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## How Writing Came About

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# HOW WRITING CAME ABOUT

Writing makes it possible for us to store information, thereby creating a "superintelligence" - a fund of knowledge which is well beyond the ability of any single human to remember yet, at the same time, is available to all of us. Ancient civilisations considered writing a gift of the gods. The Egyptians attributed it to Thoth, the god of science and magic; the Babylonians to Nebo, son of Marduk; and the Greeks to Hermes. In the XXth century how do we think writing came about?

The earliest evidence of a writing system comes from Mesopotamia, present day Iraq. During the past 200 years, archeologists working in the region have discovered large collections of ancient written documents. They consist of clay tablets written in cuneiform script. The evolution of cuneiform can be traced backwards, through a series of archaic stages, to simple incised signs and finally crudely impressed signs reaching back in time as far as 3100 B.C. but never beyond. These impressed or incised signs are the first known script. They led scholars to conclude that writing must have been invented about 3100 B.C. by the Sumerians, who inhabited Mesopotamia at the time.[1)]

The first tablets are puzzling in many ways.[2)] Clay is a very impractical material which is bulky to work with and requires careful drying before being used. Why would such a medium be selected for man's first effort at writing? Furthermore, the tablets are shaped like small cushions with strongly convex faces. Why was this unusual shape employed? Another puzzling characteristic can be noted in the earliest signs made on the tablets. While one would expect that a writing system would begin with small pictures, the signs are, as a rule, abstract. Moreover, the quantity of different signs, more than 1500, appears too many for the beginning of writing. Because of the large number of signs and their abstract shapes, the suspicion arose that the tablets of 3100 B.C. might, after all, represent an already advanced stage of writing. Scholars hypothesized that the signs could have developed from small pictures to abstract signs and their repertory multiplied in earlier attempts, perhaps

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1) I.J.Gelb, A Study of Writing, The University of Chicago Press ,revised edition (1974), p.60-72; David Diringer, The Alphabet, vol.I, 3rd edition (London 1968), p.17.

2) A. Falkenstein, Archaische Texte aus Uruk. Ausgrabungen der Deutschen Forschungsgemeinschaft (Berlin 1960).

inscribed on wood, which would have disintegrated in time and were lost forever. The solution to the problem turned out to be different. It came in an unsuspected way.

In 1957, A. Leo Oppenheim of the University of Chicago noted that in 1500 B.C., while writing was commonplace, accountants of Nuzi, north of Babylon, still preferred to use counters for bookkeeping.[3] Each animal of the palace's large herds was represented by a counter. These tokens were transfered to various receptacles to keep track of change of sheperds, or pasture; when animals were shorn etc... Forty eight such counters were actually found in the excavations of Nuzi. They were contained in a hollow tablet which probably represented a transfer from one office to another. On the surface of the hollow tablet - or envelope, a list written in cuneiform script itemized 48 animals, obviously corresponding to the 48 counters. The list read: "21 ewes, 6 female lambs, 8 full grown rams, 4 male lambs, 6 she-goats that have given birth, 1 he-goat, 2 female kids". Unfortunately, the excavators who opened the envelope which was still intact when excavated, did not preserve the counters and their shape is unknown to us.

Oppenheim's finding attracted the attention of Pierre Amiet, Head Keeper of Western Asiatic Antiquities at the Louvre in Paris, to a series of about fifty hollow clay balls filled with small tokens. The clay balls dated to 3300 B.C. and came from the excavations of Susa, Iran, where they had been discovered some fifty years earlier. In 1965, Amiet realized that the Susa clay envelopes must have been accounting devices similar to the Nuzi hollow tablet.[4] His finding was of great importance for two reasons. First, the envelopes showed that, in Susa, recording with counters preceded writing by two hundred years. Second, the nature of the tokens was revealed. They were small clay artefacts modelled in various geometric shapes which Amiet rightly interpreted as standing for goods and commodities.

In 1969, I started a study on the earliest uses of clay in the Middle East which led me to systematically visit all available museum collections of clay artefacts dating 8000-5000

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3) A.Leo Oppenheim, "An Operation Device in Mesopotamian Bureaucracy", Journal of Near Eastern Studies vol.18 (1959), p.121-128.

4) Pierre Amiet, "Il y a 5000 ans les Elamites inventaient l'écriture", Archeologia vol. 12 (1966),p.20-22; Glyptique Susienne: Mémoires de la délégation archéologique en Iran vol.43, pts 1,2 (1972), p.60.

B.C. I was looking for figurines, bricks and pots. I found plenty of these but, in addition, I was surprised to find a category of artefacts which I did not expect because they were never discussed in publications. They were series of small clay tokens of various geometrical shapes. I was even more surprised when I realized later that they were identical to the counters described by Amiet, although the early tokens were never enclosed in envelopes but always found loose. Wherever I went from Turkey to Israel and from Syria to Iran, the small tokens were ubiquitous. It became evident that recording with clay tokens was practiced in the entire Middle East and that the tradition originated as early as 8000 B.C. - five thousand years before writing was invented.[5] The identification of tokens as counters was not surprising since sets of small objects have been used for counting in most societies. What was unexpected was the discovery that more than 80 shapes closely matched the shapes of the earliest signs of writing. Much work and research will be necessary to comprehend fully the steps that led from tokens to writing. For the time being it appears that it happened in four major stages:

1. 8000 B.C. a system of recording is used based on tokens.
2. 3300 B.C. clay envelopes hold tokens of particular transactions.
3. 3300 B.C. signs are impressed on the surface of envelopes.
4. 3100 B.C. clay tablets appear with impressed or incised signs.

The appearance of tokens around 8000 B.C. coincides with the beginning of food production in South West Asia. This suggests that the new economy, based upon agriculture and animal husbandry generated a need for record keeping and the tokens were developed to meet this need.[6] They were small artefacts ranging from 1-3 cm, made of fine clay and moulded in various shapes. The most frequent types were spheres, cones, discs, cylinders and tetrahedrons. Their careful manufacture, which included firing, was achieved by simple hand moulding either rolling them between the palms of the hands or by pinching them with the finger tips. Some examples bore incised and punched markings presumably made with a stick. Each token stood for a precise quantity of a particular commodity and there

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5) Denise Schmandt-Besserat, "The Earliest Precursor of writing", Scientific American vol.238, No.6(1978), p.50-59. German translation: "Vom Ursprung der Schrift", Spectrum der Wissenschaft (December 1978), p.5-12.

6) Denise Schmandt-Besserat, "The Emergence of Recording", American Anthropologist (forthcoming).

is evidence suggesting that the cone and the sphere stood for amounts similar to our "peck" and "bushel" of barley.[7)]

The tokens became common in the following millennia and they are found in most Middle Eastern archaeological sites. Their number at each site may reach sizeable proportions. For instance, the site of Jarmo (Iraq), a village dating about 6500 B.C. yield 1153 spheres, 296 discs, and 106 cones.[8)] During the four thousand years which followed their invention, the tokens evidence little change in shape, size and manufacture. This reflects the stability of the economy and way of life which existed between the development of agriculture and the beginning of cities.

When cities started to appear, the token system shows evidence of profound changes.[9)] This evolution was expressed by the appearance of new shapes of tokens, bringing to 14 the number of types commonly found. Among them were biconoids, ovoids, bent coils, triangles, rectangles, parabolae, rhomboids, containers and animals. Also, incised and punched markings started proliferating on the face of the tokens. There is no doubt that these changes, associated as they are with the appearance of urban life, were the result of new stresses being placed on the economic system. Associated with the development of cities are specialization of labor and the growth of centralized administration. Both tend to increase the number and complexity of busyness transactions thus requiring a more intricate record keeping system.

Shortly after these changes in the tokens occured, around 3300 B.C., envelopes were invented in which tokens could be saved.[10)] These envelopes consisted of a simple hollow clay ball somewhat smaller than a tennis ball. They provided both a means of holding and protecting tokens and also a clay surface onto which the parties involved in a transaction could impress their personal seals, thereby insuring against any tampering with the contents of the envelope.

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7) Denise Schmandt-Besserat, "The Envelopes that Bear the First Writing", Technology and Culture, vol. 21, No.3 (1980), p.370-372.

8) Vivian L. Broman, Jarmo Figurines, unpublished Master Thesis (Cambridge 1958), p. 62, 63, 58.

9) Denise Schmandt-Besserat, "An Archaic Recording System in the Uruk-Jemdet Nasr Period", American Journal of Archaeology, vol. 83, No.1 (1979), p.20-48.

10) Denise Schmandt-Besserat, "The Envelopes that Bear the First Writing", Technology and Culture, vol.21, No.3 (1980), p.357-385.

As might well be imagined, the opacity of clay was soon recognized as a serious problem. Once the envelope was sealed, one had to remember the number of tokens enclosed. If one's memory failed, the envelope had to be opened and the seal broken. This shortcoming was quickly overcome by pressing the tokens into the still soft clay of the envelope's outer surface and then enclosing the tokens themselves in the envelope. Thus, once the envelope hardened, it contained the tokens themselves inside, and impressions of the tokens on the outside where they could be "read" without breaking the seal. This was the beginning of writing.

Once the tokens were impressed upon the outer surface of the envelope, their presence inside the envelope became superfluous. It was not long before the hollow envelopes were replaced by solid tablets into which the shapes of the relevant tokens had been impressed.[11] The crudely impressed signs were soon replaced by incised signs which were able to accurately illustrate the exact shape of the most intricate tokens and their particular markings.[12] Having lost the cumbersome three dimensionality of their token progenitors, the written signs started a life of their own. Their repertory grew to include symbols other than economic goods and drawn from other sources than the token system, opening writing to all fields of human endeavour.

The first tablets derived from the envelopes holding tokens. This explains the choice of clay for their manufacture and their odd shape. Also, the abstract shape of the signs, along with the relatively large number of such shapes can be explained as the carrying over the visual qualities of the tokens previously used for record keeping. After all, writing was neither a miraculous nor an instantaneous development as it had traditionally been assumed. Writing, the most perfect supplement to language, originated from a modest system of counters to keep track of economic goods.

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11) Denise Schmandt-Besserat, "From tokens to tablets: a re-evaluation of the so-called numerical tablets", Visible Language, vol.15, No. 3 (1981, forthcoming).

12) Denise Schmandt-Besserat, "Decipherment of the Earliest Tablets", Science , vol. 211 (1981), p.283-285.