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THE USE OF SEALS AND THE INVENTION OF WRITING

BY

MALATI J. SHENDGE

Abstract

The use of clay pebbles, and hollow clay balls with the pebbles enclosed within, as an accounting device, has been recognized. Textual support for the existence of such an accounting system is also brought to light recently. It is contended by D. Schmandt-Besserat that this system in which the clay figures prominently was the precursor of writing. It is also contended that this system was spread over a vast area from Turkey, Syria to Southern Persia, from IXth mill. B.C. to IVth mill. B.C. when it culminated in a form of writing at Susa, and Uruk. Archaeological evidence at the sites does not support the above hypothesis as the context and the repertoire of artifacts found at the sites of the earlier date differs from that of the later ones (Susa) completely and is not comparable at all. And therefore it is possible that the geometric objects of the earlier sites were used for some purpose which we have not yet been able to determine. The invention of writing it appears, cannot be traced back to the use of clay balls marked with the clay pebbles but probably to the use of seals and the notches representing numbers.

It has nothing to do with the use of clay. The important idea was the formation of association between sound and representable or reproduceable form, and this beginning was made when the first numbers were notched on the clay-tablets. The methodology used by Schmandt-Besserat leaves much to be desired *.

In the last few years Denise Schmandt-Besserat has vigorously pursued her work on the use of clay by early man through so many

*) Even while this article was getting ready, S. J. Lieberman's article entitled "Of clay pebbles, hollow clay balls, and writing: Sumerian view" was published. *American Journal of Archaeology*, 84, 1980, pp. 339-358. I agree with Lieberman in his observations on methodological aspects of Schmandt-Besserat's work discussed, in pp. 351-358 of his article. I am indebted to Professor Helen Kantor for showing me the clay pebbles from Choga Mish, and also drawing my attention to recent archaeological work in South-West Iran. I have shared my views with her, and our discussions were illuminating.

Abbr. MDP: *Mémoires de la Délégation en Perse*

DAFI: *Cahiers de la Délégation Archeologique Francaise en Iran, Association Paleorient*

AJA: *American Journal of Archaeology*.

articles and talks ¹). She sees the use of clay to be at the basis of the invention of writing, the middle stages being made up by the use of geometric objects, clay pebbles (or tokens) and clay balls which are compared to clay envelopes.

Schmandt-Besserat's hypothesis may be summed up as follows: Her studies in the early uses of clay have enabled her to document the occurrence of clay tokens in quantity on practically all Middle-Eastern sites starting in the ninth millennium B.C. It is presumed that the tokens were used for computation and record-keeping in households and businesses. Certain tokens seem to have had a numerical value whereas others stood for commodities ²). She postulates that the tokens formed part of a system at the time of the appearance of writing in the late Uruk and Jemdet Nasr Period, and that the markings of these tokens on the clay balls which contained the tokens and which were also imprinted with the contents were the beginnings of writing. She also attempts to demonstrate that some of the tokens actually formed part of the early writing system as found in Uruk IV ideographic writing system.

In our reexamination of this hypothesis, first we shall go into Schmandt-Besserat's archaeological findings of the social and economic scene of which this record and accounting system formed a part, and then we shall also examine this hypothesis in the light of the archaeological findings in the recent excavation at Susa, as the material from Susa excavated from the early part of this century has a place of importance in the evidence used by her.

1) Denise Schmandt-Besserat, *The use of clay before pottery in the Zagros, Expedition*, 16:2, 1974, pp. 11-17; Idem, *The earliest uses of clay in Syria*, *Ibid.*, 19:3, 1977, pp. 28-42. Idem, *The beginnings of the use of clay in Turkey*, *Anatolian studies*, XXVII, 1977, pp. 133-150. Idem, *The invention of writing*, in *Discovery: Research and Scholarship at the University of Texas at Austin*, Vol. 1:4, 1977. Idem, *An archaic recording system and the origin of writing*, *Syro—Mesopotamian studies I*, 1977, pp. 31-70. Idem, *The earliest precursor of writing* *Scientific American* Vol. 238:6, June 1978, pp. 50-59. Idem, *Reckoning before writing*, *Archaeology*, 32:3, 1979, pp. 22-31. Idem, *An archaic recording system in the Uruk-Jemdet Nasr Period*, *AJA*: 83, 1979, pp. 19-48.

2) *AJA*: 83, p. 20.

The presence of the clay balls containing small terracotta man-made pieces mainly with geometrical shapes has been recognized as a part of an accounting system as early as 1921³⁾ by Legrain, who analysed the written material found in the earlier Susa excavations. The balls were traced back to the Orchoeniens (the Greek name for Uruk) in the Greek sources, where they were identified as a public accounting of the Urukans. The bulles were tied to the merchandise as the official mark guaranteeing that the merchandise has passed through the octroi. This practice was documented at the end of 3rd c.B.C.⁴⁾. Legrain does not mention the tokens. As a matter of fact he connects the tablet with the bulle, though he does not distinguish between the inscribed tablet and the bulle⁵⁾. He only asserts that whatever its destiny the tablet is also a clay-stopper (*le tampon d'argile*) that is the common usage of bulle and tablet. But he does see the generic similarity. He considers the writing or the cylinder seal impression on the tablet as the indelible mark of authority. In 1959, A. L. Oppenheim in his article "On an operational device in Mesopotamian Bureaucracy"⁶⁾ tried to show that the hollow egg-shaped tablet, bearing text no 449 (HSS XVI) when excavated contained 48 little stones which were later lost, was really a bureaucratic device. He correlated the stones with the inscription written on the surface of the tablet and showed that it was really an account of a transaction. He also called attention to the use of the Akkadian word *abnāti*, stones in other texts from Nuzi and parallel practices for such use. These stones he calls counters as they represent the items transacted. The final conclusion that he draws is that the accounting was done simultaneously on two levels, in writing and by means of stones⁷⁾.

3) MDP, XVI, pp. 4-9.

4) Ibid., p. 8.

5) Ibid., p. 8.

6) JNES, XVIII, 1959, pp. 121-128.

7) Oppenheim did not visualize a dual *system*. He has clearly said that this device has been used in this case. Oppenheim as is clear from his article did not have an hypothesis as is said by Schmandt-Besserat. He was looking for plausible explanations and after the consideration of several alternatives he thought one to be feasible on the basis of other facts.

P. Amiet in 1966⁸⁾ working on the Susiana seal-impressions, arrived at the conclusion that the spherical bulles were also being used for the purposes of accountancy, and classed them as earlier than the tablets. This has since been confirmed stratigraphically in the 1969 and 1972 excavations at the Susa Acropolis by Le Brun⁹⁾. He also envisaged them as small envelopes containing the small clay pebbles of divers shapes, corresponding to different types of numerals. After enclosing these inside, he pointed out, the bulles were sealed with one or more cylinder seals. In the final stage, the bulles were covered with the imprints, often with impressions of cylinder seals engraved in massive reliefs which were never utilised for the tablets. He drew attention to this special type of cylinder-style used only to seal a document. He compares them to the tablets placed in an envelope towards the end of the neo-Sumerian epoch. Two types of bulles were noted at Susa: spherical and oblong. The spherical types are paralleled at Uruk in connection with the Temple of stone-cones, contemporary with level VI which suggests that they preceded the tablets. This is confirmed by the discovery of a bulle resembling a written tablet at Nineveh. The oblong bulles at Susa bear the impressions of a cylinder seal and may have served as a guarantee tied to the linen-sacks¹⁰⁾. P. Amiet supported his interpretation further by Oppenheim's work on the Nuzi clay ball. Lieberman has reinforced the use of the clay pebbles as the pieces used in accounting by pin-pointing the mention amongst the lexicon of occupations called the Old Babylonian Lu-series, the name of *lú im-na.an* (in its various recensions) as the man of the *im-na.an* (in Sumerian probably pronounced *imna*) stone(s)/weight(s)¹¹⁾. This finally confirms the use of the clay pebbles for accounting purposes in the textual evidence. Lieberman has drawn our attention to an im-

8) P. Amiet, *Il y a 5000 ans les Elamites inventaient l'écriture*, *Archeologia*, 12, 1966, pp. 16-23, also see n. 9.

9) DAFI, 8, 1978 pub. 1979, pp. 34-37.

10) P. Amiet, *Glyptique Susienne. Mémoires de la Délégation Archéologique en Iran*, Tome XLII, Vol. I, Paris, 1972, pp. 69-70.

11) *AJA* 84, pp. 346-351.

portant fact that the accounting system may have been one of the several systems to which end the clay pebbles were probably used. From the different types of shapes which appear in the repertoires given by excavators of Susa, Ur, and Jemdet-Nasr, it seems that they were used towards more than one end. It has also been noted that only certain (2/3) types appear as signs, whereas there are several additional types of clay pebbles which have been brought together under the same classification. From this point of view it would be useful for the archaeologist to observe the archaeological context of all the objects especially now being classified as clay pebbles or tokens. During the 1933-39 season at Susa, they were found in children's graves¹²), sometimes all over the site as at Jemdet-Nasr¹³), or in certain buildings as in 1969-72 excavations at Susa¹⁴) or in pits as at Jemdet-Nasr¹⁵). The context should be of primary help in determining their use. It is also necessary to know the quantities. From this point of view the latest (1969, 1972) excavations of Le Brun at Susa are an advance¹⁶).

D. Schmandt-Besserat traces the invention of writing by man to the use of clay from 9th millennium onward. In the two articles¹⁷) she has tried to maintain that the use of clay to make what she describes as tokens started during the 9th and 8th millennium B.C. At these sites at Karim Shahr, Tepe Asiab, Ganj Dareh Tepe (level E) still temporary encampments with economy based on *intensive food-collection* or an *incipient cultivation* of cereals, and probably *the domestication of sheep may*

12) R. de Mecquenem, G. Contenau, R. Pfister and N. Belaiew, *Archéologie Susienne*, MDP Vol. XXIX, pp. 27-29.

13) Ernest Mackay, Report on the excavations at Jemdet Nasr, Iraq, Field Museum of Natural History Anthropology, Memoirs, vol. I, no. 3, Chicago, 1931, pp. 277-278.

14) See below n. 21, Le Brun et Vallat, 1978, pp. 34-39.

15) Mackay, *Ibid.*, p. 277.

16) DAFI, 8, pp. 11-58, especially, 30-37. The article of dr. A. Brandes, *Modelage et imprimerie aux débuts de l'écriture en Mésopotamie*, *Akkadica* 18 (1980), pp. 1-30, was brought to my notice. However, as the article has not been available to me, it could not be used here.

17) D. Schmandt-Besserat, The use of clay before pottery in the Zagros, *Expedition* 16:2, 1974, pp. 11-17; *Idem*, The earliest uses of clay in Syria, *Expedition* 19:3, 1977, pp. 28-42.

probably have been achieved, (but it is not certain)¹⁸⁾, the use of clay to make figurines and small geometric objects such as cones, spheres, discs and cylinders seems to have been made. This means that even before man started the settled agricultural way of life, before he had learnt to maintain the flocks of sheep and other draught cattle, he started keeping accounts by making the small pebbles which practice was handed down through the millennia and over the vast area covered by Syria to Elam or southern Persia which is inconsistent with the evolutionary stages established through archaeological findings. The archaeological report of Tepe Luran which appears in the suggested reading list¹⁹⁾ may well help to correct the understanding of the earlier stages of man's existence. Clearly the small geometric objects referred to, cannot be identified with what are known as the calculi or the small clay pebbles. The use of clay pebbles for accounting purposes presupposes a long succession of evolutionary stages which are the concomitant factors for the existence of any accounting system. For such a system to be operative the first factor is an agricultural or pastoral surplus, the knowledge of numbers i.e. certain amount of arithmetic and the need to use any such system which implies certain amount of economic developments, and trade and political control. Clearly the account given by Schmandt-Besserat does not bring out all these factors. As is well known the sedentary mode of life started with agriculture, and the use of clay in wattle and daub shelters, and after that pottery etc. If at all, all these small geometrical pieces are recorded, they were put to some use other than an accounting system²⁰⁾. The stage II with all its uses of clay from houses to figurines curiously enough does not record the small geometric pieces of clay. Once again when they appear they are associated with Belt cave which

18) Idem, *Expedition* 16:2, pp. 11-12. Emphasis mine.

19) *Expedition*, 16:2, 1974, p. 17.

20) Here we are handicapped for two reasons. These small clay pieces have been variously described by different excavators and not always their context or their existence has been carefully reported. Especially the preliminary reports do not pay much attention to these minor finds, and hence it is difficult to ascertain their existence, number, context and other details from the reports.

was occupied by a group of hunters, and possibly incipient herders ²¹). This throws light on the use of these small pebbles - they were some way useful in hunting or for some other purpose which we still do not know. If the hypothesis were correct, they should have been found in the subsequent stages II and III; however at least as far as Zagros is concerned during stage II and III the author does not report the occurrence of clay-pebbles during the sedentary occupation. They are associated with the pre-agricultural stages and only peripherally.

The other article ²²) dealing with the Syrian sites presumes the use of clay from paleolithic times 150,000 B.C.-10,000 B.C. and one fails to understand the inclusion of such stages ²³). It refers to the geometric objects found at the sites of Tell Aswad and Ghoraife. The actual number of cones, discs, and spheres reported are not given. They are found in association with the transition from Mesolithic to Neolithic (8000-6500 B.C.) with the economy still relying upon hunting and gathering and agriculture being practiced ²⁴). That nearly confirms the earlier context in Zagros. Similarly the geometric objects reported from the sites of Can Hasan III, Çatal Hüyük East, Çayönü Tepesi and Suberde occur in doubtful context. These are cave sites and the objects are found along with weapons and figurines in a pit near a shrine. Amongst these are also spheres 5-10 cm in diameter and they do not form part of the system. Six spheres smaller in size are found at Suberde along with other things. An attempt to connect these and apparently some other objects lacks conviction ²⁵).

In general the material which is referred to in the IXth-IVth millennia is uniformly of doubtful nature, and without the context of sedentary habitation. As a matter of fact while explaining the hypothesis covering the long span of time, the gap created by the scarcity of the earlier material is invariably filled by references to material and

21) Expedition, 16:2, 1974, p. 15.

22) Expedition 19:3, 1977, pp. 28-42.

23) Ibid., p. 28.

24) Expedition, 19:3, 1977, pp. 30-31.

25) Anatolian studies XXVII, 1977, pp. 133-150, *espe.* 139-143.

technology reflected in the later millennia. No material comparable to later clay pebbles is really available in the finds of the earlier levels. The same clay pebbles to be found and to be comparable, it would not be wrong to look for comparable context. In the absence of such a context the hypothesis cannot stand. In order to be able to connect the earlier geometric objects with the Susa calculi the comparable context is essential. At Jarmo (6500-6000 B.C.) the number of geometric objects found is 1541. The hypothesis is however substantiated on the 4th millennia material in Susa and Elam. Again in Syria during the phase 6500-5500 B.C. as the sedentary way of life advances the geometric objects disappear mysteriously. Had they anything to do with counting, they should be found in increased numbers than before. But on the contrary, they are not reported during this phase at all²⁶). An object of doubtful significance reported from Tell Abu Hureyra is interpreted to be a stamp seal. Thus the author's contention that these clay objects were a part of a system which was widely used and understood and was becoming slowly conventionalised is not supported by the evidence presented by her. The use of the geometric objects if they are really so is confined to the presedentary way of life and in fact they disappear when man actually uses clay extensively for fashioning devices for his daily needs.

In archaeological evidence an object found in isolation is practically of no use. The context is an important determinant of the use. However this principle seems to have been disregarded to a large extent in Schmandt-Besserar's hypothesis. Otherwise it is difficult to attribute the same function to similar objects found in different contexts. This is indeed a flaw in the argument. In fact because this principle has been almost disregarded many times the material from earlier levels of hunting stage groups is found to be supported by material from the agricultural groups which is a glaring error. Thus in the comparison of the geometric objects found in Zagros, Turkey, and Syria in the earlier levels, the context seems to have been overlooked. Besides this,

26) Expedition, 19:3, 1977, pp. 35-40.

a large time gap between the Syrian sites and Susa viz 2-3 millennia also seems not to have been taken note of. At Susa, the bulles, the clay pebbles, and the tablets with numerical notations and later on the script, have a particular archaeological context which is significant. That particular context consists of agricultural sedentary habitation of long standing, monumental and residential structures, accompanied by pottery and other artefacts concomitant of civilization, and development of tools. All this context is completely absent in the earlier phases. Besides if the author's claim about the geometric objects forming a system is to be true, the objects must be in use simultaneously over a given area. Whereas in reality even in the author's evidence it is a shifting, temporary phenomenon. Thus the earlier (9000 B.C.-4500 B.C. or 4000 B.C. millennium) and later (post-4000 B.C.) geometrically shaped clay pebbles are to be treated as separate systems because they occur in different contexts. Therefore the use that they were put to may be quite different, although at this stage we cannot offer a plausible explanation for it. Even in later repertoire it is difficult to account for all shapes and sizes within one single system. It is possible that they were used in diverse ways. One of these ways of which we have now become fairly sure is the calculi or clay pebbles for reckoning and accounting purposes. Even this will have to be studied further to obtain detailed knowledge about its functioning. And for the clay pebbles found in the two strata, in order to belong to the same system, should be found in comparable context, which is not the case here. In the absence of such a comparable context, the hypothesis cannot be justified.

As shown by Lieberman and A. L. Oppenheim in textual interpretation the clay pebbles along with the bulles and the actual usage found in the archaeological material at Susa viz. the enclosure of the clay pebbles within a bulle and seal impression or the writing on the outside authenticated a transaction. This whole system or even some of its elements do not seem to have existed during the period before IVth millennium. The essential conditions of agricultural surplus or even flocks to be maintained do not seem to be reflected in the archaeological findings.

If at all the beginning of the idea of authentication or of possession represented is to be traced backwards, the stamp seal may be its earliest representative and first precursor, strange as it may sound.

In order to trace the idea of writing to its earliest appearance in the archaeological material, and to unravel the social and economic context in which a particular need felt by the early communities was to become manifest finally in the form of writing, it is essential to examine the work done by French archaeologists especially by Alain Le Brun, and his stratigraphical findings during a little more than a decade at Susa ²⁷). The French archaeological reconnaissance at Susa started in the early years of this century. The more recent excavations have concentrated on the study of stratigraphy and now an accurate sequence going down to virgin soil has been made available ²⁸). There are in all 20 levels, 7-27, described by Le Brun. We are concerned with levels 16-27 below which is found virgin soil. This sequence stretches over probably a little less than two millennia. Carter who has conducted excavations in the Susa city (or Ville Royale) has tentatively dated level 16 as 3000 B.C. ²⁹). According to Le Brun's stratification ³⁰) the pictographic tablets appear in 16C (16A being a later level). They are accompanied by the impressions of the cylinder seals, cylinder seals themselves, round seals, spheres decorated with netting. The pottery of this level was plain, goblets with bases in stumps, pottery plates, basins, common pottery with minerals removed, jars etc. From this level were also recovered a mass of stone arms. Level 16 gave evidence of three phases of occupation in its constructional remains. It is characterised by a strong architecture ³¹). The pottery described above is marked by

27) Alain Le Brun, *Recherches stratigraphiques a l'acropole de Suse*, 1969-71, DAFI 1, 1971, pp. 163-233; A. Le Brun et F. Vallat, *L'origine de l'écriture a Suse*, DAFI 8, 1978, 11-58; A. Le Brun, *Suse, Chantier "Acropole 1"*, *Paleorient*, Vol. 4, 1978, pp. 177-192; also see D. Canal, *La haute terrasse de l'acropole de Suse*, *Paleorient*, Vol. 4, 1978, pp. 169-176; E. Carter, *Suse ville royale*, *Ibid.*, pp. 197-211; F. Vallat, *Le matériel épigraphique des couches 18 a 14 de l'acropole*, *Ibid.*, pp. 193-195.

28) Le Brun, *Paleorient* 4, pp. 177-192.

29) *Ibid.*, pp. 197-211, Table 1.

30) *Ibid.*, p. 181.

31) *Ibid.*, p. 183.

a considerable change from the pottery of earlier levels. As a matter of fact Le Brun describes it as “une rupture complète”³²⁾ from the earlier levels 17-22. The texture of the paste and also the forms are different. The forms and decorations characteristic of level 17 disappear and are replaced by goblets. Also a shallow plate generally used to eat solids and found in the earlier levels is also found. But the deep bowls of the previous level disappear³³⁾. This marks a change in the food-habits of the users of the pottery. The next (lower) level 17 yielded tablets with numeral notations and is accompanied by cylinder seal impressions, cylinders, and all the other types of seals found in the upper level 16. Pottery recovered from this level was characterised as plain, common ware, fine ware, slipped ware tall bowls for ordinary use, vases, small and deep bowls, jars, carinated jars, jars with flat handles incised decoration and reserved slip. The typology of the repertoire is richer than described here. In stone, miniature vases, zoomorphic vases, multimouthed vases, masses of arms and sandstone basins are recorded. The architecture of level 17 consists of outstretched rectangular rooms juxtaposed with one another. In (earlier) level 18, tablets with numeral notation, clay balls with numeral notations and calculi i.e. the clay pebbles were reported. The numeral tablets are accompanied by cylinder seals. Their use is attested by the imprints of seals on the clay balls, on tablets, spindle-shaped seals, and on fragments of clay. The scenes on the sealings deal with daily life, or represent animals. The impressions of a square seal difficult to read has alike been recovered. The pottery of this level consists of plain pottery of common use, fine pottery with slip, small bowls, deep bowls, jars, incised decoration, handles with bird's heads, and reserved slip. Eye-idols made of alabaster have also been reported from this level. Levels 19-21 are not very rich in finds. Level 22 is marked by common pottery, with plain texture and new forms. In general it is different from those of levels 27-23. In this level, the handled plates,

32) Loc. cit.

33) Ibid., p. 189, fig. 36:315.

tubular spouts, and the plain bowl or basin make their appearance for the first time, as also the handles with birds' heads and the use of reserve slip. Although seals or seal impressions are recorded, the orientation of the construction walls has changed and the brick size has become smaller. The earlier levels 27-23 seem to form one continuous occupation sequence in which the pottery was clear buff colour with painted decoration, or also without it. Alongside was also used pottery with red lustrous colour, and a plain ware. The lustrous ware and the red ware with sombre decorations are also attested by some sherds. The constructions are made with a brick rectangular and big. This general picture continues in levels 27-23. In level 23, 25, 27 are recorded terracotta seals and seal-impressions. Level 27 is found embedded in virgin soil ³⁴).

The complete sequence is characterised from the earliest level by sedentary habitation, constructional remains, use of brick, stone-pots and clay pottery, slipped, painted, decorated, ware marking the aesthetic developments, consisting of a wide range of typology which implies wide variety in food, drinks and certain storage capacity, and agricultural surplus, as also certain division of labour, the monumental and ordinary architecture characterised by the acropolis and lower city implying centralised governmental authority, and finally the use of seals. This archaeological sequence has begun with the use of button seals in the earliest levels and may probably be dated to the second or third quarter of the sixth millennium B.C. An important element in the excavated material which has not been highlighted is the absence (in the published material up to September 1980) of the clay pebbles in the levels earlier than level 18 in which the reckoning system is found in its complete form. The material of levels 21-19 excavated between 1970-71 has been studied, but in any case it is poor ³⁵). And probably it does not contain any clay pebbles. This absence of clay pebbles in the earlier levels of Susa, and the appearance of the complete system in

34) *Ibid.*, pp. 181-183.

35) *Ibid.*, p. 183.

level 18 has implications of its own. However at this stage it is sufficient to point out that the comparison between IXth-Vth millennia geometric objects and the complete absence in the earlier levels of Susa of the clay pebbles once again falsifies the hypothesis that there was a continuity or any connection between the systems in Syria and Susa. They are to be treated as separate. No line of evolution can be established either at Susa or in intersite comparisons. Despite changes in the pottery styles, there is no long break in the sequence and it is likely that there was a continuity in the occupants too. It is to be noted that despite the civilizational development to the point of urbanization, the clay pebbles have still not appeared. If they were to make their appearance with the beginning of sedentary habitation, they should have appeared before or along with the seals. However that does not happen. On the other hand, seals make their appearance first and only after a lapse of almost a millennia or more the clay pebbles are recorded along with numerals and the clay balls in level 18. They do not appear independently. In the meanwhile in level 24 digital impressions are recorded. Further at Uruk too, the clay pebbles or what has been described by Julius Jordan³⁶) as "*kleine tonnabbildungen*" appear only in Uruk IV level along with the written tablets. Whereas at Susa, the tablets are preceded by the clay pebbles, balls and cylinder seals i.e. a whole system, not just single elements of the system. Thus the occurrence on both the sites is similar if not the same, and so may be the underlying factors. In any case the clay pebbles make their appearance first time in level 18 accompanied by the clay balls in which they are found enclosed and the balls are engraved with seal impressions over which numeral marks are made. From this time on, in the next two levels appear tablets with numeral notation (level 17), and tablets with writing (level 16). Thus a need which was created in the earliest level 27 and for which the button seal was found useful gradually evolved into writing. What was this need?

36) Julius Jordan, Uruk, Zweiter Vorläufiger Bericht etc., Abhandlungen der Preussischen Akademie der Wissenschaften, Jahrgang 1930, Berlin, 1931, see Abb. 41, pp. 47-8.

It may also be noted that the clay pebbles or calculi, the clay ball with the numeral notation, and the tablets with numeral notation have been found in the latter half of the same level 18. In order that Schmandt-Besserat's hypothesis is supported by the evidence it is necessary that the clay pebbles make their appearance first, which after a lapse of time should be followed by the clay balls and during a still later period they should bear the numeral notation, and at a still later date it should be followed by the numeral tablets. However all these stages are not reported in the Susa material. This also implies that the clay pebbles formed an integral part of this system within which the balls, pebbles and numerical notation were all used together and were not in use independently as loose pieces. In the levels excavated by Le Brun no tokens are recorded and therefore we conclude that they were not found in the levels earlier than 18. They were found in the context noted by him. The sudden appearance of this system complete with numerical notation and the idea of imprinting it on the outside of the clay ball seems to be rather precocious, especially considering that there were no earlier precursors for any of the individual items viz clay pebbles, or balls or numerical notations or the tablets separately in the earlier levels at Susa from 27-19. As a matter of fact the immediately preceding levels 21-19 are characterised by feeble or poor remains of occupation. On this back drop the sudden appearance of the completely developed system of accounting and recording is rather curious, and an explanation for the sudden appearance has to be sought for. There can be two explanations of this phenomenon: 1. It can indicate the borrowing of this system from a neighbouring people who had already gathered considerable experience in its operation which is evident from all the essential elements for this system being found together simultaneously and in a particular juxtaposition. 2. The other alternative was that this system was a natural evolution of the technical know-how which became manifest for the first time in the seals in level 27. However besides the lack of a direct line of evolution of the various elements of the system viz. the clay pebbles, balls or the numerical system in the earlier levels, the

poor nature of the remains in the immediately preceding levels 21-19 makes it less likely to be an indigenous achievement. Further does the square seal impression³⁷⁾, in a preponderantly round seal using community, imply a contact with a foreign land or system, through which the recording-accounting system arrived there? At least it seems that the revivification of the site reflected in an enlarged repertoire of pottery and the complete recording system have to be associated together and are to be attributed to a single cause viz the material prosperity, through trade and possible foreign contacts which resulted in improvement in the conditions and created the necessity of the new recording and reckoning system. While saying all this the fact that this site was the Susa citadel or acropolis cannot be overlooked. Moreover it may also be noted that this is only a minor portion of the acropolis. It is possible that in the earlier levels these buildings were out of use, or were not so important sections of the habitation. In such a situation the above conclusion cannot hold good. A wider range of additional material is therefore necessary.

The borrowing or installation of this system may have been necessitated by two important factors: The assertion of the central authority and the extraction of revenues, and their upkeep may have been one of the most important factors. The manifest evidence of the existence of a central authority is the division of the settlement into acropolis and city, and the division also presupposes the payment of revenues in one form or other, which could mean the part of the produce as payment or direct work for the authority. The payment of revenues by the people in different forms and, may be at different, stages of the year might necessitate a system which will record the previous payment in whichever form it is made and the dues to come in future. The significance of a recording system is twofold viz. it must serve as an aid to memory which plays truant very frequently, and it must also communicate over time and space. Although the recording device was limited in its efficiency in that it recorded only the numbers and not the goods, it

37) Le Brun, *Paleorient* 4, p. 183.

still aided the memory (albeit partially). If the form of payment was already fixed, the quantities were the only thing to be remembered. Thus the fact that the quantities came to be recorded first, seems to mean that this system was basically used for accounting purposes, at least in the earlier level, thus it could function.

Besides this system could be used in trade, especially trade over a distance where it served as a sort of receipt for certain payments, most probably the king's revenues. This takes us back to the Greek tradition quoted by Legrain which explained the bulles as the octroi receipt of the Urukans. For want of written records explaining the operation and extent of this system especially in the early stages, it is not possible to reconstruct its application in all clarity and details.

Thus the real incentive for the borrowing of this system was the economic cause, trade or the collection of revenue, and the necessity to preserve the details of the transaction as an aid to memory in the future or as a means of symbolic communication. The use of clay as a medium for making the necessary devices for the system did not signify anything special. Clay was a universal medium used for building the shelter to making pottery and ornaments for daily use. The use of clay was the most obvious thing in the given circumstances. It was available universally and effortlessly, and could be moulded equally easily, used and reused and thus it was the most obvious medium man could think of using.

Hereafter are examined the possible implications of the sealing devices to which ultimately this system may be traced. In level 16, Le Brun has noted the changes in architecture and ceramics, which is marked by a complete break with the earlier levels viz 17-22³⁸). The texture of the paste and the forms are different. The forms and decoration of level 17 disappear and are replaced by goblets with a base, plain plates, and basins. In this level, the proto-Elamite tablets bearing the pictographic script make their first appearance. Cylinder seals and a tablet bearing the impression of cylinder seal and lenticular tablets were also reported.

38) *Ibid.*, pp. 183-4.

Once again the proto-Elamite script³⁹⁾ displays certain well established conventions even in the earliest levels. For example the inscriptions invariably open with either of the three graphemes  ,  ,

 ⁴⁰⁾. This implies that the script has been already in use for long enough for the scribal professionals to set up certain conventions referring either to the content of the tablet, or to the function, or nature of the tablet in the existing economic and administrative systems. This would imply that this particular script was not being written for the first time. Alternatively, if this proves to be the first stage of the script in Elam, then the inventors were certainly already well acquainted with the idea of writing and in creating this new script were only putting into practice the conventions established or learnt by them elsewhere. In any case, the appearance of writing does not seem to be an indigenous growth. The earlier stages of its evolution are still unknown to us and the material for such a study is not yet available. Thus despite an apparent continuity in the archaeological sequence there are problems which need to be clarified in further excavations. Whether the change observed by Le Brun at the beginning of Level 16 is spread over the whole acropolis or it is confined to this particular portion of the site needs to be specially observed.

In the present state of our knowledge it seems likely from the number of signs, and from the conventionality reflected in the usage of certain signs, that the script has functioned for some time. In this usage may also be considered the actual shapes of the signs. Although the signs are stylized shapes of things, some of them at least already display variance from their originals to the extent of being unrecognizable⁴¹⁾. And that the sequence excavated here does not give evidence

39) I do not have access to the work of P. Merriggi on this subject.

40) V. Scheil, *Textes de comptabilité proto-Élamites*, MDP XXVI, Paris, 1935

 , — pls. I-VII;  , — pls. VIII-X;  — pl. XI;  — pl. XII, XIII,

XIV etc. There are also tablets which do not begin with these signs, which means those beginning with a sign probably formed a special category.

41) Those which bear resemblance to actual things like equide (the horse or the ass)

as to this evolution of the script on this site, the conclusion that it was evolved elsewhere seems to be inevitable.

It is of interest to note that a similar view is expressed by Lieberman⁴²) in his observations on the Uruk tablets and the evolution of the script observed there. As a matter of fact, we agree on this point of the general evolution of writing. That despite the present evidence on earliest proto-Elamite writing, it seems that this is still not the earliest material. We have yet to come upon it.

A seal or its impression attached to a bale essentially represents the exclusive ownership of that thing. The same purpose was served by the king's sceptre which essentially indicated the king's authority. In the same manner a private individual's proprietary right to a thing in his absence could be indicated by something—that is something could represent him or symbolize him and this symbol will be recognized as his right. This was the beginning of the idea of seal. When this convention was fully established and widely understood the bales of goods, jars of oil etc. which were traded or sent from one place to another bore the mark of the seal for the purposes of easy recognition, i.e. identification. It incidentally worked as a deterrence from any external interference and thus the goods could be safe-guarded, and the person for whom they were meant could be sure of their safety during transaction. Any interference which was caused on its journey from the sender to the receiver could be easily detected as the seal attached would be broken. From all these points of view the invention of seal and sealing itself should mark a revolutionary step. In the creation of sealing, several things could be achieved simultaneously, the most important gain being the establishment of the proprietary rights of two individuals or the involved parties. This may have happened after the establishment of the central authority in whatever form it may be either the governor of the god as we know him to be in Mesopotamia, or in any other manner. However the seal which closed the mouths of the jars

in the proto-Elamite sign may be late introduction which were not yet stylized through over-use. Except a few animal and bird graphemes, others are already stylized.

42) *op. cit.*, pp. 357-358.

or the knots of the bundles still served a limited purpose. It did not aid the memory or the receiver of a bail did not get the authentic information about the number of things, except through oral communication.

Obviously after the creation of seals and seal-impressions, which I think went hand in hand as man was already making pottery and painting it, the right and the authority to the thing to which the seal or its imprint was attached was firmly established. Moreover this also meant that during the person's absence or away from him, his authority and right will be recognized. Whether such a person was just a private individual or he represented the government, it did not matter.

However as the practice and convention became established, and with rapid economic changes especially the changes in the barter and trade systems may have created further needs amounting to the preservation of the details of a transaction taking place between two or more parties, and more important than this the preservation of these details for future reference which may either be required in the same place or over a distance. It may also be required for reference over a lapse of time by the parties involved. These lacunae were probably partially covered by a further step viz. of the clay balls in which were stored the details either numerical or symbolizing things in the case of trade or exchanges of some other nature and which were further sealed with the (cylinder) seal. The seal once again gave the indication about the proprietary right, but it gave a little more information than before. But still whatever information was conveyed through the clay pebbles within the clay ball was found inadequate and a further change about the numbers was introduced.

This was probably the most important stage during which the notches on the clay balls tallying with the inside clay pebbles were introduced. Here man had stumbled upon an important principle viz. that of representing a conceptual, abstract, intangible and conventional into two dimensions and effecting communication through it. The level of seal was merely conventional and symbolic. It communicated only limited information viz. the proprietary parties in-

volved, or it acted as a deterrent and it established the convention to recognize the authority of the individual. Though in itself these were a highly significant contribution to the existing social-political structure their contribution towards communication and especially communication over a distance was very little. It would however be wrong to presuppose that man was thinking of these things consciously. In the gropings towards fulfilling certain immediate needs some advances in civilization were made, mostly through accidents and possibly through the ingenuity of certain skilled workers who handled the materials and faced the problems.

Having thought of representing the numbers through notches, the representation of the things exchanged or stored along with the numbers was not very far ⁴³). In the case of numbers they had no form but in the case of things their three dimensional forms could be reduced to two dimensions. This stage was not very difficult because man already had enough experience of making clay figurines i.e. a three dimensional representation of a thing. He was also familiar with the technique of reducing three-dimensional thing to two dimensional representation through pottery paintings, wall-paintings, and so on. So having overcome the more difficult part of representing the conceptals viz. numbers, the representation of things was not difficult. But even at this stage when the tablets were covered with pictographs and numbers, it had still not become writing in the real sense of the term. What is involved in writing is the principle of communication through representation. The representation is not the representation of things but of language, and more precisely the sound of a language which is also the basic unit through which communication takes place.

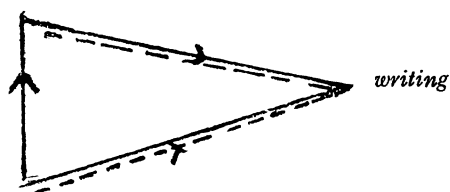
The proto-Elamite pictographic tablets were still merely accounting or book-keeping. They had not reached the stage of communication

43) Also see P. Amiet, *Glyptique Susienne* (Text Vol. 1, p. 24, n. 4), where he attributes the idea of writing to seal impressions on a tablet. It seems to me however that the seal impressions were made from the earliest times but specificity was added to the idea of imprinting when the numerals were imprinted on the bulles first and then on the tablet. But since numbers alone did not make the transaction, the things were added to the imprints. That is how writing started.

although they certainly communicated in a very crude manner. In order for this invention, as it was an advance in the general technical achievement of mankind, to be fulfilled writing, it was essential to relate it closely to the language and to reflect the structure of the language, however crudely it did this it did not matter. Despite this it cannot be denied that a beginning to this end was made when the pictures of things involved in the transaction were drawn in conventional form or otherwise beside the numbers.

Although it is now easy to think of relating the sound to the form or picture of a thing, it was obviously not the manner in which the prehistoric thinking took place. That man did not think of representing the language itself is evident in the fact that when it came to representation in two dimensions he only thought of things and drew them and that is how we get pictographs in early writing. He did not think of the name of the thing he was representing which means communication through language was not the purpose of the initial tablets written. The purpose of the tablets was keeping accounts and only by and by the idea that the two-dimensional representations can be related to language was thought of. When this was thought of, the pictures were given the readings, and this time probably consciously of the names themselves and thus started the ideographic script. At this stage it became script or writing.

Language



The speech and things

— Modern thinking

--- Prehistoric man's thinking

things

There is an alternative explanation too: If man had thought of representing the language or its sound, both being intangibles, the only course open was to reduce them to certain signs and conventionalize them. The signs did not stand for abstract sounds of the language. The things came along with the sounds and thus they represented the sound.

Further in order to communicate the signs of writing must be invested with convention which is known and accepted by both the writer and the reader/s. This convention is what makes a symbol a writing which is different from the motifs used in art-forms. These signs should further be correlated to the language. Both these are intangible factors on which the invention of writing depended. The question of the origin of writing even in Susa needs further investigation. There are certain questions posed by the archaeological findings which need clarification, the most important of them being: Were the proto-Elamite tablets written by the Elamites? If not, who were the people who brought in the whole system of bulle, calculi, and numerals on tablets? From where did this system come as no traces of it have been found in the earlier levels?

Thus it seems very likely that we still do not have the material recording the earliest appearance of writing. We have yet to discover the material pertaining to it. Despite this, it is obvious that the beginnings of writing cannot really be traced back to the clay pebbles or the clay balls. The earliest precursor of this idea is the seal, or the idea of sealing as shown above. Therein is the germ of the idea of writing. Even the imprint on the clay ball of the pebbles enclosed inside or of the numbers is like imprint of a cylinder seal. It is the gradual logical evolution of this very idea which led ultimately to the invention of writing.

During the several articles that Schmandt-Besserat has devoted to the elaboration of her hypothesis, she refers to a number of sites which she has visited and had chance to examine the excavated material first hand. However it is curious that in the comparative analysis of the typology of clay pebbles and the Uruk graphemes she makes use of only 661 clay pebbles: From Uruk (63), Jemdet Nasr (9), Tello (36), Fara (10), 'Ubaid (1): Total 119 + 481 clay pebbles from Susa (432), Choga Mish (49) + 61: from Habuba Kabira (54), Jebel Aruda (7). This means that the largest single lot of pebbles is from Susa. After this the comparison of the Susa material with the signs found in

Susa proto-Elamite tablets should have followed as a matter of course. However for some unknown reason Schmandt-Besserat compares this material from Susa with Uruk signs, without stating her reasons for adopting this course. She leaves the reader to guess her reasons and draw his own conclusions. A close look at the proto-Elamite list of signs ⁴⁴⁾ shows that the similarities between the 432 tokens i.e. more than 2/3 of the material used is even less than those displayed by the Uruk material. The inconsistency of this comparison has been discussed in detail by Lieberman and we are in agreement with him ⁴⁵⁾. Probably the reason underlying this inconsistency is that it is not possible to establish any correlations between the signs and clay pebbles in their localised distribution, which ultimately means that even in the local script the clay pebbles were not used, and it is surprising that this important fact has gone unnoticed. Or else the complicated and highly misleading tabularisation in Appendix II ⁴⁶⁾ would not have been found necessary.

The undeciphered nature of the proto-Elamite script cannot be the reason for this course as what she proposed to compare were only the shapes of the signs and the clay-pebbles and the semantic comparisons were not included. If semantic comparisons were essential, the only material that should have been used was from Uruk, with Uruk signs leaving out of consideration the Susa material altogether. In any case, the present situation is not justifiable.

In Appendix II ⁴⁷⁾, even in cases where the clay pebbles were not reported from Uruk have been compared with Uruk signs. For example I-2a; III-2, 5b, 4a; VII-1; IX-2, 6, 8, 9; X-4, 5; XI-1, 2, 3, 4; XII-1, 4; XIV-1, 2, 3; XV-1, 2, 3. That is from the point of view of material from both the sites Susa and Uruk, there can be little comparison. The situation that emerges may be described as follows: At Susa, the clay pebbles were found but no counterparts of the pebbles could

44) See MDP, vols. VI, XVII, XXVI, XXIX..

45) Lieberman, p. 356, col. 2 ff.

46) AJA 83, p. 41 ff.

47) Ibid.

be traced to the signs of the script. And at Uruk the pebbles were not numerous. However, the script had some signs comparable with the Susa pebbles. Although the possibility of their not having been recorded by the Uruk excavator cannot altogether be ruled out, it would be wrong to proceed on this assumption.

Thus from the point of view of the archaeological context in which the early geometrical objects and the later Susa clay pebbles enclosed in clay balls marked with cylinder seals were found they are not comparable. They cannot be looked upon as the part of the same system as there is not a single site where a continuous sequence marking the evolution of the geometrical objects into the clay ball enclosing the pebbles is so far known. In fact the early sites do not continue the use of the geometrical object and therefore it is not possible to compare them with Susa material because at Susa the whole system is found together in one level. Therefore the use of the word system to describe the earlier material (from 9th millennia-5th millennia) is not justifiable. These are to be treated as two distinct types of artefacts. The Susa material needs to be studied further, and the satisfactory answer to the question of the originators of this system has to be looked for. Further the invention of writing cannot be traced back to the use of clay as clay was the universal medium for man in those millennia. It may be traced back to the idea of representing numbers in two dimensions from which probably the representation of words in association with the forms of things was born and that became the invention of writing. The proto-Elamite tablets or the Uruk-tablets are not the earliest forms. The earlier material is yet to be brought to light.