokens have been excavated in Iran, Syria, and Iraq, and make their first appearance in the archaeological record in the middle of the fourth millennium and so are contemporaneous with, or slightly earlier than, the first texts (c. 3200 BCE). There is a general consensus that the envelopes represented an early administrative device, which served as a means to monitor and control the flow of materials, various commodities, and labor. The tokens, which are contained within the envelopes, represent quantities and/or commodities of the proto-literate economies. Essentially, these devices served as receipts for various economic transactions.

Building upon the work of Pierre Amiet, Schmandt-Besserat connected these early administrative devices directly to the origins of writing in the ancient Near East, arguing that both the numerical and logographic signs of cuneiform evolved out of the earlier token system. A major obstacle in testing this theory — and, moreover, in understanding these proto-literate accounting devices — has been our inability to easily inspect the contents of the vast majority of clay envelopes. According to a recent estimate, some 80 of the 130 or so excavated clay envelopes are intact. Since the 1960s scholars have x-rayed these envelopes and scanned them with computed tomography (CT) equipment. Typically, these techniques could not offer the resolution and clarity necessary to determine the exact number of tokens and whether they have markings or not — critical data for understanding their meaning. However, major advances in CT and digital imaging technology have been made in recent years and it is now possible to obtain the requisite resolution, fidelity, and much more. The Oriental Institute of the University of Chicago is currently collaborating with North Star Imaging of Rogers, MN, a leading manufacturer of

state-of-the-art industrial CT systems, and Kinetic Vision of Cincinnati, OH, to scan and analyze the eighteen clay envelopes in our collection, all of which the Oriental Institute excavated from Choga Mish, Iran in the 1960s and early 1970s. The value of the envelopes in the Oriental Institute's collections lies not only in the fact that they roughly double the corpus of envelopes for which the contents are known, but also in their well-documented archeological context, having been excavated using relatively modern scientific methods and recording techniques. In this presentation, I will discuss the particulars of our imaging project, the current state of our ongoing investigation, and our initial results.