

Reallexikon der Assyriologie und Vorderasiatischen Archäologie

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communicate economic data in oral preliterate cultures (Schmandt-Besserat 1992; ead. 1996). T. played a major role in the development of counting, data processing and communication in the Ancient Near East. They made possible the establishment of a Neolithic redistribution economy and thereby set the foundation of the Mesopot. Bronze Age civilization.

About 7500–3500 the code consisted of some 6 types, such as cones, spheres, disks, cylinders, tetrahedrons and ovoids (fig. 1), each standing for one unit of a particular commodity. Most forms occurred in two distinct sizes, respectively about 1 or 3 cm across, denoting quantity. These early types of geometric counters modeled in clay with an even surface, except for an occasional dot, are referred to as plain t.

During the Urban Period, 3500–3100, new types of t. appeared besides the plain ones. Among them were further geometric shapes such as quadrangles, triangles, paraboloids, ovals and biconoids, but also naturalistic forms including vessels, tools and animals. These so-called complex t. were characteristically covered with lines or dots conferring qualitative information. Triangles, paraboloids, and mostly disks occurred in series bearing various sets of lines. Plain and complex t. were found by the dozen or the hundreds in Near Eastern archaeol. sites from Palestine to Anatolia and from Syria to Persia.

After 3500, t. were often perforated in order to be strung to a clay bulla (Siegelpraxis* B. § 2.2). Others were kept in envelopes. These artifacts were hollow clay balls of spherical shape. Some of the envelopes displayed on the surface the impression of the t. held inside (Siegelpraxis* B. § 2.3 with Abb. 10).

Token.

§ 1. Definition. – § 2. Counting. – § 3. Economy. – § 4. Administration. – § 5. Cognition. – § 6. Writing. – § 7. Tokens beyond the Near East.

§ 1. Definition. T. were clay symbols of multiple shapes used to count, store and

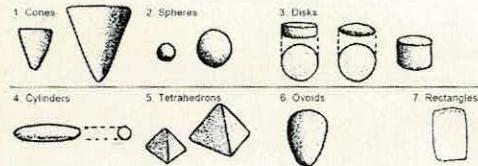


Fig. 1. Plain tokens, after Schmandt-Besserat 1996, 49 chart 2.

Schmandt-Besserat D. 1992: Before writing 1-2; ead. 1996: How writing came about.

§ 2. Counting. T. shed light on the beginning of counting. First, the t. were used in one-to-one correspondence: three jars of oil were shown by three ovoid t., which is the simplest way of reckoning. Second, the fact that each commodity was counted with a specific type of t., i.e. jars of oil could only be counted with ovoid t., denotes concrete counting. Concrete counting is characterized by different numerations or different sequences of number words to count different categories of items.

§ 3. Economy. T. were linked to the economy. Their invention corresponds to the beginning of agriculture. For example, at Mureybet, Syria, t. occur in level III, where pollen indicated the presence of cultivated fields (Cauvin 1978, 74). Second, the counters served exclusively to keep track of commodities. The plain t. stood for farm products: small and large cones, spheres and flat disks stood for different measures of barley; ovoids for jars of oil; cylinders and lenticular disks represented numbers of domesticated animals, and tetrahedrons for units of labor.

Ca. 3500, the proliferation of t. shapes and markings reflected the multiplication of commodities manufactured in urban workshops. Triangular shapes stood for ingots of metal; series of disks bearing on their face various numbers of parallel lines stood for various qualities of textiles (fig. 2) and paraboloids for garments. Quantities of beer, oil, honey were shown by t. in the shape of their usual containers. There is no evidence that t. were used for trade. Instead they were central to administration.

Cauvin J. 1978: Les premiers villages de Syrie-Palestine du IX^{ème} au VII^{ème} millénaire avant J. C.

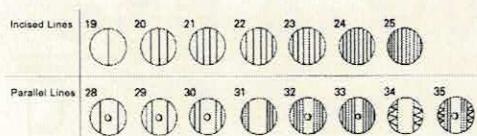


Fig. 2. Disks with incised and parallel lines, after Schmandt-Besserat 1996, 21 chart 1.

§ 4. Administration. The mastery of counting and accounting with t. fostered an elite based on administrative skills who controlled the redistribution economy. The main function of t. was to keep track of household and workshop contributions of surplus goods to the communal wealth and their redistribution for the support of the underprivileged or the organization of religious festivals. The bullae and envelopes, with their multiple office seals, illustrate the toughening of the city state administrations, as unpaid contributions were recorded until their settlement.

T. used for this purpose are found even in Neo-Ass. times (cf. Tušan* B. § 3).

§ 5. Cognition. Counting with t. reflected the level of cognition of preliterate oral cultures (Malafouris 2010). Data processing with t. was tactile. The counters were meant to be grasped and manipulated with the fingers. Addition, subtraction, multiplication and division of quantities of commodities were done by moving or removing counters by hand.

T. processed data concretely. First, the items counted consisted exclusively of goods, such as barley, animals and oil. Second, plurality was treated concretely, in one-to-one correspondence and with concrete numerations.

Malafouris L. 2010: Grasping the concept of number: how did the sapient mind move beyond approximation?, in: I. Morley/C. Renfrew (ed.), The archaeology of measurement: comprehending heaven, earth and time in ancient societies, 35-42.

§ 6. Writing. T. represent the first stage in the 9000-year continuous Near Eastern tradition of data processing which ultimately led to writing (Keilschrift* § 5). The change in communication that occurred on envelopes when the three-dimensional t. were replaced by their two-dimensional impressions is considered the beginning of writing. Clay tablets (Tontafel*) bearing impressed signs replaced the t. enclosed in envelopes (Siegelpraxis* B. § 2.4). In turn, the impressed markings were followed by pictographs, or sketches of t. and other items traced with a stylus.

Writing inherited from t. a system for accounting goods, as well as the use of clay, and a repertory of signs. Writing brought abstraction to data processing: the signs of t. were now abstract, and no longer tangible; abstract numerals such as "1" "10" "60" replaced one-to-one correspondence; finally, pictographs took phonetic values (Keilschrift* § 6f.).

§ 7. Tokens beyond the Near East. Plain t. are not unique to the Ancient Near East. Identical artifacts have been excavated in Central Asia at Jeitun (Masson/Sarianidi 1972, 35), in Western China at Shuangdun (Hang et al. 2008, 130: 1–12; 133: 1–4 and 132: 1–12) and in the Indus Valley at Mehrgarh (Jarrige et al. 1995, 361: 7,32c). Similar clay counters in the same shapes and sizes are also reported in preliterate excavations outside of the Near Eastern sphere of influence in Europe (Budja 1998), Africa (Addison 1949/1, 214, 227, 241f.; id. 1949/2, 105: 11–13; 114: 6–11) and Mesoamerica (Manzanilla 2009, 30, 2.8) suggesting that the tactile, concrete system of data processing corresponds to some fundamental aptitude of the human preliterate mind. However, the phenomenon of complex t. and the evolution into writing occurred only in the Near East.

Addison F. 1949: *Jebel Moya 1–2.* – Budja M. 1998: Clay tokens: accounting before writing in Eurasia, *Documenta Praehistorica* 25, 219–235. – Hang K. X./Qun Z./Li X. D. (ed.) 2008: *Bengbu Shuangdun 2: a report on the Neolithic site.* – Jarrige C. et al. (ed.) 1995: *Mehrgarh: field reports 1974–1985: from Neolithic times to the Indus Civilization.* – Manzanilla L. R. 2009: Corporate life in apartment and barrio compounds at Teotihuacan, Central Mexico: craft specialization, hierarchy, and ethnicity, in: ead./C. Chapdelaine (ed.), *Domestic life in Prehispanic capitals*, 21–42. – Masson V. M./Sarianidi V. I. 1972: Central Asia: Turkmenia before the Achaemenids (= *Ancient Peoples and Places* 79).

D. Schmandt-Besserat