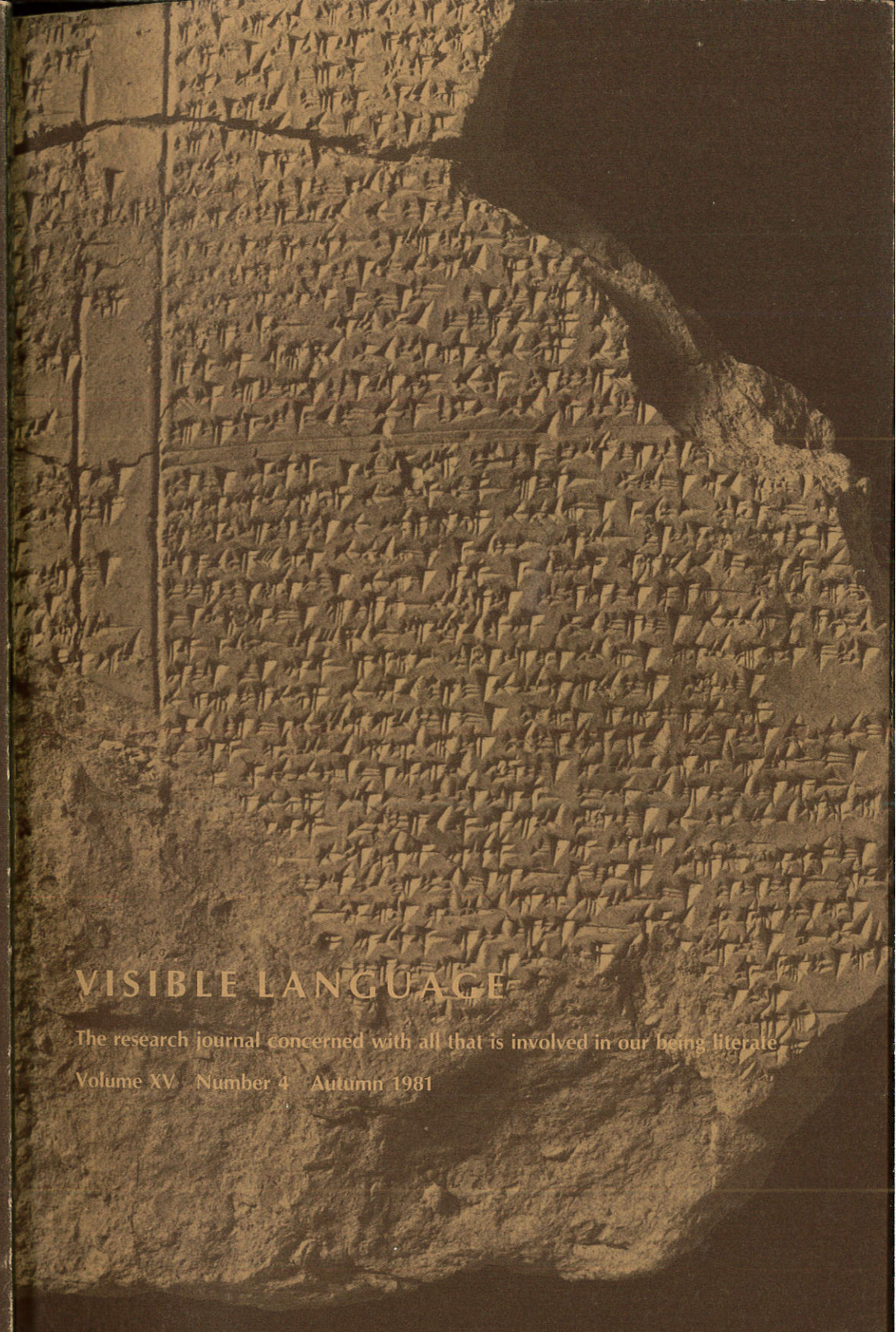

VISIBLE LANGUAGE

The research journal concerned with all that is involved in our being literate

Volume XV Number 4 Autumn 1981

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Special issue: Aspects of Cuneiform Writing
Guest editor: Marvin A. Powell, Ph.D.

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Merald E. Wrolstad, Ph. D., Editor and Publisher
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Editor's Foreword

The papers published in this issue of the journal represent, from the standpoint of discipline and methodology, four distinct points of view: that of the archaeologist, the Sumerologist, the linguist, and the ancient historian. However, in spite of the diversity of approaches, only a few of the many problems involved in cuneiform writing are touched upon here. For the reader who is not a specialist in this area the following may serve as a brief orientation.

Most useful for succinct, but fairly comprehensive treatment of the subject is D. O. Edzard's recent article "Keilschrift" in the *Reallexikon der Assyriologie* 5 (1980) 544-568. An annual bibliography appears in the journal *Orientalia* (Rome) as *Keilschriftbibliographie*, section 2, "Schrift und Epigraphik," which covers the whole range of scripts that derive from or relate to cuneiform.

Worthy of note for the approaches they represent are S. J. Lieberman, *The Sumerian Loanwords in Old-Babylonian Akkadian*, I (Harvard Semitic Studies 22, 1977), especially "The Character of Cuneiform Script" (pp. 39-62), and G. Buccellati, "Comparative Graphemic Analysis of Old Babylonian and Western Akkadian," *Ugarit-Forschungen* 11 (Festschrift für Claude F. A. Schaeffer, 1979) 89-100. The former deals with the central, but very complex, problem of how Sumerian is represented in Old Babylonian script. The latter reports on a long term project which uses the computer to analyze graphemic patterns in cuneiform. An example of this work is now available in Yoshitaka Kobayashi, *Graphemic Analysis of Old Babylonian Letters from South Babylonia* (Diss., Univ. of California, Los Angeles, 1975; Univ. Microfilms #76-3072).

It is also important to note that the papers in this issue deal primarily with the "core" area of ancient southern Iraq. Of the so-called peripheral areas, only Hittite in Anatolia (Turkey) is represented by a special study. Elamite and Persian in western Iran, Hurrian and Urartian (known primarily from northern Mesopotamia, northern Syria, and Turkey), Ugaritic and Eblaitic (north Syria), as well as the use of Akkadian in the peripheral areas, are not treated here. Nevertheless, the peripheral areas are of great importance, not only as evidence for the diffusion of cuneiform, but also for chronicling changes in the script which are poorly attested in the core area. Eventually, if accumulation of evidence continues at the present rate, one will be able to utilize this material to write a "History of the Cuneiform Script." However, we are probably still several generations away from anything that could approach definitive treatment.

One important discovery from the "peripheral" area deserves special mention: the discovery of the palace archives of the Syrian town of Ebla. This material, which is particularly important for understanding the evolution and diffusion of cuneiform in the third millennium, is still largely unpublished and undigested, but much important work is in progress and being published, especially in the journals *Oriens Antiquus* (Rome) and *Studi Eblaiti* (Rome), as well as in the two series of text publications *Materiali Epigrafici di Ebla* (Naples) and *Archivi Reali di Ebla: Testi* (Rome).

Finally, the guest editor would like to thank the other contributors for participating in this issue and especially for their patience and willingness to try to communicate to others beyond their own discipline something of the character and importance of what is, in all probability, the oldest writing system of humanity.

Marvin A. Powell
October 1981

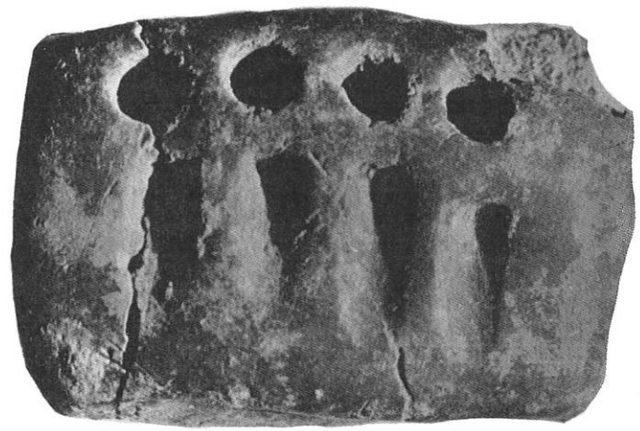
Denise Schmandt-Besserat

From Tokens to Tablets: A Re-evaluation of the So-called "Numerical Tablets"

The paper deals with 185 impressed tablets which illustrate the crucial step between an archaic recording system based upon tokens and writing. The discussion includes the historical background of the discovery of the tablets, their geographic distribution, chronology, and the context in which they were found. The various impressed signs are related to their token prototypes, and a new decipherment is proposed. In the light of the decoding of the most basic types of tokens, the signs are metrological, not numerical as had hitherto been assumed.

The earliest clay tablets bear series of crudely impressed signs (Figure 1). They are usually called "numerical tablets" suggesting that they yield only numerical notations. In this paper I will refer to them as "impressed tablets." I will review the information available on these documents and analyze their relationship to the preceding recording system based on tokens.

Figure 1. Godin Tepe (73-19), impressed tablet, courtesy T. Cuyler Young, Jr., Royal Ontario Museum, Toronto, Canada.



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The Discovery of the Impressed Tablets

The first series of impressed tablets was found on Elamite territory. They were excavated in Susa by Jacques de Morgan in 1901-5. The techniques available at the time did not allow him to distinguish with enough accuracy between the successive levels of occupation, and the impressed tablets found themselves mixed together with later pictographic texts. As a consequence, no special mention was made of them in the first publication of Proto-Elamite tablets published by Vincent Scheil in 1905.[1] When impressed tablets appeared in Mesopotamia in the excavations of Uruk, circumstances were different. Applying stratigraphic techniques and blessed with the discovery of a substantial number of tablets, Julius Jordan was able to follow back in time the major steps of the evolution of writing from the evolved cuneiform script of the third millennium to its first stage in the fourth millennium. His level I of the Eanna precinct brought forth poetic hymns written in cuneiform with the characteristic triangular headed stylus; Levels II and III produced a pictographic script inscribed with a sharp stylus. The signs, which had a phonetic value, were as yet unable to express the syntax of the spoken language. Stratum IV yielded pictographic tablets of a more rudimentary type bearing a sparse number of ideograms preceded by impressed signs indicating quantities. When, in the excavation season of 1930-31, tablets appeared bearing only impressed signs, Jordan was prompt in correctly identifying them as "Vorläufer von pictographischen Tontafeln."[2] The tablets were interpreted as bearing numbers only, and this is why they have since been referred to as "numerical tablets."

Jordan's work was of great importance, since it established the impressed tablets as the first step in the evolution of writing: 1) Signs in impressed technique; 2) incised pictographic signs; 3) shift from ideographic to phonetic value; 4) acquisition of full syntax and use of the triangular headed stylus.

The Background

My previous work has shown that, prior to the tablets, tokens were used for computation and record keeping in the Middle East. The tokens were made of clay and were modeled into various shapes, mostly geometric, including spheres, discs, cones, biconoids, ovoids, cylinders, triangles, sometimes bearing incised and punched markings.[3] The tokens represented a mere elaboration of pebble counting but were a better memory aid, as the distinctive shapes and markings stood for specific economic units such as "one bushel of grain," "one jar of oil," "one pot of beer," or "one fleece of wool." I recently proposed, for instance, to equate the cones and spheres to metrological units of grain and the cylinders and discs as units of animal numeration.[4] The tokens were used in a one-to-one correspondence, and their main function was thus to translate the few commodities of daily life which needed to be recorded/computed into counters easy to handle and store. The fact that each category of goods was computed with tokens of different shapes suggests that there were different numeration systems to count different items. Because the use of abstract numbers is so obvious to us, it will come as a surprise and even as a shock to many to realize that not so long ago number words were tied to concrete groups. This stage is called "objective counting" by mathematicians and its consideration is important for the understanding of this paper. An illustration of objective counting in

present-day language are the many terms we have to express two, such as "a couple of days," "a pair of shoes," "twin brothers," and "a brace of pheasants." In other languages the number names may mean literally "one stone, two stone, three stone" or "one fruit, two fruit, three fruit."[5]

In the fourth millenium, envelopes were invented to hold tokens. These artifacts which appear simultaneously in Mesopotamia, Syria, and Elam at such sites as Uruk, Habuba Kabira, Susa, and Chogha Mish were hollow clay balls the size of a fist. They provided the advantage of keeping together tokens representing special transactions and offered an ideal clay surface to imprint the necessary seals to authenticate them.[6] However, the opacity of clay presented a serious problem, as once the envelopes were closed and the seals applied, the number and types of tokens enclosed were left entirely to memory with no possibility of checking them without breaking the sealings. It was probably to overcome this shortcoming that a technique was developed to make tokens readily visible at all times. The tokens were impressed upon the surface of the envelopes before being enclosed, leaving markings which could be " read." Such markings could be classified into the following types: 1) deep circular, 2) shallow circular, 3) wedge shaped, 4) oval, 5) cylindrical, and 6) triangular. These signs equate tokens in the shape of 1) spheres, 2) discs, 3) cones, 4) ovoids, 5) cylinders, and 6) triangles. It was soon realized that the envelopes filled with tokens and bearing signs could be simplified to lumps of clay bearing signs – these were the impressed tablets.

The Geographic Distribution

Through the years not only did further tablets consistently trickle from among the material recovered at both Uruk[7] and Susa,[8] but they also started to appear in other sites (Figure 2). As so often happens, the findings came in waves. The first ones followed shortly after the Uruk discoveries of the 1930's, and were recovered at Khafaje in 1934/5,[9] Tepe Sialk in 1937,[10] and Tall-i Ghazir in 1948-49.[11] A second series started with the tablet of Mari in 1964[11a] and continued with those of Habuba Kabira,[12] Jebel Aruda,[13] Godin Tepe,[14] and lastly, Chogha Mish in 1974-75.[15] Each of these further discoveries came as a surprise and appeared eccentric, especially those from Tepe Sialk, Godin Tepe, Habuba Kabira, and Jebel Aruda. It had been instinctively presumed that the art of writing had been confined to the main metropolitan centers and had simmered there for an extended time before spreading to more remote regions. Contrary to those expectations, the ten sites which yield impressed tablets are scattered on a radius of one thousand kilometers divided into three present-day countries of the Middle East. Susa, Tepe Sialk, Godin Tepe, Chogha Mish, and Tall-i Ghazir are located in Iran; Uruk and Khafaje in Iraq; Mari, Habuba Kabira and Jebel Aruda in Syria.

The ten sites where the impressed tablets occur share one common denominator: all were located at strategic positions along main arteries of the ancient Middle East. Jebel Aruda, Habuba Kabira, and Uruk were situated on the Euphrates River which constituted the main avenue of communication of the ancient world. There is no doubt that the two Syrian sites upstream served as links to the Syrian hinterland, Anatolia, the Mediterranean, the coastal road to Egypt for the political centers situated downstream such as Uruk. Mari was on the desert road to the Levant. Susa and

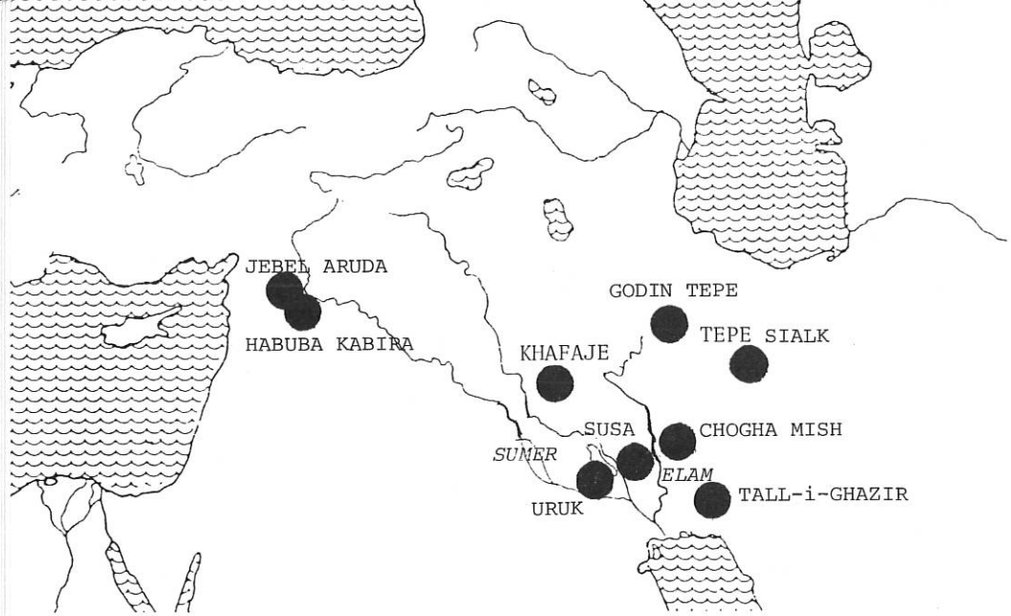


Figure 2. Map showing sites yielding impressed tablets.

Chogha Mish were not only on one main access road to the Gulf, to which they were much closer than today,[16] but also represented the southern gates to the Iranian plateau and the east. Tall-i Ghazir was backed against the southern skirt of the Zagros mountains in the extension of the Ram Hormoz valley, where caravans to Mesopotamia were still assembling in AD 985. The oasis site of Tepe Sialk, sandwiched between the foothills of the Zagros and the Dasht-i-Lut, commanded the unique valley connecting the north of the Iranian plateau with the south. Godin Tepe was in a position to control the Khorasan route and its traffic of lapis lazuli at the passage of the Gamas Ab river. This main route from the east reached Mesopotamia via the Diyala river where Khafaje was situated.

The Description

The tablets constitute a homogeneous group and no distinction can be made between the groups originating in the three various regions of Syria, Mesopotamia, and Elam. The artifacts were apparently considered as purely practical and their manufacture was casual rather than meticulous. No effort, for instance, was made to eliminate the imprint left by the fingers of the scribes while modeling or handling them. Some tablets, particularly from Susa, Uruk, and perhaps especially from Jebel Aruda, are bulky and even crude.

The tablets were made of clay, usually well levigated and only rarely showing coarse inclusions. No stone example is known, and the only alternative to clay yet encountered is plaster, in a group of tablets found by Julius Jordan in the White Temple of Uruk.[17] While these examples required a preliminary burning of the ground limestone, the clay tablets were never fired.

The lack of standardization in the shape of the tablets is indicative of the novelty of the craft. A number of tablets are oval, some roundish, others square or rectangular.

The edges, tapering at first, tend to become flat or slightly concave to provide additional space for notations. The profile of the tablets is also highly variable, and while a majority of specimens have both faces convex, others show one or both faces flat. When one face only is convex, it is generally the obverse.

The tablets are small, with an average size of 5 by 4 cm. and a thickness of 2 cm., and can be comfortably held in the hand.

Nine tablets from Tepe Sialk have the peculiarity of being perforated, which led Ghirshman to believe that they were invoices tied to shipments of goods.[18] Several examples from Godin Tepe have a margin or frame designed probably by pressing the shaft of the stylus along three or four of the sides. In one example an additional line divides the face into two horizontal cases, thus separating signs of two different orders.[19]

Most tablets bear designs imprinted by cylinder seals rolled over the signs. The sealings were used to authenticate the documents and suggest an official use.

The Number of Tablets

The total number of impressed tablets – complete or fragmentary – included in the present study amounts to 186. The majority originate from Iran with a total of 150 specimens, including 90 from Susa, 42 from Godin Tepe, 13 from Tepe Sialk, 5 from Chogha Mish, and 1 from Tall-i Ghazir. The tablets from Susa have been recovered in successive excavation campaigns by Jacques de Morgan in 1901-11 and by Roland de Mecquenem in 1912-46. The recent expeditions by Jean Perrot added 11 specimens in 1969-71, 6 in 1972, and most recently, 11 in 1977.

The number of known Iraqi examples amounts to 18. This may be deceptive as the 17 examples reported for Uruk seem to represent only a fraction of the actual material recovered.[7] The third report acknowledges a series of "several" impressed tablets recovered during the season of 1930-31, of which only two are published. Two further specimens are discussed in the IVth report, three in the Vth, five in the VIIIth; and finally a single example in each of the XIXth, XXth, XXIIIrd, XXIVth, and XXVth seasons. To these 16 examples from Uruk there can only be added, in Iraq, the single specimen found in Khafaje. There are 15 impressed tablets from Syria, with 10 originating from Habuba Kabira, five from Jebel Aruda, and one from Mari.

It is interesting to note that the antiquity market, which since the late 19th century has brought forth a number of pictographic tablets, has not yet produced any impressed tablets and that all specimens come from controlled excavations.

The Context

The tablets are found in a variety of settings including temples, administrative buildings, or domestic structures, some of which have been associated by archaeologists with mercantile activities. At Uruk and Khafaje the tablets belonged to sacred precincts. Seven of the Uruk tablets came from the White Temple. Two of them were found associated with an alabaster theriomorphic vessel carved in the shape of a dove. The 11 remaining examples belonged to Eanna where they were found mixed into the destruction debris of level IVa. The deep sounding of Khafaje in which the tablet was unearthed was dug below the Early Dynastic complex of the Oval Temple, an area which might already have been sacred in the early periods.

All the tablets from Susa come from the mound of the acropolis. The building in which the most recent group was excavated appears to be of domestic character. Some tablets were resting upon the floor while others were kept in pottery vessels. In one case two specimens were found in a coarse bowl together with an envelope filled with tokens.[20] The tablets of Tepe Sialk and Tall-i Ghazir were in the context of simple mud-brick houses. At Habuba Kabira envelopes, tokens, and tablets were in the main room of a spacious building interpreted as the house of a merchant.[21] The situation is not so clear at Chogha Mish, where the tablets were found in refuse pits.

At Godin Tepe and Jebel Aruda the tablets belonged to imposing buildings probably used for official functions. At Jebel Aruda they were associated with cylinder seals, torn jar sealings, and a few sherds.

Chronology

The chronology of the impressed tablets is best illustrated at Susa.[22] The earliest examples appear in level 18 in association with envelopes and tokens; they continue in level 17 when envelopes disappear; in level 16 they are replaced by tablets bearing incised proto-Elamite pictographic signs.

The tablets, consequently, can be divided into three closely consecutive groups dated between 3200 and 3000 BC. The earliest group includes the specimens from Susa 18 and Chogha Mish, the Red Temple of Uruk, and Habuba Kabira. The tablets of Uruk belong to stratum IVa. The assemblages of the three other sites share with Uruk IVa a number of typical features which suggest their contemporaneity. The parallels include tokens, envelopes, seals, bevelled-rim bowls, and four-lugged jars.

The second group consists of the tablets from Susa 17, the White Temple of Uruk III, those from Jebel Aruda, and Khafaje. The characteristic changes in the assemblages include the disappearance of complex tokens and envelopes, a linear style of glyptics, and theriomorphic alabaster vessels.

The third group consists of the tablets of Susa 16, Tepe Sialk, and Tall-i Ghazir. The assemblages of these sites are characterized by high bevelled rim bowls (so called *"Blumentopf"* vases), proto-Elamite sealings, and lugged jars with rope appliqué bands. The assemblage of Godin Tepe V, which includes the jars with rope appliqué bands but no high bevelled rim bowls, may be viewed as a transition between the second and third group.

The Origin

Several studies have been devoted to the fact that Uruk IVa in Mesopotamia, Habuba Kabira in Syria, Susa 18 and Chogha Mish in Iran share a common assemblage.[23] It has been pointed out that the shared items in question – tokens, envelopes, tablets, seals, sealings, four lugged jars, and bevelled rim bowls – all have an exclusively economic function.[24] It is undisputed that the pottery is at home in Mesopotamia and foreign in Elam and Syria. Scholars have explained the phenomenon by the presence of Sumerian "'colonial installations" in foreign countries. Amiet[25] and Strommenger[26] suggest merchants; Beale[27] proposed outposts for the control of trade routes. Whatever it may be, the tablets appear as an homogeneous group of artefacts shared by a community of people relying upon the Mesopotamian recording system at the time when tokens were being replaced by tablets. It would therefore be a mistake to

separate the impressed tablets into three categories according to their find spots. This would erroneously suggest a triple invention of writing simultaneously supplanting the tokens. The same conclusion had been reached by epigraphists, such as A. A. Vaiman who considers the proto-Elamite system of notations as a mere variant of the proto-Sumerian system.[28]

It is important to note that the impressed tablets represent only a very short episode in Uruk while they lasted for about one century in Syria and Elam. Pictographic tablets started to supplant the impressed tablets within the same stratum of Uruk IVa but the new Sumerian writing technique never seemed to reach Syria or Elam. This may well suggest that the active Sumerian outward involvement lasted only during a brief period close to 3100 BC.

The second group of tablets was contemporary with those of Jemdet Nasr, showing that occasionally impressed tablets continued to be used at Uruk, parallel with the more elaborate script. The continued absence of pictographic tablets in Syria and Elam demonstrates that the development of writing there was out of step with Mesopotamia and remained at a complete stand-still.

All the tablets of the third group come from Iran, showing that the impressed technique lingered longest in that region. The use of writing appears to have been discontinued in Syria while Elam, finally, built upon the Sumerian impetus to develop its own writing system. At Godin Tepe and Tepe Sialk the last impressed tablets are found associated with the first proto-Elamite pictographic tablets, which soon superseded them.

The Signs

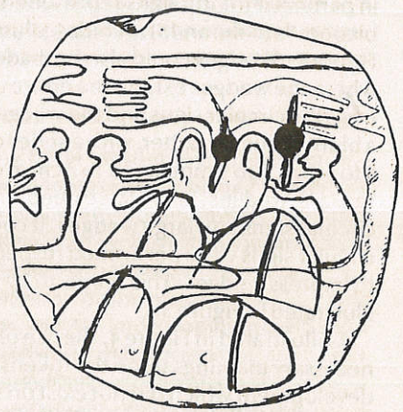
Nineteen signs can be identified on the impressed tablets. They are divided into the following categories: 1) *Deep circular:* a. small, b. large, c. incised, d. punched, e. appendix, f. & g. fractions; 2) *Shallow circular;* 3) *Wedge shaped;* a. small, b. large, c. punched, d. sideways, e. apex to apex; 4) *Biconoid;* 5) *Oval;* 6) *Cylindrical;* 7) *Triangular:* a. plain, b. incised. (See also Figure 5). A number of signs were made by impressing the tokens themselves into the clay of the tablets, and this seems the case in particular for the signs representing spheres with appendix (Figure 5, column 5), biconoids (column 15), ovoids (column 16), and triangles (columns 18 & 19 and Figure 4). Wedges could also be made by impressing a cone as illustrated in Figure 3 where the wedges exhibit the entire outline of the cone used to impress them. However, the circular signs and the wedges seem, as a rule, to have been impressed with a blunt stylus, or rather, with a series of at least three styluses measuring alternatively 3 to 5 mm, 7 to 9 mm, and 1 to 2 cm in diameter to make 1) the small circular signs and the long wedges, 2) the large deep circular signs and short wedges, and 3) the shallow circular signs and large wedges. It could also be posited that the deep and shallow circular signs were performed respectively with the tip and the base of cones used to impress wedges. This seems to be the case, for instance, in the tablet from Susa illustrated in Figure 3.

As illustrated in Figure 4, the use of a pointed stylus was introduced to add all necessary markings upon the tokens' impressions. This represents an interesting development which did not exist on the envelopes, where incised tokens appeared as reverse images with ridges featuring incised markings.

Figure 3. Susa (Sb 2313) impressed tablet, courtesy Musée du Louvre, Département des Antiquités Orientales, Paris, France.

Figure 4a. Susa (Sb 1975 bis) tablet with two incised circular and four triangular markings. Courtesy, Musée du Louvre, Département des Antiquités Orientales, Paris, France.

Figure 4b. Susa (Sb 1975 bis), after Roland de Mecquenem and Georges Contenau, Aarchéologie Susienne, *Mémoires de la Mission Archéologigue en Iran* 29 (1943) fig. 17: 2 (drawn by Ellen Simmons).



On the majority of the tablets the signs are organized in horizontal rows traced parallel to the larger side of the tablets (Figures 1, 4, 7, 8). The lines are spaced evenly upon the face, starting from the top. Following the sense of symmetry which so strongly governs Sumerian and Proto-Elamite art, the signs are placed in the center of the line rather than along a side margin.

Signs of different types are usually not mixed on the same line, and each line is therefore composed of series of identical signs repeated to the required multiplicity (Figures 1, 4, 7, 8). Contrary to this norm, the tablet shown in Figure 3 exhibits two different types of signs associated on the same line. The signs are by no means placed at random but follow a logical order. The units expressing the largest quantities appear on the top line and they are followed by lines of units representing lesser quantities in hierarchical order. Because each line usually consisted of series of identical signs, they could be written or read in any direction without altering the content. The rare tablets bearing signs of different values on the same line indicate, however, that writing and reading must usually have been performed from right to left, because the signs standing for the larger quantities are placed on the right. This is the case of the tablet from Susa illustrated in Figure 3 and the tablet from Khafaje. Two interesting tablets from Godin Tepe illustrate a case in which a scribe could not accommodate nine identical signs on a single line.[29] A first line was started from right to left, then a second line continued from left to right to enter the remaining few units. A unique tablet from Habuba Kabira (MII: 127) bears long wedges along two perpendicular edges. These details stress that writing, at this stage, had barely emerged from the abacus system which preceded it. The repetition of signs carried on the old habit of lining up tokens to match a required quantity. The impressed tablets, one may say, were still read in exactly the same manner as an abacus is handled, by mentally computing each line before adding the smaller units of the following row.

Most tablets are written on one side only, but some examples bear additional notations on the second side or along the edges. Some tablets were turned for reading on an horizontal axis, while others were handled like the page of a book. Each face seems to present a separate account, and in no circumstances do the number of signs on the second face add up to a total summarizing the computation of the obverse, as is usually the case in pictographic tablets. The shape of the tablet does not seem to be indicative of the type of accounts it bears.

The Place of the Impressed Tablets in the Evolution of Recording/Writing

The impressed tablets represent the third step in the evolution of recording in the Middle East. This evolution can be summarized as follows: 1) tokens (three-dimensional symbols), 2) envelopes bearing signs (tokens supplemented by two-dimensional impressed signs), 3) impressed tablets (two-dimensional impressed signs), and 4) pictography (incised signs). The link between the token prototypes and the resultant impressed signs are close and often very obvious. There are signs, as were described above, which can be pointed out as being the mere imprint of a token. The tablet shown in Figure 4 illustrates one of these instances and illustrates triangular signs which could only be made by impressing a token in the shape of a triangle in the moist clay – not by stylus. The three large wedges in Figure 3 show the complete outline of the cone used to impress them.

Likewise, a strong similarity exists between the impressed signs on tablets and those found on the surface of the envelopes. All the signs impressed on the envelopes (deep circles, shallow circles, short wedges, long wedges, ovals and triangles) are unchanged in the repertory of the signs on tablets.

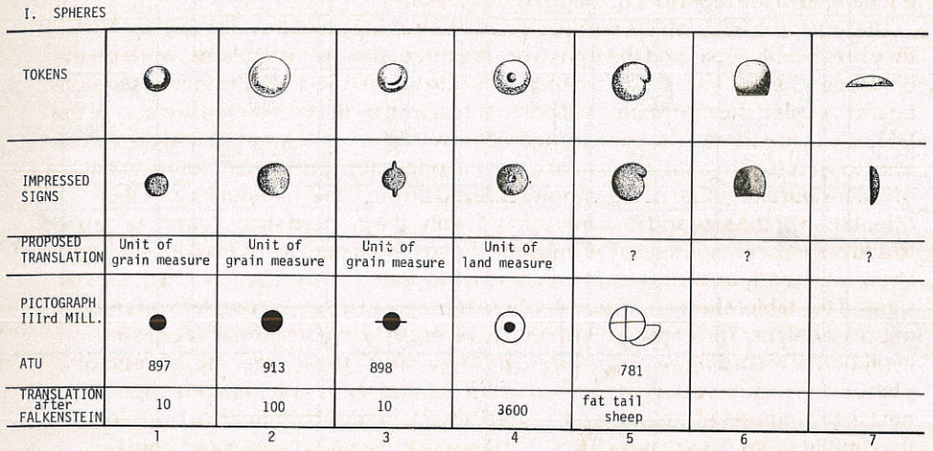
The impressed clay tablets represent a crucial turning point towards writing. First they irrevocably separated the signs from the three-dimensional tokens, while on the envelopes the signs were still complementary to tokens. Second, the impressed signs begin to exploit the morphological potential offered by the two-dimensionality of the tablets' plane surface. The cone turned sideways (Figure 5, column 13) and the cones apex to apex (column 14), for instance, are no longer straight-forward representations of tokens but altogether new symbols achieved through the manipulation of the orientation of the sign and its duplication. Finally, the pointed stylus started to be used to add necessary markings to the impressed signs when the tokens markings did not show sufficiently on their impression. This is illustrated on the circular and triangular signs of the tablet shown in Figure 4, where the median incision complements the impressed signs. The impressed tablets represent a short transitional stage in the evolution of recording, soon leading to pictography. In the succeeding, pictographic phase small pictures of tokens incised with a pointed stylus – pictographs – appear next to the impressed circular wedge-shaped signs, which continued to be used in the third millennium. This new technique of incising the symbols originated from the practice of tracing markings upon the impressed signs, as described above. The incised signs were more accurate and legible, but more importantly, pictography brought about the realization that any concept could be communicated by a sign. This meant a sudden proliferation of symbols: wild animals and parts of the human body, which never had a token in the previous system of recording, were represented by a small incised sketch; adjectives such as "furious" were communicated by the suggestive drawing of a man's head with his hair raised; verbs such as "to eat" were expressed by combining the two signs for a human head and bread; and, finally, personal names were rendered by using phonetic value of the concepts, in a rebus principle. Pictography, therefore, brought recording to new thresholds: first, it opened the system to all fields of human endeavour; second, the signs henceforth started to model themselves into representation of language.

Pictography may also prove to be an essential step towards the acquisition of abstract numbers. The appearance of pictographs representing ears of wheat and barley placed next to the units for grain attest that, henceforth, the quantity of all grains were represented by the same wedges and circles while the quality was specified by adjoining pictographs. Furthermore, the combination of wedges and circles with adjoining pictographs indicating all possible commodities, suggest that these signs took the value of abstract numbers, finally breaking down the archaic system of special numerations for various categories of items.

The Meaning of the Signs

The key to understanding the impressed signs and their token prototypes lies in the cuneiform writing system of the third millennium. It has proven possible for epigraphists to identify the meaning of some pictographs by tracing back the evolution of cuneiform signs to their original pictographic form. Jordan and Scheil

Figure 5. Chart of impressed signs and corresponding tokens and pictographs (drawn by Ellen Simmons).



Column 1
Token prototype: sphere
Impressed sign: deep circular sign about 0.3 to 0.5 cm in diameter, sunk between 0.5 and 1.0 cm into the clay
Pictograph: ATU 897
Translations: Falkenstein: number, 10. Vaiman: measure of capacity, 10. Friberg: unit of grain metrology, 1 bariga.

Column 2
Token prototype: large sphere
Impressed sign: deep circular sign, about 0.7 to 0.9 cm in diameter, sunk between 0.50 and 1 cm into the clay
Pictograph: ATU 913
Translations: Falkenstein: number, 100. Vaiman: measure of capacity, 100. Friberg: unit of grain metrology, 10 bariga.

Column 3
Token prototype: sphere with a deep incised notch
Impressed sign: deep circular sign with a median incision
Pictograph: ATU 898
Translations: Falkenstein: Number, 10. Vaiman: Unit of measurement, 10. Friberg: Unit of land measure, $^1/_8$ iku.

Column 4
Token prototype: punched sphere
Impressed sign: circular sign with a central punch mark
Pictograph: after M. W. Green
Translations: Green: number, 3600. Friberg: unit of land measure, 10 bur.

Column 5
Token prototype: pinched sphere
Impressed sign: circular sign with an appendix
Pictograph: ATU 781 shares the same outline; however, it has an additional incised cross
Translation: Falkenstein: fat tail sheep

Column 6
Token prototype: $^3/_4$ sphere
Impressed sign: $^3/_4$ circle
Pictograph: ATU 915
Translation: none

Column 7
Token prototype: $^1/_4$ sphere
Impressed sign: $^1/_4$ circle
Pictograph: ?
Translation: none

	II. DISCS		III. CONES				
TOKENS							
IMPRESSED SIGNS							
PROPOSED TRANSLATION	Unit of grain measure	10 animals	Unit of grain measure	Unit of grain measure	Unit of land measure	Unit of land measure	Unit of grain measure
PICTOGRAPH IIIrd MILL.							
ATU	907	753	892	899	905		
TRANSLATION after FALKENSTEIN	3600	slab, total, circle	1	60	600		fraction
	8	9	10	11	12	13	14

Column 8
Token prototype: disk with straight edges
Impressed sign: shallow circular sign, ca. 2 cm. in diameter
Pictograph: ATU 907
Translations: Falkenstein: number, 100 or 3600. Vaiman: measure of capacity, 100. Friberg: unit of grain metrology, 10 bariga.

Column 9
Token prototype: disk with tapering edges
Impressed sign: circular sign
Pictograph: ATU 753 (?)
Translations: Falkenstein: slab, block, total, circle. Vaiman, Friberg: unit of animal numeration, 10.

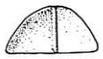
Column 10
Token prototype: cone
Impressed sign: short wedge
Pictograph: ATU 892
Translations: Falkenstein: number, 1. Vaiman: unit of capacity, 1. Friberg: unit of grain metrology, 1 ban.

Column 11
Token prototype: large cone
Impressed sign: large wedge
Pictograph: ATU 899
Translations: Falkenstein: number, 60. Vaiman: unit of capacity, 300. Friberg: unit of grain metrology, 180 ban.

Column 12
Token prototype: punched cone
Impressed sign: wedge with a punch mark
Pictograph: ATU 905
Translations: Falkenstein: number, 600. Vaiman: unit of capacity, 1000. Friberg: unit of land measure, 1 eše.

Column 13
Token prototype: cone
Impressed sign: Horizontal wedge
Pictograph: ATU 892
Translation: Friberg: unit of land measure, 1 iku.

Column 14
Token prototype: cone
Impressed sign: two horizontal wedges apex to apex
Pictograph: after Vaiman
Translation: Vaiman: unit of measurement, 120

	V. BICONOIDS	VI. OVOIDS	VII. CYLINDERS	IX. TRIANGLES	
TOKENS					
IMPRESSED SIGNS					
PROPOSED TRANSLATION	?	?	1 Animal	Unit of grain measure	Unit of grain measure
PICTOGRAPH IIIrd MILL.					
ATU	428	733			900
TRANSLATION AFTER FALKENSTEIN	Good/Sweet	Oil		Fraction	60
	15	16	17	18	19

Column 15
Token prototype: biconoid
Impressed sign: diamond
Pictograph: ATU 428
Translation: Falkenstein: good, sweet.

Column 16
Token prototype: ovoid
Impressed sign: oval
Pictograph: ATU 732, shares the same outline. ATU 733 has an additional incised line at the maximum width.
Translation: Falkenstein: ATU 732, nail; ATU 733, oil

Column 17
Token prototype: cylinder
Impressed sign: long wedge
Pictograph: after Friberg
Translation: Vaiman, Friberg: unit of animal numeration, 1

Column 18
Token prototype: triangle
Impressed sign: triangle
Pictograph: after Vaiman
Translations: Vaiman: unit of capacity, $^1/_5$.
Friberg: unit of grain metrology, $^1/_5$ *ban*.

Column 19
Token prototype: triangle with a median incision
Impressed sign: triangle with an incised median line
Pictograph: ATU 900
Translations: Falkenstein: number, 60. Vaiman: unit of measurement, 1.

correctly assumed that the translations of the pictographs could, in turn, be applied to decipher the corresponding signs on the impressed tablets. The same method is applied here to decode the impressed signs as well as their token prototypes. Three stages of the evolution of the impressed signs are presented in the following section (Figure 5): 1) a token prototype, 2) the corresponding impressed sign, and 3) the following pictographic sign. The pictographs are drawn from the list compiled by Adam Falkenstein[30] with the exception of four identified by Green (columns 4, 14), Friberg (column 17), and Vaiman (column 18). The translations presented for each sign are those proposed by Falkenstein, Green,[31] Vaiman,[32] and Friberg.[33] A discussion will follow based upon my research on tokens at large and on a particular series of 26 envelopes with their content of 281 tokens.[34] It is important to emphasize that all of the translations, as well as the alternative interpretations proposed by me in this paper, must be regarded strictly as working hypotheses.

I. Units of Grain Metrology

Column 1. I view the token prototype of the circular sign ATU 897 as a small sphere, based upon the fact that small spheres contained in envelopes are frequently represented on the surface of these envelopes by a corresponding number of small deep circular markings.

Columns 2, 8. Falkenstein identified two circular impressed signs, ATU 913 and 907, which may correspond to the two categories of signs which I differentiate as "deep" and "shallow." There are, namely, a number of tablets where the small deep circular signs (column 1) are associated with larger deep circular signs (column 2), while on others they are together with large shallow circular signs (column 8) (Figure 3). The deep and shallow signs appear to be different entities and may correspond respectively to large spheres and disks.

There are spheres of two different sizes (large and small) among the tokens found at large as well as among those found enclosed in envelopes. The envelope Sb 1967 from Susa, for instance, yielded a total of 15 tokens including four small and two large spheres;[35] another specimen from Chogha Mish contained eight tokens including one small and one large sphere.[36] One would expect that the large sphere (column 2) would be represented by the same deep circular marking used for the small spheres, only larger in diameter. This fact, unfortunately, cannot be verified on the envelopes because none of those yielding large spheres bore any markings. Tablets such as MII 130 from Habuba Kabira, which bears five large deep circular signs followed by five small deep circular signs,[37] seem to illustrate, however, the existence of two different deep circular signs which logically could correspond to the small and large spheres.

Two types of disks are consistently represented among the tokens found at large: 1) with straight sides (column 8); 2) with tapering sides (column 9). It seems apparent that these shapes were made deliberately and that each form stood for a different commodity. Both types are found enclosed in envelopes, and it can be expected that they were represented by closely similar circular signs on the tablets.[38] Disks with tapering edges were found enclosed in two envelopes from Susa, Sb 1927[39] and Sb 1940,[40] which bore on their surface a corresponding number of shallow circular markings. Unfortunately, none of the envelopes containing

disks with straight edges bear markings, and therefore no comparison is yet possible between the symbols representing the two types of disks.

Although the envelopes contained accounts of mixed goods and therefore could house any possible combination of tokens, it appears not to be fortuitous that in the four instances when disks with straight edges were found included in an envelope, they were associated with small spheres[41] and in one case with small and large spheres.[42] On the contrary, the five envelopes which contained disks with tapering edges did not yield spheres. The association of spheres and disks with straight edges seems to be reflected in the frequent association of deep and shallow circular signs on the impressed tablets. I would like, therefore, to propose the possibility that ATU 897, 913, and 907 may, in fact, represent a sequence corresponding to three tokens: 1) the small sphere, 2) the large sphere, and 3) the disk with straight edges. The fact that both the large sphere and the disk with straight edges were enclosed in same envelope demonstrates that the two symbols were separate entities. The identification of two circular signs with "deep" and "shallow" signs will have to be verified by epigraphy and has presently to remain hypothetical. The discussion of the disks with tapering edges will be resumed later in the paper.

Columns 10, 11. The cones, like the spheres, are found in two different sizes; I view them as the prototypes of the short wedges ATU 892 and 899.

Columns 10, 1, 11, 2, 8. Falkenstein identified these signs as the sequence of abstract numbers 1, 10, 60, 100, and 3600 used in the Sumerian protosexagesimal counting system. In agreement with Falkenstein, Jordan and Scheil also gave numerical values to the corresponding signs on the impressed tablets. Jordan thought that the quantities entered referred to goods that were obvious to all parties involved.[43] Scheil, on the contrary, believed that numbers could only refer to people "on n'aurait pas omis ou sous entendu le nom d'objets quels qu'ils fussent."[44] Consequently, the tablet in Figure 1 would have been interpreted by Scheil as: "Quantités d'hommes" (Scheil usually avoided specifying the numbers involved). According to Jordan the same tablet would have read: $(10 \times 4) + (1 \times 4) = 44$ (of a commodity known to the recipient). In recent years the Soviet scholar A. A. Vaiman has departed from Falkenstein's translations of the impressed signs as abstract numbers, proposing instead that they represent metrological units. Each of the symbols, he writes, "expresses at the same time the number 'one' and the term for a specific measure."[45]

Following Vaiman's publications, Jöran Friberg of the University of Göteborg used a mathematical approach to further specify the value of several signs as metrological units of grain (Figure 6).[46] According to these latest developments, the tablet discussed above means the following: 4 bariga and 4 ban of grain (equivalent to 168 liters–about 5 bushels).

These new results coincide with my own findings concerning the value of the signs' token predecessors. The analysis of groups of tokens found in the clay envelopes led me to conclude that the tokens were used in a one-to-one correspondence. None, therefore, assumed the value of an abstract number, but each token represented an economic or metrological unit of a specific commodity which was repeated as many times as necessary to express the quanity involved.[47] It should be emphasized here that the proposed translations borrowing the third

millennium nomenclature of "ban" and "bariga" is not fully adequate. In fact the tokens and their sign counterparts probably represented informal containers such as "a peck" and "a bushel" in which the goods were usually handled and were by no means multiples of one another. This seems to be demonstrated, in particular, by the fact that seven tablets bear series of six to eight short wedges,[48] instead of using the larger unit "bariga" standing in historical times for 6 ban. As a consequence, it will be more realistic to interpret the fragment of tablet in Figure 3 which shows three large wedges, 1 shallow circular sign, and four (visible) deep circular signs: three "large," one "medium," and four "small" measures of grain.

It is conceivable that there was a greater gamut of grain metrological units during the archaic period, compared to historical times. This could account for the fact that some units such as the large sphere (or the disk) fell into disuse when standardization made them superfluous.

Column 3. Series of spherical tokens bearing a deep incised notch may correspond to the deep circular signs with a median incised line (Figures 4 and 4a). Vaiman views barred signs as representing varieties of cereals and a single line, in particular, as standing for wheat.[49] As a consequence, the two deep circular signs with an additional incision on the tablet in Figures 4 and 4a may be interpreted as 2 bariga of wheat.

Columns 18-19. Vaiman presents a series of signs of triangular shape, plain, with a median incised line (column 19) and with sets of multiple lines in various combinations. He proposes a plain triangular sign as a metrological unit of capacity standing for $\frac{1}{5}$.[50] Friberg, in turn suggests a plain triangular sign as a metrological unit of grain standing for $\frac{1}{5}$ ban (Figure 6).[51] As a consequence, the two top lines of the tablet shown in Figure 7 may be read: 5 ban and $\frac{2}{5}$ of grain.

Following Vaiman's interpretation of barred signs, the triangle with a median incised line may correspond to a measure of wheat. If this assumption is correct, the tablet in Figure 4 can be interpreted as 2 bariga and $\frac{4}{5}$ ban of wheat. It still remains to be explained why the triangular signs with a median incision do not have the same orientations as the plain ones.

Column 14. Here the cone prototype is doubled to form a new sign featuring two wedges apex to apex (Figure 7). This illustrates the first use of graphic design to create new symbols and represents an important departure for writing. The sign can be paralleled to a unit of capacity identified by Vaiman as $\frac{1}{10}$.[52] Thus for the tablet of Figure 7 one may tentatively propose the interpretation "5 $\frac{2}{5}$ and $\frac{1}{10}$ ban of grain."

II. Units of Land Measure

Columns 13, 12,1, 4. These signs and their matching token prototypes may possibly correspond to the sequence of signs designating area measures (Figure 6).[53] There may be a possible relationship between these signs and those for grain metrology which might be related to the calculation of area measures in terms of seed ratios. The unit of land measure corresponding to 1 iku is differentiated from the unit of grain metrology for 1 ban by turning the wedge sideways thus taking advantage of graphic design. The option of changing the orientation of the sign, of course, did not exist for the circular sign, which remains the same. Multiples of the iku and the bur would seem to be indicated by a punch mark.

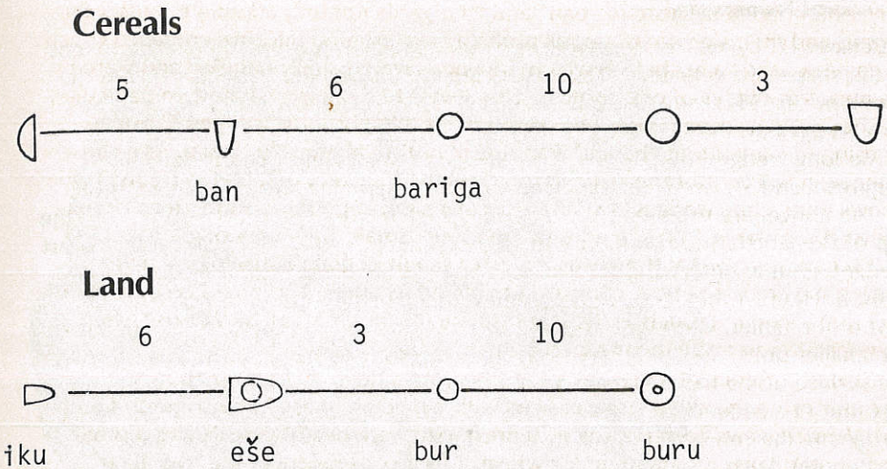


Figure 6. Sumerian and Proto-Elamite numeration systems after Jöran Friberg, *The Third Millenium Roots of Babylonian Mathematics, I.A Method for the Decipherment through Mathematical and Metrological Analysis of Proto-Sumerian and Proto-Elamite Semi-Pictographic Inscriptions.* Chalmers University of Technology and the University of Göteborg, Department of Mathematics (1978-9) p. 10, 20, 46.

Figure 7. Godin Tepe (73-291), impressed tablet, courtesy T. Cuyler Young, Jr., Royal Ontario Museum, Toronto, Canada.

III. Animal Numeration

Column 17. I view the long wedges as the graphic representation of the tokens in the shape of a cylinder.[54] This assumption is supported by the fact that in the envelope Sb 1940 from Susa the three cylinders enclosed correspond to three long wedges on the surface.[55]

The long wedges are placed, as a rule, along the lower edge of the tablet (Figures 8 and 9), which may provide a clue to their meaning. The signs, as discussed above, are usually organized in lines of decreasing order starting from the top of the tablet. The two tablets in Figures 1 and 7 show, for instance, that short wedges assume different positions according to the signs they are associated with. In Figure 1 the short wedges follow circular signs and occupy the lower part of the tablet, while in Figure 7 they are placed on the top line to allow place for smaller units. The systematic placing of the long wedges on the lowest possible surface of the tablet seems to point out that they represent the lowest, indivisible unit of a sequence. Following this reasoning, I propose to view the long wedges as the smallest, indivisible unit of a numeration system for animals (or people). Such a sequence, which could not accommodate any fractions, is suggested by Vaiman (and after him by Friberg) to start with a wedge standing for 1.[56] As a consequence, I propose to read the eight long wedges shown on the tablet in Figure 8 as "8 animals" and the nine (visible) wedges of Figure 9 as "9 animals." The special numeration for animals includes further multiples and, in particular, a circular sign standing for 10, as will be discussed below.

Column 9. Groups of three disks with tapering edges were found enclosed in two envelopes from Susa SB 1927[57] and Sb 1940[58] and were represented on their surface by groups of three corresponding shallow circular markings. It is therefore to be expected that circular signs representing disks with tapering edges were transposed onto the impressed tablets.

As for the meaning of these tokens, there is an interesting series of disks which may be helpful for their identification. The disks are often, although not always, characterized by a strongly convex face and slanting edges, and they bear distinctive patterns of incised lines. These tokens can be matched to pictographs featuring an incised circle filled with identical patterns of incised lines which are translated as "sheep, ewe, lamb, wool, cloth, and garment."[59] I find it striking that commodities of closely related meaning—such as small animals of various breeds, sexes, and ages and their products used in the weavers' craft — are all represented by a disk bearing various markings. I would anticipate the plain circle to represent the root of the series and to be a common unit of animal numeration. The pictograph ATU 753 which features a circle and could logically represent the plain disk is, however, presently translated "slab block, total, circle" which does not seem to correspond. There is, however, a circular unit of animal numeration proposed by Vaiman[60] to stand for 10 animals which may provide the answer. This interpretation finds support in the fact that, among the five envelopes which yield disks with tapering edges, three also included cylinders.[61] The envelope Sb 1940 from Susa discussed above, which contained three such disks and three cylinders corresponding on the surface to three circular markings and three long wedges, would suggest a total account of 33 animals.

Figure 8. Susa (Sb 6299), impressed tablet, courtesy Musée du Louvre, Département des Antiquités Orientales, Paris, France.

Figure 9. Susa (Sb 6299), impressed tablet, courtesy Musée du Louvre, Département des Antiquités Orientales, Paris, France.

It seems evident that the envelopes, which sometimes yield as many as five types of tokens, could hold accounts of mixed goods. The impressed tablets, on the contrary, appear to be dealing mostly with accounts of a single commodity. In this light, the circular sign on the tablet in Figure 8 could be viewed as standing for 10 animals because it is associated with long wedges. It is a deep circular sign, not a large shallow marking as those impressed on the envelopes yielding disks with tapering edges. It may be that a circle associated with long wedges immediately conferred the notion of a flock of 10 animals and that it was unnecessary to the scribe to make that circle in a very particular way. It was, of course, easiest to impress the circular sign with the same stylus as that used for the long wedges and therefore producing a small circle.

The Meaning of the Remaining Signs

The deep circular markings standing for the spheres and the short wedges standing for cones are by far the most frequently used signs. They occur respectively on 88 and 69 tablets. If, therefore, the interpretation of these two signs proposed above should prove to be correct, we would have identified the objects and the numerical relationships of 85% of the impressed tablets. The long wedges standing for cylinders and the shallow circles standing for disks are next in frequency and appear on 30 and 15 tablets respectively, the remaining signs are rare. The irregular circle shown on two tablets from Susa[62] is similar to the later sign for "fat tail sheep." The ¾ circle shown on a tablet from Susa[63] and the ¼ circle of a tablet from Godin Tepe[64] still await identification. The biconoid which appears on one tablet from Godin Tepe[65] can be paralleled with the corresponding token identified as "sweet." The oval sign which occurs on one tablet from Chogha Mish,[66] one tablet from Jebel Aruda[67] and one tablet from Habuba Kabira[68] may tentatively be compared with the ovoid token standing for "oil."

The Function of the Tablets

The "translation" of the various signs proposed above assumes that the tablets were accounts dealing with foodstuffs and, in particular, with grains and animals. The amounts of goods recorded were strikingly small: the quantities of grain usually vary between five ban and four bariga and rarely exceed 12 bariga. The number of animals usually range between one and ten. These small quantities make it unlikely that the tablets pertained to long distance trade of costly material as has been suggested. One would expect that shipments of lapis lazuli, metal, or other precious goods would entail the exchange of similarly valuable materials rather than small quantities of staples. The texts are similar in form and context to the later administrative tablets dealing with 1) receipts of offerings brought to the temple, 2) distribution of rations to workers and dependents of the temple, 3) release of seeds for planting the fields.

Conclusion: Writing or Pre-writing?

The impressed signs were mere accountant notations. Should they be considered as writing or pre-writing? The answer depends upon the definition of writing adopted. Some scholars place the dividing line between pre-writing systems and writing when the signs take a *phonetic* value, others at the emergence of *graphic* symbols.

According to the former definition, the impressed signs do not qualify as writing as they were ideographs and entirely unrelated to phonetics. According to the latter, the impressed signs both on envelopes and impressed tablets are writing because they are a communication system by means of conventional markings. The most appropriate term for the impressed tablets may be "proto-writing" thus emphasizing their transitional character. The impressed signs completed the shift from three-dimensional tokens to their graphic representation and thereby represent the most extraordinary and significant event in the evolution of recording.

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Abbreviations

ATU: Adam Falkenstein, *Archaische Texte aus Uruk*. ("Ausgrabungen der deutschen Forschungsgemeinschaft in Uruk-Warka," Bd. 2.) Berlin: Kommissions-Verlag Harrossowitz (1936)
DAFI: Délégation Archeólogique Française en Iran
MDP: Mémoires de la Mission Archéologique Française en Perse
OIC: Oriental Institute Communications. The Oriental Institute of the University of Chicago
UVB: Uruk, Vorläufige Berichte, Abhandlungen der preussischen Akademie der Wissenschaften, philosophisch-historische Klasse, Berlin

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48. Susa: Vincent Scheil (1923), p. II: 11; Pl. IX: 58, 70; François Vallat (1971) fig. 43: 9. Sialk: Roman Ghirshman, (1938) Pl. XCII: S 1621; Pl. XCIII: S 1632. Godin Tepe: 73-318.
49. A. A. Vaiman (1974) 21.
50. *Ibid.*, 20, fig. 3.
51. Jöran Friberg (1978) 10, 20.
52. A. A. Vaiman (1974) 19, fig. 2.
53. Jöran Friberg (1978-79) 46.
54. Alain Le Brun and François Vallat (1978) 32.
55. Pierre Amiet (1972) Vol. I, 92: 555.
56. Vaiman, A. A., "O svyazi protoelamskoĭ pis'mennosti s protošumerskoĭ," *Vestnik Drevneĭ Istorii* (1972/III) 124-133; Jöran Friberg (1978), 21.
57. Pierre Amiet (1972) Vol. 1, 91:539.
58. *Ibid.*, 92: 555.
59. Denise Schmandt-Besserat (1980) 374, fig. 11.
60. A. A. Vaiman (1972) 124-133.
61. Susa: SB 1940, Sb 6350, ACR 1999.1. In Sb 1927 and ACR 2067.2 the disks were associated with cones.
62. Alain Lebrun and François Vallat (1978) fig. 4: 2, 4.
63. Pierre Amiet Vol. II (1972) Pl. 79: 642.
64. Harvey Weiss and T. Cuyler Young, Jr. (1974) fig. 4: 6.
65. GD 73-61, unpublished.
66. Helene Kantor (1974-75) Pl. 17: 7.
67. S. E. van der Leeuw (1974) 82.
68. Eva Strommenger, "Ausgrabungen in Habuba Kabira und Mambagat," *Archiv für Orientforschung* 24 (1973) 171, fig. 17.

M. W. Green

The Construction and Implementation of the Cuneiform Writing System

Cuneiform was, from its inception, not merely a collection of individual symbols, but a coherent system of information manipulation for which written characters were the main, but not the only, component. This system did not evolve by itself, but was manufactured, developed, and implemented within the framework of a bureaucratic organization which controlled the distribution not only of goods and services but also of status and information. That institution produced the demand for a control technology for which the cuneiform writing system was the eventual realization. While the user institution imposed specific, characteristic constraints and demands, it also adjusted its own needs and goals to adapt to restrictions and functions of the technology itself. We look at the early development of the cuneiform writing system with special attention to the less well recognized peripheral components and to interactions between the technology and its user.

I Introduction

1 The Archaic Cuneiform Script

This article focuses on the early "archaic" stages of the cuneiform writing system. According to the archaeologically-based chronology of Mesopotamia, this refers to the Late Uruk and Jemdet Nasr periods (ca. 3300-2900 BC) and corresponds to archaeological levels IV (Late Uruk) and III (Jemdet Nasr) at the site Uruk and to the single-period type-site Jemdet Nasr. The archaic tablets discovered at these two sites form the basis for our discussion—especially the Uruk tablets which we have been studying intensively for the past several years.[1]

The dating of the archaic cuneiform script has never been rigorously based on archaeological level because most of the tablets from Uruk were found in fill areas, rubble, and pits, not *in situ* in good archaeological context. Adam Falkenstein, who was epigrapher for the first Uruk seasons when archaic tablets were uncovered (1928-31), established a writing-stage terminology "Uruk IV" and "Uruk III" corresponding to archaeological level. But thereafter he assigned the tablets to one or another writing stage according to similarity of signform. We have followed this latter practice in determining writing stages for tablets found in subsequent excavations. The Jemdet Nasr tablets closely resemble the Uruk III tablets and are considered contemporary with them. The later "archaic" stages represented at Ur (Early Dynastic I period, ca. 2900 BC) and at Fara, Abu Salabikh, and elsewhere

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("Fara" period = Early Dynastic II-III, ca. 2600 BC) will be mentioned here only in light of long-term trends and later evolution of the script system.

The Uruk and Jemdet Nasr tablets represent the earliest preserved stages of a well-developed, stable writing system. Although we can posit an earlier, formative stage of incomplete and inconsistent sign repertoires and writing standards, its traces have not yet been discovered. At this stage the writing system contained an extensive character set of approximately 1200 signs, as well as a coherent set of rules for writing texts. Later the character set was gradually reduced by various economizing principles, the pictorial content was gradually removed by various techniques of stylization, and the morphophonemic basis of the writing system was gradually transformed from chiefly logographic to chiefly syllabic.

The language(s) of the archaic period script have not yet been determined. Within the Uruk III lexical corpus, textual variants reveal the phonetic value of a few signs. While these do correspond to later known Sumerian sign values,[2] other languages which we cannot yet recognize might also be represented. No similar phonetic clues appear in the non-lexical corpus or in texts of the Uruk IV stage.

Many summaries are available of the development of cuneiform and other scripts from "realistic" pictographs to "abstract" linear characters.[3] In this article we view the script as a non-independent component of the cuneiform writing system and trace some parallel developments of script and meta-script components. Especially, we direct our attention to 1) the overall visual information system, and 2) the bureaucratic/clerical organization for which the visual system served as a tool.

2 Symbolic and Informational Aspects of Writing

There are many fruitful approaches to understanding the purpose and significance of writing, none of which should be exclusively taken as correct or definitive. Writing might be interpreted as 1) a symbol system, 2) a vehicle of communication, or 3) an information storage and retrieval system. We will utilize each of these interpretations in our discussion of the archaic cuneiform system. Important to us is their shared appreciation for the instrumental nature of writing, the conventional character of the encoded information, and the indispensibility of transmitter and receiver.

Writing provides a set of visual images to represent language items. Depending on the complexity of the system, many linguistic levels can be simultaneously represented and many visual patterning techniques exploited. The early stages of most writing systems show only a loose correspondance between the spoken and written forms of the language. With recognition and application of linguistic principles—that is, with deliberate, analytic modification of the system—the correspondance between speech and writing increases. The phonetic principle is vital to this development, but not exclusively so.[4] The cuneiform writing system always remained a mixed system including elements representing phonetic, semantic, etymological, and elocutionary levels of various languages.

Any system of visual patterning can be chosen, however arbitrary. Pictorial correspondence between sign form and meaning ("pictographs") might assist the novice, but the fluent reader relies more on mentally-organized information patterns which he has constructed from his experience with the language, the writing system, and the textual context.

For the reader, processing the visual information is a task involving symbolic thinking, pattern recognition, and memory organization. Symbolic learning proceeds by mentally organizing separate information units into increasingly large and complex patterns. Eventually a complex array of information is translated into a more easily apprehensible system of a few patterns and symbols.[5] The process of learning to read involves both the assimilation of visual patterns and their integration with other, above all linguistic, knowledge. As with any perception, in understanding a written text the amount of visual information required depends on 1) the amount of information otherwise accessible, from memory or elsewhere, and 2) the information-processing capacities of the reader. With experience, the size, complexity, and speed of pattern recognition increases. Whereas the beginning reader struggles with each character, the experienced reader can comprehend entire sentences at a glance. Yet he, too, will stumble over a text in an unfamiliar handwriting or language.[6]

The written text itself contains visual images composed in such a way that a unit of information (a "record" or "message") is stored on the writing medium. The medium and symbol set are neutral instruments in this information system. Coding and decoding, storage and retrieval, are technological processes defined by the construction of the system. Message transmission, however, involves processes of analysis and interpretation by both transmitter and receiver—processes which are not inherent in the technology but are nevertheless intrinsic to the functioning of the system. We would stress that, besides the script itself, there are many components and many levels to a writing system, and that they function together simultaneously and interactively.

3 The Tool's User: Clerk and Bureaucrat

Writing was a powerful tool. Like any tool, its creation undoubtedly arose in response to the needs of its potential user, and its application was defined by user demands and directed toward user-defined goals. We therefore want to examine the nature of that user, its demands and goals, and its role in the invention and development of that tool, writing.

The cuneiform writing system functioned as a device to record transactions of the Sumerian administrative bureaucracy. It enabled that bureaucracy to expand vastly its basic resources and production processes—the control and distribution of information, labor, goods, and services.

Bureaucratic structures and their internal management vary. Accordingly, responses to technological innovation and utilizations of technology also vary. We might conjecture, based on studies of modern organizational structure, that the Sumerian administration had an "organic" style of management, with a diffuse allocation of responsibility, informal supervision, and a fair degree of local autonomy. This has been found to be a more successful management system for a highly professionalized organization using sophisticated, non-mechanized technology in its basic production process.[7] Nevertheless, that the historical development of the Mesopotamian public bureaucracy was toward ever-increasing centralization and formalization of controls has been amply demonstrated.[8]

We know little about the hierarchical structure of the organization which employed the scribe. We can probably assume that he himself was a low-to-

intermediate-level staff member, an accountant or clerk who performed procedural tasks but did not much participate in policy-making. The prominence of bookkeeping among the scribe's assignments is demonstrated by the extensive training in various forms of accounting, mathematics, surveying, etc., given by the scribal school.[9] Lacking, as yet, any trace of written creative literature from the early archaic periods, we must view the scribe of those times as neither scholar nor poet, but as, above all, a clerk. Nevertheless, in contact with the public he was probably highly regarded as an official, a "white-collar" worker, and a "professional." His familiarity with a sophisticated technology would alone have been a warranty of high status.[10]

In our investigation of the dynamic relationship between writing technology and the bureaucratic system within which it functioned, we assume that the Sumerian bureaucracy of the early archaic period already had a departmentalized, hierarchical structure. This seems likely from the large number and variety of official titles which occur in the archaic administrative texts and which, by Uruk IV, were already collected in lexical lists. Furthermore, we expect the operation of the usual internal bureaucratic constraints. These would include demands for documentation, specification, quantification, routinization, standardization, efficiency, and accountability, as well as a drive to maintain or tighten control of authority. It is important to remember that cuneiform writing is not an artistic style which might have had a "natural" evolution strongly affected by popular fancy and showing erratic variations or stages of "degeneracy" or "renaissance." Rather, it is a technology, designed and manipulated according to specific user needs. Therefore, as we trace its evolution within the bureaucratic framework, we will look for evidence of deliberate, systematic, and bureaucratic developments.[11]

Technology, in its turn, also has an impact upon the worker, the work process, and the organizational structure. Tools can have subtle, retroflexive effects upon their makers and users. Especially, they tend to restrict the user's outlook to the narrow avenue of approach provided by their specialized solution to a problem. Writing itself can affect the spoken language, as with the historical shift in English from inflection to word order as the main principle for representing grammatical syntax.[12] Printing technology has even been credited with the revolutionization of modern thought processes.[13] Keeping these notions in mind, we will also watch for evidence of such subversive reciprocal influences in the earliest evolution of writing technology.

II Meta-Script Information Inherent in a Written Text

We have already mentioned, with respect to pattern recognition in general, the importance of the accessory information used in conjunction with the featural information present in the pattern. This is the background knowledge which the reader brings to the task of reading—above all, his linguistic and lexical proficiency, but also familiarity with the visual configurations of a written text.

Besides the graphic shape of individual characters, visual information is provided by the arrangement of signs into larger units, the patterning of units on the writing material, individual handwritings or embellishments, etc. Although they vary with time, place, and script form, some such categories of information are

always incorporated into a writing system as writing conventions. They may be deliberately designed as features of the writing system or they may arise incidentally. An important supplementary information source for the reader, they are essential to the writing system, although peripheral to its main visual component the grapheme.

Examples of common writing conventions in modern script systems are: consistent linear direction of script, word-separation, punctuation, capitalization, and paragraphing. These provide higher-level information concerning the language and the written text, and thereby facilitate the close reading of individual words and characters. Other conventions are specific to text genres and serve to differentiate one genre or text subunit from another. For example: left-margin justification in poetry, column-justification in accountancy records, speaker-designation in play or movie scenarios, heading and signature formats in letters.

Analogous writing conventions were also incorporated into the cuneiform writing system. Eventually the direction of script became firmly established left-to-right; columns were customarily read left-to-right on the obverse of a tablet but right-to-left on the reverse; the tablet was rotated from obverse to reverse around a horizontal axis (as for a modern steno notebook, in contrast with the vertical axis for turning pages in a modern book). Even word-separation was frequently practiced in literary texts; mathematical and lexical texts were ruled into appropriately-spaced columns for various types of entries; interlinear bilingual translations were left-justified to indented margins. For a proficient reader of cuneiform, either ancient scribe or modern scholar, different text genres such as omens, rituals, lexical lists, mathematical tables, ration lists, etc., often could be distinguished at a glance.

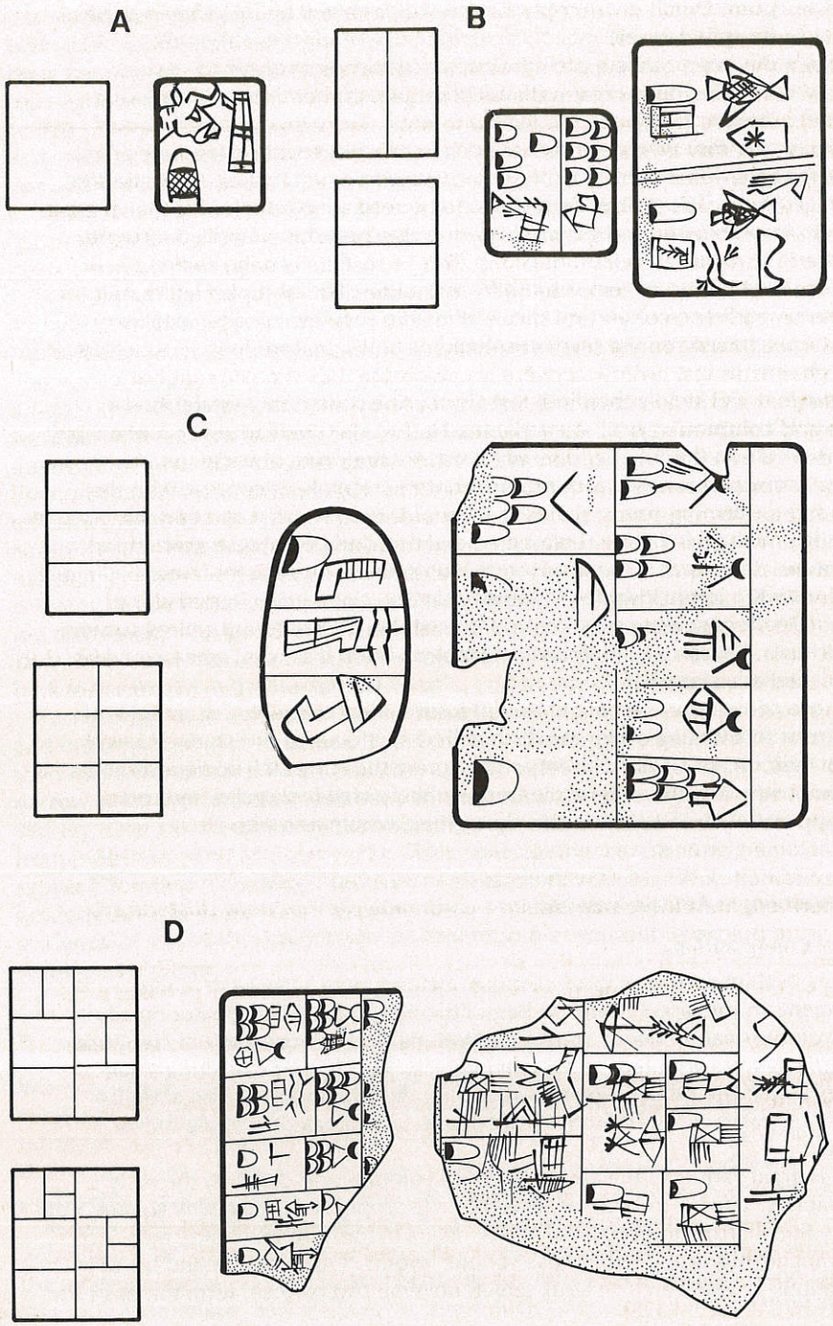
It is these conventions—the meta-script information components, peripheral but essential to a writing system—which will be the focus of our study. We will describe their inception and development during the early archaic periods and thereafter, with particular interest in trends, their possible direct or indirect influences, and their integration into the writing system as a whole.

III Conventions in Archaic Cuneiform

1 Visual Configurations

As long as a tablet records a brief memo containing only a few signs, their arrangement on the tablet seems to be of little importance. But greater detail or quantity of information needs some coherent method of organization. Two practical solutions were adopted by the Sumerians. One involved clustering small groups of signs; the other involved structuring the tablet surface into a regular series of compartments—"columns" and "cases"—separated by straight dividing lines.

There is great variety in the arrangement of columns and cases on the early archaic tablets. Usually in Uruk IV texts the case proportions are nearly square, but gradually they narrow to horizontal "lines" like a modern ruled writing pad. We have compiled and categorized these various layouts. Our typology and list of classifications for each archaic Uruk tablet, obverse and reverse, form the basis for



this presentation. Detailed descriptions and diagrams will be included in the first volume of text publications.

Although the exact column and case pattern depends on the data of the individual text, consistent organizational principles can be deduced. These are illustrated in Figure 1. At one extreme is the single-entry text with no dividing lines. A two-entry text may be divided either horizontally or vertically; multiple entries are arranged top-to-bottom in a column. A text with many entries would require several columns, each divided into cases, to be read sequentially like the columns in a modern newspaper. Individual cases may also be subdivided by a secondary sequence of vertical and horizontal lines. This procedure is described in detail below. The tablet reverse seems to follow the same general organization, but the direction of reading columns and the relationship between obverse and reverse depend more heavily on the text's content.

The other organizational principle, sign clustering, has the same goal of separating integral segments of the text from one another for more efficient reading and comprehension. But it is more likely to be misread and is limited by space restrictions. It is most commonly used in large cases or wide columns without subdivisions, and rarely with more than three sign clusters per surface unit.

Chronologically, clustering seems to have preceded column and case division, or cluster patterns tended to be replaced by dividing-line patterns. A gradual replacement process may be observed in the comparison of three layouts illustrated in Figure 2. Example (A) shows clustering of signs arranged at the top-left, bottom-left, and center-right of the tablet; (B) has an equivalent column and case arrangement with one wide column on the left divided into cases and one narrow, undivided column on the right; (C) has a combination pattern with only a horizontally-ruled case dividing line on the left side of the tablet, no column dividing line, and a single sign group centered on the right. These three layouts are common among the Uruk IV tablets and we may guess that the combination type is transitional between the other two. Of these three types, only the two-column layout appears in Uruk III texts, although other layouts with sign clusters or partially divided cases do occur (e.g., Figure 4 D, column i, first case). There are also a few Uruk IV tablets with irregular and jagged dividing lines, as if drawn as an afterthought. If there was indeed a chronological shift from clustering to case-division practices, these would represent an intermediate stage.

We would interpret the invention of columns and cases as an attempt to devise a system of text organization which could encompass more, detailed information within a single tablet record. Mere spatial separation was found to be insufficient, but the addition of linear separators became a satisfactory solution. Still, the clustering technique was never entirely abandoned. It underlies word-separation, for example, which may often be seen in cuneiform literary texts,

Figure 1. Diagrams and examples of tablet layouts. A: Single-entry tablet (W. 15658) B: Two-entry tablet with horizontal or vertical case-divider (W. 19592E, W. 10632). C: Columnar arrangement of cases (W. 19948.1, W. 21418.2). D: Case subdivision (W. 22100.3 obv., W. 20274.125).

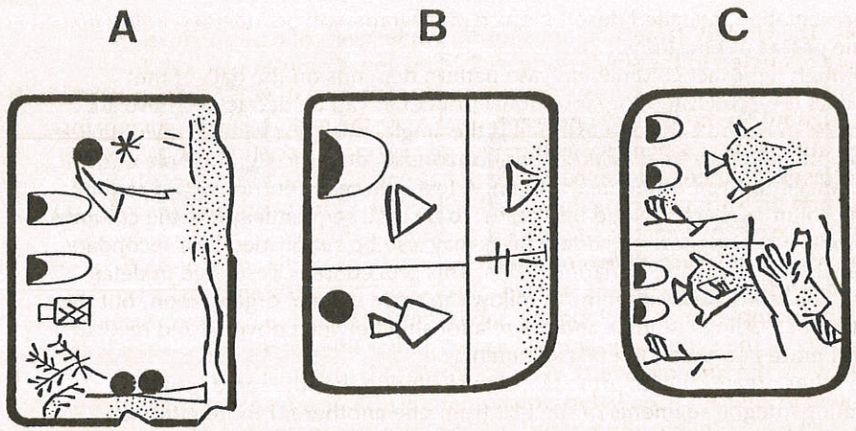


Figure 2. Alternative arrangements of three entries. A: Sign clusters (A. Falkenstein, *ATU* [1936] no. 65). B: Columns and cases (W. 20044.8). C: Combined pattern (*ATU* no. 63).

and columnar spacing (without column dividers) used in various administrative and numerical lists.

Column and case patterns show a chronological increase in complexity associated with an increase in the total number of entries. Most Uruk IV tablets are written on only one side (75%)[14] and 40% of those are single-transaction records with no compartmentalization of the tablet surface. Half the Uruk III or Jemdet Nasr tablets are written on both sides and fewer than 5% are single-entry texts. By the time of the archaic Ur tablets, single-entry texts are extremely rare.

Multiple-column texts are common throughout the Uruk corpus; use of that format seems to depend mainly on the quantity of data to be recorded. As the average total number of entries increases, there is also, not surprisingly, a noticeable increase in the number of columns required to contain the data. Twenty percent of the multiple-entry Uruk IV texts use only one column (data given only for obverse); 30% need three or more columns. In Uruk III one column is sufficient for fewer than 10% of the texts, and 60% need three or more columns. Among the Jemdet Nasr tablets, 12% use one column but only 30% use three or more.

Moreover, the Uruk III scribes were able to pack far more into a column than the Uruk IV scribes. This they accomplished by the principle of case subdivision which, although occasionally used in Uruk IV, became prevalent and was elaborated in Uruk III (see Figure 1 D). The first subdivision is made by drawing a vertical line, usually somewhat off-center, through a case to divide it into a pair of adjacent subcases. Such subcases appear only rarely among the Uruk IV tablets (7% of the multi-entry texts) but more frequently in Uruk III (20%) and at Jemdet Nasr (23%). The Uruk III and Jemdet Nasr texts carry the subdivision procedure a step further by drawing horizontal dividing line(s) through the right-hand subcase (15% of multi-entry Uruk III texts, 9% at Jemdet Nasr). The procedure can continue algorithmically. The Uruk IV tablets do not show multiple levels of case subdivision; they are restricted to the single vertical dividing line. Complex case subdivision patterns can therefore serve as a diagnostic identification of writing stage III.

Throughout the history of cuneiform, even from the earliest stages, underlying all text-organization schemes was the principle of one conceptual unit per spatial unit. Obviously, there can be many interpretations of the size and content of a "unit," and the various archaic formats do allow for a variety of possible units and subunits. Case subdivision is one data-organizing technique which functions to confine within one case all the information considered pertinent to a single record. In an administrative document, a single entry concerning distribution of beer rations, for example, might include the number of jugs, the type of beer, the name and/or title of the supervisor, and the names and/or titles of the lower-level individuals who are the final recipients. A typical Uruk III layout of such a record is illustrated in Figure 3. General information (total quantity, type of goods, supervisor) is given in the left subcase and specific information (individual names and disbursements) in a miniature column of subcases on the right. Uruk III "ration lists"[15] contain lengthy series of such entries arranged in separate cases. The visual pattern permits immediate recognition as a ration list and localization of the individual units. In later periods the same data categories are organized in a simple, linear sequence of cases. Ration lists have not yet been recognized among the Uruk IV texts. Very likely composite lists were not written then, but rather individual distributions were recorded on separate tablets.

According to another basic format convention, information pertaining to the entire tablet as one unit is spatially segregated in a "subscript." Such information might include a total, transaction classification (e.g., payment, income, votive gift, worker assignment), supervisor, city or state involved, etc. Often this subscript is written in a single, undivided column placed at the far left or right side of the tablet surface (Figure 4 A, B); or sometimes the whole reverse is used for the subscript. A predecessor to this text layout is the sign cluster set apart at center-right (Figure 2 A, described above), which occurs in Uruk IV tablets; an extension of it is the "intercolumnar," narrow, undivided band inserted between other normal columns (Figure 4 D), which is an innovation of the Uruk III writing stage. In a subdivided case with many specific items or names recorded on the right side (Figure 3 col. iii bottom), the left subcase takes on the appearance of such a subscript column, as, indeed, it contains an analogous data set. The visual effect of these patterns is to stretch the unifying subscript across a surface parallel to the area encompassed by the individual entries. The Uruk IV cluster pattern often actually rotates the sign (group) on the right 90° and draws it larger.

Spatial separation of different text sections can also employ a double dividing line or a fancily ornamented one (Figure 4 B, G); this technique is more typical of Uruk IV texts. Case proportions can be given special significance. For example, a subscript can be isolated at the bottom of an exceptionally tall final case in a column. Sometimes several adjacent columns bear such individual subscripts (Figure 4 C).

Certain tablet layouts are specific for particular text genres. Lexical lists are an outstanding example. Beginning with writing stage Uruk III, their standard format of regular, narrow cases with a single wedge or numeral "1" at the left edge of each

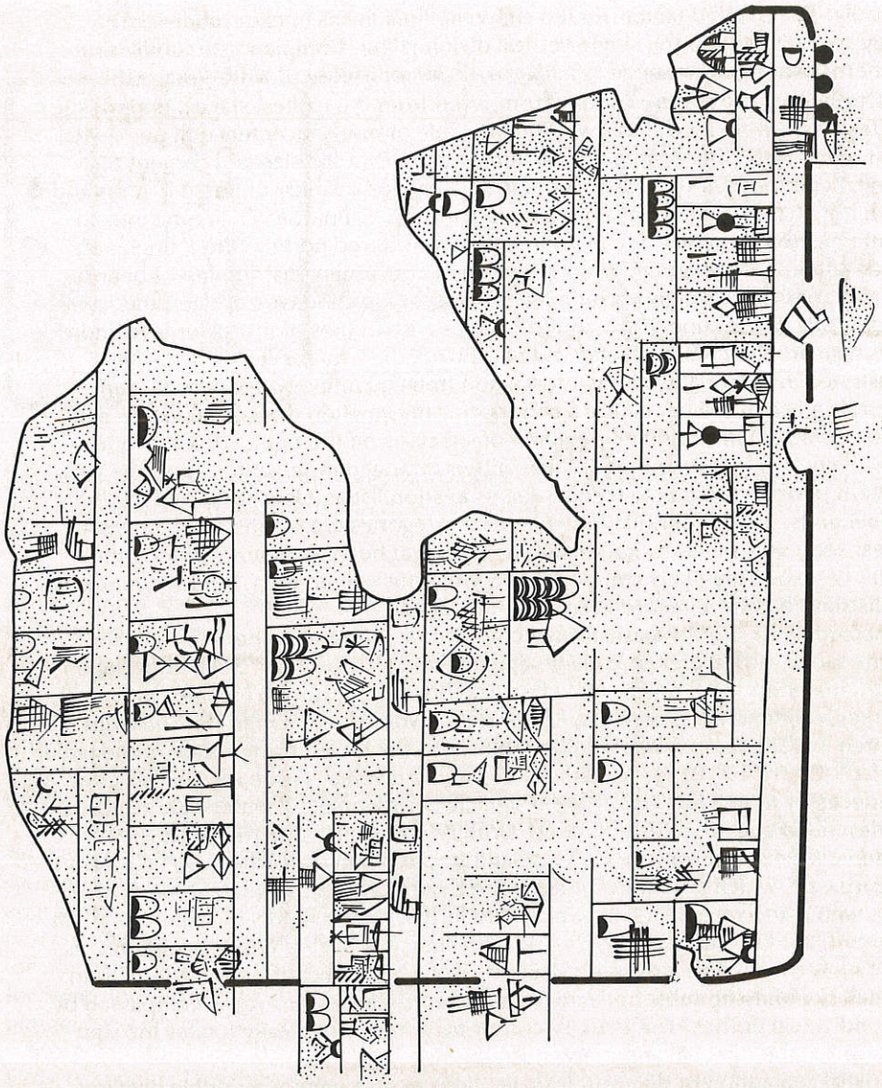


Figure 3. Uruk III "ration list" (W. 20327.3 obv.).

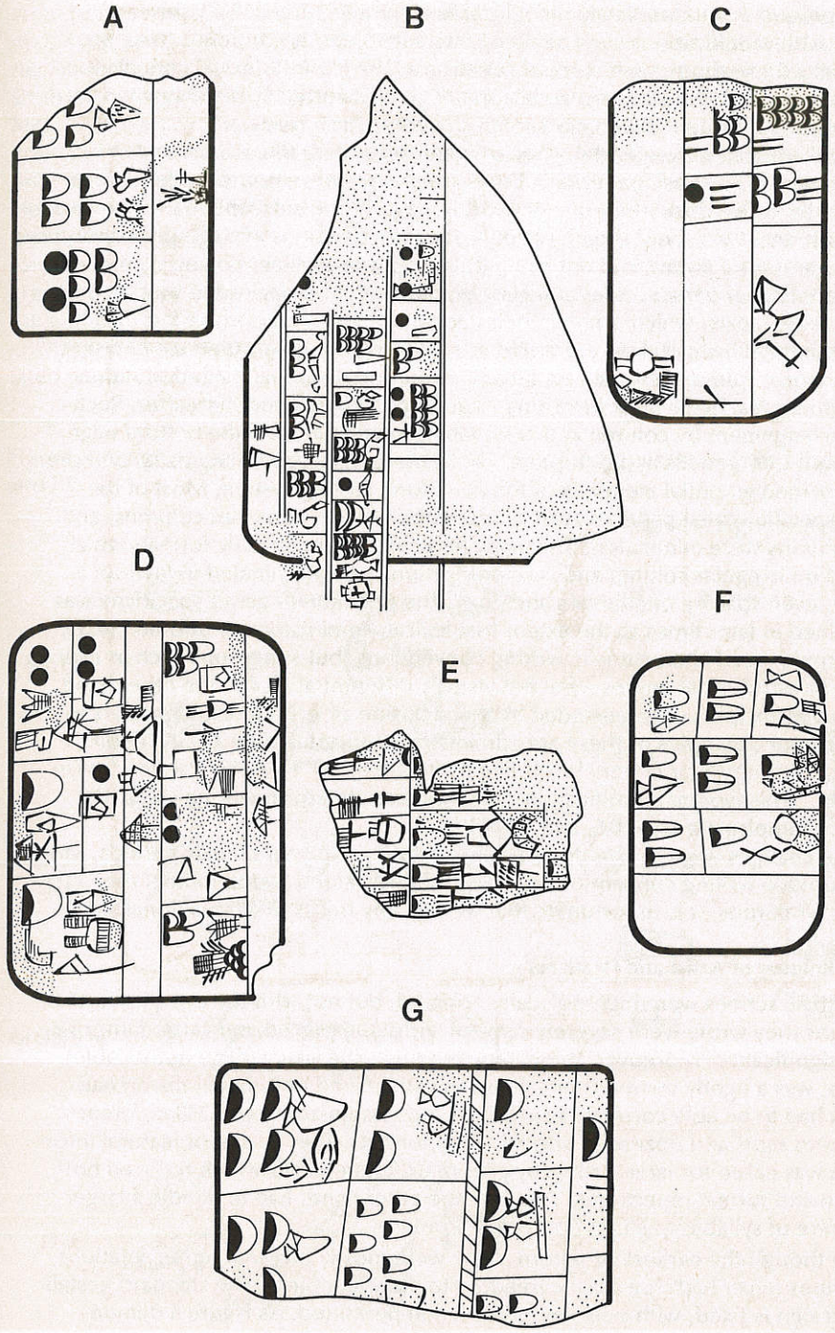


Figure 4. Special formats and format elements. A: Subscript column at right (W. 21049). B: Subscript at left; double dividing line (W. 22102.0). C: Multiple subscripts in elongated cases (W. 21195.1 obv.). D: Intercolumnars; partially subdivided case (W. 20274.5 obv.). E: Lexical text (W. 15958B+D, Lu-List). F: Vertical "columns" (W. 21300.6). G: Ornamental dividing line (W. 21403).

case is unique and immediately recognizable (Figure 4 E). Essentially the same format, with modifications such as ruling into subcolumns, continues to earmark lexical lists throughout the history of cuneiform. The Uruk IV lexical compilations are not organized into standardized lists and are not written in any characteristic case pattern, although most have a "1" at the left of each case.

Several administrative genres are also signalized among the archaic texts by unique column and case patterns.[16] These genre-specific patterns are found predominantly in the Uruk III corpus. In writing stage IV the correspondance between layout and text type is not directly one-to-one, as it becomes in stage III. Rather, certain genres are always laid out in a particular pattern which, however, may also be used for other genres. A Jemdet Nasr example might be provided by certain "field survey" texts, which arrange their data in rows instead of columns.[17]

In tracing the historical development of spatial tablet organization we find that the basic principles established in the archaic period were maintained, but their multiformity reached a peak in writing stage III and diminished thereafter. Rectilinear arrangement by column and case, tablet rotation around the bottom edge,[18] placement of numerals at the (top)-left, and one conceptual (or linguistic) unit per line remained essential elements of the cuneiform writing system. Most of the highly specific spatial patterns such as case subdivisions, subscript columns, and intercolumns were eliminated. The many particular genre-specific formats which depend on irregular column and case proportions were eliminated in favor of a regular, even spacing of columns and lines. The principle of genre specificity was maintained in later times to the extent that lexical, administrative, or omen texts, for example, used characteristic writing conventions, but subgroups such as liver omens or astrological omens were not visually differentiated. On the other hand, the visual principle was superseded by the inclusion of written text identifiers in the subscript. Examples of these are administrative formulas like ZI-GA "debit," MU-IR_{10} "delivery"; or literary labels like *nishu* "extract," $EŠ_2$-GAR_3 "series," *pirsu* "section." This type of identification came into use already in writing stage III; archaic examples are GU_7, BA, and GI-(GI).

These changes were substantially achieved during the later archaic periods. Most of the unique writing conventions of Uruk III disappeared by the time of the archaic Ur corpus. It is unfortunate that we lack any traces of a transitional stage.

2 Techniques of Artist and Draftsman

The archaic scribes were highly visually oriented, but not with the eye of an artist. The signs they wrote were severely stylized and standardized and carried informational significance. Moreover, the writing medium, the visual plane of the tablet surface, was a tightly compartmentalized and structured unit. In all, the archaic scribes had to be able correctly to produce and recognize nearly 1200 different cuneiform signs and dozens of special tablet formats. The burden of featural information was eased for later scribes by economizing measures which reduced both the sign and format repertoires. They, on the other hand, had to handle a larger repertoire of syllabic spellings and verbal formulas.

Even though the earliest cuneiform signs were mostly pictorial representations, the scribes never had true artistic freedom to draw an object. The standard gestalt of each sign is fixed, with only limited variation permitted. As Figure 5 demonstrates, the sign SAG, "head," may be realistically drawn with clearly delineated eye, nose, and chin, but it has to be a right side-view and include both head and neck but not hair, mouth, or ears. GUD, "bull," has to be a front-on view of the animal's head only; MUŠEN "bird,"a right side-view of the whole body but without legs. DU, "to go," "to stand," a picture of an human leg and foot, may include the knee but not the toes. The directional orientation[19] of the sign is also fixed, with only occasional, sign- dependent variation. The signs BU or ŠU may be rotated 90° clockwise; SANGA 180°; but EN only through a horizontal axis outside of the plane, producing an upside-down mirror image (Figure 6). Graphic variability, of either form or orientation, occurs most frequently in Uruk IV; inverted or rotated signs are almost never to be found thereafter unless they have acquired a special meaning and distinctive phonetic value.

The size and arrangement of signs within a case also seems to have been regulated to some extent. As a rule Uruk III signs are drawn to fill the case, with neat,

Figure 5. Range of variation for selected archaic signs (examples taken from Uruk IV and III).

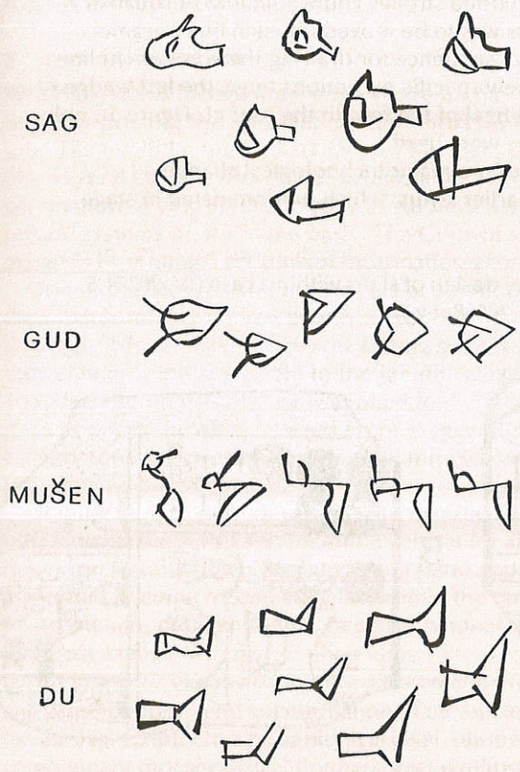


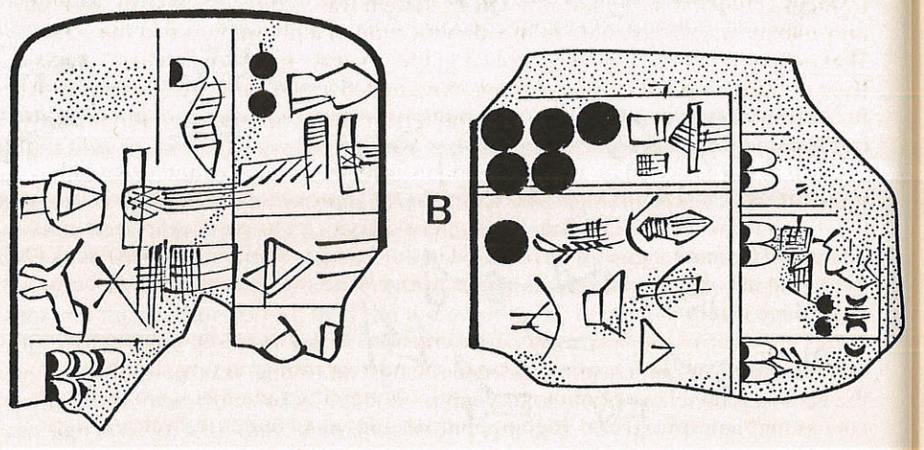
Figure 6. Sign rotations.

artistically designed packing of wedges around numerals and within the negtive space of neighboring signs. Uruk IV signs are somewhat more scattered, individually drawn, with less apparent regard for overall design. There seem to be several distinctive writing styles among the archaic Uruk tablets, however. One of these is characterized by tiny, isolated signs surrounded by large, blank spaces. Because the signs tend to look more archaic than the typical Uruk III shapes but less clumsily drawn than in Uruk IV, we have postulated that this style represents an intermediate writing stage between IV and III. It is nevertheless possible that these and other "artistic" differences, which are always difficult to assess objectively, could characterize different scribal schools or teachers, or a range of individual handwritings.[20] Examples of the Uruk III "unit design" and the "scattered" styles are shown in Figure 7. Compare also Figures 1 D left *vs* 1 D right.

Between writing stages IV and III the technique of sign production developed from drawing to writing, as the signs themselves began to change from pictures to script characters—a process that would continue for many more centuries. The "archaic" stages witnessed the breaking of long, curved lines into a series of shorter, straighter, quick strokes, as well as general reduction of curvature and detail. Whereas in stage IV a circle—a basic outline form appearing in dozens of archaic signs—might be drawn with a single, continuous stylus motion, in stage III it would be sketched with four only slightly rounded strokes and would have a squarish look. The direction in which the stylus was to be moved for each line became standardized, and eventually, a correct sequence for drawing the component lines of each sign was established. With a few specific exceptions (e.g., the last wedge of DU, drawn bottom-upwards from the heel of the foot to the toe; cf. Figure 5), only left-to-right and top-to-bottom strokes were used.

This development was accompanied by a major technological change—the redesign of the reed stylus. The earlier stylus, which predominated in stage

Figure 7. Artistic techniques. A: Spatial design of signs within a case (W. 20274.5 obv.). B: Scattered, isolated signs (W. 20568 rev.).



IV, was sharpened to a (blunt) point like a pencil. The later stylus, also used frequently in stage IV but later exclusively, was sharpened along the length of one side like a knife edge.[21] With the new stylus new manipulation techniques were also developed.

The pointed stylus can be manipulated much like a modern pen or pencil, its tip drawn or pushed across the clay surface to produce a line of fairly even thickness. Undulating lines, closed loops, and continuous outlines, typical of stage IV signs, are especially readily drawn with the pointed stylus.

The edge-sharpened stylus is pressed into the clay by a slight rotation of the hand, producing the characteristic, triangular-looking wedge "head." The "tail" of the wedge is automatically produced by the sharpened edge, or can be lengthened by a slight sweeping wrist motion. The handsome trailing-off and flowing lines of the Uruk III script are probably attributable to this technological change.

Familiarity with wedge characteristics and sign edges and fragments contributes to reading proficiency, especially when the writing is imperfect or abnormal. A modern comparison is the offhand knowledge of which letters in cursive script hang below the line or which degenerate into a series of cusps when rapidly written. Admittedly, such skill in recognition is probably more vital for the modern scholar, who is regularly confronted with tablet fragments and broken signs, than it was for his ancient counterpart.

3 Information Content

Writing systems incorporate some conventional tricks for expanding or (more often) abbreviating the information transmitted in the written text. Acronyms (JFK for John Fitzgerald Kennedy, KaDeWe for Kaufhaus des Westens) are a modern example. Several current shorthand systems also rely on abbreviated spellings, primarily elimination of vowels; many college students invent less efficient, but satisfactory, private systems on the same basis. The German system of noun capitalization expands by adding a redundant information element to the script.

One of the most frustrating aspects of attempting to study the archaic texts is their extraordinary degree of abbreviation. As described by Miguel Civil and Robert D. Biggs,[22] the archaic cuneiform writing system was a "nuclear" system, whereby only elements indispensable to the identification of a phrase figure in the script. That description was originally applied to literary texts of a later "archaic" stage (Fara period). The effect is even more exaggerated in the early archaic texts which, furthermore, are economic texts (i.e., memos) where the niceties of phrasing are irrelevant and disregarded.

Gradual introduction of additional linguistic levels of information eventually transformed the script system into a vehicle for approximating the spoken language in written form. By the Old Babylonian period about a thousand years later, this effect had become a goal, encapsulated in the Sumarian proverb dub-sar šu ka-ta sa_2-a e-ne-am_3 dub-sar-ra-am_3, "a scribe whose hand matches the mouth, he is indeed a scribe."[23]

This linguistic expansion involved the creation of new linguistic-graphemic correspondences[24] and augmentation of the nuclear root-structure shorthand of the earliest script. On a phonological level, phonemic graphemes were used to complement morpholexical (logographic) writings by phonetic indicators, or to

replace them by "syllabic" spellings. On a morphological level, previously omitted grammatical elements were expressed in the writing. Semantic level information was added by means of semantic indicators. In short, information which once belonged to the sphere of the scribe's personal familiarity with the language and writing system, information which was used by him to supplement the featural information of grapheme and text, became systematically incorporated into the visual writing system itself.

The initial stages of these developments are observable in the texts of writing stage III. The lexical lists make use of phonetic indicators and complements like ^{U_2}UGA^{MUŠEN} (bird list) and ^{GIŠ}ALIM-MA (tree list). Syllabic spellings also appear in the lexical lists, as in BALA-ZA^{MUŠEN} for later BIL-ZA-ZA^{MUŠEN}(practical vocabulary), and possibly among administrative texts in the personal names.[25] Semantic indicators are used regularly in the lexical lists and sporadically in the administrative texts. The determinatives GIŠ, KU$_6$, and MUŠEN accompany every entry in the archaic tree, fish, and bird lists, respectively. DUG, "jar," in both lexical and administrative texts, functions as a determinative but is written enclosing an inscribed sign. KI and DINGIR, indicators of geographical and divine names respectively, occur in administrative texts. There are also some uncertain examples of grammatical elements (dative-ra and genitive-ka).

Information content in a bureaucratic sense is also systematically regulated—which details of the transaction are pertinent and how they are to be recorded. As described above, tablet format plays a vital role in data organization, and certain format elements are designed for particular information categories. The subscript column is one example; sometimes several subscripts serving different functions are included, or portions of the information are repeated in separate subscripts. Another major data category is the total, required by many types of documents and sometimes organized into a series of subtotals and totals arranged in adjacent columns on the reverse.

In comparison with Uruk IV texts, those of Uruk III contain more bureaucratic detail. As mentioned above, the multiple-transaction document becomes widespread, in contrast to the prevalence of single-entry texts in Uruk IV. This could mean that many individual transactions belonging to a single office are tabulated together in a collective record, or that sublevels of a single transaction are accounted in more detail. In Uruk III the individuals involved in a transaction are more often personally identified by name and /or title; totals and subtotals are more often registered; the type of transaction, or text genre, is more often specified. These data categories, which pertain directly to the bureaucratic, administrative levels of the distribution process, appear more often in individual entries. And beyond that, they constitute the main elements of the subscript, which is also more often included as a vital, integral part of the document, either to serve as a resume or to designate a higher supervisory level of authority.

IV Interpretation: Implementation of a Technology

1 Intentional Visual Modifications

The script and text characteristics which we have described as writing "conventions" are, in many cases, purposefully designed features of the writing system. Their development represents an effort to refine or improve the already powerful and successful technology of writing. In other cases, however, some features might have arisen coincidentally, without deliberate design. We will consider these unintentional developments later, but first, we look at what more probably are intentional measures.

The fundamental system and its basic conventions were established at the outset of, or during, writing stage IV. These include representation of words or other linguistic message units by pictographic signs; impression of characters with a stylus into a flattened clay surface; specification of a conventional, limited character set; fixed sign orientation; relative patterning of numerical and pictographic signs; rectilinear subdivision of the tablet surface into columns and cases; and sequence and direction of reading cases for transmission of an extended, multi-component message or record. What preliminary stages might have preceded the mature Uruk IV writing system we cannot yet establish precisely. Surely the calculi system described by Denise Schmandt-Besserat[26] was an important predecessor. Another stage is probably represented by the tablets found at Susa, Habuba Kabira, and elsewhere including Uruk,[27] which bear impressed numerals dissimilar to those of the archaic cuneiform texts and often seal impressions but no written characters.

The Uruk III writing stage amplified the system and added many specific innovations, but in subsequent stages the range and variety of elaborations were curtailed. The repertoire of column and case patterns introduced in stage III was discarded thereafter in favor of a regular sequence of vertically ordered cases and horizontally ordered columns. Specific examples of eliminated patterns are extra-wide columns, extra-tall cases, narrow-band intercolumns, case subdivisions, and horizontally arranged rows of cases. This standardization reduced the informational significance of layout patterns. Survival of the principle of visual format, in a restricted form, has already been mentioned above.

Clustering of signs, a convention maintained in stage III, was also discarded later. Information units which previously had been clustered were written in separate cases instead. The design units which clusters sometimes form, with wedges of one sign overlapping or intruding into the negative space of its neighbors, continued to be a feature of squarish case proportions. But with narrow lines, which became common in late Early Dynastic times, cuneiform script acquired a new linearity, soon thereafter accompanied by a new convention of graph sequence and spoken morpheme sequence concord. Survival of the cluster principle is apparent, however, in word-separation and sign ligatures. It might also have contributed to the sign construction technique of inscribing one sign within another.

The visual expansion of the writing system undertaken in stage III may be understood as an attempt to discover its limits and to exploit the maximum information potential of its components. Information incorporated into the system at one level need not be reiterated at another level. Thus, what the case patterns convey need not be redundantly conveyed by signs; the unique format of a ration list precludes

the need for a label declaring "this is a ration list"; scribal knowledge of the Sumerian language counter-balances highly selective morpheme representation.

Memory capacity usually fixes the limits of a writing system,[28] especially the size of the visual character repertoire and, here, also the case pattern repertoire. The cuneiform character repertoire probably reached its limit early, for we can observe contraction and standardization already in writing stage III. Some of the modifications were primarily visually or aesthetically oriented, such as the general reduction of pictorial content and the standardization of sign form by reduction of the permissible range of variation. Other changes, like elimination of some infrequently used signs and coalescence of graphically similar signs, were more direct manipulations of the information content and the grapho-linquistic relationship.

We would view the case pattern innovations of Uruk III as recognition and exploitation of the informational potential of that component. Later contraction indicates that, like the logogram, its capacities were restricted and its limits were quickly reached.

Analogous situations arose at other stages in the evolution of cuneiform. One was the Late Uruk period expansion of the calculi system, when there was a great proliferation of incised or otherwise marked types and unique shapes. That attempt to infuse more information into the system overburdened its capacity and gave way to the more powerful recording technology of incising pictographs on a flat clay surface.[29] A second example is the Old Babylonian period experimentation with the principle of phonetization. An attempt to apply it to Sumerian, evident from the large number of "syllabic Sumerian" texts, was abandoned except as a pedagogical tool, although it had long been effectively used for the Akkadian language.

2. Intentional Bureaucratic Modifications

Bureaucratic changes are primarily localized in the information content of the texts. More information was recorded in stage III, more detail, and new categories of information. The data volume increase per text – seen in the far greater proportion of multi-entry tablets and, among these, the greater average number of entries – signifies to us an extension of the bureaucratic reach. A single-entry tablet deals with a transaction at an individual level. A collective report serves organizational efficiency by consolidating related data, and also by treating the individual client or event as a member of a larger classification.

The creation of special formats, reminiscent of modern form sheets which require data to be entered in the appropriate columns and boxes, is an example of bureaucratic routinization and standardization. The underlying demand, the development of text genres which would be repeatedly transcribed, implies general task routinization.

Transactions became larger and more complicated, involving more hierarchical levels of personnel and more departmental or distributional levels. The texts which we believe to be ration lists, which first appear in Uruk III, record as a single entry unit (subdivided case) a quantity of goods and the responsible official and, moreover, a further subdivision of that quantity among other named persons. Another type of Uruk III text lists on the obverse single allocations of gods to named persons, on the reverse a series of subtotals for each individual recipient and a total naming a different official, presumably the supervisor of the entire transaction.

While these might be receipts rather than allocations, and administrative units rather than persons, nevertheless, the point holds that several levels along a distributive chain are documented by such texts. A third type, which might reveal a network of intercoordinated departments, are annual herders' reports. These give an account of the condition of the herd but also mention cultic allocations of animals for particular temples, gods, or festivals.[30]

This is not to say that such details are absent from Uruk IV texts, but that they are more often included in Uruk III, and clerical procedures were adjusted to implement them. While the hierarchical structure might not have altered, its documentation increased; and we think that is indicative of tighter centralized supervisory control within the administration. The Uruk III texts' more frequent identification of persons by name and title, at all personnel levels, from supervisor to client or slave, might also show more direct or more authoritarian internal controls.

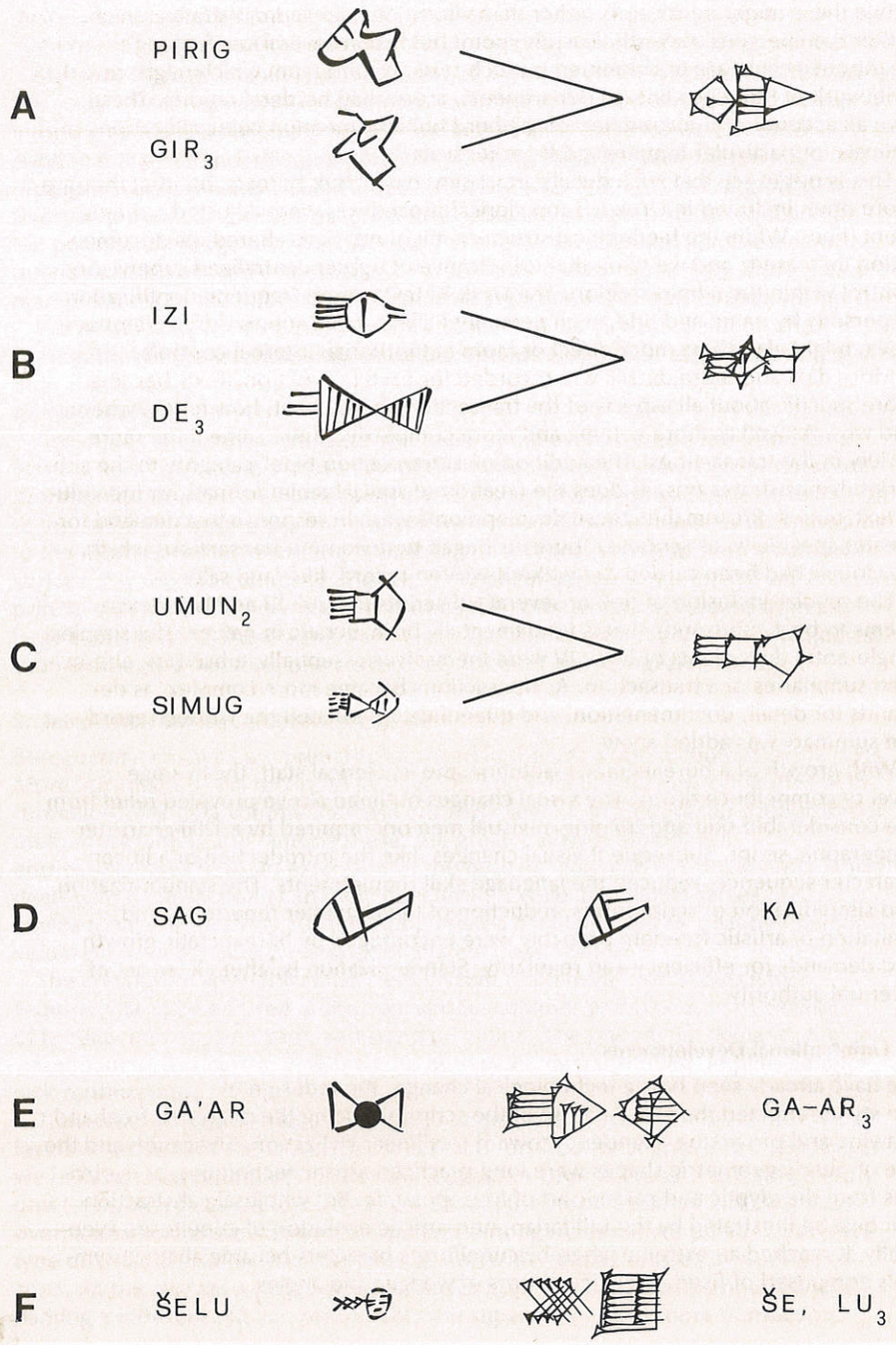
More data and more details wre recorded for each transaction. Texts became more specific about all aspects of the transaction – who, what, how much, where, and why. As well as more volume and more complexity, there came to be more variety in the transactions. The addition of a "transaction type" category to the subscript demonstrates this, as does the creation of special tablet formats for individual text genres. Presumably, these developments were in response to a demand for greater specificity, as scribes or bureaus began to document transactions which previously had been carried out without written record, like land sales.

The regular inclusion of one or several subscripts in Uruk III and later texts seems to be a conformity that is fundamentally bureaucratic in nature. The simpler single-entry documents of Uruk IV were themselves essentially subscripts, abbreviated summaries of a transaction. As transactions became more complex, as demands for detail, documentation, and quantification inflated the written record, the summary was added anew.

With growth of a bureaucratic institution and its clerical staff, the average level of competence drops. The visual changes outlined above provided relief from the considerable skill and training in visual memory required by a 1200-character logographic script. Subsequent visual changes, like the introduction of a linear character sequence, reduced the language skill requirements. The standardization and simplification of script forms, reduction of the character repertoire, and limitation of artistic freedom probably were encouraged by bureaucratic growth and demands for efficiency and regularity. Standardization is, after all, an act of a central authority.

3. Unintentional Developments

We have already seen how a technological change, the redesign of the stylus, affected the visual nature of the script, reducing the degree of freehand drawing and provoking a tendency toward rectilinear stylization. Stylization and the use of purely geometric shapes were long-practiced artistic techniques, as is obvious from the glyptic and ceramic art of Mesopotamia. But wholesale abstraction can best be illustrated by the utilitarian, non-artistic evolution of cuneiform. Eventually, it reached an extreme whereby cuneiform characters became abstract symbols composed of fixed, specific patterns of wedges and angles.



Stylization and simplification gradually remove the differentiating features of visually similar graphemes, eventually leading to their coalescence. While the original objective might have been faster writing, at some point in the evolution of cuneiform this process became recognized and adopted as an organizational principle. We would suggest that true coalescence of signs, even if gradually approached, cannot be entirely accidental. Either it is recognized and affirmed or measures are taken to prevent it. An example of the latter is the addition of differentiating features for KA, "mouth," *vs.* SAG, "head."

Examples of sign coalescence are shown in Figure 8. In these examples coalescence occurs after the Uruk III stage. We can guess at examples dating to stage III but cannot prove them because no phonetic identifications can be made for stage IV signs. In this stage the signs involved are usually both visually and semantically related. The signs GIR_3 (basic meaning of pictograph unknown) and PIRIG, "lion," originally represented by different animal heads, are visually similar signs belonging to the same wider semantic field. IZI, "fire," and DE_3, "torch," are a similar case. The original forms of SIMUG, "smith," and $UMUN_2$, "forge," carried only slight differentiating marks which were eventually eliminated.

Stylization produces an overall modulation of the sign system. Sign coalescence and differentiation have the more profound effect of altering the graphemic relationships between signs. The introduction of the phonetic principle, however, transforms the morphophonemic foundation of the system.

Reduction of one spectrum of information reduces the communication capacity of the system unless it is compensated for by amplification at another informational level. While sign simplification and coalescence might promote writing efficiency, the loss of visual featural information interferes with reading efficiency.[31] For cuneiform a solution was found in the introduction of new linguistic features into the script, most notably phonetic values. By this means, the decrease in visual correspondence between graph and meaning was compensated for by a closer phonetic correspondence. This probably worked retroactively to accelerate the divorce between visual and semantic significance and the further abstraction of sign forms. Once the requirement of the sign system to maintain a minimal level of information content was recognized, and a mode of implementation by substitution of information levels was invented, the technique was adopted as a principle for further development of the system.

Specific results (see Figure 8) include replacement of logographic signs by syllabic spellings, such as $GA\text{-}AR_3$ for earlier GA'AR, "cheese"; reinterpretation of logograms as composed of syllabic elements, such as the ligature of ŠE and "LU_3" in ŠELU (a type of metal); and polyphony (multiple phonetic values for a single sign). The addition of redundant phonetic "indicators" and purely semantic "determinatives" functions as compensation for polyphony.[32]

The substitution of syllabic writing for logographic both trims and transforms the sign system. Whereas the conceptual unit of a logographic script is the sememe,

Figure 8. Methods of script systemization. A, B, C: Coalescence. D: Differentiation E: Phonetic replacement. F: Grapho-phonetic composition of grapheme.

that of a phonetic script is the morphophoneme, a smaller, specifically linguistic unit. Although the total number of signs is reduced, the number required to write a message is increased. Thus one factor in efficiency is counteracted by another; maintenance of cuneiform as a combined logographic-syllabic system might represent a compromise between them.

Another subtle consequence of the adoption of the phonetic principle is to make the script language-bound. A logographic script can be "read" in any language. Although we doubt that any "full" script (non-rebus, more than numerical) is ever totally logographic, phonetization fixes the sign "value." As a logogram the sign NUN can be read *"nun"* in Sumerian, *"rubû"* in Akkadian, or "prince" in English; as a character of a phonetic script, however, the reading is *"nun,"* while *"rubû"* or *"prince"* can only be translations.

At other levels of the archaic writing system, uniqueness was replaced by consistency. Specialized tablet formats were replaced by regularly-spaced lines and columns. And, whereas each individual format had been associated with a particular column and case reading sequence, the regular lines were also consistently ordered. Within broad limits, and with many exceptions, there was also a trend toward consistent spelling. This is most noticeably true for Sumerian; but for Akkadian, too, in each later period and region a small, select set of basic syllabograms was preferred. With standardization, the reader lost the informationally-rich visual gestalt of Uruk III, to be confronted instead with segmented elements which he had to piece together into a coherent message. Consistency, as an ordering principle, benefitted the reader by adding featural information back to the visual form.

We have described the informational enrichment of layout patterns as a bureaucratically-guided attempt to maximize the information storage capacity of the text. The fact that this was visually oriented and reached its culmination in writing stage III gives us a clue to the relative chronology of these trends. For it contrasts with the linguistically-oriented innovations which did not develop fully until after stage III. Indeed, most of the information incorporated visually into tablet formats was later replaced by verbal formulas and labels. The total, for example, was deprived of a special spatial position, to be identified instead by a label $NIGIN_2$ or $ŠU\text{-}NIGIN_2$, "total," an important term which is exceptionally rare in the archaic documents. Predecessors to many important formulaic phrases, such as DI-TIL-LA, "completed court case," or LU_2-KI-INIM-MA, "witness," are probably likewise to be found in the archaic tablet formats. This strong shift from visual to verbal dependence was a step toward the transformation of writing from an independent symbol system to a tool for transferring speech to a more permanent storage medium.[34]

4 After Effects

We have seen how the archaic cuneiform script system was constructed and refined according to the needs of the user, and how manipulation of some features of the system produced imbalances and ambiguities which were either incorporated into the system design or counteracted by other adjustments and manipulations.

We close now with a look at some of the subtler effects of writing technology on the administrative bureaucracy and its literate clerical personnel.

One of the earliest recognizable objectives is the exploitation of the maximum data storage capacity of the texts. This is apparent, first, in the sudden sign explosion with the invention of writing, which does not seem to have been a gradual growth process; and second, in the data accretion and the cooptation of format as a system component in writing stage III. Another contrivance to enable denser packing of data was a miniaturization of the script, which seems to belong to an intermediate IV/III stage. Yet another was production of larger tablets. Such improvisation never went so far as either computer-on-a-chip size script or bookbinding, although the "tablet basket" archives and libraries of later times should perhaps be viewed as system components. Nonetheless, a maximum information capacity was quickly reached and alternative solutions had to be sought. Outstanding among these was the shift to a phonetic script basis.

The existence of a technology which can reliably preserve information facilitates the control and management of information, which is a primary task of a public administration. The socio-economic basis—a stratified society, a redistribution system, and voluminous transactions—preexisted in ancient Mesopotamia. So, too, did the demand for accountability and record-keeping, attested by the widespread use of tokens (calculi) and seals. The emergence of a large-scale, centralized, bureaucratic institution, however, might itself have been a consequence of the creation of the tools which empowered its functioning. Certainly, writing enabled the administration to grow and, through written liability, to maintain direct authority over even the lowest levels of personnel and clientele.

It is also clear from the standardization and complexity of the script system that scribal training was the province of a central, coordinating authority. With the lexical texts of writing stage III the establishment of the scribal school is confirmed. This implies the existence of a professional class of scribes removed from productive labor. We do not know from what socio-economic class archaic scribes were drawn. Since the professional title DUB-SAR, "scribe," is not attested, we may guess that the scribes of Uruk, like those of Fara and Abu Salabikh later were members of the SANGA-college of temple priest-administrators (perhaps specifically the DUB-SANGA included in the archaic list of professions: Lu List 47, 67a). In that case, they were selected from an already hierarchically ordered, exclusive class.

Mastery of any secret or esoteric wisdom confers a high status if it is viewed positively and its practitioners are integrated into the culture. The opposite, negative attitude leads to accusations of witchcraft and to social ostracism. In the case of Mesopotamia, the scribal art became the exclusive prerogative of an elite, specialist group. Moreover, the written record itself may be viewed superstitiously as a powerful object possessing a higher authority and wisdom.[35] That such seems to have been the case in ancient Mesopotamia is apparent from the Sumerian epic "Enmerkar and the Lord of Aratta," which portrays the awe inspired by Enmerkar's use of the written word in international diplomacy. Further evidence is the rapid expansion of cuneiform writing into the fields of religion and creative literature. The professional scribal college, which we have characterized in ancient times as essentially a clerical staff, developed into a literati and added to its ranks scholars, sages, and pedagogues.

Visual fixation of language patterns also influences the spoken form. Modulations of acoustic elements such as pitch or accentuation, pronunciation changes, archaizations and retardations of language evolution are attested in the history of writing.[36] While some such effects may be imagined for archaic Sumerian, such as damping of phonetic distinctions, the difficulties in reconstructing spoken Sumerian from written sources prevent serious speculation. Moreover, at that stage such effects could scarcely have infiltrated from the small, specialized literati into the wider culture. The same considerations hamper evaluation of McLuhan's theses on separation and specialization of senses, the dominance of visual experience, or the evolution of categorical and analytical modes of thought in light of ancient scripts.[37]

Acoustic ambiguities in language are not readily represented in writing, yet they formed an essential component of Sumerian creative literature.[38] Fondness for riddles, word play, rhetorical wit, and equivocation is a well-known Sumerian character trait.[39] Writing provided a new medium and opened a whole new range of opportunities for linguistic divertissement, which the ancient scribes did not overlook. Ambiguities inherent in the polyphonic graphic system, which could be avoided by various redundancy techniques, were sometimes left standing, or were even exaggerated by syllabic spellings.[40] The boredom of multiple repetitions of a phrase could be relieved by writing MIN, "ditto," instead, as was the practice of Babylonian hymn copyists—or more cleverly by inventing fancy, uncommon spellings, like the Ugaritic scribe who managed to use four different spellings in five occurrences of one phrase within eighteen consecutive lexical entries.[41] Finally, entirely new, esoteric language games based on a visual system were developed, like acrostics,[42] visual puns, and parodies of written literary genres.[43]

1. Study of the Uruk tablets is sponsored by the Deutsche Forschungsgemeinschaft under the grant title "Archaische Texte aus Uruk," directed by Hans J. Nissen, Berlin. I thank Marvin A. Powell, Jr., for reading and commenting on preliminary drafts of this article. Photographs courtesy of the Deutsches Archaeologisches Institut.

2. Examples are KAŠ/KIŠ, LU/LU$_3$, SUHUR/SAHAR.

3. Samuel Noah Kramer, *The Sumerians: Their History, Culture, and Character* (1963) Appendix A; David Diringer, *The Alphabet: A Key to the History of Mankind* (1948); I. J. Gelb, *A Study of Writing* (1963); George L. Trager, "Writing and Writing Systems," in Thomas A. Sebeok, ed., *Current Trends in Linguistics,* vol. 12: *Linguistics and Adjacent Arts and Sciences* (1974).

4. Gelb, *Study of Writing,* 10ff. Frank Smith, in "Alphabetic Writing—A Language Compromise?," *Psycholinguistics and Reading* (1973) 117 ff., points out that the phonetic principle, particularly alphabetic script, benefits the writer more than the reader. "The fact of there being any relationship at all between the written form of language and its sound may be one of the major concessions made by readers to writers" (117).

5. George A. Miller, *The Psychology of Communication: Seven Essays* (1967) 6ff., 37ff.

6. H. J. Chaytor, *From Script to Print: An Introduction to Medieval Vernacular Literature* (1945) 9f.; Frank Smith, *Understanding Reading: A Psycholinguistic Analysis of Reading and Learning to Read* (1971) 76f.

7. Kenneth C. Laudon, *Computers and Bureaucratic Reform: The Political Functions of Urban Information Systems* (1974) 25; James D. Thompson and Frederick L. Bates, "Technology, Organization, and Administration," *Administrative Science Quarterly* 2/3 (Dec. 1957) 340.

8. I. M. Diakonoff, "The Rise of the Despotic State in Ancient Mesopotamia," *Ancient Mesopotamia, Socio-Economic History: A Collection of Studies by Soviet Scholars* (1969) 173ff.; Horst Klengel, "Einige Bemerkungen zur sozial-ökonomischen Entwicklung in der altbabylonischen Zeit," *Acta Antiqua Academiae Scientiarum Hungaricae* 22 (1974) 249ff.; Thorkild Jacobsen, "Early Political Development in Mesopotamia," *Toward the Image of Tammuz and Other Essays on Mesopotamian History and Culture* (1970) 132ff.

9. Åke W. Sjöberg, "The Old Babylonian Edubba," in Stephen J. Lieberman (ed.), *Sumerological Studies in Honor of Thorkild Jacobsen on his Seventieth Birthday, June 7, 1974* (1975) 168f.

10. Laudon, *Computers and Bureaucratic Reform,* 30.

11. Systematic revisions of the writing system and other bureaucratic tools are well known in later Mesopotamian history; for example, Šulgi's revision of the calendrical and metrological systems (Ur III period) or the creation of the purely literary Standard Babylonian dialect (Kassite period). For these see E. Sollberger, "Sur la chronologie des rois d'Ur et quelques problèmes connexes," *Archiv für Orientforschung* 17 (1954-6) 17ff; W. G. Lambert, *Babylonian Wisdom Literature* (1960) 14.

12. Marshall McLuhan, "The Effect of the Printed Book on Language in the 16th Century," in Edmund Carpenter and Marshall McLuhan (eds.), *Explorations in Communication: An Anthology* (1960) 131. See also McLuhan, *The Gutenberg Galaxy: The Making of Typographic Man* (1965) 229ff.; Chaytor, *Script to Print*, 53; Gelb, *Study of Writing,* 223ff.

13. McLuhan, "Effect of the Printed Book"; *idem, Gutenberg Galaxy.* But now, against this thesis, see Elizabeth L. Einstein, *The Printing Press as an Agent of Change* (Cambridge, 1979).

14. These statistics are approximations based on those texts which are well enough preserved for an accurate estimation of column and case layout and for which a photo is also available. This includes approximately 400 of the published Uruk IV tablets in A. Falkenstein, *Archaische Texte aus Uruk* (1936) plus 500 unpublished Uruk IV tablets and 200 unpublished Uruk III tablets. A possible bias in the sample might be overrepresentation of smaller tablets, since these tend to survive intact and to permit pattern recognition even from a broken fragment. The relatively large number of Uruk IV texts, and especially single-entry texts, is a sign that this bias is indeed present.

Very generally stated, the published and unpublished Uruk IV tablets are equivalent samples. The published corpus does have a larger number of tablets with a single entry (44% *vs* 23% of the unpublished) and tablets with one entry on each

obverse and reverse (26% of those inscribed on both sides *vs* 6% of the unpublished). One hundred twenty tablets from Jemdet Nasr, published by Stephen Langdon in *Pictographic inscriptions from Jemdet Nasr* (Oxford Editions of Cuneiform Texts VII, 1928), without accompanying photos, have been used for comparison. But because these texts show unique characteristics which are as likely to represent local scribal practices as chronological changes, the Jemdet Nasr data are given only parenthetically.

15. We conjecture, but are not able to prove, that these are "ration lists."

16. See M. W. Green, "Animal Husbandry at Uruk in the Archaic Period," *Journal of Near Eastern Studies* 39 (1980) 1ff.

17. Langdon, *Pictographic Inscriptions,* nos. 67, 83, 99, 100.

18. Bottom-edge rotation is the rule in the archaic texts, but there are exceptions. While some of these seem due to simple misjudgement by the scribe of how much space was required, others do appear to be significant; rotation might function as a specific writing convention. See A. A. Vaiman, "The Formal Characteristics of Proto-Sumerian Texts," *Vestnik Drevnĭ Istorii* 119 (1972/I) 127ff.

19. Cuneiform signs were standardly written 90° counterclockwise from what would be the normal viewing position of the object depicted. However, at what writing stage this practice began remains an unanswered question. Although archaic signs are usually copied in the rotated position (for better comparison with later graphic shapes), most scholars believe that throughout the early archaic periods the signs were written upright (or perhaps written at an angle but read upright). Falkenstein proposed a date shortly after the time of the Fara texts for the change, but Anton Deimel considered it to have predated the Fara texts. See Falkenstein, *Archaische Texte aus Uruk* p. 11; Deimel, *Liste der archaischen Keilschriftzeichen* (1922) 13. Sergio Angelo Picchioni presents a fresh review of this problem, bringing in new evidence from Ebla and offering convincing arguments for an even later date, in "La direzione della scrittura cuneiforme e gli archivi di Tell Mardikh-Ebla," *Orientalia* n. s. 49 (1980) 225ff. In our work we have maintained the assumption that the Uruk IV tablets are already written in the standard, rotated position. We have suspected, further, that a pre-rotated stage could be represented by a few tablets assigned to Uruk IV. These include Falkenstein, *Archaische Texte aus Uruk*, nos. 1-6, for which Falkenstein (p. 11 n. 2) already noted this possibility, Figure 1A here, and about ten other unpublished tablets of similar appearance.

20. We are trying to establish graphic and chronological criteria for differentiating these writing styles. Our results will be published in detail elsewhere.

21. L. Messerschmidt, "Zur Technik des Tontafel-Schreibens," *Orientalische Literatur-Zeitung* 9 (1906) 185ff., 304ff., 372ff.; Deimel, *Liste der archaischen Keilschriftzeichen*, pp. 9ff. For a different idea about the stylus see Falkenstein, *Archaische Texts aus Uruk,* pp. 5ff.

22. "Notes sur des textes sumériens archaiques," *Revue d'Assyriologie* 60 (1966): 12ff.

23. Sjöberg, "Old Babylonian Edubba," p. 170. The Sumerian text does not distinguish between speed and accuracy.

24. See the graphemic typology outlined by Miguel Civil, "The Sumerian Writing System: Some Problems," *Orientalia* n.s. 42 (1973) 21ff. As yet, no P(hono-logical)-level graphemes have been identified in the Uruk IV script.

25. AD-DA, Langdon, *Pictographic Inscriptions,* no. 51 ii 2.

26. See the contribution by Schmandt-Besserat in this volume and "The Earliest Precursor of Writing," *Scientific American* 238 (June 1978) 50ff.; "An Archaic Recording System and the Origin of Writing," *Syro-Mesopotamian Studies* 1/2 (1977) 31ff.; "An Archaic Recording System in the Uruk-Jemdet Nasr Period," *American Journal of Archaeology* 83 (1979) 19ff.

27. Alain Le Brun and François Vallat, "L'origine de l'écriture à Suse," *Cahiers de la Délégation Archéologique Française en Iran* 8 (1978) 18ff., pl. 4; Harvey Weiss and T. Cuyler Young, "The Merchants of Susa: Godin V and Plateau-Lowlands Relations in the Late Fourth Millenium B. C.," *Iran* 13 (1975) 8ff.; A. Nöldeke, *Vorläufiger Bericht über die von der Notgemeinschaft der Deutschen Wissenschaft in Uruk unternommenen Ausgrabungen* 5 (1934), pl. 14 b, d; D. Sürenhagen and E. Töpperwein, "Ḥabuba Kabira (Ḥububa Kabira) Herbstkampagnen 1971 und 1972 sowie Testgrabung Frühjahr 1973: Kleinfunde," *Mitteilungen der Deutschen Orient-Gesellschaft zu Berlin* 105 (1973) 21, nn. 19f.

28. Albert Upton, "On the 'Matter' of Freshman English," in Lee Thayer (ed.), *Communication: General Semantics Perspectives* (1970) 333. This fact underlies the "principle of economy" enunciated by Gelb, *Study of Writing,* p. 251.

29. Schmandt-Besserat, "An Archaic Recording System in the Uruk-Jemdet Nasr Period," pp. 22ff.

30. Green, "Animal Husbandry," p. 8.

31. In written, as in spoken language, ease of production varies inversely with ease of discrimination; Smith, "Alphabetic Writing," pp. 117f.

32. Gelb, *Study of Writing,* pp. 103ff.

33. Smith, "Alphabetic Writing," p. 120. Smith's valuable notion of proficient reading and writing as fundamentally logographic processes (p. 124) seems to be contradicted by evidence from recent neurological studies. See S. Toulmin, "The Mozart of Psychology," *New York Review of Books,* Sept. 28, 1978, pp. 51ff. (review of L. S. Vygotsky, *Mind in Society: The Development of Higher Psychological Processes* and M. Cole [ed.], *Soviet Developmental Psychology: An Anthology*).

34. Gelb, *Study of Writing,* p. 12.

35. Even in a basically non-literature culture: Albert B. Lord. *The Singer of Tales* (1965) 109, 137f.; McLuhan, *Gutenberg Galaxy,* p. 144.

36. Gelb, *Study of Writing,* pp. 223ff.; Chaytor, *From Script to Print,* p. 3; McLuhan, *Gutenberg Galaxy,* p. 231.

37. Several aspects of McLuhan's powerful insights into the nature and significance of writing seem applicable to cuneiform, although that itself contradicts his basic tenet as to the uniqueness of alphabet and print. Visual fixation, linguistic analysis resulting in segmentation of language flow, translation of sound into sight, and compartmentalization are all present in the earliest decipherable pre-alphabetic script systems. Moreover, the ideolectic construction of larger logographic symbol systems for reading, and integrated movement sequences for writing, as proposed

by Frank Smith and others, diminishes the intellectual importance of alphabetic or typographic characters.

38. Note especially the story of the Babel of Tongues in "Enmerkar and the Lord of Aratta," Inanna's enigmatic message in "Lugalbanda," and the repartee of the debates and dialogues.

39. Bendt Alster, "Paradoxical Proverbs and Satire in Sumerian Literature," *Journal of Cuneiform Studies* 27 (1975) 201ff.; *idem*, "A Sumerian Riddle Collection," *Journal of Near Eastern Studies* 35 (1976) 263ff.; Robert D. Biggs, "Pre-Sargonic Riddles from Lagash," *Journal of Near Eastern Studies* 32 (1973) 26ff.; Miguel Civil, "The Anzu-Bird and Scribal Whimsies," *Journal of the American Oriental Society* 92 (1972) 271; *idem*, "From Enki's Headaches to Phonology," *Journal of Near Eastern Studies* 32 (1973) 57ff.; Benjamin R. Foster, "Humor and Cuneiform Literature," *Journal of the Ancient Near Eastern Society of Columbia University* 6 (1974) 69ff.; Edmund I. Gordon, *Sumerian Proverbs: Glimpses of Everyday Life in Ancient Mesopotamia* (1968).

40. Examples are given by Civil, "Anzu-Bird."

41. Ras Shamra Recension A of Har-ra = *hubullu* XX-XXII (B. Landsberger, et al., *Materials for the Sumerian Lexicon* 11 [1974] 42ff.): *bir*$_x$ (BUR$_5$)-*ti* (ii 61′, iii 8), *ša bi-ir-ti* (iii 2), *šá bir*$_5$-*ti* (iii 4), *šá be-ri-ti* (iii 6).

42. "The Babylonian Theodicy," Lambert, *Babylonian Wisdom Literature*, pp. 63ff. The textual organization of Sumerian proverb collections is according to the initial sign, even though the phonetic value varies.

43. E. Sollberger, "The Rulers of Lagaš," *Journal of Cuneiform Studies* 21 (1967) 279ff.; cf. the "Monkey Letter," interpreted by M. Powell as a parody of a formal business letter: "Ukubi to Mother . . . The Situation is Desperate," *Zeitschrift fur Assyriologie* 68 (1978) 173.

Carol F. Justus

Visible Sentences in Cuneiform Hittite

On the premise that horizontal Hittite scribal rulings be taken seriously as punctuation, this study investigated their content and found that in fact they punctuate a structure similar to the periodic sentence in older Greek and Latin. As such they are to be compared with the oldest (alphabetic) Greek mark of punctuation, the paragraphos, *which begins to be replaced in Alexandrian Greek by marks which segment the language on the basis of prosodic features, as in English. Hittite "visible sentences," moreover, signal in visual form underlying differences in language structure and cohesive basis which can be correlated with differences in word order type and changes which the genetically related Indo-European (IE) languages have undergone over a period of c. 4000 years of written attestation.*

0.0 Introduction

Written English demands today for interpretation conventions of punctuation which were not imposed on Englishmen as late as Chaucer, Shakespeare, or even Noah Webster. Use of comma, period, and quotation mark, question mark, or exclamation point makes visible in writing the intonations of voice pattern which distinguish a completed assertion from a question, command, or half-finished sentence. As the linguist Charles Hockett (1958:33ff.) noted, a simple sentence like "I'm going home" has many interpretations depending on the speaker's intent. While the words, when segmented into separate units, retain their original semantic values, nonsegmental voice inflection or prosodic features create important distinctions of their own.

Most work on the Hittite writing system focuses on phonetic interpretation of the script or dating of its form. Hittite phonetic forms, however, clearly underlie both syllabic and logographic spellings. This study, then, concerns itself not so much with the signs of the script as with the auxiliary scribal marks which visually represent speaker intent and sentence structure in the language. Analysis of the structural content in units formed by horizontal scribal rulings, by contrast with that of English sentences, leads to the conclusion that the bases of cohesion marked by English periods differ from those marked by scribal rulings. The differences, morever, correlate with systematic differences in word order patterns and rhetorical construction already noted by linguists (Greenberg 1966; Lehmann 1973, 1974; and others) and classicists (Weil, discussed by Justus 1981a).

The perspective here, while historical, is not in any sense evolutionary. Although punctuation using comma, period, and capital letters did undergo evolutionary development from its beginnings with the third century BC Alexandrian scholar, Aristophanes of Byzantium, up through recent codification in manuals of style (see below), scribal rulings on cuneiform tablets were already punctuating written

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language in Hittite texts as early as the seventeenth century BC (earlier elsewhere: Green, this volume). Written language thus knew punctuation before its earliest Greek use. But Greek strategy itself changed well after the development of the alphabet. Developments in the use of comma, period, and capital letters in fact are chronologically contemporary with changes in structure in the Indo-European (IE) languages, changes as dramatic as loss of case endings on the noun, loss of verbal inflection, and shifts in basic word order patterns (Lakoff 1972), as well as shifts in rhetorical order (Justus 1981a:446-9). Change here is thus change between typologically variant systems, not development out of early origins, nor even changes correlated with the writing down of language, as the patterns of Hittite scribal ruling go back to a written tradition that precedes it by over a millennium (Powell, this volume). Assuming that the basis of modern English punctuation is established, the focus here turns to the earlier system.

First, I sketch the textual and linguistic context of the study and illustrate the problems using as example the first account of aphasia in history, a text which purports to be the King's own story of his speech loss, but which may well have had the more practical function of illustrating well-formed Hittite sentence structures.

Next I address the issue of sentence structure in language and its visible definition in Hittite writing. Crucial are criteria for identifying minimal cohesive structures and the basis of cohesion. Criteria of quite separate kinds (ruled units and quoted speech units) lead to the hypothesis that grammatical cohesion within the clause, but pragmatic cohesion between clauses, characterizes Hittite sentences. By contrast, English cohesion within the clause is based on pragmatic subject-predicate relations, but between clauses on grammatical subordination classified in terms of noun-verb relations (substantive or adverb clauses) and noun modifying relations (relative clauses). The Hittite strategy is the reverse of that in English – not a less complicated form – and repeats itself in a nonrandom way which has parallels outside Hittite.

I conclude that visible Hittite sentences elucidate a typologically different principle of cohesion in language.

1.0 Context of the Study

1.1 Cuneiform Hittite

The corpus of Hittite documents comes from the period c. 1650-1200 BC almost entirely from Hattuša in Central Anatolia, which was the capital of the Hittite kingdom throughout this era (Otten 1964:17 with note 29; CTH 267 and ix). Hittite scribes wrote a Mesopotamian type of cuneiform on clay tablets. While the oldest cuneiform tablets yet found in Hittite territory are records of Assyrian merchants from the nineteenth-eighteenth centuries BC, the Hittites ultimately adopted a Babylonian style of writing, not the Old Assyrian form of the script. Because they borrowed this script from an established literary source, it presupposed a minimal knowledge of Akkadian and some acquaintance with Sumerian (Goetze 1957:17lf.). Lexical texts (StBoT 7; CTH 47-53), Akkadian-Hittite bilinguals and trilinguals in Sumerian-Akkadian-Hittite (Cooper 1971; Justus 1981:0.4), as well as translation literature (CTH 53f.; 145-8) attest to the multilingual training of a Hittite scribe.

Texts in cuneiform Hittite include genres as diverse as laws, annals, edicts

and testaments, treaties, letters, hymns and prayers, procedural instruction, court testimony, rituals, and literary texts (CTH 1971; CTH 1972), as well as the bilinguals, lexical texts, and translations into Hittite from Akkadian such as omens (StBoT 9) and oracles (THeth 7; THeth 6) or medical texts (StBoT 19). Since scribes often signed the texts they wrote, we can often distinguish their family, period, and ethnicity (Laroche 1949).

Current philological and paleographical work is attempting to date individual tablets to periods of Hittite history, assigning them to linguistic categories Old Hittite (OH: c. 1700-1500 BC) and New Hittite (NH: with earlier and later periods, Kammenhuber 1969a passim), or to historical and paleographical periods OH (c. 1700-1500 BC), Middle Hittite (MH: cf. Košak 1980:34ff. with references; c. 1450-1380 BC), and NH (c. 1380-1200 BC: Suppiluliuma I to the destruction of Hattuša). Paleographical studies distinguish choronological periods on the basis of handwriting, isolating first an OH ductus as opposed to NH forms for writing the signs, the latter contrasting with a "relatively old" or MH script form (StBoT 20; KBo 21 introduction, nr. 15-21). Ongoing dictionary projects reflect both the linguistic division between OH and NH (HW^2) and paleographic distinctions among OH, MH, and NH (CHD), while text editions illustrate linguistic characteristics by genre and period (e.g., THeth 6: NH oracle language; StBoT 8 and 12: OH rituals; StBoT 13: NH ritual). Beside lexical, grammatical, and paleographical material found in text editions and dictionaries, standard grammars (Friedrich 1960; Kammenhuber 1969:119-357; Kronasser 1956; 1966) and hand copies of texts (KUB, KBo, etc.: CTH ix) constitute essential reference tools.

1.2 Genetic Relations

Jakob Grimm (Lehmann 1967:71ff), long before the decipherment of Hittite (Gurney 1952:8ff; Ceram 1956:71ff), showed that systematic correspondences in sound between Germanic on the one hand and ancient Greek, Latin, and Sanskrit on the other reinforced the opinion of earlier scholars that these languages all sprang from an original, no longer existing protolanguage. Similarities among words for basic kinship relations like "father" (Latin and Greek *patēr,* Sanskrit *pitar-*), "mother" (Latin and Greek *mātēr,* Sanskrit *mātar-*), "brother" (Latin and Greek *frātĕr,* Sanskrit *bhrātar-*), body parts like "foot" (Latin *ped-*, Greek *pod-*, Sanskrit *pad-*), numerals like "two" (Latin and Greek *duo,* Sanskrit *dva*), and "three" (Latin *trēs,* Greek *treis,* Sanskrit *trayas*), or celestial phenomena like "sky, cloud" (Latin *nebula,* Greek *nephelos* "cloud," Sanskrit *nabh-*) are thus not coincidental (Lehmann 1973:21ff). Hittite scholars like Bédrich Hrozný, Holger Pedersen, and Edgar Sturtevant were quick then to order Hittite *pedan* "place" and *nepiš-* "sky, heaven" among other forms which showed that Hittite was systematically related to the other older IE languages. As a result, IE etymological dictionaries like Buck (1949) and Pokorny (1959) now include Hittite forms beside those of the other IE languages.

More recently, comparison of the cultural system which results from linguistic reconstruction of terms like those for "horse," "vehicle," and "bronze," combined with prehistoric archaeology, suggests that the Proto-IE homeland once stretched across the river valleys north of the Black Sea, the Caucausus Mountains, and the Caspian Sea c. 3400-2500 BC or earlier (Gimbutas 1974; 1977). Among earliest migrations out of the homeland was that of the Hittites, whose kings ruled the Hatti

land and whose scribal school produced texts c. 1650-1200 BC, texts which include Indo-Iranian personal names in treaties and technical terms in horse training texts of the fourteenth century BC, texts all written in Hittite (Kammenhuber 1961). Unlike their Mycenaean Greek cousins who left administrative texts in quite another script (Linear B) on Crete and mainland Greece (c. 1450-1250 BC: Chadwick 1967), the Indo-Iranians are next heard from in the oral religious tradition of the Vedas, which were not written down before c. 600 BC (Macdonell 1916:2; Burrow 1973:3).

Of the languages preserved in texts from the Hittite capital, two (Hattic and Sumerian) are genetically unrelated to any well-studied family, despite attempts to relate Sumerian to Chinese, Hungarian, and IE. A third, Hurrian, has certain affinities with eighth century BC Urartian (Laroche 1978:14f.). Despite the literary prestige of Semitic Akkadian, it is the IE language family which is the most securely represented. Hittite and its sister languages Palaic (Kammenhuber 1959; 1969; StBoT 10) and Luwian (with hieroglyphic Luwian continuing in the South after the destruction of Hattuša until the eighth century BC: Hawkins et al. 1973:146), together with the later Lydian (7th-4th centuries BC: Gusmani 1964:17-9, but Heubeck 1969:358f.), constitute the Anatolian branch of the family (Kronasser 1956:12ff.; Kammenhuber 1969:119ff.), recording events in Anatolia from c. 1700 BC to the Hellenistic period.

1.3 Typological Relations

Morphologically, Hittite is synthetic, using inflectional endings on nouns and verbs to express grammatical relations which English expresses with word order or prepositions. As in older IE generally, roots are fused with the suffix obscuring the boundary between the two. English archaic forms like "deep:depth" and "high:height" retain relics of the older pattern beside newer "deep:deepness" (Sapir 1949 [1921]:129ff.). Hittite word order patterns of the second millennium BC are fundamentally different from those of the modern western IE languages. The basic Hittite "sentence" has subject, object, verb order (verb final order) as opposed to the subject, verb, object order of English (verb initial: Lehmann 1976a:5ff.; 15ff.; 1973:46ff.). Other patterns, despite certain inconsistencies that increase in time in IE (Lehmann 1974; Justus 1980), bear out the implicational relations of having the object precede the verb (Greenberg 1966). For example, Hittite has postpositions instead of prepositions, the infinitive and other nonfinite verbals precede the main verb (cf. 6, 6 and 11, 3 below), and the standard precedes the adjective in the comparison of inequality ("John-from tall" not "taller than John"; Justus 1981:8.2).

Genetically unrelated Anatolian neighbors of Hittite vary widely in type from Hurrian with verb final order (Bush 1964 with references) to Hattic with preverbal negation and other preverbal modifiers (Kammenhuber 1969b:503ff.; 532; 542f.) as well as prefixes for case and possessive pronouns (*ibid.*, 468ff.; 534f.), clearly not verb final characteristics. Mesopotamian literary languages show modified verb final patterns – Sumerian more so than Akkadian – while political powers in Egypt and Canaan with whom the Hittites corresponded had verb initial languages (Gardiner 1957:34, 412ff.; Justus ms.). Within IE, Indic languages like Bengali and Hindi, in contact with verb final Dravidian languages in India, have retained much of the verb final character of the proto-language,[2] while Irish has become verb initial (Schmidt 1980:188ff.; Greene 1977:21ff.), similar in word order to Old Egyptian (cf. above) and Easter Island (Justus 1980:190f. with references). Verb final languages in Anatolia are

unlikely to be responsible for Hittite word order, as the Anatolian substratum, with Hattic case prefixing and with verb final Hurrian, included both verb initial and verb final models. That other IE languages retain similar relics points to a genetic explanation for verb final Hittite patterns (Lehmann 1974).

1.4 The Script

The Hittite adaptation of Mespotamian cuneiform uses signs that are unambiguously linear, left to right, based on an Old Babylonian form of the script (Friedrich 1960:21-5; Kammenhuber 1969:161ff.; Kronasser 1966:3ff.; Jucquois 1972:62ff.). Consequently, the case division of Old Sumerian texts (Green, this volume) has given way to regularized vertical rulings to separate columns on the tablet, with horizontal rulings to indicate divisions in content within the column. Genres of texts, with the exception perhaps of lexical texts, are not visually distinct but usually distinguished by text introduction. Cuneiform signs represented, however imperfectly, the phonetic speech of the Hittite scribe, with signs used in the three ways conventionally termed logographic, syllabographic, and determinative (Gelb 1963:99ff.; 105ff.; Güterbock 1951:141ff.).

Logograms stand for entire words (a single sign for *šiunaš* "of (the) god" e.g.); syllabograms spell words phonetically, syllable by syllable (e.g., *ši-u-na-aš*), or in combination with logograms often analyze root and grammatical ending (e.g., single sign for base root *šiu(n)-*, plus a sign *-aš* as phonetic complement for the genitive case of the word). Logograms in Hittite texts are of two kinds, those transliterated with capital letters for the Sumerian phonetic value (e.g., DINGIR "god") and those transliterated with italicized capitals to represent Akkadian phonetic sequences (Figure 1). Transcriptions of the basic "god" sign as Sumerian DINGIR, Akkadian *I-LU-UM* (nonimative singular as opposed to genitive and accusative), but underlying *šiuš* (StBoT 18, 122ff.: nominative singular among other possibilities; cf. Figure 1, 1) are conventions of modern scholarship which reflect scribal use of the three literary languages. The educated scribe exploited his trilingual knowledge as ingeniously as alphabetic use does numeral signs (1, 2, 3) which have underlying phonetic forms "one, two, three" in an English text, "un, deux, trois" in French, but

Figure 1. Logograms

Sign		Sumerian *phonetic value*	Akkadian *phonetic value*	Hittite *phonetic value*	Meaning
1.		dingir	*ilu(m)*	šiuš	"god" (nom.)
			ila(m)	šiunan	"god" (acc.)
			ili(m)	šiunaš	"god" (gen.)
2.		an	*šamû*	nepiš	"heaven" (nom.)
			šamê	nepišaš	"heaven" (gen.)
3.		ud	*ūmu(m)*	šiwatt-	"day" (root)

"eins, zwei, drei" in a German text, or the form "2nd" with phonetic complement *-nd* to indicate that "2" stands for phonetic "second," not "two". The parallel is not exact, but in the context of borrowed Latin forms like *et cetera*, it comes close to principles behind Hittite adaptation of cuneiform. However the scribe chose to "spell" (e.g., *I-LI-IM* or *I-LIM,* even DINGIR-*LIM* for *šiunaš*), his writing stood for underlying Hittite phonetic forms, whether modern scholars know what the form is or not. Writings like DINGIR-*LIM*-aš (cf. Figure 2) with both Akkadian and Hittite phonetic complements confirm the fact that genitive *šinuaš* is meant. Multiple copies of the same text, moreover, make the equivalence conclusive.

A complication of the system stems from the use of the same logogram for more than one phonetic value. The Sumerians, for example, could read the "god" sign as AN (Figure 1) to mean "heaven, sky," a use which the Akkadians and Hittites took over using it for Akkadian *ŠAMÛ* "heavens" or *ŠAMÊ* "of the heavens," Hittite *nepišaš* (NH genitive singular or plural: Friedrich 1960:57).

It is the distribution of the sign with other signs which disambiguates its function as logogram, syllabogram, or determinative. Determinatives, placed before nouns, signal noun class (Powell, this volume). The single vertical wedge precedes a male proper name, URU city names, and DINGIR names of deities, both male and female. As logogram, the "day" sign (Figure 1) has Sumerian reading UD, Hittite *šiwatt-* (root without case ending). Preceded by the "god" sign, the "day" sign is read UTU in Sumerian, Akkadian *ŠAMAŠ,* or with phonetic complement *-uš,* Hittite-Hattic *Ištanuš* (Figure 2) referring to the male Sungod (Laroche 1947:25).[3] With Akkadographic complement *-ŠI* (Figures 2 and 3), the sequence "god" plus "day" refers to a specific use of "Sungod" as royal title: Akkadographic ^{d}*ŠAMŠI,* translated with varying degrees of idiomacity as "the (divine) Sun" or "his Majesty," to be compared with the Egyptian Pharaoh who was descended from the Sungod Re, a title which Louis XIV *le roi soleil* immortalized in modern times.

Besides logographic and determinative use, the same sign, with different distribution was used syllabically. The syallabic value of the "god" sign was *-an* as in ^{uru}*Ha-at-tu-ša-an* (Figure 2). To the degree that determinatives (as auxiliary marks) facilitate phonetic interpretation of the context as a whole (Gelb 1963:103 passim),

Figure 2. Sign Distribution

Sign Sequence	Sign Transliteration	Hittite Transcription	Interpretation
1. 	^{d}UTU-uš	Ištanuš	^{god}SUN-nominative
2. 	^{d}UTU-*ŠI*		^{god}SUN-MY
3. 	DINGIR-*LIM*-aš	šiunaš	"of [the] god"
4. 	^{uru}Ha-at-tu-ša-an	Hattušan	Hattuša-accusative

they might be compared with English capitalization of proper nouns and German capitalization of all nouns. Besides determinatives, the *Glossenkeil,* one or two tilted wedges written before a foreign word or technical term (Goetze 1957:5 with note; StBoT 4, 16; 79; HW 330-4), was another auxiliary mark. One might compare use of italics or quotation marks with single words in English.

While Hittite scribes borrowed many distributional patterns along with the phonetic values for signs, the Hurrian-initiated convention known as Sturtevant's Rule is new. Sturtevant argued that Hittite scribes disregarded the Babylonian voicing rules for syllabic signs containing the consonants p/b, t/d, k/g and used single spelling of the bilabial stop /p/ in *ne-pí-ša-aš* "of heaven" for voiced /b/ (cf. comparative IE forms, Latin *nebula* "cloud," Sanskirt *nabh-*), but double spelling as in *a-ap-pa* "after" for voiceless /p/ (cf. Jucquois 1972:86-125 with references). English spelling, too, is often conventional as when final -e after a single consonant indicates preceeding "long" (diphthongized) vowel as opposed to a short, undiphthongized one ("mite:mit, site:sit, bite:bit, hope:hop, note:not").

1.5 Tablet Space and Script

As elsewhere from the second millennium on, the cuneiform Hittite scribe might use vertical lines to separate the left hand column from the one or more columns to the right on the front of the tablet, but because of the peculiarly cuneiform convention for turning the writing surface over (Powell, this volume), the columns of the back were ordered from right to left. Typical is the NH text which tells of the aphasia of one of the greatest royal heroes, Muršili II (c. 1339-1306), and the ritual prescribed for it (Figure 3). The tablet (KBo IV 2) contains two texts. One, the ritual of Huwarlu involving birds, takes up the front and first 39 lines of the first column on the back, Rs. III, the column on the right. Both vertical and horizontal rulings segment the tablet. Double verticals separate the last column, Rs. IV on the left, from Rs. III, while double horizontals with wedged left ends mark the boundary between the preceding ritual and the Aphasia text (Rs. III 39-40). Signs from the fifth ruled unit of the Aphasia text (back left) have spilled over into the space between columnar rulings which separate it from the beginning of the text in Rs. III (cf. *-an* of *GIMan* and *-ya* of *keldiya*).[4]

Signs depend for clarity on the smoothness and state of preservation of the clay surface. In Figure 4 the angle of the shadow is crucial, because of the three dimensional character of the script (cf. Powell, this volume). Clearly visible here under the double ruling before Rs. III 40 are signs *UM-MA*, determinative (god), logographic UTU with Akkadographic *-ŠI,* determinative (male name), and *mur* of Muršili[5] (Figure 5).

Like first lines of texts elsewhere in Hittite, *UMMA* ^{d}*ŠAMŠI* ^{m}Muršili LUGAL.GAL "Thus (speaks) the Sun, Muršili, the Great King" is a formula for introducing the text as the quoted speech of the King, a style borrowed with the script. Prototypical is the address in a letter like that found at Alalah (nr. 125, lines 1-2: Rost 1956:340ff.): *UMMA* LUGAL-*MA ANA* ^{m}Pirwannu *QIBI-MA* "Thus [speaks] the King: say [as follows] to Pirwannu."

Hittite scribes sometimes find it convenient to maintain the cuneiform equivalence, one line equals one clause (cf. Green, this volume; in Hittite StBoT 13, I 9-11; Aphasia KBo IV 2 III 49; IV 37; IV 40; IV 41), but the rule is to abandon it.

Güterbock's (1951:141ff.) comparison of the Song of Ullikummi line/verse units with Ugaritic texts exemplifies the Hittite scribe's deviation from cuneiform tradition in use of line space. One might further compare the Hittite version of Ullikummi with Homeric grammatical clause distribution over the dactylic hexameter as line unit. It may well be the IE character of Hittite that makes it depart from cuneiform tradition on this point.

Tablet rulings from cuneiform tradition, however, persist in Hittite use. While horizontal rulings vary – double to divide texts on the same tablet, often to divide the colophon from the text,[6] or larger thought units within a text (KUB XIII StBoT 4: court testimony) – suffice it here to isolate single horizontal ruled breaks in the text. Such breaks constitute the primary visual data relating to questions of punctuation and grammatical structure. Older editions (Friedrich's treaties, Goetze's annals, Tunnawi ritual, plague prayers, and Hattušili *Apology*) recognized the linguistic reality of the scribal ruling, assigning each ruled unit a paragraph number in the text edition, although one of the difficulties in editing the Laws stems from the occasional lack of scribal agreement among the many extant copies as to where the ruling should fall.

Figure 3. Scribal Rulings on Back of KBo IV 2[4]

IV			III	
(41)	-an-zi		(38)	
				(previous text: Huwarlu ritual)
(42)	-1]a-az		(39)	
(43)	-ul-ši GIM	-an	(40)	*UM-MA* ^{d}UTU-*ŠI* ^{m}Mur-ši-li LUGAL.GAL *I-NA* ^{uru}Til-Ku (-un-nu)
(44)	ki-el-di	-ya	(41)	na-an-na-ah-hu-un nu har-ši-har-ši ú-da-aš . . .
(45)	-ya-an		(42)	[t]e-it-hi-iš-ki-it nu na-a-hu-un nu-mu-kán me-mi-aš . . .
(46)	-ri-iš-	ma	(43)	te-pa-u-e-eš-ta . . .

Text transcription of KBo IV 2 III 40ff. with glossed translation:

(40)	*UMMA*	^{d}*ŠAMŠI*	^{m}Muršili	LUGAL.GAL	*INA*	^{uru}Til-Kunnu	
	thus	Sun King	^{m}Muršili	King-great	to	Til-Kunnu	
(41)	nannahhun	nu	haršiharši	udaš	namma	^{d}U-aš	hatuga
	I-marched	ptc	bad-storm	brought	further	Stormgod	terribly
(42)	tethiškit	nu	nahun	nu-mu-kan	memiaš	išši	anda
	kept-thundering	ptc	I-feared	ptc-me-ptc	speech	mouth	in
(43)	tepawešta	. . .					
	small-became	. . .					

"Thus [speaks] the Sun [my Majesty] Muršili, the Great King: '[As] I marched to Til-Kunnu, there came a terrible storm [a *haršiharši*]; the Stormgod further kept thundering, [so] I feared, [so that] the speech in my mouth became small.' "

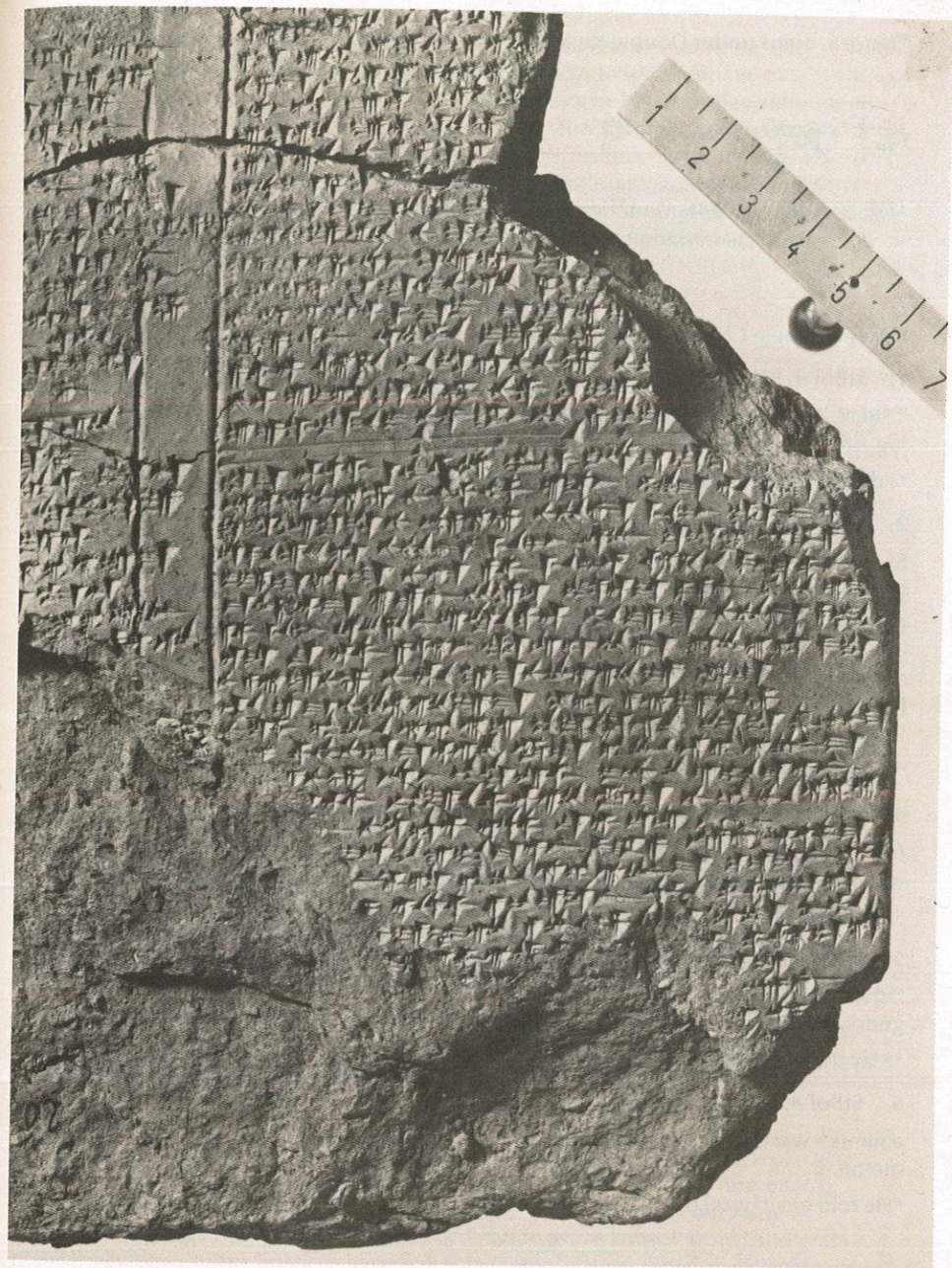
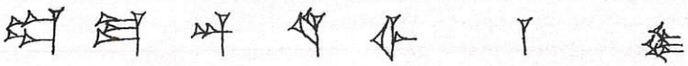


Figure 4. Photograph of KBo IV 2 III 40ff.[5]

Figure 5. Signs under Double Ruling



UM- *MA* (god) UTU- *ŠI* (male person) Mur-

Figure 6. Single Clause Units

1. StBoT 4, 8 KUB XIII 35 + II 38: Transitive verb with direct object

^{dug}BUR.ZI ^{na}4KÁ.DINGIR.RA=wa=za *UL* dahhun
jug Babylonian-stone-ptc-ptc not I-tŏŏk

"I did not take the jug made of Babylonian stone."

2. StBoT 1, 22 II 6: Transitive verb with direct and oblique object

ŠU.NIGIN 23 SAG.DU^{meš} KASKAL ^{uru}Zikeššara ^{m}Á^{mušen}Ziti uppešta
total 23 persons campaign Zikeššara Eagleman sent-3s

Eagleman sent a total of 23 persons from the campaign against Zikeššara."

3. StBoT 4, 10 III 38 (court testimony): nominal sentence with predicate adj.

[^{m}K]ukkuš=ma ^{lú}šalašhaš arahza
Kukku-ptc šalašha-man absent

"Kukku, the *šalašha*, [was] absent."

4. TH 6, 98 (KUB XXII 70 Rs. 65 oracle text: nominal sentence)

(nu memai) DINGIR-*LUM* GEMEiš=wa=tta
(ptc speaks) god servant-ptc-you

"[She speaks]: 'O god, [I am] your servant!' "

5. Otten (1956) 182 VAT 13 047 (letter), line 5

DINGIR^{meš}=(š)maš TI-an harkandu
gods-you alive may-they-hold

"May the gods keep you alive."

6. StBoT 4, 10f. KUB XIII 35 III 17 (court testimony): object complement

ammuk=war=an akkantan *IQBI*
me-ptc-it dead he-said

"He told me it [was] dead."

Güterbock (1980:42) likewise notes the lack of scribal agreement in ruling the different versions of the prayer to the Sungod. But such disagreement is overshadowed by more than random agreement among multiple copies of the same text. Of particular interest are the two copies of the Muwattalli ritual-prayer (KUB VI 45 and 46) which show scribal notations that appear to correct disagreements in ruling.[7] Without some independent attestation from antiquity, modern scholars could not hope to define Hittite syntactic units as linguists can English sentences. The ruling, however vague a clue, is our link with second millennium BC speaker intuition, and should not be disdained.

2.0 Hittite "Sentences"

2.1 Scribal Division and Language Structure

Two essential questions converge in the analysis of the ruling as auxiliary sign in the writing system. While it is the scribal ruling at which the study is directed, the linguistic structure of the content within the ruled unit is presumably the *raison d'être* for the ruling. Auxiliary mark and its linguistic basis are thus two sides of the same question. Diringer's (1948:191; 231; 284; 439) study of the alphabet describes punctuation as word division marking. Some scripts use dots or vertical marks to indicate word boundaries. Gelb (1963:14f.; 99; 113 passim), in discussing sign types, rightly suggests that pauses separating words mark prosodic features of intonation and pause and as such are phonetic. Hittite, much like early Greek which even omitted any sign of word division (Thompson 1966:67ff.), lacks any mark associated with the prosodic correlates of grammatical structure (Allen 1973:4f.; 18ff.; 20ff.). Without such phonetic correlates as comma and period, how did one then recognize syntactic divisions such as clause and sentence? The suggestion here is that symbols for text interpretation vary just as linguistic structures do. The English period punctuates one kind of structure, the Hittite ruling another.

For clausal boundary, early IE language structure places particles at the beginning, the verb often at the end essentially "punctuating" the clause. Hittite initial particle *nu* and the regularly clause final verb are characteristic. In Figure 3 (line 41) the clause *nu haršiharši udaš* "there came a *haršiharši*" with initial *nu* and final verb *udaš* varies with clause types where enclitics like pronominal *-mu-* or directional particle *-kan* (cf. *nu-mu-kan memiaš išši anda tepawešta* "the speech in my mouth became small" [Figure 3, line 42f.]; cf. also middle-reflexive enclitic *-za* and quotative *-wa(r)-* [Figure 6]) follow *nu* or some other initial form. Parallels in older IE Greek, Latin, and Sanskrit are well known in Wackernagel's famous "Law" on enclitic position of particles and pronominals. Watkins (1963) has compared it at length with Old Irish and Hittite, sifting out its true IE character from more general language phenomena (1964).

Clauses so punctuated by linguistic form appear strung together as if they lacked a fully developed basis of cohesion (Goetze 1957:58; Justus 1979 with references). This intuitive impression is based on the assumption that cohesion between clauses in language must be based on subordination as we know it from Latin grammatical tradition, subordination based on substantive clauses, adverbial clauses, or relative clauses (see any grammar). Such subordination is based on grammatical relationships determined by a particular noun relation to the verb (subject, direct

object, oblique adverbial objects expressing time, place, purpose), or by the modifying relation to another noun (adjectival relative).

Likewise intuitive are traditional categories, subject and basic sentence, which presuppose pragmatic subject-predicate cohesion in the single clause and grammatical cohesion between clauses. Keenan's (1976:307ff.) logical definition is an attempt to formulate an explicit definition of sentences in general. I excerpt: "A syntactic structure *x* is *semantically more basic* than a syntactic structure *y* if, and only if, the meaning of *y* depends on that of *x*. That is, to understand the meaning of *y* it is necessary to understand the meaning of *x*." In Hittite, clausal sequences begin with a topic clause and end with a final main statement, each of which depends on the other for its proper meaning (Justus 1976:222ff.). Because scribal rulings which bound such structures agree nonrandomly when multiple copies of the same text are preserved, one must conclude that they reflect divisions based on an intuitive knowledge of cohesion which escapes us today.

The Aphasia text, a text of perhaps some 75 clauses, has only six ruled units. If cohesion is based on grammatical relations between clauses, as many as the five clauses of the shorter ruled units make an awkward sentence outside our archaic legal language. The longer rulings are even clumsier. One has the option thus of assuming, with traditional IE scholars, that subordination as the basis of cohesion is still incomplete in the early texts. Or, one might make the abductive leap and suppose that a different basis of cohesion lies behind the scribe's intuition. Similarities between units of scribal ruling and the older Greek and Latin periodic sentence (see below) in fact suggest that Hittite should be taken seriously on its own terms.

The analysis here suggests – on the basis of data from minimal units of scribal ruling which parallel minimal quoted speech units – that Hittite reverses grammatical and pragmatic bases of cohesion. Both paratactic clause (Figure 7:3) and nonfinite verbal (Figure 6:6) express basic object complementation, a traditional grammatical function (Justus 1979:93f.; 98ff.). But in Hittite the separate (paratactic) object clause has a distinctively pragmatic function, its grammatical one being redundant by contrast with the distinctively grammatical object clause of English. Analysis of scribal rulings as visible expression of the Hittite "sentence" explores this other, equally complex, distribution of cohesion within the single clause and between separate clauses.

2.2 Content of Horizontal Scribal Rulings and Quotations.

2.2.1. Single Clause Units.

The minimal scribal ruling contains a single clause (or ellipsis for it), and is paralleled by quoted single clauses of similar structure. While the scribal ruling after the construction is predictable, no single formal feature obligatorily isolates quoted speech units. The enclitic particle *-wa(r)-* is frequent (Figure 6:4; Friedrich 1960:148-50), but perhaps lost or regularized in some places (cf. StBoT 4, 77-9 for discussion of the spoken form). Written convention introduces the text itself as quoted speech using Akkadographic *UMMA* "thus" for Hittite *kiššan* "as follows" (cf. the Aphasia text, spoken, according to the introduction, by Muršili: Figure 3, line 40), but subparts of the text may also be introduced this way, or by verbs of

communication like *IQBI/memai* "[he] said/says" replacing *UMMA/kiššan* (Figure 6:4). English verbs of communication may begin or end quoted speech, but in Hittite they usually begin it (cf. note 7) with a summary of the effect of the speech (Figure 11:2) at the end. Archaic in English is the Hittite use of "thus" instead of the verb of communication to introduce the speech.

In both ruled unit and quoted speech, cohesion is based on semantic properties of the final verb which govern noun relations (noun-verb cohesion) in verbal sentences, or on noun-noun relations of modification and apposition in nominal sentences. Pragmatic subject-predicate cohesion is secondary. In Figure 6:1, a ruled unit, transitive verb *dahhun* "[I] took" governs direct object ("jug of Babylonian stone") and agent relation ("I" expressed in the verbal inflection). Similarly, Figure 6:2, also a ruled unit, has final transitive *uppešta* "[he] sent" governing agent ("Eagleman"), direct object ("a total of 23 persons"), and oblique object ("from the campaign against Zikeššara"). Here logograms, undifferentiated by case marking, depend on the meaning of the verb for grammatical interpretation in a case grammar sense (cf. Fillmore 1968:21ff.).

Since Hittite nouns do inflect for case, including the nominative "subject"case, often with verb agreement, one might argue that cohesion is subject-predicate as in English. But with *uppešta* (Figure 6:2) the fact that the verb governs a human agent, a direct object, and an oblique relation for direction disambiguates relations among nouns in the clause. Cohesion based on inner semantic government is typical of older Indo-European generally, in fact (Lehmann 1974:39ff.). Single quoted clauses from an oracle text (TH 6, 64: KUB XXII 70 Vs. 38) and from court testimony (StBoT 4, 10f.: KUB XIII 35+ III 9-10) parallel the ruled clauses. The court testimony, governed by *pešta* "gave" (not cited here), a verb which governs two human animate nouns, illustrates use of case to clarify verbal government. Interestingly, to specify the relations of the two animates to the verb the scribe uses Akkadographic *ANA* for the oblique case (Friedrich 1960:179f.). It is the *ANA*, not verb agreement for the second person "subject," which clarifies the relation. In form *pešta* may be either second or third person.

The nominal sentence (Figure 6:3) illustrates cohesion based on nominal modification. In the ruled unit here an adjectival form modifies the "subject" where "subject" case is explicit in the scribe's phonetic spelling, but it need not be (cf. StBoT 1, 30 III 10-1 not cited here). Similarly, cohesion in the quoted speech from an oracle text (Figure 6:4) is based on a noun-noun relation, here apposition: "O god, [I am] your servant," where the pragmatic context (first person addresses second) is clarified by enclitic second person pronominal *-tta* "your." English expects an overt first person subject, but possessive second person equally implies the first-second person speech act context.

Besides sentences based on verbal government or on noun-noun grammatical relations, sentences may combine both grammatical bases of cohesion (Figure 6:5). Final verb *harkandu* "let them hold" in a ruled unit governs both agent "gods" and object "you alive" where cohesion within the object phrase is based on the modifying relation of the nominal sentence. Likewise quoted speeches can be built on both verbal government and modification (Figure 6:6). Here final verb IQBI "he said" governs agent "he," dative "me," and object phrase "it dead" in which cohesion is based on modification of "it (-an)" by participle *akkantan* "dead."

Figure 7. Minimal Multiclause Units

1. StBoT 13, 8 III 21-3 (NH ritual); cf. also *ibid*. 4f. Vs. II 20-2

GA.KIN.AG=ya arha paršan
cheese-and up breaking

nu=šša̍n GA.KIN.AG tepu LÀL memall=a šer šuhhai
ptc-ptc cheese some honey meal-and over shakes-3s

"Cheese being broken up, he shakes some honey and meal thereover."

2. AM 124f. KBo IV 4 Rs. III 24-5 (NH king's annals)

MU.KAMza=wa=ta šer tepaweššanza
year-ptc-you over small-becoming

nu=wa *BELI=NI* *INA* ^{uru}Hayaša le paiši
ptc-ptc lord-our to Hayaša let-not you-go

"The year [is] getting short, [so] do not, our Lord, go to Hayaša."

3. Gurney 1940: 30f. C II 49-53 (NH prayer)

kinuna arahzenanteš [udniant]eš humanteš KUR ^{uru}KUBABBAR-ti
now neighboring lands all land Hatti

[w]alhaneškiuwan dair
attacking-supine they-set-3p

n=at *ANA* ^{d}UTU ^{uru}Arinna kattawatar namma kišaru
ptc-it to Sungoddess Arinna grievance again let-it-become

nu=za DINGIR-*LUM* tuel *ŠUM-KA* le tepšanuši
ptc-ptc god of-you name-your let-not you-humiliate-2s

"Let it become a matter of vengeance for you, Sungoddess of Arinna, again, [that] all the neighboring [land]s have now begun to attack the Hatti land, [so that] you do not humiliate your divine name."

Distinctively governed participial phrases (Figure 6:5-6) contrast with distinctively pragmatic participles (Figure 7:1-2).

Facts from study of Hittite *šak(k)-/šek(k)-* "know" (Justus 1981:9.0-9.4) further support analysis of cohesion as distinctively based on grammatical relations of government, modification, and apposition by contrast with the pragmatic subject-predicate cohesion which is distinctive in English, but redundant in Hittite. First, "subject" with Hittite "know" is not necessarily identified by nominative case. It may be written logographically (Figure 6:2), or it may take an oblique case form as first person pronominal. Second, while "subject" usually triggers agreement in number with the verb, agreement in person is not predictable (ibid., 9.1). Characteristic in fact of Hittite agreement in general is its irregularity (Friedrich 1960:115ff.). Finally, it is the object relation which is invariant and obligatory. Fillmore's well known examples "John broke the vase" and "The vase broke" really show how the subject slot, while semantically variable, is always filled in English. One might compare Hittite particle -za which increases the number of nouns "know" can govern, and

4. KUB XXI 27 Rs. III 43'-47' (NH prayer)

^{d}Zintuhiš GAŠAN=*JA* *ŠA* ^{d}IŠKUR ^{d}UTU ^{uru}TÚL-na=ya aššiyanza
Zintuhi̯ lady-my of Stormgod Sungoddess Arinna-and favorite

haššaš *ANA* ^{d}IŠKUR=za *Ù* *ANA* ^{d}UTU ^{uru}TÚL-na
granddaughter to Stormgod-ptc and to Sungoddess Arinna

^{uzu}GAB-aš *TUDITTUM*
of-breast ornament

nu=ddu=za lammar lammar katta uškanzi
ptc-you-ptc hourly hourly down look-3p

"They notice you hourly, Zintuhi, my lady, favorite granddaughter of the Stormgod and Sungoddess of Arinna, they [whose] breast ornament [you are]."

5. Gurney 1940:16 I 3-6 (NH prayer; ruled unit as well as speech unit)

^{d}Telipinuš šarkuš nakkiš DINGIRuš zik
Telipinu great mighty god you

uiyat=mu ^{m}Muršili LUGALuš tuel ÌR=*KA* SAL.LUGALašš=a tuel
sent-me Muršili king of-you slave-your queen-and of-you

GEME=*KA* uieir it=wa ^{d}Telipinun
slave-your sent-3p go-ptc Telipinu

anzel EN=*NI* DINGIR=*LAM* *ŠA* SAG.DU=*NI* mugai
of-us lord-our god of person-our entreat-2s-imper

"Telipinu, you [are] a great and mighty god, [so] Muršili, the King your servant, and the Queen your maidservant sent me [to say]: 'Go entreat Telipinu, our Lord and our personal god.'"

at the same time effects a semantic change in the "subject" from base meaning (dative/experiencer: the one who experiences rather than instigates the verbal action; "The King knows him") to derived agentive ("The King acknowledges him as heir"). But *-za* primarily effects changes in verb semantics which secondarily result in changes in subject relation. Verbal government is thus distinctive, pragmatic subject relations redundant.

2.2.2 Minimal Multiclause Units

In a set of two or more clauses, a last Final statement predicates something about an initial Theme clause. The Theme clause, as topic, is not necessarily governed by the Final verb, but it may be (see below). In fact particular grammatical relations like purpose/result subordination, object complementation, and relativization redundantly emerge, depending on the nature of redundant government between a Final verb and a preceeding Theme. Characteristic is Figure 7:1, a structure with

similarities to both the colloquial English "You know [how/when] they break the cheese, well then they sprinkle honey and meal on it" and older IE absolute constructions like "Having broken the cheese, they . . . ." But the Hittite construction occupies a unique position in its own system. By contrast with the governed participial objects (Figure 6:5-6), this two clause ruled unit preposes its participial phrase as Theme clause (Figure 7:1). Theme clause "cheese being broken up" states what the construction is about, while the Final clause "he shakes some honey and meal thereover" predicates the essential ritual act performed on the cheese. The distinctive basis of cohesion is thus pragmatic, not grammatical. The translation here deliberately emphasizes the literal form to show this, although a more idiomatic translation like "He shakes honey and meal over the cheese [once it is] broken" would be truer to the English basis of cohesion.

Besides the distinctive basis of cohesion, topicality, one also perceives the redundant grammatical relation between Final verb "shakes" and Theme "broken cheese": "he shakes meal . . . over [the cheese]" where "shakes" obliquely governs "cheese." Often, as here, temporal relations are derived from contexts where oblique government is redundant. By contrast, redundant direct government relations evoke derived relative and object complementation, while ungoverned relations are the source of purpose/result readings. Characteristic of such derivation of purpose/result is Figure 7:2, a minimal quoted speech unit. By contrast with the obliquely governed Theme in Figure 7:1, this one is a simple Theme-Final construction, again with participial Theme verb, but Final verb *paiši* "do [not] go" has no governing relation to the Theme whatsoever. As a result, the corresponding English construction is best construed as grammatical cause-result cohesion: "The year [is] becoming small/short, [so] . . . ." Hittite otherwise has no means to express purpose between clauses (Friedrich 1960:163).

Questions of pragmatics and topicality in language only begin to be sorted out. Li and Thompson (1976) separated subjects from topics, noting among other things that topics have no necessary grammatical relation to the verb as subjects do. Given a sentence "Elephants, their trunks are long," "elephants" is topic, "trunks" is subject. Topics must also be definite and known or presupposed, either because they are generic (cf. "elephants"), because they refer (anaphorically) to some known entity, or because of some obvious relation to something already known (cf. "trunks" to "elephants"). Theme clauses in Figure 7:1-2, in fact, have no necessary grammatical relation to a governing constituent, and in the discourse they represent the maximally presupposed information of the message. The Hittite topic/themes differ only in that they are entire clausal constituents, not single nouns in a clause.

Scholars disagree in fact as to whether syntax or discourse is primary in language (Givón 1979:207ff.). Factors of discourse presupposition like topicality (Givón 1979:50ff.) form the basis of cohesion between Hittite clauses, but the Hittite data here would not argue with Givón (1979:208ff.) that pragmatic structures evolve into a more tightly cohesive grammatical structure. Instead they argue for a reversal of pragmatic and grammatical bases of cohesion, both strategies equally as "grammaticalized," for it is grammatical cohesion that binds the Hittite clause (see above). Pragmatic cohesive bases between clauses too are as structured and regular as English subject-predicate.

Beyond known, independent topics, Chafe (1976:30ff.) pointed to topics which result from speaker emphasis or contrast, noting that English "focus of contrast" is given information, like other topics. Kuno, separating out "theme" ("what the sentence is about," a kind of information that is, not only known, but which also receives the speaker's empathy: 1976:420ff.; 427ff.) from "focus" (topical, but not the speaker's focus of empathy), established a hierarchy of topicality. Hittite confirms the need for such a hierarchy, although distinctions still need study. Hittite Theme corresponds so far to Kuno's "theme," to Li and Thompson's known "topic," but probably excludes "focus of contrast," despite problems. Hittite Focus introduces new information which is to dominate two or more clauses beside the known Theme (Justus 1976:235f.), but is not necessarily contrastive, and probably not the focus of empathy.

Analysis here adds to semantic criteria of presupposition also structural criteria for distinguishing between Theme and Focus. Both turn out, as sub-Themes, to elaborate part of a Theme or part of a Final. The Theme-Final as a unit serves as frame for such elaboration of detail, regularly defining it as medial. Medial elaboration may then give further detail about the Theme or about the Final. It may, like Theme and Final, exhibit distinctive subpragmatic relations, sub-Theme or pre-Final, each with possible redundant government relations to the constituent it elaborates. Examples of elaboration in Figure 7: 3-5 all illustrate Theme elaboration. To get at the nature of the elaboration, one first peels back the outer Theme and Final. The medial (Figure 7:3) makes a pre-Final predication to the Theme ("Now all the . . . lands have begun to attack"), one which redundantly governs the entire Theme clause as argument: "Let *it* ("that all the . . . lands have . . .") become a matter of vengeance for you." Pronominal *-at* "it" is the Hittite counterpart of English grammatical conjunction "that" (cf. Justus 1980a:100f.). While Theme with pre-Final could be an independent sentence, in fact they function as complex Theme in this ruled unit, awaiting resultant Final "Do not [thereby] humiliate your divine name." Because Final verb *tepnuši* "humiliate" does not govern the Theme, the main statement evokes a redundant purpose/result reading (see translation).

The second elaboration of a Theme (Figure 7:4) is a sub-Theme in redundant grammatical apposition to the Theme (cf. Figure 6:4 where this noun-noun relation is distinctive inside the single clause). Peeling back initial Theme *Zintuhi . . . haššaš* "Zintuhi, granddaughter of . . .," one comes to its elaboration in nominal sentence *ANA* ^{d}IŠKUR-za . . . *TUDITTUM* "[you are]breast ornament for the Stormgod . . . ."[8] The complex Theme is then governed by the Final verb *uškanzi* "they notice," and the redundant government eliminates any resultant reading. Final clause particles and verb agreement *(nu-ddu-za . . . uškanzi)* make both distinctive pragmatic and redundant government relation explicit. Initial *nu* continues the Theme (Raman 1973:126ff.), while resumptive enclitic *-ddu-* "you" refers specifically to Zintuhi: "they notice you . . . Zintuhi [who are] the breast ornament . . ." Although the overt pragmatic Hittite construction begins with the Theme and pivots on the description of *Zintuhi* in Theme and sub-Theme, an idiomatic English translation starts most naturally with the Final "[The Stormgod and Sungoddess] . . . notice you hourly" and makes the redundant Hittite government relation between elaborated Theme and Final overt (see translation and below on "descending" order). This ruled unit is ambiguously also a unit of quoted speech, one in a set of glorifications of a deity.

Figure 7:5, despite lack of *-wa(r)-*, is both a ruled unit and quoted speech. The priest addresses the god Telipinu in the Theme clause, and states the purpose of the address in the Final: "Go entreat Telipinu." Because medial elaboration "the King and Queen sent me" has no redundant government relation, its pragmatic relation as sub-Theme is not immediately obvious. But the three sentences, independent at one level, are bound pragmatically by both Theme-Final predication and by speaker-addressee roles inherent in the direct address form (Benveniste 1966:228ff.). It is their character as addressee to the priest (the speaker) which unites both vocative "Telipinu" and elaborating "King and Queen," a pragmatic identification which allows both Theme and elaboration to function as complex Theme to nongoverning Final result "Go entreat Telipinu." By contrast with "Telipinu" and "King and Queen" as Theme and sub-Theme, both Theme by virtue of discourse role, the relation between Theme "Zintuhi" and sub-Theme appositional "Stormgod and Sungoddess" is not based on speech act function, but on real world role. But in both examples Theme and sub-Theme have a pragmatic basis of relation. The sub-Theme is known by association with known Theme. Both have parallels with prayer structure (see below), but the Zintuhi unit lacks a final request and the Telipinu one differs in the point of view break occasioned by the role of the priest. Typical of structure with ungoverned Theme (cf. vocative below) are successive result and purpose readings which emerge with sub-Theme and Final: "You are mighty . . . [so] Muršili sent me . . . [in order to] entreat . . ."

To summarize Theme construction, one might sketch differences in Theme-Final construction as in Figure 8.

2.2.3 Focal Constructions

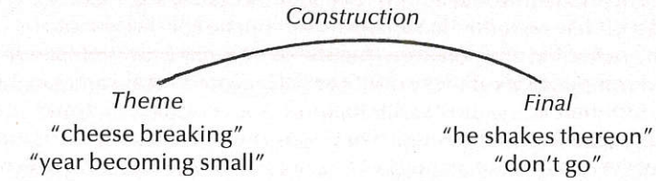
By definition, Focus introduces new topical information (Justus 1976), and in the Theme-Final construction it elaborates a Final. Like Theme and Theme elaboration, it can be redundantly modifying (relative) when governed, causal (cf. *kuit* "because" discussed in Justus 1981:10.4.3) when ungoverned, or temporal (cf. *kuwapi* "[when] where") when obliquely governed (Justus 1981:10.3.4). Only redundantly governed Focus elaboration will be discussed here.

By contrast with the sub-Theme of a Theme, the sub-Theme which elaborates a Final is marked by "relative" *kui-*, a form that inflects for case (Friedrich 1960:68f.). Held (1957) used terms "relative word" for *kui-*, "resumption" for forms in a following clause which refer back to *kui-* (cf. "*what* [kui-] *goods* I brought . . . , *with those* (resumption) I inlaid the temples"), and "relative sentence" for the two clauses of the *kui-* construction. English terms "antecedent" and "relative pronoun" ("I inlaid the temples with *the goods* [antecedent] *that* [relative pronoun] I brought from the raiding campaign") apply poorly to the distribution of "goods" in Hittite and to adjectival "what," where main clause order is reversed, "goods" does not "antecede," and "what" is an adjective, not a pronoun. It is this *kui-* that expresses Focus, the sub-Theme elaboration of a Final. But no special marker distinguishes the sub-Theme elaborating a Theme.

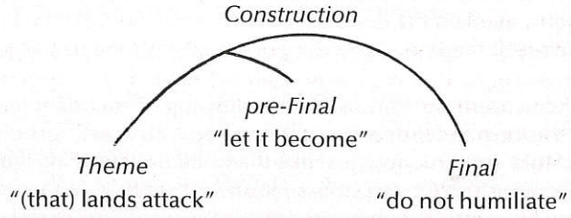
The literature on relative clauses is long now. Givón's (1979:Chapter 4) typology of relative clauses classifies the Hittite type as "loosely" pragmatic. Now that we recognize the primary topicality role (Justus 1976) and redundant relative function of *kui-* (Justus 1978) beside similarities between Hittite syntax and verb final type

Figure 8. Sketches of Theme Constructions

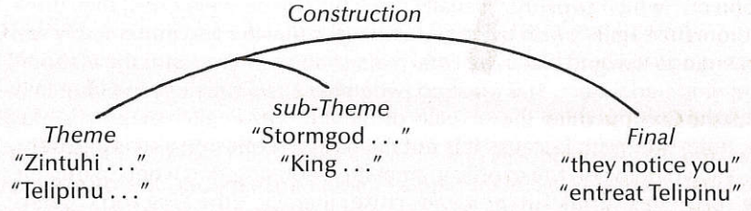
1. Simple Theme-Final (Figure 7:1-2)



2. Elaborated Theme: pre-Final elaboration (Figure 7:3)



3. Elaborated Theme: sub-Theme elaboration (Figure 7:4-5)



constructions (Raman 1973:9ff.; 166ff.; Justus 1981:8.2),[9] it is not necessary to view this construction as evolutionarily prior. Instead one might recall Givón's suggestion that topically marked constructions lay the basis for reanalysis and change in language, and view distinctive topicality as a mechanism for loosening the consistency of verb final word order patterning as the language moves in the direction of verb initial patterns. One might further note that the pragmatic Hittite hierarchy which *kui-* provides has a parallel in English grammar distinctions between "that" and"which," restrictive and nonrestrictive (cf. Curme 1931:223ff.), a hierarchy of a different sort. But to understand relativization in language, it is important to take seriously related grammatical constructions as they change through different kinds of languages.

Closer analysis of redundantly modifying Theme and Focus clauses here reaffirms the old-new topic distinction, contrasts redundant modifying cohesion with redundant purpose/result, and associates Final elaboration with new information by contrast with known Thematic elaboration. If one can compare Prague school analysis of English theme (known information) and rheme (predication where new information is introduced at the clause level; cf. Halliday 1967) with multiclause level

Hittite Theme and Final, the Final is where one would expect new information to be introduced.

Beyond their function to introduce new, redundantly modifying, topical information and their use of *kui-* with variable resumption, Focal clauses, as elaboration of the outer Theme-Final construction, are medial between Theme and Final. Figure 9:1 exemplifies all of these characteristics. Topic-Focal *kuit aššu* "what goods," as new information, contrasts with topic-Theme "temples," known from the previous ruled unit. The *kuit* clause medial between Theme "temples" and Final "I inlaid" elaborates the instrumental object of the Final verb, a relation made explicit in the sequence "relative" *kuit aššu* "what goods" . . . *apedanda* "with that." Both Theme clause and Focal *kuit* introduce redundantly modifying information essential to the Final statement: "I inlaid the temples [Theme] with goods [Focus] . . .," hence the lack of purpose/result reading.

In a similar OH ruled unit, Theme "The King and Queen sit" is at best obliquely governed by Final verb *tuhhušta* "it is finished," allowing a redundant temporal reading: "[When] the King and Queen sit, it is finished." Elaborating the Theme is an entire three-clause construction, just like the ruled unit itself in Figure 9:1. Known Theme ("The King and Queen sit") is redundantly modifying to pre-Final ("they drink"): "The King and Queen [who] sit, drink [those]." While initial Theme clause introduces and modifies the "subject" of "drink," the medial *kue* elaborates on its object: "*which cups* they usually drink full, *those* [very ones] they drink." More idiomatic English, with overt grammatical cohesion and more nearly verb initial word order would place the Final main statement first, with the elaboration after the modified noun: "It is finished [when/because] the King and Queen [who] sit, drink those cups which they usually drink full." The English pragmatic effect is, of course, quite different, because it is not the basis of cohesion as it is in Hittite. Contrast again between the overtly grammatical construction where participle "sitting" precedes "drink" in the same clause: literally, "the King and Queen sitting . . . drink" (both OH and NH: StBoT 12, II 46 and StBoT 13, IV 47′-9′ not cited) and pragmatic cohesion in Figure 9:2 parallels that above between governed participle (Figure 6: 5-6) and separate Theme clause (Figure 7: 1-2).

Muršili's prayer, like the Theme-Final prayer (Figure 7:5), is both quoted speech and ruled unit, and has a vocative Theme "Gods, my Lords, I, Muršili, . . . have worshipped you" independent of (resultant) Final "hear me." Thematic elaboration in pre-Final ("hold your ear inclined to me [in this matter]") governs its own Focal elaboration "*for what matter* I have worshipped you," but not the Theme. As in prayer structure generally, the force of the vocative and the imperative is to render a noun relation independent of verbal government (see below). Redundant relative and purpose/result readings thus form the basis of corresponding idiomatic English constructions (cf. Figure 9:3). Independent outer Theme "You gods" and outer Final "hear me" elaborated by Thematic pre-Final and its own Focal elaboration parallels "The King and Queen sit" (Theme) with Final "it is finished" (Figure 9:2). Both have Focals which elaborate the pre-Final of an ungoverned Theme. Both are highly intricate layerings of elaboration which must be peeled back as one would an onion to understand the relationship.

Finally, paradigmatic of the Focal construction, is the quoted unit from the soldier's oath (Figure 9:4). Repeatedly, some evil fate is described (Theme), then a

Figure 9.

1. StBoT 18, 12ff.; 30; 119f. Rs. 55-58 (OH proclamation: ruled unit)

É	^{d}Halmašuittaš	É	^{d}IŠKURnaš	*BELI=JA*	*Ù*	É
house	of-Halmašuitta	house	of-Stormg.	lord-my	and	house
^{d}Šiunašummiš	*ABNI*					
of-our-Šiu	I-built					

KASKALaz	kuit aššu	udahhun	[ne ?] apedanda	hališšiyanun
campaign-from	what goods	I-brought	ptc-them with-it	I-inlaid/plated

"The temples of Halmašuitta, the Stormgod, and of our Šiu [that] I built, I plated/inlaid with the goods which I brought from the campaign."

2. StBoT 12, 34 IV 41-2; StBoT 25, 69 Rs. IV 34′-5′ (OH ritual; ruled)

[LUGAL]	*Ù*	SAL.LUGAL	ešanda	šuwaru	kue	GAL$^{hi.a}$	akkuškanzi
king	and	queen	sit-3p	full	which	cups	they-drink
[ta]	apuš=pat	akuanzi	tuhhušta				
ptc	those-ptc	they-drink	finished-3s				

"It is finished [when] the King and Queen [who] are seated drink those cups which they usually drink full."

3. Goetze (1927:242 KUB XIV 13 + Vs. I 17-20 NH prayer: ruled and quoted)

DINGIR^{meš}	EN^{meš}=*JA*	kaša=šmaš	^{m}Muršili[š	ÌR=*KUNU*	^{lú}SANGA=*KUNU*
god	lords-my	see!-you	Muršili	servant-your	priest-your
arwanun					
I-worshipped					

nu=šmaš	arwa[nun]	kuedani	memiyani
ptc-you	I-worshipped	for-which	matter

nu=mu	ištamaš[šan	par]a	epten	nu-mu	ištamaš[ten]
ptc-me	ear	forth	take	ptc-me	hear-2p

"O gods, my Lords, see! I, Muršili, your servant, your priest, [who] have worshipped you, hold your ear [inclined] to me in this matter for which I worship you, [so that] you hear me."

4. StBoT 22, 12 Rs. III 32-5 (NH soldier's oath: quoted speech)

kaš	mahhan	šannapilešta	n=ašta	kuiš	kuš	*NIŠ*	DINGIR^{meš}
this	as	became-empty-3s	ptc-ptc	who	these	oaths	(of) gods
šarrizzi							
breaks-3s							

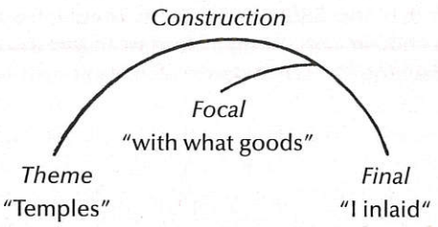
nu	apel	É=*ZU*	*IŠTU* DUMU.LÚ.ULÙ-*LU*	GUD$^{hi.a}$	=*ŠU*
ptc	of-that-one	house-his	from son-mankind	oxen-	his

UDU$^{hi.a}$	=*ŠU*	*QATAMMA*	šannapilešdu
sheep-	his	evenso	let-it-become-empty

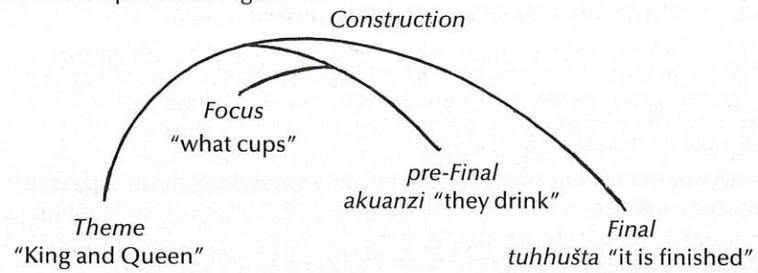
"As this [bladder] became empty, so let the house of the human being who breaks the oaths of the gods become empty of people, its sheep, [and] its oxen."

Figure 10. Focal Sketches

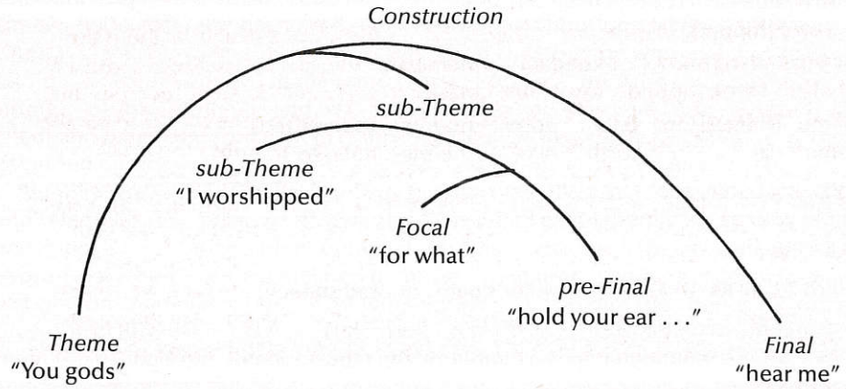
1. Basic Focal Construction: sub-Theme elaboration of a Final: Figure 9:1 cf. 9:4



2. Elaborated pre-Final: Figure 9:2



3. Quite elaborate pre-Final: Figure 9:3



hypothetical malefactor is introduced (Focal *kuiš*) whose fate is to be the same as that described in the Theme clause. Theme of the text as a whole is the breaking of the oath, with individual evil fates as Theme of individual scribal rulings. The example here takes the fate of the deflated bladder as Theme, the individual who breaks the oath as Focal, and the application of the fate to him as Final result of the ungoverned Theme. To summarize, one might sketch Focal constructions as in Figure 10.

2.3 Paradigmatic Variation

From analysis of ruled units and quoted units have emerged pragmatic bases of cohesion between clauses as opposed to overt grammatical cohesion within the clause. Data in this section confirm that structures beginning with a Theme, having optional medial elaboration, and ending with a Final main statement whose redundant relations derive grammatical noun modification and purpose/result, form the basis of Hittite syntax. Variation on structures which form the basis of minimal rulings and quoted speeches also make up the components of longer ruled and quoted units. Exemplary are the governed Theme elaborated in the fifth ruling of the Aphasia text (Figure 11:1) and governed Focal elaboration in the prayer from Muršili's annals (Figure 11:2). These longer structures are simply more complex layerings of sub-Theme and sub-Final developments within a larger unit. By contrast, constructions with Final verb *handaittat* "established" in the Aphasia text pair overtly governed infinitives which elaborate the Final (Figure 11:3) and parallel Focal elaborations governed by the pre-Final elaboration of the Final (Figure 11:4). These four variations on the Theme-Final structure form a short paradigm which argues for its reality as a basis of cognitive organization.

Governed Thematic elaboration in Figure 11:1, a five-clause structure about the already prescribed sacrifice of an ox as substitute for the speechless King, pivots on Theme "They bring the scape-ox." The structure fittingly ends in Final "even so they perform it [the ritual sacrifice]." Medial elaboration concerning the ox (three parallel *mahhan* "as, how" clauses of which I quote only one here) describes the ritual sacrifice, but is governed by Final verb *eššanzi* "they perform." Differences in meaning and word order with *mahhan* (initial *mahhan* "when," noninitial "as, how") find parallels in distribution of *mahhan* clauses dependent on Final (or pre-Final) verb *šak(k)-šek(k)-* "know." Governed (noninitial) *mahhan . . . š.* means "know *how* . . .," while obliquely governed *mahhan . . . š.* is temporal. Similar government relations distinguish *man* "whether" (governed) from *man* "when" (not governed: Justus 1981:10.3). Like derived purpose/result readings between ungoverned Theme and Final, temporal meanings of *mahhan* and *man* are derived from obliquely governed contexts. One might compare too the more general linguistic tendency for temporal conjunctions to be derived from more concrete spatial forms (Traugott 1978 passim). Here obliquely governed Thematic results in temporal, as opposed to governed manner, *mahhan*: *"when* [*mahhan*] they bring the scape-ox, they perform the ritual *as* [*mahhan*] it is written . . ."

Muršili's prayer (Figure 11:2) is the epitome of the Theme-Final where Theme is ungoverned, Final resultant, but Focal elaboration governed. The prayer begins by addressing the Sungoddess (Theme), proceeds to the reason for his prayer (the

Figure 11. Paradigmatic Variations

1. Aphasia (KBo IV 2 IV 41-6: ruled unit number 5 of the text)

mahhan=ma ^{gud}puhugarin arnuwanzi
when-ptc (ox) substitute they-bring
nu ŠA ^{gud}puhugari mahhan SISKUR annalaz IŠTU ^{giš}LI.U$_5$
ptc of (ox) substitute as ritual from-old from tablet
gulaššan . . .
written . . .
n=at QATAMMA eššanzi
ptc-it evenso they-perform

"When they bring the scape-ox [to Kummanni], they perform the ritual just as it is written concerning the scape-ox ritual on the old wooden tablet."

2. Muršili's Prayer (AM 20ff. KBo III 4 23-7)

(nu kiššan AQBI) ^{d}UTU ^{uru}Arinna GAŠAN=JA
(ptc thus I-said) Sungoddess Arinna lady-my
arahzenaš=wa=mu=za KUR.KUR ^{lú}KÚR kuieš DUMU-lan halzeššir
neighbors-ptc-me-ptc lands enemy which youth they-called
nu=wa=mu=za tepnuškir
ptc-ptc-me-ptc humiliated-3p
nu=wa tuel ŠA ^{d}UTU ^{uru}Arinna GAŠAN=JA ZAG$^{hi.a}$ danna
ptc-ptc of-you of Sungoddess Arinna lady-my borders to-take
šanhiškiwan dair
trying-sup. they-set
nu=wa=mu ^{d}UTU ^{uru}Arinna GAŠAN=JA kattan tiya
ptc-ptc-me Sungoddess Arinna lady-my down step-2s-imp
nu=wa=mu=kan uni arahzenaš KUR.KUR ^{lú}KÚR piran kuenni
ptc-ptc-me-ptc these neighbors lands enemy before strike-2s-imp.
(nu=mu ^{d}UTU ^{uru}Arinna memian ištamašta)
(ptc-me Sungoddess Arinna word heard-3s)

"Thus I spoke: 'O Sungoddess of Arinna, my Lady, the neighboring enemy lands which called me a youth humiliated me, [and] have begun to take your borders, O Sungoddess of Arinna, my Lady, (so) come down to me, O Sungoddess of Arinna, my Lady [and] strike these neighboring enemy lands before me.' [With the result that] the Sungoddess of Arinna heard my word."

3. Aphasia (KBo IV 2 III 49-51; development of first ruling)

^{d}U ^{uru}Manuzziya=ma katta ariyanun
Stormgod (of) Manuzziya-ptc down I-made-consultation
nu=šši ^{gud}puhugariš piyawanzi IZIit wahnumanzi
ptc-him (ox) substitute to-give with-fire to-burn
MUŠEN$^{hi.a}$ wahnummanzi handaittat
birds to-burn established-3s

"But the Stormgod of Manuzziya [whom] I made the subject of oracular consultation, established that he be given a scape-ox [instead of the King], that it be burned with fire, that birds be burned."[10]

4. Aphasia (KBo IV 2 Rs. IV 28-34; second development in fourth ruling)

IŠTU ^{giš}BANŠUR=ma=za=kan kuezza azzikkinun . . .
from table-ptc-ptc-ptc which I-usually-ate . . .
šašti=ya=zza=kan kuedani šeškiškinun . . .
bed-in-and-ptc-ptc which I-usually-slept . . .
kuitta=ya imma UNUTUM anda weriyan ešta
what-and ever utensil on called was-3s
nu natta kuitki dattat IŠTU DINGIR-LIM QATAMMA handaittat[10]
ptc not anything taken-3s from god evenso established

"So it was established by the god [that] no utensil whatever that was called out be taken, [neither] the table from which I ate, (nor) the bed in which I slept, [nor] . . . ."

behavior of the enemy lands: Focal elaboration), and ends with the resultant request for help (Final).

The classic prayer exchanges second person for first as discourse theme. Theme elaboration might give attributes of the deity, while elaboration of the Final establishes the basis of the relationship between deity and speaker, followed by Final request. Muršili's prayer, as quoted speech, is framed at the beginning by a verb of speaking (Akkadographic *AQBI* "I said") and at the end by reference to its efficacy: "The Sungoddess of Arinna heard my word." Outer Theme is the (vocative) address to the "Sungoddess of Arinna, my Lady," with resultant outer Final "[so] come down to me, O Sungoddess of Arinna, my Lady [so that you] slay these neighboring enemy lands before me!" at the end. Ordinarily, the semantic agent relation between Final verb(s) *tiya . . . kuenni* "come . . . slay" and thematic "Sungoddess" would constitute a government relation and rule out the resultant meaning of the Final. But here, precisely because of the pragmatically marked nature of the genre, taking addressee instead of speaker as discourse theme pragmatically isolates it from usual government relations. Grammatical devices for doing this are the well known vocative case for the noun itself, and the imperative for the potentially governing verb.

Between Theme and Final "come . . . slay" stands the three clause Focal elaboration. Having peeled back outer Theme and outer Final, next one peels away Focal (sub-Theme elaborating the Final) *arahzenaš-mu . . . kuieš . . . halzeššir* "which neigh-

bors called me . . ." and pre-Final *nu-wa . . . dair* "they have begun . . .," down to innermost sub-Theme *nu-mu-wa-za tepnuškir* "they humiliated me." The entire Focal elaboration is then governed by the Final "come . . . slay [them]." Purpose/result reading with the request is derived from the independent character of vocative Theme, while governed Focus precludes further result derivation (cf. Figure 13).

Prayer introduction and summary ("Thus I said . . . the Sungoddess heard the matter for me") constitute contextual Theme-Final to the quoted prayer itself, where the prayer is governed as *memian* "word, speech, matter" by Final "heard," but Thematic introduction is not. The summary thus is also resultant: "I speak, [therefore] hear."

Paradigmatic uses of middle voice *handaittat* "established"[10] in the Aphasia text raise questions as to the purpose of the text, perhaps as a school paradigm of Hittite syntactic structure. At the end of the text the King had certainly not regained his speech, so one wonders how he dictated it to the scribe. But suffice it here to note the systematic variation in structure of the two uses. As noted above, overtly governed and redundantly governed Theme use of the participle contrast in word order patterning (Figure 6:5-6 with Figure 7:1-2). The same contrast appears between governed infinitives before *handaittat* (Figure 11:3) and redundantly governed Focal elaboration with *kui-* forms (Figure 11:4). The first is a Theme-Final construction where governed Theme "I made the Stormgod subject of oracular consultation" has governing Final "[he] established him[self] to [be] give[n] a scapeox . . ."[10] Elaboration, however, is not pragmatic, but overtly governed in infinitive phrases "to give him a scape-ox," "to burn it with fire," and "to burn birds." By contrast the next use of *handaittat* (Figure 11:4) redundantly governs a preceding set of parallel Focal clauses inside a larger Theme-Final construction. Focal elaboration begins "From which table I usually ate" and ends with redundantly governing Final "[that] nothing [of these] be taken, so it was established by the god," where "nothing be taken" summarizes the preceding set of *kui-* clauses which enumerate possessions of the King. The pragmatic effect of using *kui-* elaboration is to emphasize for a limited length of text new information as opposed to use of the infinitives which allow focus on the act of "establishing."

3.0 Crosslinguistic Parallels

3.1 Ancient Greek

Rhetorical treatises in Greek and Latin describe the need for beginning and end (Aristotle *Rhetorica* III 9, 2f.) and opine that saving the main statement till the end effects a more tightly cohesive structure than the loosely connected sequences that result when elaboration follows rather than precedes the main statement (Denniston 1960:66ff.). Rhetorical devices which Aristotle praises include the use of parallel thought and antithesis. Such constructions are well known in both Greek and Latin as periodic sentence structure, the structure which the nineteenth-century classicist Henri Weil termed "ascending" by contrast with "descending" structures in modern French, English, and German, differences which appear to parallel differences in word order type.

Predictably, Hittite patterns are ascending in type, only more regularly so than patterns of later, less consistently verb final Greek and Latin (Justus 1981a:447-9). The older ascending structure states some initial position, then builds ("ascends") to a final main statement about it, while the newer constructions start with the main statement and "descend" to the detail.

If one contrasts different versions of the first five clauses of Muršili's narration, the archaic and literal order is ascending: [As] I marched to Til-Kunnu, there came a *haršiharši*. [And] the Stormgod further kept thundering [so] terribly [that] I feared, [so that] the speech in my mouth became small." The idiomatic order, by contrast, descends: "The speech in my mouth became small [because, when] I marched to Til-Kunnu there came a *haršiharši,* [in which] the Stormgod kept thundering [so] terribly [that] I feared." One notes further that the ascending order of the original is verb final or some variation thereon, while the newer has variant verb initial patterns.

Like Muršili's Hittite prayer to the Sungoddess (Figure 11:2), the Homeric prayer of Chryses to Apollo is announced by a verb of speaking ("he prayed") and the result summarized afterward: "Thus he spoke praying, him [whom] Phoebus Apollo heard." Chryses, who earlier asked Apollo to avenge him on the Achaeans, now prays that Apollo's plague, which Chryses had asked for, be removed.

The prayer itself begins with the addressee as Theme ("Silverbowed one" – i.e., "Apollo") and ends with Final request: "grant this . . . ward off . . ." (cf. Muršili's "come . . . slay"). But Chryses' prayer uses the relative *hos* clause to elaborate the Theme ("Silverbowed one, [you] *who* guardest Chryse and most holy Cilla . . .") by contrast with Hittite Theme elaboration without any relative word: "Telipinu, you [are] a great and mighty god" (Figure 7:5). Although the Final elaboration in Chryses' prayer takes the form of three clauses like that of Muršili's, the Greek focal lacks a relative like Hittite *kuieš* to introduce the opponent "Achaeans." Instead, it has enclitic particle *de* which often introduces a secondary idea after the initial thematic one with *men*. Here sub-Thematic speaker "You honored *men* me" contrasts with Focal "Greatly *de* you smote the Achaean army."[11] But again like Hittite Focal "enemies," Greek Focal "Achaeans" is governed by the Final request verb "ward off": "Ward off this plague from the Danaeans [Achaeans]."

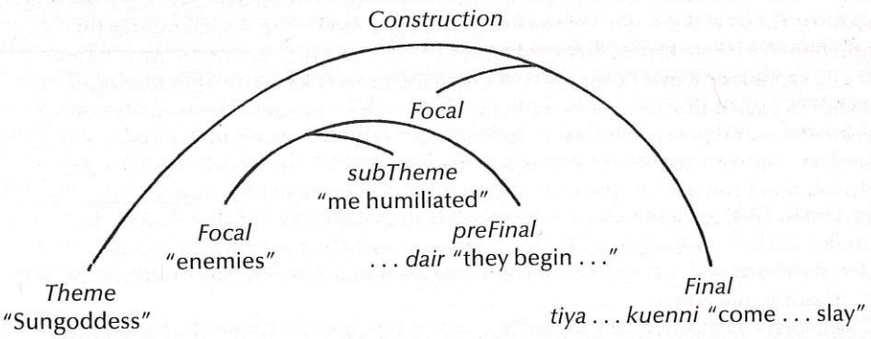
Literal translation of the prayer is ascending and fittingly archaic: "Hear me, O Silverbowed One, [you] who guard Chryse and most holy Cilla, [who] also rule mightily over Tenedos. Indeed, if you ever heard my prayer [in that] you, on the one hand [*men*] honored me, on the other hand [*de*] you smote the Achaean army well, then now too grant this wish for me: ward off now the unseemly plague from the Danaeans."

By contrast more idiomatic phrasing is descending: "Grant this wish of mine, that you remove the plague from the Achaeans whom you smote well, because I prayed to you before to avenge me on them. Since you guard Chryse and sacrosanct Cilla, since you rule over strong Tenados, hear me, you with the silver bow."

One might sketch the prayer structures as in Figure 12 to visually show how the Focals elaborate the Final in both, but how the Greek relative clause elaborates the Theme. Compare Hittite Theme elaboration in Figure 7 and 8, particularly Figure 7:4-5 and Figure 8:3.

Figure 12. Prayer Sketches

1. Complex Focal Elaboration: Muršili's prayer (Figure 11:2)



2. Elaborated Theme and Complex Focal Elaboration: Chyrses' prayer

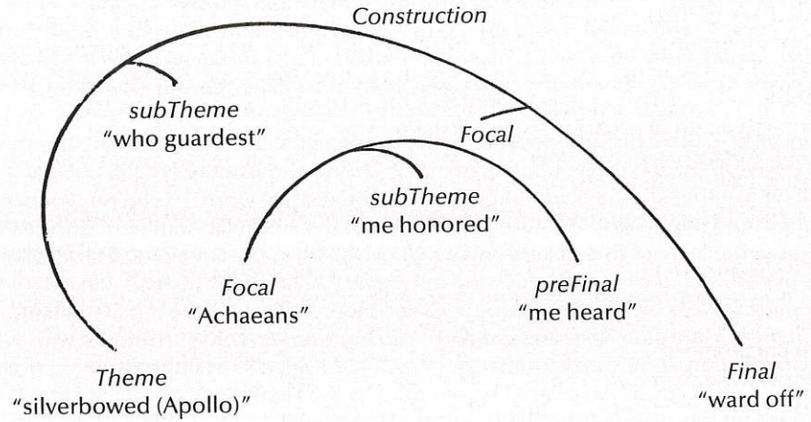


Figure 13. Akkadian ARM X 92, 9-10

mSin-mušallim	ihbulanni=ma	fTariti	ilqi	
Sin-mušallim	wronged-me-ptc	Tariti	took-3s	
ù	ina[nn]a	ina	biti=šu	wašbat
ptc*	now	in	house-his	stays-3s-feminine-stative

"Sin-mušallim has done me wrong in that [*-ma*] he has taken Tariti, [with the result that] now she is staying at his house."

*Usually translated "and."

3.2 Akkadian

But the periodic structure where Final clauses correspond to Aristotle's "end" and a redundant resultant reading emerges when the Final verb does not govern the Theme or Focus is not confined to older IE, nor are the Hittite scribal rulings that mark them. Lest one forget that the Hittites borrowed the script and scribal ruling from Akkadian, one must observe that Old Babylonian Akkadian from Mari uses some of the same devices. Particles keep track of thematic development, the order is ascending, and purpose/result is derived from context. Compare Figure 13 where a particle *ù* introduces Final "now she is staying at his house" much as Hittite *nu* introduces clauses which continue a preceding Theme. Since the verb *wašbat* "stays" does not govern Theme "Sin-mušallim wronged me," result is derivative: "Sin-mušallim . . . has taken Tariti, [so that] now she is staying at his house."

3.3 Greek Punctuation

Interestingly, earliest Greek punctuation used a dividing stroke known as early as Aristotle as the *paragraphos*. It was inserted at the beginning of the line, but essentially to mark the preceding periodic sentence as finished, much as the cuneiform ruling ends a speech unit in Hittite. Variant markers which segment such chunks included spacing between last word of the preceding "paragraph" and first word of the next. Use of capitals to reinforce the separation also precede the Alexandrian system of separating various degrees of pause and accentuation of words and word groups attributed to Aristophanes of Byzantium (3rd century BC: Thompson 1966:67-70; cf. also Allen 1973:4f.; 18ff.). This shift from marking of content units to our modern punctuation based on breath group and intonation contour needs further study in conjunction with changes from pragmatic cohesion between clauses, ascending periodic structure, and verb final word order to pragmatic subject-predicate cohesion, descending structure, grammatical cohesion between clauses, and verb initial word order. It seems clear, however, that our modern paragraph structure is a relic, both in name and in basis of cohesion, of older periodic structure. The older structure correlated rather with verb final patterns, redundantly derived purpose/result without conjunction, and temporal value of conjunctions from redundantly ungoverned or weakly governed context, while the newer correlates with verb initial patterns, lexically encoded purpose/result, and temporal subordination. Further crosslinguistic study, of course, is necessary to gauge the extent of correlation of English and Hittite differences with systematic differences in language generally.

4.0 Conclusion

The early IE periodic structure based on ascending order with medial elaboration between pragmatic Theme and Final main statement and verb final word order patterns lies behind the visual Hittite sentence punctuated by horizontal scribal rulings. The *paragraphos* of early Greek, used before the language shifted strategy enough to change the basis of punctuation, is the alphabetic counterpart of the cuneiform convention. Later developments of comma, period, and capitals reflect basic changes in language structure, changes in basis of clausal cohesion and other language patterns with which it correlates.

1. Data for this analysis includes the OH corpus (Raman 1973:201-3), standard edited texts in the series (StBoT and THeth) as well as older editions of the treaties, prayers, annals, selected letters, and texts which, according to Professor Annelies Kammenhuber's Thesaurus files, attest either *šak(k)-/šek(k)-* "know" or *hališšiya-* "plate, inlay." Work here represents research begun in Summer 1975 on NSF research grant GSOC-7002248 and added to during periods of research supported by the University of California (Berkeley), 1977-81, including work on IE syntax and prayer structure in general. I am grateful, too, to Linda Coleman and Julian Wheatley for discussion of assumptions which lie behind the script and its transliteration, and to Linda Coleman for comments on a first draft. And special thanks belong to Marvin Powell for careful editorial work on earlier versions of this paper.

2. Emeneau's (1980:1-3; 85ff.) work on language change, language type, and linguistic area is followed now by McAlpin's (1981:55f.; 129f.) account of Dravidian and Elamite typology and genetic affiliation. The use of syntax in cognate relations remains an important, debated topic.

3. The Sungoddess of Arinna is, by contrast, always written logographically without phonetic complement (cf. Figure 11:2; Laroche 1947:105f.).

4. Focus here is on scribal lines segmenting the Huwarlu text from the Aphasia text and columns from each other. For the text of Rs. IV 41ff. see Figure 11:1.

5. Professor Horst Klengel and A. Lübse of the Akademie der Wissenschaften der DDR, Zentralinstitut für Alte Geschichte und Archäologie, Bereich Alter Orient, kindly made available this excellent photograph of KBo IV 2 III 40ff., originally for a project which has grown into a revision in progress of Goetze and Pedersen's (1934) German edition. Issues here are basic to the new edition.

6. Double rulings often, but not always,separate the colophon from the text (cf. KBo V 1 and 2; KBo XI 1, 12, and 14). The colophon varies in length and gives such information as to whether the text is finished on one tablet, the name of the scribe who copied the tablet, and perhaps a brief title of contents (cf. Laroche 1949). If correctly restored from other fragments, the Aphasia text may have been known as "When the Sun, Muršili, heard the thunder at Til-Kunnu." The restoration is from new fragment XLIII 50, 9-10 plus XII 31 Rs. Rs. 27: [kuw]api *INA* ^{uru}Til-^{m}Kun[nu] [^{m}Mur]šili tetheššar (written logographically KAxIM-ar) ištama[šta], all read from hand copies of the tablets.

7. The tablet KUB VI 46 uses slanted verticals going slightly below the line to insert divisions which KUB VI 45 made with scribal rulings. The ruled unit KUB VI 45 III 40-44, for example, has the same content as KUB VI 46 IV 9-14 which is part of a larger ruled unit on that tablet. The slanted vertical in line 14 "corrects" for the missed ruling. This is not an isolated "correction," moreover. Again KUB VI 46 uses the divider to separate midline in IV 48 what KUB VI 45 IV 47-48 placed between rulings. Other dislocations can only be discussed with the entire text.

Discrepancies in ruling divisions which variously place speech introductions at the end of a preceding ruling or at the beginning of the next in texts like the Ullikummi (Güterbock 1951:142f.) and the Muwattalli ritual-prayer here must result from ambiguity between direct speech introduction which precedes (cf. KUB VI 46 III 62-3 "I called aloud: Ištanu calls [you] from your temples.") and governing verb of indirect speech which follows (cf. KUB VI 45 III 21f. "The gods [that] I prayed to on that day, for what things I prayed, [to them] I called aloud."). Compare direct (Figure 6:4) and indirect speech (Figure 6:6) above as well.

8. Particle *-za* is enclitic on the first word here of a nominal sentence with second person "subject" (Hoffner 1969). In verbal sentences it functions as middle/reflexive (Friedrich 1960:131-3; Justus 1981:9.3).

9. C. Lehmann (1979) rightly recognizes the role of topicalization in IE relativization, but wrongly interprets (1979:6 and 19) my criteria for verb final Hittite relative clauses as mere clause order. Such patterns are not in themselves verb final, but in conjunction with other patterns compatible with the verb final system. Correlates of the Hittite variant of verb final patterns include, besides those discussed elsewhere (Justus 1981:8.2) and derivative relative and purpose/result discussed here, derivative adverbial temporals without overt conjunction as well as oblique *mahhan* and *man* (cf. Figure 11:1 with discussion and references).

10. Older IE had active and middle rather than active and passive voice distinctions where middle uses resemble intransitive ("The vase broke" or "The cut hurt"), reflexive ("John hurt himself"), and passive ("John was hurt"). Parallel uses occur with middle verb *handaittat* (written SIxSÁ-at). The first (not cited here) is without objects: "The Stormgod . . . was established/emerged (from oracular consultation)." The second (Figure 11:3) reflects an action in the interest of the Subject/Theme: "The Stormgod . . . established (for) him(self) to (be) give(n) a scapeox . . .," while the last (Figure 11:4) is passive: "It was established by the god (that) none of these things be taken." But passive translation of the infinitive (Figure 11:3) depends on context, not form, as Hittite infinitives do not differentiate voice.

11. Elsewhere Zirin (1977) showed how uses of *de* in Homer indicate continuation of the secondary topic.

Abbreviations

Cf. HW^2 and CHD for fuller bibliography

AM Annals of Muršili (Goetze, Albrecht. 1967 [1933]. Die Annalen des Muršiliš. Darmstadt: Wissenschaftliche Buchgesellschaft.)

ARM Archives Royales de Mari.

CHD Chicago Hittite Dictionary, ed. Hans G. Güterbock and Harry A. Hoffner. Oriental Institute. Chicago: Chicago University Press.

CTH Laroche, Emmanuel. 1972. Catalogue des textes hittites, premier supplément. Revue Hittite et Asianique 30.94-133.

_____. 1972. Catalogue des textes hittites. Études et Commentaires 75. Paris: Klincksieck.

HdOr Handbuch der Orientalistik. Altkleinasiatische Sprachen, ed. Johannes Friedrich. 1. Abt. 2ter Band. 1-2 Abschn. Lfg. 2.

HW Friedrich, Johannes. 1952. Hethitisches Wörterbuch. Heidelberg: Winter.

HW^2 _____, and Annelies Kammenhuber. 1975–. Hethitisches Wörterbuch. 2te Aufl. Heidelberg: Winter.

KBo Keilschrifttexte aus Boghazköi.

KUB Keilschrifturkunden aus Boghazköi.

StBoT Studien zu den Boğazköy-Texten, ed. Heinrich Otten. Wiesbaden: Harrassowitz.
StBoT 1 Carruba, Onofrio. 1965. Das Gelübde der Königin Puduhepa an die Göttin Lelwani.
StBoT 4 Werner, Rudolf. 1967. Hethitisches Gerichtsprotokolle.
StBoT 7 Otten, H., and W. von Soden. 1968. Das akkadisch-hethitischen Vokabular KBo I 44 – KBo XIII 1.
StBoT 8 Otten, H., and Vladimir Souček. 1969. Ein althethitisches Ritual für das Königspaar.
StBoT 9 Riemschneider, Kaspar K. 1970. Babylonische Geburtsomina in hethitischer Übersetzung.
StBoT 10 Carruba, Onofrio. 1970. Das Palaische: Texte, Grammatik, Lexikon.
StBoT 12 Neu, Erich. 1970. Ein althethitisches Gewitterritual.
StBoT 13 Otten, H. 1971. Ein hethitisches Festritual (KBo XIX 128).
StBoT 18 Neu, Erich. 1974. Der Anitta-Text.
StBoT 19 Burde, Cornelia. 1974. Hethitische Medizinische Texte.
StBoT 20 Rüster, Christel. 1972. Hethitische Keilschrift-Paläographie.
StBoT 22 Oettinger, Norbert. 1976. Die Militärischen Eide der Hethiter.
StBoT 25 Neu, Erich. 1980. Althethitische Ritualtexte in Umschrift.
THeth Texte der Hethiter, ed. Annelies Kammenhuber. Heidelberg: Winter.
THeth 6 Ünal, Ahmet. 1978. Ein Orakeltext über die Intrigen am hethitischen Hof (KUB XXII 70).
THeth 7 Kammenhuber, A. 1976. Orakelpraxis, Träume und Vorzeichenschau bei den Hethitern.
VAT Inventory numbers of tablets in the Staatliche Museen in Berlin.

1s, 2s, 3s 1st, 2nd, 3rd person singular
1p, 2p, 3p 1st, 2nd, 3rd person plural
acc. accusative case
gen. genitive case
imp. imperative
nom. nominative case
ptc particle
Rs. Rückseite (back of the tablet)
sup. supine
Vs. Vorderseite (front of the tablet)

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The Temple Scribe in Chaldean Uruk

The education and activities of the Eanna temple scribe in sixth-century B C. Uruk varied little from what they had been prior to the Chaldean era. The cuneiform writing system was still in use, and Akkadian economic documents continued to be composed and literary texts preserved in a manner not unlike that of previous periods. These traditions, however, did not preclude the scribe's attending to his own private business affairs or prevent his engaging in the collection or composition of literary documents that reflect either his own personal interests or the necessity to prepare materials with decidedly political overtones. The result of these endeavors is a body of texts which, in many respects, indicates both the influence of spoken Aramaic on written Akkadian and the everchanging political situation (from both official and private perspectives) in southern Mesopotamia in the Chaldean period.

With the fall of Nineveh in 612 BC the once mighty Assyrian empire passed into history. A new star was on the rise in the form of the Chaldeans; power shifted from northern Mesopotamia back to Babylon. The conquests of Nabopolassar[1] (626-605) the founder of the Chaldean dynasty, however, did not result in a severing of ties with the past. Like the Amorites and Kassites of an earlier age, these Chaldeans were well aware of the cultural achievements of their predecessors and sought to reestablish ties with them. The libraries of the Assyrian king Ashurbanipal lay in ruin; yet the scribal schools of palace and temple in southern Mesopotamia sought to perpetuate the use of the cuneiform system of writing and, as a consequence, to preserve a tradition long associated with bygone eras. Cuneiform, and the clay tablets on which it was written, were not adapted to the writing of Aramaic, yet their use was continued, partly because tradition dictated that this be so and partly because Akkadian, the written language of court and commerce, had always been linked with the system and was still a facet of everyday life in sixth-century Mesopotamia.

This can best be seen in examining the documents from the southern Mesopotamian city of Uruk (modern Warka) and its great Eanna temple (the center of worship of the goddess Ishtar)[2] that was for so long a center of economic life. Uruk is a site that has yielded hundreds of tablets from earliest times as well as from the Chaldean period; although the vast majority of this material can be dated to the sixth century, a portion of it attests to the use of cuneiform in Uruk as early as the third millennium BC.[3]

While discussion concerning the original purpose of cuneiform writing continues, there can be no question that record keeping was an important part of every

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Mesopotamian city-state.[4] Bureaucracies constituted a feature of each community, and data concerning the delivery and dispensation of commodities had to be kept. The earliest documents indicate that an educational system existed to provide scribes, priests, and merchants with a knowledge of writing essential to their work. Scribal schools designed to teach the art of writing Sumerian (and, later, Akkadian) cuneiform thus emerged in urban centers and were to continue to exist long after Sumerian and Akkadian ceased to be spoken languages. Early school exercise tablets show that particular texts could be copied over and over again, perhaps by several different individuals.[5] Through the training received in the edubba ("tablet house") the scribe could "satisfy the economic and administrative needs of the land, primarily, of course, those of temple and palace."[6] While very little (comparatively) has survived (or has been published) from the second and early first millennium, documents from the seventh and sixth centuries indicate that scribal activity expanded in Uruk to include the preservation and copying of literary texts composed much earlier.[7] In addition to the preparation of receipts, ledgers, or balanced accounts necessary to the daily business of the Eanna temple, medical texts, hymns, rituals, and astrological and birth omens were copied and preserved for the future.[8] In the later Achaemenid and Seleucid periods relatively recent discoveries indicate that scribes also composed somewhat "apocalyptic" or "prophetic" texts with decidedly political overtones that may reflect both a genre having its roots in much earlier periods of Mesopotamian history and a public function of the scribe that is now receiving increased attention (see below).

We actually have no contemporary evidence for the training of the scribe in the sixth century, but there is no reason to suppose that it varied greatly from what it had been previously. From earlier evidence we know that, as with the learning of any language or script, memorization played a very important part. Lists of signs, along with their pronunciations, had to be copied and recopied until the student had mastered all of them.[9] Moving from the simple to the more complex, he then had to undertake the task of reproducing some of the more important literary works. Many examples of such efforts have been unearthed in excavations of various sites. Some of these copies remained incomplete as the student moved on to more complicated works. This scribal training resulted early in the creation of reference tools such as "syllabaries" (signs with their pronunciation written out phonetically), bilingual Sumerian-Akkadian "vocabularies" (combinations of Sumerian word signs and their pronunciation together with their corresponding Akkadian meanings), topically arranged lists of Sumerian words with their Akkadian meanings, and grammatical texts that were intended to help Akkadian scribes learn Sumerian morphology. Thus, as A. L. Oppenheim has put it, "the traditional bilinguality of the Mesopotamian scribe was maintained by the training in which a great deal of Sumerian material was used."[10] Both the "literary" and "economic" documents reflect this tradition. Such circumstances led, naturally, to the specialization of scribes and to the preservation of several categories of material, although it is important to note that present evidence does not allow one to be precise in determining the exact extent of this latter aspect of the Uruk scribe's activities.

In attempting to deal with the Chaldean scribe in general, as with scribes in any other period, one problem stands out above all the others: almost nothing is

known of his background, position in society, or possible political influence. While the goddess Nisaba and the god Nabû were, at times, patrons of this profession, it is still unclear what the precise relationship between them and the scribal craft really was. The scribe was probably trained to deal with virtually every category of material – from omen texts to plant and stone lists. However, the occurrence in the Neo-Assyrian period of a *tupšar enūma Anu Enlil* (the scribe of the series *enūma Anu Enlil*), who dealt with materials of an astrological or astronomical nature,[11] is one of a number of indications that a certain degree of specialization existed. Another case involves those men designated as "city scribes," who are significant administrative officials in the ninth, eighth, and seventh centuries. In focusing more precisely on the Chaldean era and some of its rather interesting source material, it is important to note for our purpose that perhaps (next to the third dynasty of Ur) more documents survive from the Neo-Babylonian period than from any other. Among these is a rich corpus of contract tablets and administrative records from Uruk and its great Eanna sanctuary. These provide us with a rather fascinating picture of the public and private life of numerous temple scribes and aid in attempting to reconstruct the "careers" of these individuals and their responsibilities. They suggest that a scribe in the Neo-Babylonian period was one of two types: "the literary scribe who had to be specially trained and underwent thorough schooling, and the scribes who knew enough to write out business documents but did not have any literary background."[12] This appears to have been the case in the Old Babylonian period as well. Much more, of course, is known of the activities of the men who "controlled the writing down of all legal, epistolary, business, and administrative documents" since the corpus of material in which their names are mentioned is extremely large. Although there have been those who have suggested that those scribes belonged to some type of "guild" or "association,"[13] the evidence, I believe, is presently inconclusive since the personal and "family" names included in the documents do not hint at the existence of such groups.

Fortunately for us, contracts from the Eanna sanctuary or from Uruk itself combine to paint an intriguing picture of both the personal and professional sides of the life of the scribe in the Chaldean period. A case in point is that of a certain Nabû-bāni-ahi,[14] son of Ibnâ, who repeatedly appears in administrative documents beside members of the Eanna hierachy. While his occupation and involvement with the overseer (*qīpu*) and administrator (*šatammu*) of this important temple are well-known, his activities provide us with a few more clues as to a) the precise role played by scribes in the public and private lives of the officials beside whom they worked, and b) the background or training that may have been necessary before an individual could assume an administrative position. His name is attested in the Uruk documents as early as the 23rd year of Nebuchadnezzar (582) where he first appears as a witness to a transaction. He also appears as a witness in a promissory note involving the delivery of sheep to the executive officers (the *bēl piqnēti*) of Eanna and later turns up in 564/3 (the 8th of the month Abu) in another promissory note concerned with the payment of silver. It is in this latter text that he is designated "scribe of Eanna" (the *tupšar Eanna*), although this is not an official title. He seems to have been one of several scribes who, contemporaneously, are called "scribes of Eanna" in the Uruk contracts.[15] However, he is one of the most

prominent scribes who is associated with the affairs of administrative personnel both in the temple proper and in other cities in Babylonia.

His most frequently attested role is not that of writer of the tablet in which his name appears but, rather, as a witness to transactions involving prominent individuals both before and after they assume their offices in Eanna or Uruk. Among these interesting people are 1) Marduk-šuma-iddina of the Gimil-Nanâ family, a man who became comptroller (*šākin tēmi*) of Uruk; 2) Sîn-iddina, the famous overseer of the Eanna sanctuary; and 3) Bānîja of the Bā'iru house, who was himself a scribe before assuming the office of temple administrator (*šatammu*). Marduk-šuma-iddina seemingly performed the function of receiver of grain delivered to the temple even before he was elevated to the office of *šākin tēmi*. It is, therefore, probable that top city and temple administrative personnel went through an apprenticeship in Eanna before assuming their office. Sîn-iddina, the overseer of Eanna, turns up everywhere, both in public and private records in both northern and southern Babylonia, and Nabû-bāni-aḫi is almost always at his side either as a party to several transactions or as a witness. Lastly, Bānîja, appears as witness in promissory notes involving not only Sîn-iddina, but also his predecessor as temple administrator and the temple accountant. This Bānîja, recruited from the scribal ranks, subsequently became Eanna administrator during the reign of Neriglissar (560-556).

These bits and pieces of information, extracted from contract tablets, do not shed much light on the function of the scribe as "tablet writer." Nevertheless, the names and activities of such men as Nabû-bāni-aḫi do allow us to draw tentative conclusions concerning the background and possible political influence of certain Uruk scribes in Chaldean Mesopotamia. First, it seems likely that at least some of the men in the scribal ranks came from banking houses or "families" noted for their business activities throughout southern Mesopotamia. The documents bearing their names do bear witness to the prominence of certain families in temple affairs. Nabû-bāni-aḫi was just one of the many scribes who, while apparently never holding such important administrative positions as did Sîn-iddina or Marduk-šuma-iddina, were involved with these men (just as members of the Egibi, Nabāja, and Nūr-Sîn families were business associates in northern Babylonia) in transactions that transcended the basic responsibility of "tablet writer." The same types of relationships existed in the succeeding Achaemenid period, where it can be shown that the scribal positions and administrative offices (at times filled by individuals who were trained scribes) were handed down from one family member to another.

A case in point is that of Mūrānu, Nabû-bāni-aḫi's son. Mūrānu, like his father, is, on occasion, mentioned in texts along with other scribes, most notably Nādin, son of Bēl-aḫḫe-iqīša, descendant of Egibi, and Kinâ, son of Zērīja, where he and Nādin are referred to as *tupšarrū ša Eanna*. On the 20th of Nisanu, 544/3, Mūrānu is found writing up a tablet involving Gabbi-ilāni-šarra-usur, *qīpu* of Eanna, and Zērīja, the *šatammu* of Eanna. In the reign of Cyrus (539-529) the names of all three of the above scribes occur together in several documents where they act as witnesses. On the 9th of Simanu, 534/3, Mūrānu appears with another scribe, Nabû-nādin-apli, son of Bānîja, former *šatammu* of Eanna. This evidence seems to indicate that offices became to an even greater extent (no doubt as a result of royal intervention or control) virtually the private preserves of individual families.

Secondly, material such as this, when taken together with the almost totally propagandistic documents from the early Achaemenid period, shows that an Eanna scribe could not only be influential, but could also be installed in or removed from a position of authority in accordance with the king's wishes. A case in point is that of Zērīja, the administrator of the Eanna sanctuary in the reigns of Amēl-Marduk (562-560) and Nabonidus (556-539). The interesting "Persian Verse Account of Nabonidus," composed by Babylonian scribes after Cyrus' conquest, clearly portrays Zērīja as a loyal follower of the last Chaldean monarch, who used to "sit at the feet of the king." His official activities are well documented in numerous Uruk contracts bearing his name. Yet it has been recently shown that this Zērīja held his office at two different times.[17] His first term is documented from the month of Nisanu in 561 until at least 559, when he suddenly disappears and is replaced by a certain Bānîja, son of Tabni-Ea of the Bā'iru family, a man who, as we have already seen, was also a scribe.

It is indeed interesting that Zērīja's sudden departure from his official position in the Eanna sanctuary coincides with the equally sudden disappearance of the temple overseer Sîn-iddina and with the accession to the throne of an apparent usurper, Neriglissar. While the reasons for these changes are, understandably, not revealed by these or any other documents presently known, it nevertheless seems likely that close relationships had to be maintained between the palace and temple personnel who, at least in this instance, were scribes before they assumed their administrative duties. Furthermore, if the information contained in the fragmentary history of Berossos (fl. ca. 290) is correct and Neriglissar did obtain his throne by a coup d'état, then it would seem logical for him to attempt to build a base of support, either through forming alliances with individuals who were already powerful (in the temple and elsewhere throughout the kingdom) or, where circumstances would permit it, by placing individuals loyal to him in positions of authority. Perhaps, then, he removed Zērīja (not to mention other prominent personnel) from his office in Eanna, replacing him with his own appointee.

Whatever the case, available source material clearly indicates that, as was the case in the reign of Nebuchadnezzar, an Eanna scribe could not only rise to a position of administrative importance, but also develop ties with the monarchy in Babylon that could be of use in holding on to his own office, as well as providing the king with needed support.

As a consequence of several recent discoveries, we should say a few words about the "public" activities of the Uruk scribe during the Chaldean period. The Uruk contracts bear unmistakable witness to the prominence of certain families in temple affairs.[18] The scribes who were members of these families seem to have been involved in collecting cuneiform tablets representing various literary genres surviving from earlier periods[19] as well as in composing texts which had the effect of perpetuating earlier tradition for political reasons.[20] While it has been known for some time that Achaemenid propaganda was circulated by the priest-scribes of Babylon to justify Cyrus' conquest of the Chaldeans and the apparent "exile" of Nabonidus, it is now clear that the Uruk scribes were also engaged in composing such material at least as early as the Neo-Babylonian period.

A case in point lies in an example of the so-called "apocalyptic" or "prophesy" literature brought to light only a few years ago, a genre which is now receiving

increased attention. Discovered in a residential area of early Achaemenid Uruk during the German Warka Expedition in 1969, text 22307/7 may well have come from the library of some magician or diviner. In any case, it constitutes further evidence for the inclination to collect and preserve tablets prepared by scribes of prior periods. While the lack of personal names has resulted in considerable debate over the identity of individuals referred to in the text, there can be little doubt that the Uruk priest-scribes were involved in preparing this propagandistic document. A portion of the text reads as follows:

> After him a king will arise, but he as well will not provide justice in the land; he will not give the right decisions in the land.
>
> He will subdue the world, and all the world will tremble at the mention of his name.
>
> But after him, a king will arise in Uruk, who will provide justice in the land and will give the right decisions for the land.
>
> He will establish the rights of the cult of Anu in Uruk.
>
> He will remove the ancient protective goddess of Uruk from Babylon and let her dwell in her own sanctuary in Uruk. The people belonging to her he will devote to her. He will rebuild the temples of Uruk and restore the sanctuaries of the gods.
>
> He will renew Uruk. The gates of Uruk he will build of lapis lazuli. He will fill the rivers and fields with abundant yield.
>
> After him his son will arise as king in Uruk and become master over the world.
>
> He will exercise rule and kingship in Uruk, and his dynasty will be established forever.
>
> The kings of Uruk will exercise rulership like the gods.[21]

This document clearly reflects a function of the priest-scribes of Chaldean Uruk, which is to be seen also in the so-called "Persian Verse Account of Nabonidus," the Cyrus Cylinder, and the Adad-guppi material from Harran. At times when threats to the stability of the monarchy may have been perceived, local attitudes toward political events could be represented by using apocalyptic descriptions which perhaps reflect a literary genre having its roots in earlier periods of Mesopotamian history.

In this case the scribe employs the *vaticinium ex eventu* device "to prove the authenticity and reliability of the real prediction . . . and thus to legitimate and lend support to the predicted rule of the son of the good king and his dynasty."[22] Parallels to this type of text extend from the Neo-Assyrian period to the time of Alexander the Great and his successors and serve to give "in the form of predictions, a history of the kings of Babylon from the rise of the Neo-Babylonian empire to the Hellenistic Age," while at the same time reflecting local attitudes to changing conditions.[23] Thus, while the thousands of Neo-Babylonian business documents provide glimpses into the private life of some scribes, the literary remains also bear witness to their inclination to collect and copy literary material surviving from earlier periods, as well as to their political involvement by the production of "apocalyptic" pieces like the one we have discussed above.

Appendix: Aramaic Influence on Cuneiform Akkadian.

The preceding paper has focused in a general way on the training of scribes and in a more specific way on the official and unofficial activities of the scribes of Eanna who wrote Akkadian cuneiform documents in the Chaldean period. However, as we noted at the beginning, Akkadian was no longer the primary spoken language and, despite the established tradition, this frequently posed graphic-linguistic problems. As Gelb notes, "this was the time when Aramaic influence began to be preponderant in large parts of the Near East. How strong this influence was, especially in Mesopotamia, is well-attested by the numerous Aramaic inscriptions discovered in both Assyria and Babylonia, which clearly prove that the country was at that time bilingual and biscriptural."[24] Even though the educational system designed to teach cuneiform seems to have remained basically the same as in previous periods, this did not preclude the development of local or regional "styles" of writing. Akkadian cuneiform, though far removed from the days of its origin, came to display characteristics heretofore unknown that have come, in modern times, to be associated with a Neo-Babylonian "dialect." As a result, the writing of cuneiform signs expressing the final vowels or consonants of an Akkadian word frequently creates the impression of a scribe prone to grammatical error. This simply was not the case.

Contrary to Hyatt's reasoning of a generation ago,[25] what may appear as incorrect spelling in Chaldean cuneiform is actually a reflection of Aramaic intrusions or, more correctly, "a system of syllabic signs each expressing a consonant plus any vowel."[26] This would explain the occurrence of unusual verbal forms (such as *na-ta-ku-lu* or *ba-la-ta*). Furthermore, it appears likely that the scribes of the Neo-Babylonian period "consciously began to select certain signs over others in order to express unambiguously the nature of the consonants in the words they were writing."[27] This would involve overlooking a number of grammatical features common to correct Akkadian, such as case endings and proper final vowels. However, because of the flexibility of the cuneiform writing system itself, the scribe could discard "correct" spellings in favor of accurately indicating the consonants making up the root of the word employed in the text.[28] Thus, while the form of a verb, for example, might appear to be awkward, such a situation could be readily tolerated, since the "awkwardness" was purposely designed to remove all doubt as to what verb was being used. Hence, the presence of Aramaic in both spoken and written form served to partly change the character of the Akkadian being written in the cuneiform system.

1. For translations of the "Nabopolassar Chronicle," see Donald J. Wiseman, *Chronicles of the Chaldean Kings* (London: The British Museum, 1961) 51 ff.; and A. K. Grayson, *Assyrian and Babylonian Chronicles* (Texts From Cuneiform Sources) V (Locust Valley, New York: J. J. Augustin, 1975) Chronicle 2, pp. 87 ff. A bibliography of reviews of Wiseman's book and related studies is included by Grayson on p. 87.

2. See "Eanna" in *Reallexikon der Assyriologie* II (Berlin: Walter de Gruyter and Co., 1938) 260. Inscriptions attest to construction efforts as early as the time of Enannatum of Lagash during the Early Dynastic period.

3. See Eva Strommenger, "The Chronological Division of the Archaic Levels of Uruk-Eanna VI to III/II: Past and Present" in *American Journal of Archaeology* (1980) 480-1. See also Adam Falkenstein, *Archaische Texte aus Uruk* (Berlin, 1936).

4. Samuel Noah Kramer, *The Sumerians* (Chicago: University of Chicago Press, 1963) 230. For additional commentaries on the Sumerian Edubba, see Adam Falkenstein "Der Sohn des Tafelhauses," *Die Welt des Orients* 3 (1948) 172-86; Cyril J. Gadd, *Teachers and Students in the Oldest Schools* (London: School of Oriental and African Studies, University of London, 1956); Samuel Noah Kramer, *Schooldays* (Philadelphia: The University Museum, 1949).

5. See Gadd, *Teachers and Students* (1956) 1 ff.

6. Kramer, *The Sumerians* (1963) 230 ff. This did not preclude the broadening of the scribe's base to include the study and composition of literary works.

7. See Hermann Hunger, *Babylonische und Assyrische Kolophone,* Alter Orient und Altes Testament II (Neukirchen-Vluyn: Neukirchener Verlag, 1968); Adam Falkenstein, *Literarische Keilschrifttexte aus Uruk* (Berlin, 1931) no. 2 ff.; F. Thureau-Dangin, *Tablettes d'Uruk à l'usage des prêtres du temple d'Anu au temps des Sélucides* Textes cunéiformes, Musée du Louvre, VI (Paris, 1922) no. 1 ff.

8. While much, to be sure, has been written on the subject of teaching those who *spoke* Sumerian the art of *writing* the language, very little (comparatively speaking) has until recently been done to explain the method of scribal education after its demise as a spoken language. See now the recent treatment of H. L. J. Vanstiphout, "How Did They Learn Sumerian?" *Journal of Cuneiform Studies* XXXI (1979) 118 ff. For older analyses of the teaching of Sumerian, see F. R. Kraus, *Vom mesopotamischen Menschen der altbabylonischen Zeit und seiner Welt* (Amsterdam, 1973) 214-31; A. W. Sjöberg, "The Old Babylonian Eduba" in *Assyriological Studies* 20 (Chicago, 1975) 159-79; S. N. Kramer, "The Sumerian School" in G. E. Mylonas (ed.), *Studies Presented to David Moore Robinson* (St. Louis, 1951) 243 ff.; A. Falkenstein, "Die babylonische Schule," *Saeculum* IV (1953) 125-37; and C. J. Gadd, *Teachers and Students* (1956).

9. Vanstiphout "How Did They Learn Sumerian?" (1979) 125.

10. A. Leo Oppenheim, *Ancient Mesopotamia: Portrait of a Dead Civilization* (Chicago: University of Chicago Press, 1964) 249.

11. *Ibid*., p. 242. See also Oppenheim's essay "Man and Nature in Mesopotamian Civilization" in the *Dictionary of Scientific Biography* XV 364 ff.

12. See David B. Weisberg, *Guild Structure and Political Allegiance in Early Achaemenid Mesopotamia*, Yale Near Eastern Researches I (New Haven: Yale University Press, 1967) 84. See also Samuel N. Kramer, *History Begins at Sumer* (New York: Doubleday, 1959) 1 ff.

13. Weisberg, *Guild Structure* (1967) 81.

14. Conclusions expressed in the following pages regarding Nabû-bāni-ahi and the public and private life of an Eanna scribe writing business documents are drawn from my article "The Scribe Nabû-bāni-ahi, son of Ibnâ, and the Hierarchy of Eanna as seen in the Erech Contracts," *Zeitschrift für Assyriologie* 67 (1977) 42-52.

15. In the preparation of business documents, as was the case with the writing of letters, the scribe would employ phraseology and a format that was consistently used in these texts. Thus, while letters (as in the Old Babylonian period) began with standard introductory phrases, the contract tablets included common idioms and were structured according to customary procedure (e.g., the body of the text would be followed by a list of witnesses, with the year and month of composition appearing at the end of the tablet).

16. For a translation of this interesting text, see Sidney Smith, *Babylonian Historical Texts* (London, 1924) 83 ff.; and J. B. Pritchard (ed.) *Ancient Near Eastern Texts Related to the Old Testament* (Princeton, 1955) 314.

17. See R. H. Sack, "Sin-Iddina and Zērîja, *qîpu* and *šatammu* of Eanna in Erech," *Zeitschrift für Assyriologie* 66 (1976) 280-91.

18. The contract tablets from the Achaemenid period offer even more evidence to support this conclusion. See San Nicolò, *Beiträge zu einer Prosopographie neubabylonischer Beamten der Zivil-und Tempelverwaltung* (München, 1941) 16 ff.

19. These comments certainly apply to the scribe in Achaemenid and Seleucid Uruk as well, since the literary genre discussed here is evidenced in the texts from these later periods.

20. For scribal activity at Uruk involving collecting and copying texts representing various literary genre, see Adam Falkenstein, *Literarische Keilschrifttexte aus Uruk* (Berlin, 1931); Hermann Hunger, *Kolophone* (Neukirchen-Vluyn, 1968); and F. Thureau-Dangin, *Tablettes d'Uruk à l'usage des prêtres du temple d'Anu au temps des Séleucides* (Paris, 1922).

21. See also a much later cuneiform parallel in a British Museum text published recently by A. K. Grayson in *Babylonian Historical-Literary Texts* (Toronto, 1975) 33, lines 11 ff.: "A rebel prince will arise [. . .] the dynasty of Harran [. . .] for 17 years he will exercise kingship and will prevail over the land the festival of Esagil (?) [. . .] the wall in Babylon [. . .] he will plot evil against Babylonia. A king of Elam will rise up, the sceptre [. . .] he will remove him from his throne [. . .] he will seize the throne."

22. See H. Hunger and S. Kaufman, "A New Akkadian Prophecy Text" in the *Journal of the American Oriental Society* 95/3 (1975). Likewise, see W. G. Lambert, *The Background of Jewish Apocalyptic* (London: The Athlone Press, 1978) 11: "The document is clearly a product of the city of Uruk, which had very ancient cultural traditions that had been maintained, but was not the political capital, that position being indisputably Babylon's. Thus the Urukean prophecy has tacitly passed over all the Assyrian puppet rulers in Babylon and records by their Assyrian masters! A combination of chauvinism and political realism. It is not possible to demonstrate from other evidence that all the things said about this sequence of seven kings did in fact happen. We are far from well-informed about the details of this period, especially as they were seen from Uruk, but equally nothing said can be shown to be wrong."

23. See Eric Ebeling, *Keilschrifttexte aus Assur religiösen Inhalts* II (Leipzig, 1923) no. 421. This is a late Assyrian tablet from Assur containing, essentially, the same phraseology as the Uruk text cited above. A portion reads: "A prince will arise and will exercise kingship for 13 years. There will be an attack of Elam on Babylonia and the booty of Babylonia will be carried off. The shrines of the great gods will be ruined and Babylonia will be defeated. There will be chaos, upset, and trouble in the land, and the upper classes will lose power. Some other, unknown person will arise, will seize power as if a king, and will kill off the nobility." See Lambert (1978) 10.

24. I. J. Gelb, *A Study of Writing* (Chicago: University of Chicago Press, 1952) 152.

25. J. P. Hyatt, *The Treatment of Final Vowels in Early Neo Babylonian*, Yale Oriental Researches 23 (New Haven: Yale University Press, 1941).

26. Gelb, *Study* (1952) 152.

27. Weisberg, *Guild Structure* (1967) 108.

28. Weisberg, *Guild Structure* (1967) 108 and 112-117, where a lengthy bibliography is found containing references to studies dealing with the relationship of the Aramaic language to the writing of cuneiform.

Marvin A. Powell

Three Problems in the History of Cuneiform Writing: Origins, Direction of Script, Literacy

"Origins" suggests that cuneiform was invented in a short period of time around 3000 BC by a citizen of the Sumerian city of Uruk and that it arises conceptually out of the token system described by D. Schmandt-Besserat. "Direction of script" agrees with S. Picchioni that cuneiform was written and read vertically down through c. 2300 BC, but it emphasizes the use of reed patterns to demonstrate the manner in which the stylus was manipulated and sees this mode of manipulation as the motivating force behind the transition to horizontal script. "Literacy" argues that cuneiform was not as difficult as usually assumed, that the alphabet had no demonstrable effect on the level of functional literacy, and that the superiority of the alphabet over cuneiform has been exaggerated.

All of the problems discussed in this paper have long been pondered by cuneiformists. None of them have simple answers. Thus, their perennial attraction. I do not propose to solve these problems in a definitive fashion. However, I do propose alternative solutions which, in some cases, run counter to prevailing opinion, and here my intention has been to construct answers which are not less likely to be true than opinions generally held. Ideally, we would like to substantiate our hypotheses by at least two independent witnesses. Where this is possible we conventionally call these hypotheses "facts," but it must be borne in mind that such "facts" become progressively rarer as one moves back in human history from the present day. In this sense, much of mediaeval and ancient history is without "facts," and the third millennium, which forms a large part of our concerns in this paper, is almost entirely devoid of them. Bearing this real fact in mind, we now proceed to indulge ourselves in what a certain wit termed the prerogative of the living: to play tricks on the dead.

ORIGINS

The problem of cuneiform origins can be reduced to four interrogatives: *who, when, where,* and *why?* Given my caveat above, no one will expect me to suggest the name of the individual, the year BC, and the street address associated with the invention of cuneiform writing. However, publication of the papers by Margaret

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Green and Denise Schmandt-Besserat in this issue encourage me to believe that we are perhaps closer to a solution of the problem than we have been in the past.

By convention we say that cuneiform (by which we mean its genetic parent discussed by M. Green) was invented around 3000 BC. The probability that this conventional date could be off by as much as two centuries need not disturb us, because all Near Eastern chronology for this early period is tied together by a number of typological linkages. Thus, mostly what we are talking about is an eventual shrinking or expanding of the whole chronology, not of its individual parts. Consequently, our conventional date has no significance for the question of whether Mesopotamian or Egyptian writing was created first. That is a problem which we are simply not in a position to solve presently. In this context it is worth noting that a recent attempt by the archaeologist James Mellaart to develop a chronological system using radio-carbon dating and other evidence which would eliminate "the dubious claim that writing was invented in Mesopotamia earlier than Egypt" (1979:12) has already encountered very serious criticism (Weinstein 1980; Kemp 1980; Munn-Rankin 1980).

Other chronological problems confront us at the site of Uruk where the oldest, stratified Mesopotamian examples of pictorial writing have been found. Strommenger (1980) has recently reviewed the system used by the excavators to distinguish strata III and IV and has pointed out the circular nature of the argumentation, the script being used to date the levels, and vice-versa. Thus, at present, separating out stages of the script in relation to the archaeological levels seems uncertain at best. However, other considerations enable us to treat the Uruk IV-III archaeological strata provisionally as a unit, at least with regard to the origin of the pictorial script.

During the period in question, Uruk seems to have been not only the largest urban center in Mesopotamia but also the only one that could be called a city at all (Adams and Nissen 1972:17f.; cf. Powell ca. 1982). Now, we do not *know* that writing was invented at Uruk, but our job is not to multiply hypotheses. We must choose the more likely, and the present evidence suggests Uruk as the probable locus of invention.

If we are correct in this assumption, then the arguments about the emergence of the impressed tablet system marshalled by Schmandt-Besserat above enable us to make other probable inferences concerning when and why cuneiform was invented. Her work has, in my opinion, established beyond reasonable doubt the presence of this system in the fourth millennium, prior to any pictorial writing system, as well as its continuity down into the period when the pictorial ancestor of cuneiform was invented. For our purposes it is irrelevant whether the impressed tablet system disappeared in Uruk IVa or in Uruk III, because it could have continued in use for limited purposes even after the invention of the pictorial system. Thus, we may formulate our second hypothesis: the pictorial ancestor to cuneiform writing was invented as a conceptual whole during the time period represented by the Uruk IV-III archaeological strata.

This hypothesis rests upon the likely assumption that the pictorial system grows out of the accounting system attested by the impressed bullae and tablets, and it provides us with a further inference about the nature of early Sumerian writing. The impressed tablets are clearly mnemonic in nature. They form part of

an accounting system, the rules of which we do not know and are unlikely ever to recover. The same is essentially true of the early pictorial tablets. They contained the information necessary for the accountant to interpret the record, but there is nothing in them to suggest that they represent a systematic attempt to fix most or all of the language in a way that can be decoded by an outsider. Thus, the scepticism voiced by I.M. Diakonoff (1975:109f.) about the validity of the term *logograms* for the early pictorial signs — as advocated by Falkenstein (1936:32), Friedrich (1966:45), and Gelb (1952/1963:65) — finds solid support in Schmandt-Besserat's work. The conceptual background to the early pictorial script now stands revealed, and it is not, as often supposed, logographic, but mnemonic, with elements much closer to the ideography argued by Diakonoff than to any system of logography. Even the number of signs discovered (estimated by M. Green, above, at about 1200) militates against an assumption of logography and, therefore, encourages us to seek alternative conceptual frameworks for interpreting early cuneiform writing.

If, on the other hand, we look upon the early pictorial script as basically mnemonic and seek evidence for this in its later development, we find traces of its mnemonic character enduring to the very end of the Sumerian orthographic tradition. It is, in fact, so deeply embedded in the system that it inhibits development of either a phonetic or a logographic type of writing. By the twenty-fourth century BC when the structural paradigm for all subsequent Sumerian orthography has already emerged, one finds a repertoire of phonetic signs sufficient — had the phonetic principle been systematically applied — to represent Sumerian in a phonetic script. This, however, is never done in standard orthography. One finds, alongside signs that can be called true logograms (since they are normally used only to represent one word each), signs that can only be called ideograms (or some corresponding term), since they represent a number of different words related only in a conceptual — not a verbal — sense. These ideograms — and often the logograms — are delimited and made readable by a subsystem of semantic and phonetic markers, usually called "determinatives" and "phonetic complements" respectively, which make it possible — even for an outsider — to decode and understand the system.

A few words about this system are in order because, in my opinion, it has been misunderstood, not only by linguists and historians of writing, but also by specialists in the field as well. E. Reiner (1973) treated the subject of reading cuneiform texts written in the Akkadian language, for which she set up a fairly exhaustive set of rules from the standpoint of the modern scholar. One will eventually be able to set up such rules for reading cuneiform Sumerian from the twenty-fourth century BC on, but these, being intimately linked with the origins of the script itself, are ultimately rather different from those for reading the derived systems used to write Akkadian, Eblaite, Elamite, Hittite, Hurrian, and Urartian. There are, of course, certain visual-lingual-aural rules which enable one who has mastered them to transform visual symbols into language sounds. However, anyone who becomes really proficient at this is likely to find that he has, in the process, learned the language. Knowledge of the language is probably the primary factor in determining the ability to interpret visual symbols in a manner intelligible to other speaker-hearers of the language itself.

This, of course, functioned in the same way for the ancient Sumerian (and Akkadian) scribes who really understood Sumerian (as we assuredly do not). The system of noun "determinatives" is well-known — there are only about a dozen common ones. It consists of procedures like prefixing the names of divinities with the picture of a star and suffixing the picture of growing plants to certain types of plants or the picture of a fish to aquatic animals. These determinatives serve to delimit the range of meaning of the ideogram and therefore to "determine" its reading. There also exists a parallel system of phonetic "determinatives," which function with verbs as well as nouns.

In addition to the phonetic chains of signs defining the tense, voice, person (and certain other aspects) of the verb, Sumerian writing delimits the semantic field (and therefore the reading) of verbal roots by a system of phonetic indicators with regular rules. I have tried in another context (Powell 1978: 182f. n. 31) to give an account (unfortunately incomplete) of one aspect of this system, but it remains to be described as a whole. These verb indicators, except in a few special cases, follow the sign which stands for the verbal root. Nouns, on the other hand, can have these phonetic indicators before the signs in question (e.g., ad+REEDMAT = adgub = "matweaver"), after them (e.g., PLOUGH^{na} = apinaK = "of a/the plough," distinguished from ^{ab}PLOUGH = absin = "furrow," whereby the *b* of the determinative *ab* is not significant — it could theoretically be read *ap* — only the position vis-à-vis the sign PLOUGH), and both before and after (e.g., ^{nu}BREAST^{da} = nubanda = "lieutenant" or some such meaning).[1] All of these features point to an early cuneiform writing system that is conceptually neither phonetic nor logographic. Whether one calls it *ideographic* or not reduces itself to a matter of dispute over terms.

Turning to the question of *who* invented it, my answer to this question remains, with a minor addition, the same as that I proposed a decade ago: *literatus Sumericus Urukeus*. I would like to be able to call him Ur-Nanše, Ur-Enki or, better still, Ur-Inanna, but I readily confess that — barring a revelation by Inanna — we will never know, in this sense, *who* invented cuneiform writing. However, that it was an individual I have no doubt, certainly not a committee, and not a slow accretion of sign after sign from generation to generation: there is not a single instance in the history of writing for a communal-evolutionary invention of a script. Individuals invent. The community of users modify, adapt, elaborate, refine, add to, and take away, but they do not invent. That this inventor was both a Sumerian and a citizen of Uruk (that first great city of humankind about which we know so lamentably little) is inherently probable. And, if he was not a Sumerian, then a Proto-Tigridian, Proto-Euphratean, Hurrian, Subarian, Dravidian, or Neolithian who thought, felt, spoke, and probably looked like a Sumerian.

While I hold my individual inventor to be inherently more plausible than some vague "they," my identification of him as *Sumericus Urukeus* has a more specific basis to it, which I review here by way of summation.

1) The appearance of the pictorial script coincides approximately with the emergence of Uruk as the only major urban center in Mesopotamia. 2) This script appears in Uruk at the end of a long tradition of accounting by means of the token-system. The system of numerical notation (and probably some of the abstract signs) is clearly modeled on the system attested by the impressed bullae and

tablets. 3) No earlier examples of this script have ever been found, although Assyriologists generally assume that a long period of evolution lies behind the script attested in the levels IVa/III at Uruk (which partly accounts for the predilection for speaking of *inventors,* rather than a single *inventor*). Discovery of prototypes of the Sumerian pictorial script in well-stratified deposits of the fourth millennium would, of course, make the theory here advocated untenable, but the overall archaeological evidence, especially the parallel developments in western Iran,[2] make such a discovery highly improbable. 4) The system of numeration deducible from the notation present on Uruk IVa/III tablets makes it virtually certain that these tablets are written in Sumerian and, *ipso facto*, highly probable that the inventor of the pictorial writing system was also a Sumerian.

A few additional words on this last point. The Sumerian sexagesimal system of counting is unique. This system is implicitly present in the notation of the early Uruk tablets, as well as in the approximately contemporary tablets from Jemdet Nasr and others deriving from uncontrolled excavations. Since systems of counting, like grammatical structures, tend to be stable elements in a language, the presence of sexagesimal structures in the early tablets constitutes cogent evidence that the language in which they are written is Sumerian. I presented this argument about a decade ago (1972:165-172) in the context of a critique of the "decimal substratum" theory. Having reviewed the whole problem in the light of additional evidence, I see no reason to change my opinion. Moreover, Jöran Friberg (1978:9) has recently removed one of the last buttresses for this theory by correctly interpreting a notation for capacity which looks like a unit *ten* but really represents a unit *six* (illustrated above in Schmandt-Besserat's Figure 6).

Perhaps the future will bestow upon us some unexpected piece of evidence that will settle the question of who invented the Sumerian system of writing, even to the satisfaction of those who prefer to doubt. Meanwhile, my judgment of the situation is that the balance tips heavily in favor of a Sumerian speaking citizen of Uruk. Historical reconstruction must of necessity concern itself with probability, not possibility, and many another commonly accepted assumption from ancient history rests on little or no more evidence than that which supports the theory here advocated. I am content to believe I have found the solution, but perhaps some of the doubters will find some evidence to put in the other balance pan.

Appendix: Recent Criticism of Schmandt-Besserat's Work

I have argued that Schmandt-Besserat's work provides the real key to understanding both the invention and the character of early Sumerian writing. Since two critiques pertaining to her theories have recently appeared, I shall consider briefly how they affect the underlying assumptions of my argument.

Le Brun and Vallat (1978:30-40) as well as the more recent paper by Lieberman (1980) focus, firstly, on her hypothesis that the shapes of some tokens are the prototypes for some of the early pictorial signs in the Sumerian system and, secondly, on her argument that the tokens belong to a common system of accounting that functioned as a kind of lingua franca for the whole of the Near East going back even to the beginning of the Neolithic period. I would agree with her critics that the arguments and evidence mustered to support these hypotheses are

problematic. However, her attempts to make sense out of the objects in question are worthwhile, if for no other reason than the fact that they constitute a pervasive, but much neglected, part of the archaeological record. Certainly archaeologists are now looking at this material much more closely, as the interesting paper by Le Brun and Vallat (1978) shows.[3]

On the other hand, I think we have to reject Lieberman's sweeping claim (1980:339) which deems her hypothesis "unjustified on chronological grounds, imprecise or incorrect in terms of many of the formal comparisons which have been made, inadequate as an explanation of the appearance of writing, and based on an error in classification." Only the objection to imprecision in "formal comparisons" is really valid. As we have noted, this is the chief point with which Le Brun and Vallat have also taken issue. Lieberman has also made a useful contribution in discussing the lexical evidence that might just possibly relate to abacus-like accounting techniques (1980:346-351)—a theme already broached (though in different terms) in his letter to *Scientific American* (November 1978:10-15) but this pertains only peripherally to his critique of Schmandt-Besserat's theories. I have noted various windmills in the landscape of Lieberman's article and have marked them out so as not to forget their location, but I am willing to leave them for other tilters. I would only add that, for a paper written in the name of logic, Lieberman's critique contains an amazing amount of illogic, and it in no way effects adversely the assumption underlying the present paper, namely, that Schmandt-Besserat's paper published above, which grows organically out of her previous work, enables us for the first time to understand the invention of cuneiform writing.

Finally, I would like to call attention to what I believe to be the essential point. Lieberman (1980:358) states that the "conventionality [attested in the pictorial signs of the Uruk IVa/III texts] can only have resulted from a long development." I would agree, but not in the way this is understood by him and others. The "long development" is a *conceptual* development, the nature of which is now possible to grasp as a result of Schmandt-Besserat's work. On the other hand, the theory advocated by Lieberman, namely, that a long evolutionary development of the *pictorial signs* preceded the sign repertoire of the Uruk IVa/III texts, does not have a shred of substantial evidence to support it. It is theoretically implausible, and the archaeological evidence is against it. However, now that I have started it in this bald-faced manner, perhaps some believer will come forward with a modicum of evidence in its favor. Otherwise, let us desist from presenting this theory as though it were logical and supportable.

DIRECTION OF SCRIPT

We normally read cuneiform tablets starting at the left-hand edge, reading left-to-right and down the column. If there is more than one column on the obverse of a tablet, we move over and read that just as we would a modern newspaper. We read the reverse side in a similar manner, except that we turn it over from the bottom (instead of the side) and start reading at the upper right corner, going down the column and reading lines left-to-right. At the bottom, we go back to the top of the next column immediately to the left and repeat our procedure until we reach the left-hand side of the back of the tablet. This is clearly

the way cuneiform was written and read from around the middle of the second millennium BC onward, and it is the way that most of us read even the early tablets treated above by M. Green. However, it is also immediately apparent that the early tablets assume their proper pictorial perspective only when turned 90° to the right from the way we customarily read them. This phenomenon has given rise to the questions *when* and *why* did one start writing and reading left-to-right instead of top-to-bottom? Aside from the intrinsic interest for the technique of writing, these questions touch upon other issues that have not been fully appreciated.

The question of *when* one changed over to left-to-right writing is pertinent for the history of Sumero-Babylonian mathematics. Kurt Vogel (1958) has pointed out that mathematical problems in Old Babylonian texts from the first half of the second millennium BC refer to what we call the "left edge" of the tablet as the "top." Two interpretations are possible. Either the left edge was still regarded as the "top" in the Old Babylonian period or this is an archaic terminology that has been handed down from the Sumerian period. If we could fix the change-over from top-to-bottom direction to left-to-right direction, it would also give us a much needed *terminus ante quem* for this mathematical terminology. I would like to believe with Vogel that it goes back well into the third millennium, since that would be splendid confirmation of one of my favorite theories (Powell 1976), but, unfortunately, the earliest unequivocal (and datable) evidence for left-to-right script is on Babylonian boundary stones of the fourteenth century BC (Brinkman 1976:37, 211, 265; likewise Edzard 1980:547). Thus, we must content ourselves with noting the implications of the *when* question and hope more evidence will turn up.

For the *why* I think we can offer more adequate evidence. The fundamental dynamics of the change in direction of script seem to be tied to the way in which the stylus was manipulated. This, too, has been much discussed, but never thoroughly investigated (bibliography in Driver 1976:19-26, 228, and Edzard 1980:545f.) Breasted (1916: 241-246) thought he could infer from Assyrian palace reliefs that the stylus was held in the fist, and this has been accepted by Driver (1976:22). However, a careful scrutiny of the reliefs cited by Breasted (1916:246 nt. 1), as well as others, leads me to two conclusions: 1) the depiction of scribes on Assyrian palace reliefs does not strive for representational accuracy in detail, only for symbolic representation; 2) some of the reliefs clearly contradict Breasted's assumption (e.g., Patterson 1915:P1. 40-41; Hall 1928:P1. XXXVII). Moreover, the Til-Barsip wall paintings of scribes (Thureau-Dangin and Dunand 1936: XXIVgh), though incomplete and available only in a copy by Lucien Cavro, do not support either the Breasted assumption or Driver's interpretation (1976:22) of the manner in which the stylus was held. Rather, all of these representations confirm the conclusion that emerges from careful study of stylus impressions: It was held between thumb and fingers approximately as shown in Figures 1-9.

Stylus impressions provide the key, not only for inferring the nature of the material and how it was shaped, but also how it was manipulated. The stylus is called in both Sumerian and Akkadian "reed," and this is entirely confirmed by the fibrous impressions left in the clay by the vascular bundles present in the reed itself. The only adequate study of this phenomenon was published many years ago by Messerschmidt (1906). Of all the theoretical reconstructions

of the shape and manipulation of the stylus that have been published—Zehnpfund (1893), de Morgan (1905), Clay 1906:17-20, Falkenstein 1936:5-7—only Messerschmidt's rests on adequate evidence. This may strike Assyriologists as strange. The study is little appreciated: Edzard (1980:545) omits it from his bibliography; Driver's *Semitic Writing* (1976:19-30), which has been through three editions and which quite misunderstands the implications of Messerschmidt's work, has never been challenged on this point. I myself, being ignorant of Messerschmidt's conclusions, laboriously rediscovered the same principles that he had already deduced seventy-five years ago.

The most important conclusions which derive from his investigation concern the way in which the stylus was cut from the reed (Figure 11), and the way it was held in the hand (Figures 1-9). The stylus was cut from the outer section of a mature reed. It seems unlikely that it ever consisted of the whole stalk of the reed, as Falkenstein (1936:6) seems to assume. (This is another puzzling problem clarified by Schmandt-Besserat's demonstration that the iconography of early Sumerian numerical notation has no inherent connection with the natural shape of the reed.) Messerschmidt (1906: 304 n. 1) cut his stylus from a bamboo cane twelve centimeters in diameter, but much smaller diameters are quite sufficient, as I have discovered by experimenting. The cut reed is held in the hand so that the inner side is up toward the palm of the writer. The slick, outer surface, which creates the smooth, right-hand faces of the wedge, is held down toward the tablet. This surface may be up to six or seven millimeters in breadth (but is often much smaller). On the right, the stylus tapers off to a knifelike edge, while the left side, which is braced against the thumb (and may run up to about four millimeters in breadth), forms the left-hand writing surface. It is this surface that leaves behind the reed patterns found on the tablets.

These reed patterns show that the stylus was held in one basic position and that the surfaces of the stylus which made contact with the tablet were always the same in all periods from the mid-third millennium on. For the early third millennium Messerschmidt (1906:192f.) implies that he had at his disposal at least some archaic tablets and that the same principles apply there also. Those which I have examined from Uruk in the Orientalisches Seminar of the University of Heidelberg seem to confirm this. However, it must be emphasized that, because of the state of surface conservation, perhaps only ten to twenty percent preserve these patterns. Therefore, one needs to look for divergent features on large numbers of tablets using a magnifying glass of 7x or more. I have, in this way, examined about 4000, including about 500 Presargonic, about 300 each of Old Babylonian and Neo-Babylonian, less than a hundred from various periods over the three millennia (mostly Babylonian, but some Assyrian), and the remainder from the Ur III period.[4] Not what one could call a random sample, but, together with Messerschmidt's experience, which conforms precisely to mine, enough to allow the following deductions about the change in direction of script.

Since the reed patterns show that the basic position of the stylus vis-à-vis the hand and the tablet was fixed, experimentation also shows that a right-handed scribe writing his tablet in lines top-to-bottom and in columns right-to-left has to position himself in an angle of roughly 45° to his tablet and approach it from the left side, never from the right side. Thus, there must have been from the

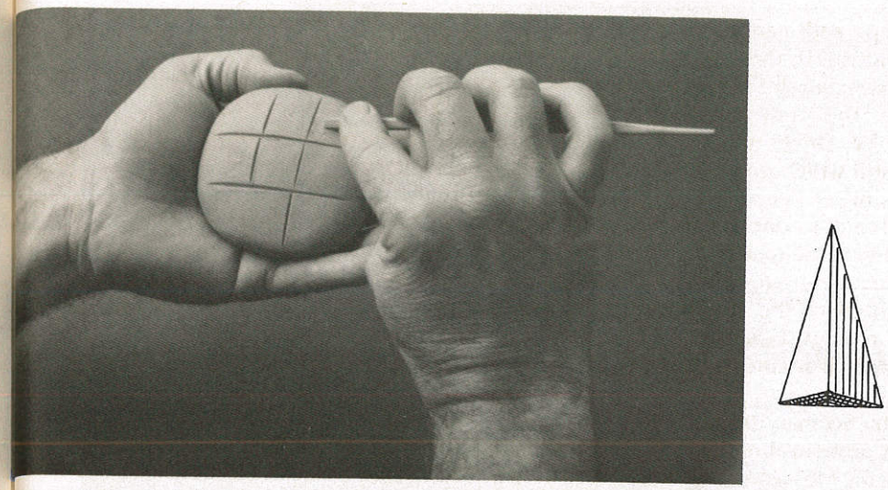
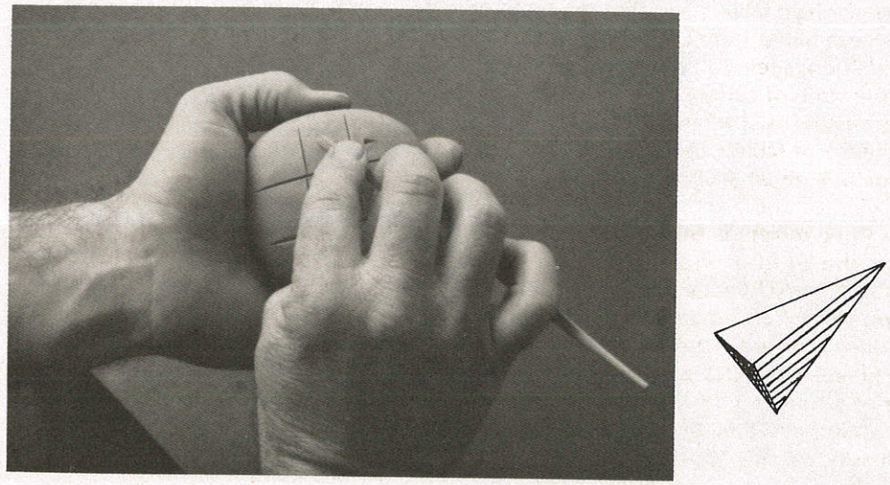


Figure 1. Stylus is held in normal position, but tablet is turned 45° to the right from normal writing position and 90° from the later (standard) reading position; i.e., it is in the orientation characteristic of the archaic script. Right: The wedge made, turned 90° to the left to the later (standard) reading position. This wedge occurs rarely and disappears from standard usage after c. 2300 BC. Note the position of the striated face created by the cut surface of the reed and the smooth face made by the outer skin of the reed.

Figure 2. Stylus and tablet in normal writing position. Note the angle of the tablet to the body and the stylus grip common to Figures 2-5. These are the wedges that survive after the middle of the 2nd millennium BC. Right: The wedge made, oriented in standard reading position.



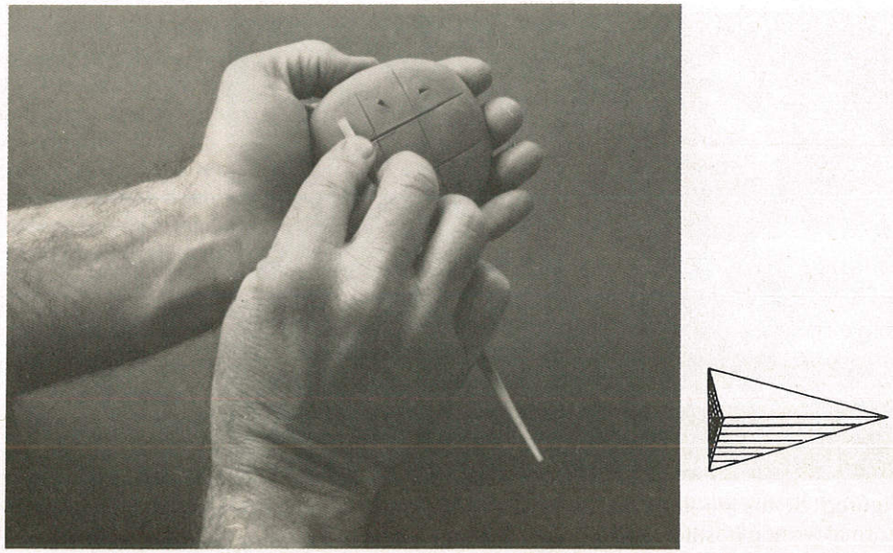
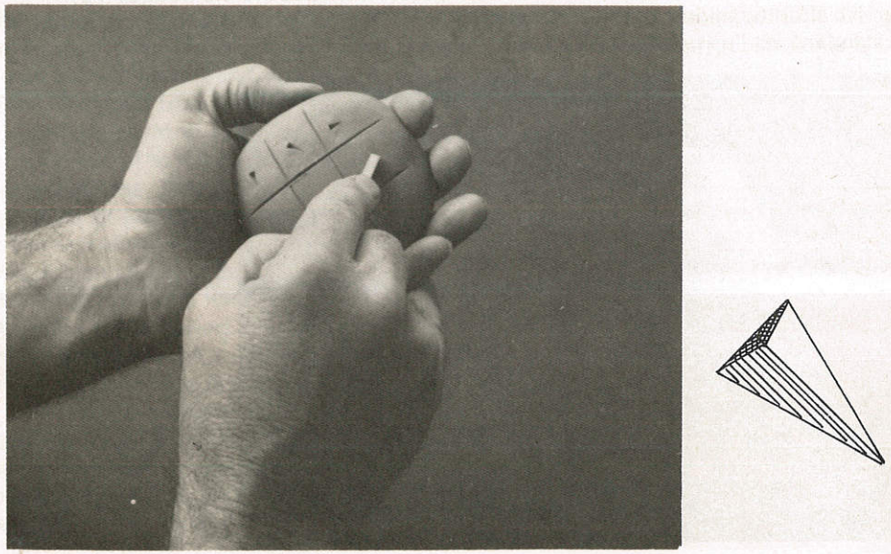


Figure 3. Standard writing position of stylus and tablet. Right: The wedge made, oriented in standard reading position.

Figure 4. Standard writing position of stylus and tablet. Right: The wedge made, oriented in standard reading position.



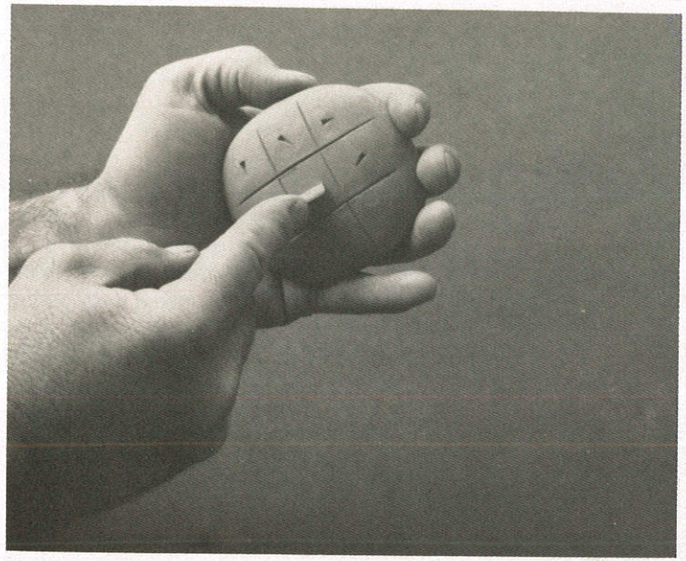
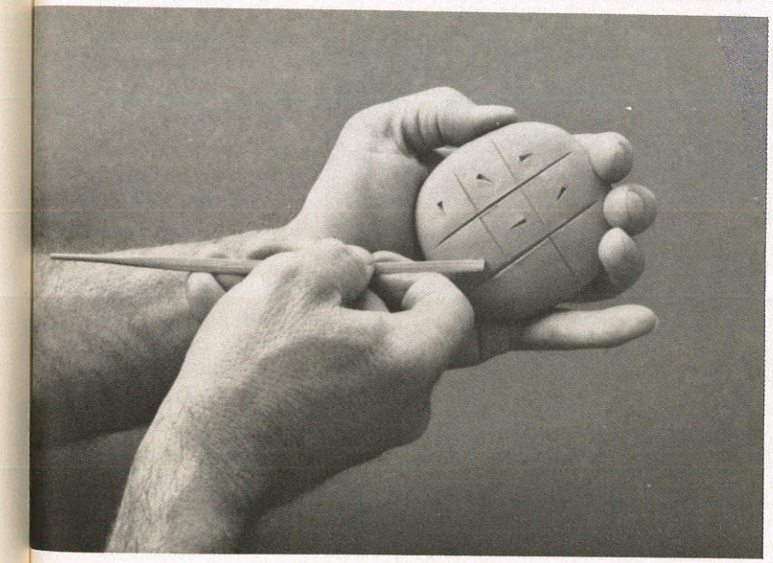


Figure 5. Tablet is in standard writing position, while the stylus cuts across the axis of the arm with the end of the stylus slightly to the left of the arm. Right: The wedge made, oriented in standard reading position.

Figure 6. Stylus must be shifted to make this wedge, but tablet remains in the normal writing position. Right: The wedge made. It is less common than the wedges in Figures 2-5 and goes out of standard use in the first half of the 2nd millennium BC.



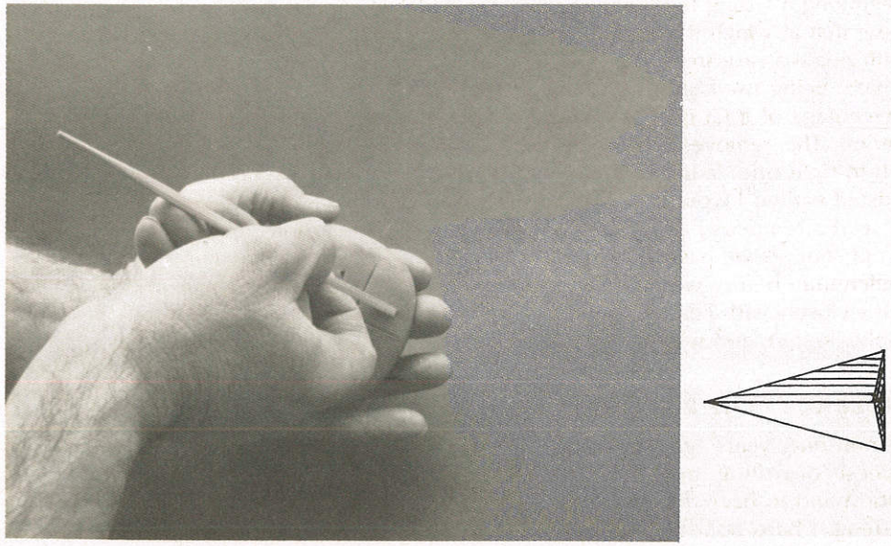
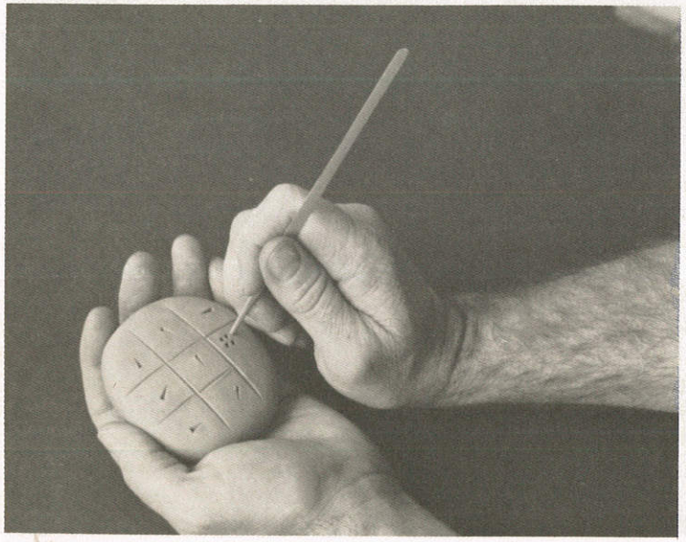


Figure 7. Stylus held in same position for making wedge in Figure 6, but tablet must be turned about 40° counterclockwise. Doing this by wrist motion alone creates an awkward writing position, thus the tablet itself must be shifted in the hand. Right: The wedge made. It is very rare and disappears from standard usage c. 2300.

Figure 8. Writing "tens" with the inverted reed, standard procedure down to c. 2300.



beginning a strong tendency to *write* the tablet at an angle rather differently from that at which it was read. The majority of stylus impressions can be made with relative ease from the left as shown in Figures 2-6. The other impressions which, being used only in special circumstances, always constituted a tiny percentage of total number of wedges are ultimately abandoned in the Akkadian period. This removes the last obstacle to perceiving the script in a horizontal, left-to-right orientation, but I see no justification for assuming this to have existed earlier. I would, therefore, see the Akkadian period (twenty-third century BC as the *terminus post quem* for a changeover in the direction of reading the script, but, as we have already seen above, this leaves us with almost a millennium before we arrive at a secure *terminus ante quem*. This coincides fairly closely with Edzard's appraisal of the situation (1980:546f., with bibliography), and with that we leave the matter, still largely in limbo.[5]

LITERACY: THE ROLE OF CUNEIFORM

About thirty years ago I. J. Gelb (1952/1963:212-220) made a case for the monogenesis of writing, by which he understood the Sumerian system to be the oldest and to have directly generated or inspired other systems of genuine writing. I have pondered this problem myself now for almost two decades and, looking at it from first one side then another, have come to the conclusion that any decision on the matter must be something like an act of intuition. Having done this, my intuition tells me that Gelb is more likely to be right than Friedrich (1966:173f.), who regards as improbable the assumption that the Sumerians made the primary invention of writing, with the Egyptian and Chinese systems being inspired by the Sumerian. While I would explicitly disavow "diffusionism," Friedrich's formulation of the matter is rather problematic. The chronology of early Chinese script is as difficult as that of early Sumerian script, but, like the latter, we have a pretty good idea of when it appears, and this time corresponds to the Near Eastern Late Bronze Age[6] (c. 1600-1200 BC). Given the contacts across the Iranian plateau that have been established by archaeological exploration for as early as the Early Bronze Age and perhaps even earlier, is it really conceivable that no *idea* of writing reached China from the Near East? I think not, but, for world literacy, that is not the central problem, since the Chinese system has not had a major impact outside of the Far East.

The other point that Friedrich raises, namely, whether the Egyptians received the impetus for the creation of a script from Mesopotamia, is more pertinent. I think we will eventually be able to demonstrate that, structurally, Egyptian writing has a lot in common with early Sumerian writing. Then, other arguments already advanced for Mesopotamian influence on Egypt about the time that writing is introduced will have a greater bearing on the problem (e.g., Emery 1961:30-42; Gelb 1952/1963:214f.). Under those circumstances, the arguments of Schmandt-Besserat (above) about the Sumerian character of the late phases of the token system will also appear in a different light. Archaeological evidence, as a whole, indicates a greater dynamism in external contacts for Mesopotamia than for Egypt in the late fourth and third millennium, and the spread of writing may well turn out to be part of this dynamism: to Egypt, to Elam, to Ebla, and perhaps to other areas of which we have as yet no evidence.

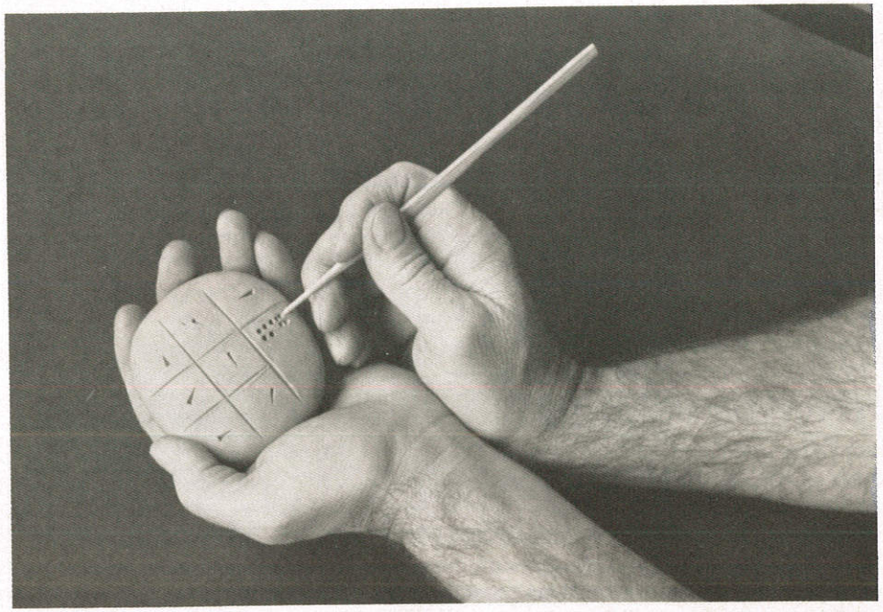
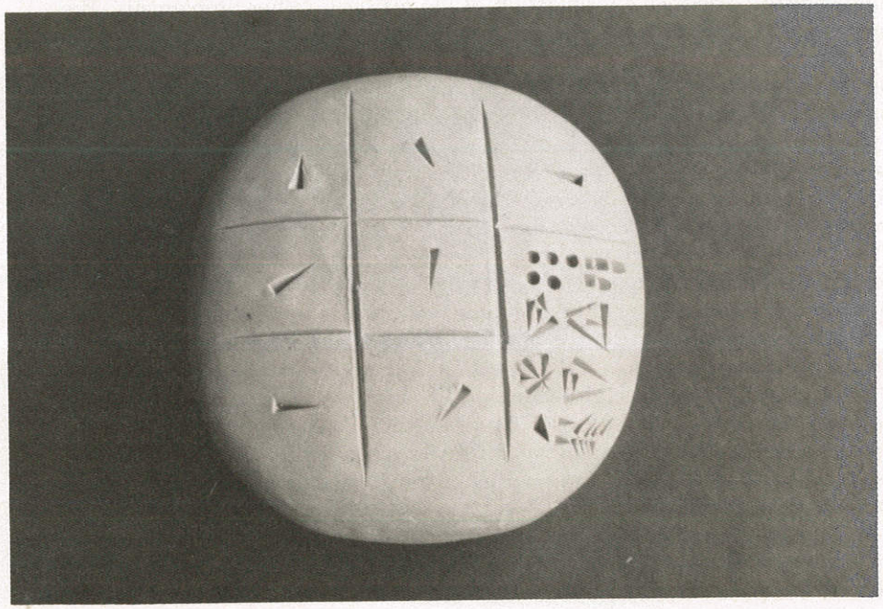


Figure 9. Writing "ones" with the inverted reed, standard procedure down to c. 2300.



The discovery of extensive palace archives at Ebla in northern Syria (recently G. Pettinato 1979; R. Biggs 1980) has forced us to reassess our understanding of the third millennium as a whole and of the spread of cuneiform writing in particular. What this discovery has shown us is a much wider spread of

Figure 11. The Reed Stylus. A. End of the whole reed showing section removed to make stylus. B. End section of the finished stylus. The acute angle formed by surfaces α and β is typical of the Presargonic stylus used to write the wedges in Figures 1-10. C. Side view of Presargonic stylus. α. Writing surface producing striated impressions in the clay. β. Smooth outer surface producing smooth face of wedge. γ. Inner surface of reed smoothed to a plane, never used for writing. δ. Sharp edge of stylus, not used for writing. ε. End of the stylus with a plane sloping downward toward edge δ and slightly toward surface γ.

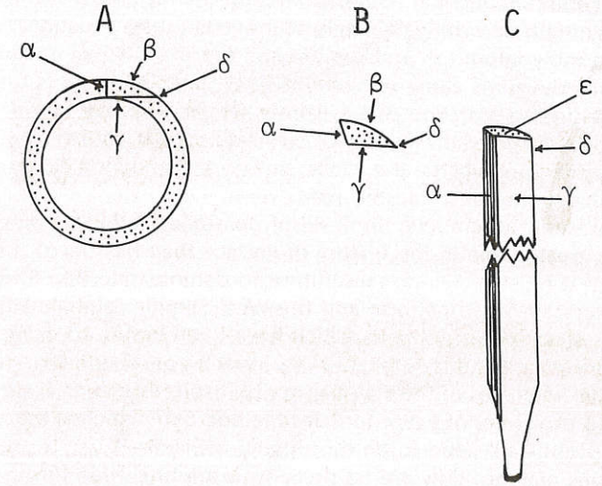


Figure 10. The impressions made in Figures 1-9, together with a brief text in the script characteristic of the state of Lagash in the 24th century. The text is in the lower right-hand section, oriented in the left-to-right perspective which characterizes the script of later periods. This is the orientation in which modern scholars normally read cuneiform, though it was not read this way in the period represented by this script. The text reads: 55 ninda ba-an-né 10 du_8, "55 flatbreads baked at [a ratio of] 10 per ban [a measure of c. 6 quarts]."

cuneiform in the third millennium than had previously been thought probable or even possible. Above all, it brings cuneiform much closer into the area where other ancient writing systems arose, in particular, close to the homeland of the alphabet. It would be premature at this point to attempt an argument in favor of cuneiform as inspirer of the alphabet, but it certainly puts cuneiform back into the front line as a contender.

In this context, it is worth noting that, in spite of objections to Gelb's theory concerning a syllabic character for the West Semitic "alphabet" (primarily by Egyptologists [Edgerton 1952] and Semitists who work with alphabetic scripts [Barr 1976:74f.]), Gelb has been able to respond to his critics (1958), and Diakonoff (1975:100f.) has recently noted another piece of evidence in favor of the syllabic theory. The significance of this is that, if it ultimately becomes clear that the West Semitic "alphabet" is, at bottom, a syllabary, cuneiform is the only likely model for it, for Egyptian writing represents an entirely different system, which has much more in common with the Sumerian system than it does with evolved cuneiform. Early cuneiform writing, if I rightly understand the situation, is spread in the early third millennium (or perhaps the late fourth) to Egypt and Elam, where it subsequently develops along indigenous lines. But, in Babylonia itself, it develops in the direction of a syllabary, which is spread by the Akkadians, whose dynamic role in the history of civilization can only be paralleled among other Semitic peoples by the Arabs, and to a slightly lesser extent, by the Amorites, the Aramaeans, and the Jews.

All of this remains, at present, little above the level of possibility. I think cuneiform played a much greater role in the history of literacy than has hitherto been thought, but it must remain for the future to demonstrate the relationship between Mesopotamian cuneiform and the West Semitic "alphabet." Nevertheless, one thing is clear: the arguments which have been based upon the suppositions that 1) the West Semitic "alphabet" is, in fact, consonantal in nature, 2) that "consonantal" features of the Egyptian script inspired this "alphabet," and 3) that the proximity of Egypt to Palestine and Syria cinches the derivation from Egyptian script —all need to be thoroughly reexamined.

Interesting as these issues may be, they are, at present, insoluble. Therefore, let us pass on to a matter which is perhaps not: the decline and extinction of cuneiform as a system of writing. It has generally been supposed that cuneiform died out because it was less practical and less easily learned than the alphabet. Proponents of this theory have often been Assyriologists themselves. This may, in part, be a function of Assyriologists being better scholars than they are pedagogues. In any case, they are hardly unbiased observers. There is definitely one aspect of the problem that is generally ignored in such formulations concerning the difficulty of the cuneiform system: learning cuneiform involves not only the mastery of a writing system, but of a whole body of knowledge associated with it. This may appear an elementary observation when stated in such plain terms, but I fear it is often overlooked. In any case, with regard to the relative ease of cuneiform *vs.* alphabetic scripts, the remarks of Diakonoff (1975:101) are worth noting: "everyone who has read Phoenician or Ugaritic, on the one hand, and Akkadian, on the other, knows that it is much more difficult to *read* and *understand* Phoenician and Ugaritic.... Reading Ugaritic is a process of

solving riddles (much more so than reading Akkadian, although there, too, an element of decipherment is always present)."

I would like to suggest that the derived cuneiform scripts used to write Akkadian and other languages were not nearly as difficult as is usually supposed—certainly not as difficult as Chinese and perhaps only slightly more so than Japanese. These two scripts have survived into the twentieth century as a result of favorable political and cultural conditions and show no signs of expiring. I think we must approach the demise of cuneiform with these facts in mind. The era in which cuneiform died (first century AD) was not only politically, but culturally, hostile to the culture which created cuneiform and the body of knowledge associated with it. That is a point I cannot argue here, but the evidence in favor of it is manifold. Had the political and cultural situation been otherwise, cuneiform might have lived on indefinitely. Still, combined with this hostile environment there was another factor that has been over-looked in considering the withering away of the cuneiform system.

Clay is a very bulky item. The cuneiform system depended on clay. It is true that some examples of cuneiform written on materials that produce a two-dimensional effect have been discovered (Driver 1976:30f.; Edzard 1980:567f.), but anyone who has either read or written cuneiform must have become at once aware of the radical aesthetic difference: cuneiform is a three-dimensional script. It began on clay, and there it ended—probably precisely for that reason.

Assyriologists have often observed that cuneiform literature does not contain works like those of Herodotus or Thucydides, and they usually attribute this to cultural causes. Other conclusions are possible. One of the longest cuneiform works known to us is the bilingual dictionary known as á = A = *nâqu* [a (pronunciation in Sumerian) = (the sign) A = (the Akkadian) "to cry out"]. It consisted of forty-two tablets. Without trying to be overly precise, I have calculated that this number of tablets would hold *no more than half* of Herodotus' *Histories*. This is an aspect of cuneiform writing that has been much ignored by both Assyriologists and historians of culture, namely, the extent to which our literary record has been affected by the writing medium itself. I think this effect has been profound, and the authors of the early Islamic period, who do not manifest the laconic character of our cuneiform sources, support me here.

Cuneiform is a beautiful system of writing that appeals very much to the senses. It is a matter of profound pleasure just to watch the signs appear under one's stylus and to feel the plasticity of the clay in one's hand. However, even the most ardent devotee might well change his mind, were he required to carry a cuneiform copy of Herodotus from Babylon to Damascus on his back. In short, I think it was primarily the hostile cultural environments that spelled the end of both cuneiform and Egyptian hieroglyphic (which lasted on a for a few centuries longer), but with cuneiform the great irony is that the one feature which insured its death in antiquity just as the codex was being born—being written on clay—is what has preserved it for us to the present day.

One final point remains: to what extent did the replacement of cuneiform by the alphabet affect literacy as a whole? The answer to this has been a common sense one. The alphabet is supposed to have opened up whole new worlds and to have had an unparalleled impact upon human literacy. David Diringer's work on the

alphabet (1968) is perhaps the best known example of the point of view, but it is to be met with everywhere. Somehow the theory does not hang together very well. The Japanese system hardly seems to have inhibited the development of literacy (to say nothing of technology!), where the mid-century illiteracy rate was estimated by UNESCO (1957:41) at 2-3%, less than that of the United States. On the other hand, Iraq, the homeland as I would believe of Near Eastern writing and acquainted with the alphabet for over two-thousand years, was found by the same UNESCO survey (1957:34) to have an illiteracy rate of 89.1%. Not a very good batting record for the alphabet.

Even more disturbing for the theory of the alphabet's importance are recent developments in China. Gelb (1952/1963:237f.) painted a dark picture of the "selfish bureaucratic clique at the top" of Chinese society maintaining the traditional Chinese script even in the face of rationality and utility, but, as French (1976;116) points out, this is a view which is characteristically "non-Chinese" and that "all currently available evidence contradicts [the] view" that the Chinese are about to abandon their traditional system in favor of a more "rational" one. In short, there are many problems associated with the traditional view that the alphabet represents a turning point in the history of mankind. There is definitely no evidence that it had a major impact upon literacy. Definition of literacy is itself a problem, as is determining who falls into the literacy categories once they have been set up (e.g., with bibliographies: Goody 1968; Lockridge 1974). These problems are simply ignored by those who argue for Athenian literacy from the fact that decrees of the boule and people were published on stone or from the well-known institution of ostracism. The election signs at Pompeii belong to this same category of undigested and absolutely inconclusive evidence: how many literate people out of a hundred do there have to be to make such signs effective? Hammurapi, King of Babylon (1792-1750 BC), also published his laws proclaiming:

> The man who has been wronged, who has a grievance, let him come before my statue, "King of Justice," and read forth my inscribed stele and hear my precious words, and let my stele show him the grievance; let him see/read his case/judgment: let his heart breathe freely . . .(Driver and Miles 1955:96f.)

But who would wish to deduce from this that most Babylonians were literate?

To sum up. Really sound statistics for literacy prior to the nineteenth century do not exist. Every estimate for literacy prior to this time must be partially a kind of intuitive process, i.e., putting together everything one has learned and experienced and, after weighing it all in the balance, reaching a conclusion. My conclusion is that, prior to the invention of the printing press in the fifteenth century, at least ninety percent of the populations of *literate* cultures were functionally illiterate. That is to say, some of the "illiterates" in some periods may have been able to write their names, but few of them will have been able to really *read*. As the experience of modern Third World societies has shown, such minimal skills as being able to write one's name *mit Müh und Not* is economically and technologically of little significance. The inescapable conclusion is that the introduction of the alphabet, by itself, has had little effect upon reduction of functional illiteracy, and thus, its importance in the history of human development has been overestimated, whereas that of cuneiform has probably been underestimated.

1. These examples can be multiplied. The last is a curious one. The sign which I have symbolized by BREAST is, in fact, not used in the Old Babylonian phase of Sumerian orthography to mean "breast" (Landsberger 1951:98f.). Rather a compound sign derived apparently from a goat's udder is used for this purpose; whereas the sign which I have transcribed BREAST is, from at least the middle of the third millennium, used to denote a noun (dumu = "child") and two adjectives (tur = "small" and banda = "little"). It is for this reason (and many others) that I must affirm the necessity of reconstructing the pictorial prototype of Sumerian signs. Misuse of this technique has brought it into disrepute. However, if the assumptions argued in this paper are correct, it should be clear that we will never understand the underlying structure of Sumerian writing unless we are willing to investigate these kinds of features.

2. The significance of the important sequence described by Le Brun and Vallat (1978:31) was called to my attention by D. Schmandt-Besserat (see her formulation of the situation above).

3. Ideally one should be an archaeologist, philologist, metrologist, mathematician, and socio-economic historian all rolled into one, but, alas, who is? Two small points from the critique by Le Brun and Vallat (1978:34) illustrate the pitfalls: 1) SU *never* means shekel; the sign in question is GÍN, which in some periods has an appearance similar to SU: they are not, however, identical; 2) the sign NINDA does *not* have "une valeur numèrale"; even its use in a metrological sense is attested only for the Neo-Babylonian period (over two thousand years later).

4. Since the evidence on which my inferences are based has been collected over the past eight years, I am indebted to a number of institutions and individuals for facilitating my work in various ways: the British Museum, Bryn Mawr College Library, the Free Public Library (Philadelphia), Harvard Semitic Museum, the Hermitage (Leningrad), the Louvre, New York Public Library, the Oriental Institute (University of Chicago), the Pushkin Museum (Moscow), the World Heritage Museum (University of Illinois, Urbana), and Yale Babylonian Collection; V. K. Afanasieva, G. van Buitenen, K. Deller, I. J. Gelb, W. W. Hallo, S. I. Hodjash, N. B. Iankovskaia, W. Moran, H. Nissen, H. Waetzoldt, and C. Wilcke. The International Research and Exchanges Board, the National Endowment for the Humanities, and Northern Illinois University all supported other work of mine, during which the evidence for the present paper also gradually accumulated. To all I express my thanks.

5. This problem has recently been treated from another point of view in a paper which became accessible to me after the present one was written: Sergio A. Picchioni, "La direzione della scrittura cuneiforme e gli archivi di Tell Mardikh-Ebla," Orientalia 49 (1980) 225-251. Picchioni's conclusions are similar to, though not precisely identical with, my own. I had the opportunity to discuss the problem with him recently at the Rencontre Assyriologique Internationale in Vienna (July 1981) and we are in agreement that cuneiform was read vertically down into the Akkad period (c. 2300 BC) and that the earliest irrefutable evidence for left-to-right reading is in the Kassite *kudurrus*. I subsequently made an additional search for earlier evidence among the published documents, but the earliest datable document I have found which incontestably shows left-to-right script is that listed by Brinkman (1976:265) as U.2.18, which is from the time of Nazimaruttaš (c. 1307-1282).

6. D. O. Edzard recently passed on to me the oral communication of a professional Sinologist to the effect that some examples of Chinese writing now seem to go back to about 2000 BC. This would, of course, fit the theory of monogenesis better than a date in the Late Bronze Age.

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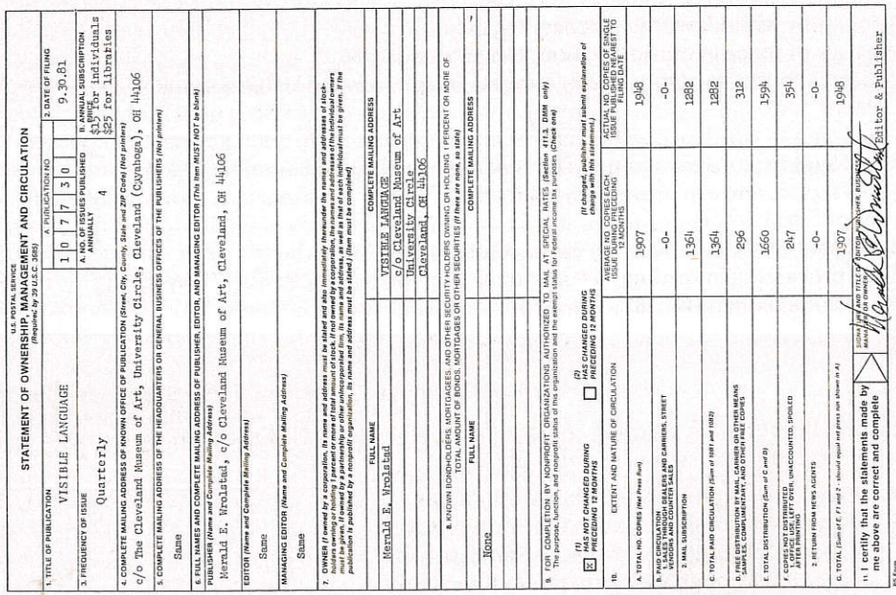

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