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of Historical Epistemology**

THE ORIGINS OF WRITING AS A PROBLEM
OF HISTORICAL EPISTEMOLOGY

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THE PERSPECTIVE OF HISTORICAL EPISTEMOLOGY

Dear colleagues, I have the great honour of being invited to speak in this introductory section of the symposium on the multiple origins of writing. It is, of course, not my intention to anticipate the possible results of the discussions during the following two days. I rather see my role in posing some questions which represent challenges resulting from successful scholarly work on the origins of writing that has been pursued in the last decades at different places and in different disciplines.

Let us start with the basic questions:

- *When was writing invented?*
- *Where was writing invented?*
- *Why was writing invented? and*
- *How was writing invented?*

In the following, I will specify these questions from a particular point of view, that is, from the viewpoint of historical epistemology. Let me first briefly explain this perspective. It is now some 200 years ago that in the aftermath of Napoleon's campaign in Egypt early writing systems and their historical origins aroused the curiosity of European scholars for the first time. They soon became a focus of never-ending attempts to decipher them and to disclose the hidden treasures of authentic information about cultures that perished long ago. Understanding these

texts primarily meant retranslating them into the oral language they represent. Thus it does not come as a surprise that work on early writing systems was widely influenced by what can be called a philological perspective. From this point of view, a writing system is essentially conceived of as a representation of a particular language. Deciphering such a system means identifying the underlying language and reconstructing the way it is coded in the written symbols. If this language was not a familiar one that had survived, scholars felt challenged to reconstruct its grammar and its lexicon. It is an encouraging fact that this endeavor has in most cases been successful, where a sufficient number of texts has been handed down to us. We therefore know today pretty well the grammar and the lexicon of the languages which have been written in systems such as Egyptian hieroglyphs or Near Eastern cuneiform.

The enormous success of the work that has been done under the influence of such a philological perspective cannot and should not be ignored. Nevertheless, it must also be admitted that this perspective, in spite of its success, has serious shortcomings. Its deficiencies become obvious especially when one focuses on the contribution of philology to the clarification of the origins of writing. It is now a well established fact that the influence of the structures of language on a system of writing becomes weaker the further one goes back in its history. I will call in the following such incipient systems of writing with weak connections to oral language „proto-writing“.

As might be expected, methods of philology are less effective if the relation between writing and language is weak. It is possibly due to this fact that major corpora of early writing systems, which do not adequately represent an ancient language, have for a long time been widely neglected by philologists. Proto-writing does not provide sufficient information about the grammar of the language of the scribe to make it a valuable source for philological research. In some cases, it is not even possible even to identify the language spoken by the people who invented and used such systems of proto-writing.

The lack of attention which proto-writing has received is nevertheless puzzling, because precisely these texts are exceptionally important for any attempt to solve the exciting riddles of the origins of writing. The difficulties of understanding texts written in a proto-writing system result primarily from the fact that the information represented in such a system is essentially incomplete. The scribes of proto-writing apparently assumed that the readers of their texts, much like discussion partners in oral communication, knew the context of the information they wanted to transmit. Therefore, they probably took it as given that their readers were able to interpret the given information correctly, in the same way as they could understand oral statements contextualized in a natural setting of discourse.

In modern cognitive science such processes of decoding incomplete information have been intensively studied. A body of knowledge shared between the partners in a communication process provides cognitive frames that are triggered by the communication process, instantiated by the given incomplete information, and finally complemented by default assumptions about the subject which are retrieved from memory as an effect of the assimilation of this subject to the frame.

Systems of proto-writing in this sense force us to broaden the perspective of our studies towards what I call an epistemological perspective. From the viewpoint of historical epistemology, proto-writing is not seen merely as a deficient representation of language but rather as a successful means of representing knowledge and transmitting it from one individual to the other, and eventually from one generation to the other.

From such a point of view, the philological perspective appears to be an interpretation of writing as a representation of a representation of knowledge, that is, as a written representation of the representation of knowledge in oral language. By and large, such a viewpoint seems to be legitimate in the case of fully developed systems of writing, but it necessarily leads to misleading consequences in the case of proto-writing. Historical epistemology poses the questions of when, where, why and how writing was invented in view of the broader perspective of studying writing as a means of representation and the historical transmission of knowledge that may or may not be intimately linked to language as a means of oral communication.

MONOGENESIS OR POLYGENESIS OF WRITING

Let me return now more specifically to these basic questions. The question of where and when writing was invented directs our attention immediately to an important alternative:

- *Was writing invented only once and did the technique of representing language by written signs spread out from one center all over the world, or was writing developed several times independently of one another?*

If the invention of writing was just a brilliant idea that was developed once and then copied over and over again, it may have been fortuitous circumstances that led to its invention and it would make no sense to compare different early writing systems in order to determine the conditions of their emergence in history. Rather the mechanisms of transfer would have to be studied, mechanisms that could induce the development of the variety of different systems of writing that emerged one after the other in the course of history.

Alternatively, if writing was invented several times independently of one another at different places in the world leading essentially to the same result, that is, to an adequate representation of oral language, the circumstances and the internal mechanisms of the emergence of writing would have to be reconstructed, mechanisms that would in this case be responsible for the repeated occurrences of such an event.

Looking forward to the discussions of this symposium, I shall not attempt to give here a premature answer to the question of which of these alternative hypotheses is more likely to be true. Let me just point out that there is probably no simple answer to this question.

On the one hand, the various systems of coding oral language which have been developed at different places show a great variety. Whatever the mutual influences of writing systems of different cultures may be, this variety shows, at least, that the development of writing, once it is initiated, attains a considerable degree of independence and flexibility to adapt a coding system to specific characteristics of the language to be represented.

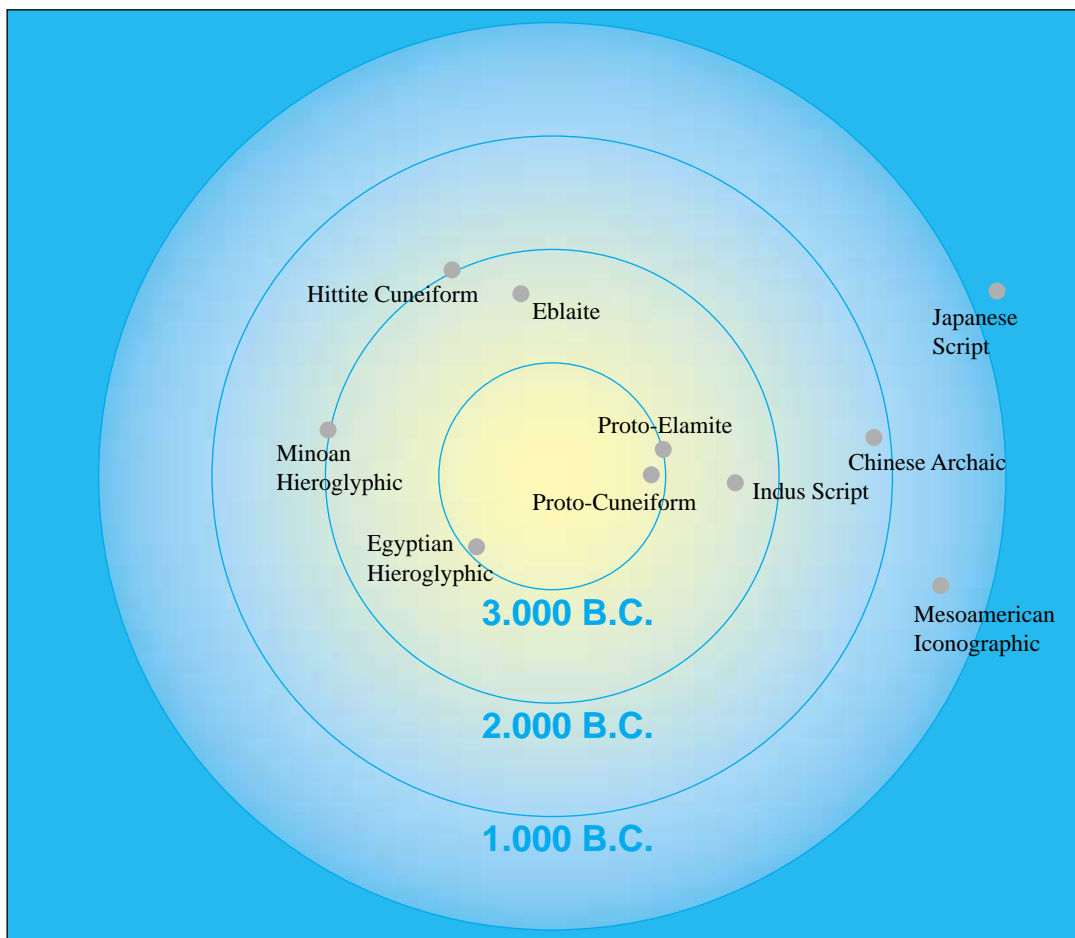


Figure 1. *Historio-Geographic Map of Earliest Attestations of Writing*

On the other hand, the historio-geographic distribution of the various occurrences of early writing systems seems to indicate, as Ignaz Gelb has pointed out in his famous „Study of Writing“ (Gelb, 1952, pp. 212-220), that the idea spread at the beginning of the third millennium B.C. from a center in Mesopotamia and Egypt in various directions. Proto-Elamite writing occurs only a short time after proto-cuneiform. It was used for a short period in vast areas of the Iranian plateau. In the second half of the third millennium B.C. writing is attested as far to the north as Ebla in Syria and to the east as to the Indus culture. Minoan writing starts at Crete around the turn of the third to the second millennium B.C. At that time cuneiform writing is also attested further north in the regions of Anatolia. The oldest attestations of writing in China date back to the Shang period at the end of the second millennium, and it is only in the first millennium B.C. that we find writing in Mesoamerica. This distribution of earliest attestations of writing in time and space shows the typical pattern of a spreading technology, although in some cases there seems to be no connection at all between the systems of writing that subsequently emerged.

THE PHILOLOGICAL PERSPECTIVE OF THE ORIGINS OF WRITING

Why was writing invented? For a long time, a straight-forward answer to this question seemed to be beyond any doubt. According to the prevailing philological perspective, writing was essentially considered as a representation of language in a way that allows for an indirect communication and transmission of knowledge. Thus, it was plausible to assume that to represent oral language in a persistent medium must also have been the intention of the people who invented writing, although no direct evidence could be provided for such an assumption. Likewise, proto-writing was considered as essentially the same as writing, only that the intention of representing oral language appeared to be as yet insufficiently realized.

This anachronistic projection of modern functions of writing into its early use had the consequence that the multiple origins of writing were widely neglected. The early development of writing was interpreted as a universal process leading from a crude representation of words by pictures to the more efficient representation of words decomposed into phonemes by syllabic signs and, finally, to alphabetic writing. As is well known, Paul Sethe (1939) and later Ignaz Gelb (1952) have developed influential theories of the origins of writing based essentially on such assumptions.

It is an irony of history that it was precisely Gelb in his „Study of Writing“ who argued vividly that for systematic reasons the Mesoamerican writing systems cannot have been based on any kind of phonetic coding, and that „even a superficial knowledge of the inscriptions of the Aztecs

and Mayas is enough to convince oneself that they could never have developed into real writing without foreign influence.“ (Gelb, 1952, p. 58) We know now that, in this respect, Gelb was wrong. This example should warn us not to trust seemingly plausible arguments or historical extrapolations if direct historical evidence cannot be provided. We should, in particular, not rely on the plausibility of the assumption that writing was created in order to enhance or to substitute for oral communication. There is, at least, no longer any reason today to assume that to represent language in an enduring medium was the only motive that triggered the invention of writing.

CHALLENGING CHARACTERISTICS OF PROTO-CUNEIFORM

Let me now turn to the question of *how* writing was invented which is, from the viewpoint of historical epistemology, the most important question. The traditional belief that writing, if not developed under foreign influence, always starts with some kind of representation of words by pictures, has been challenged, in particular, by scholarly work on proto-cuneiform. This system of proto-writing, which is probably the oldest one and at the same time the only one that is documented by an abundance of preserved original texts, shows a number of characteristics that have to be taken into account when one asks *how* writing was invented.

Let me first list briefly these characteristics before I go into details.

- *The structures of proto-cuneiform are far from matching the syntax of a language.*
- *Contrary to oral language, proto-cuneiform writing implies only simple patterns of semantic categories.*
- *In proto-cuneiform, phonetic coding plays only a minor role, if any.*
- *Proto-cuneiform is not uniformly conventionalized.*
- *Contrary to oral language, proto-cuneiform is used only in an extremely restricted context of application.*
- *Proto-cuneiform had precursors in symbolic systems which were used, at least partly, for the same purposes.*
- *The later adaptation to language changed the structure of proto-cuneiform writing considerably.*

Let me just mention further without going into details:

- *There was a co-evolution of proto-cuneiform with certain arithmetical notions.*

None of these characteristics is itself sufficient to prove or disprove a particular hypothesis on the nature of proto-cuneiform writing, but taken together, they make it unlikely that proto-cuneiform was just an early step in a linear sequence of more and more successful attempts to represent human language. What is more relevant here, they raise a number of general questions concerning the emergence of proto-writing which may be relevant also in contexts other than of Mesopotamia in the third millennium B.C. and may be helpful in the discussions of this symposium.

PROTO-CUNEIFORM DOES NOT MATCH THE SYNTAX OF ORAL LANGUAGE

Let me turn, therefore, to some details. The most obvious characteristic that distinguishes proto-cuneiform texts from oral language is their different structure. Knowledge represented by language is always transmitted sequentially. In contrast, proto-cuneiform texts are mostly organized in hierarchies. The reason for this is, of course, that most of them are bookkeeping documents, representing activities of economic administration rather than stories, arguments or descriptions. The only texts that do not reflect administrative activities are those that are generally classified as school texts, primarily lexical lists. They are apparently written as exercises which again—though for other reasons than bookkeeping documents—do not represent anything comparable to the transmission of knowledge by sequentially arranged speech.



Figure 2. Hierarchically structured proto-cuneiform administrative document (W 20274,42 with an entry and two subentries) and „list“ of vessels in a school text (fragment W 24157 of the vessels list, see Englund and Nissen, 1993). Both texts are depicted in conventional orientation turned 90° to the left.

There may be exceptions. I am thinking in particular of the so-called tribute list, attested by fragments of several copies, which exhibits structures resembling epic iterations and has therefore been interpreted by Bob Englund and Hans Nissen as the earliest example of real literature (Englund & Nissen, 1993, pp. 25-29). Unfortunately, this text is still so badly understood that no conclusion can be derived about the technique of coding language that might have been used to create it.

A number of questions that concern not only proto-cuneiform but proto-writing in general can be derived from the observation that, with this exception, the texts written in proto-cuneiform do not show any direct relation to oral language. Such questions are:

- *What kind of non-linguistic structures can be identified in other early writing systems?*
- *What kind of use can explain such non-linguistic structures?*
- *What happens to non-linguistic structures of a system of proto-writing when it is later developed into a real writing system?*

SEMANTIC CATEGORIES

Another discrepancy between proto-cuneiform writing and oral language becomes apparent when the conceptual structure of the meanings represented by its signs and sign combinations is investigated. Such signs or sign combinations represent predominantly either quantities, or registered and sometimes further qualified objects, or persons, institutions, and locations involved, or they designate somehow the type of administrative activity that is documented. This simple pattern of semantic categories again finds an explanation as a consequence of the specific use of proto-cuneiform for recording administrative activities. This conceptual pattern is, by the way, also the basis of the so-called lexical lists. In contrast to oral language, which is always contextualized and therefore displays a variety of meanings that cannot be easily reduced to a small number of categories, administrative activities decontextualize information and reduce it to a few relevant dimensions.



Figure 3. Bevelled-rim bowl (left) used for the disbursement of rations represented by the sign NINDA (middle, left column) which could be used for designating a ration of a certain size or in a semantically defined sign combination for designating an institution (middle, left column). In combination with a man's head it formed the sign combination GU₇ (right) which later stood for the word „eating.“ In proto-cuneiform writing, however, this sign combination was exclusively used to represent a certain type of administrative activity related to the disbursement of rations.

Proto-cuneiform thus shows that in proto-writing systems the meaning of signs and sign combinations may be restricted to a few dimensions determined by their specific functions. The question has to be asked for any early writing system:

- *Does the meaning of the signs and sign combinations potentially cover the full variety of meanings that can be expressed by language or are there, on the contrary, indications that they represent only a restricted semantic field.*

LACK OF PHONETIC CODING

A further question raised by proto-cuneiform concerns the kind of coding that is used to represent information. In proto-cuneiform writing a great number of sign combinations can be identified—used primarily to denote persons or institutions—which do not seem to show any relation between the depicted objects and the meaning of the sign combination.

The first guess is, of course, that this is so because the meaning of these sign combinations is coded phonetically. This, however, seems not to be the case. Phonetic coding is, in fact, not the only possible explanation that can be given for such an independence of depiction and meaning. In a restricted semantic field such as administration in an archaic society any other convention of coding could easily serve the same purposes as phonetic coding, provided that the context of its application makes it possible to memorize the represented meanings.



Figure 4. Proto-cuneiform text (depicted in conventional orientation turned 90° to the left) with several combinations of signs which neither represent the depicted objects, nor the flow of phonemes of oral language.

If a writing system does not have to represent the full range of semantics of oral language, to depict an object or to use some kind of phonetic code are obviously not the only ways in which meaning can be conveyed. The possibility has to be taken into account for every early system of writing that a variety of different techniques may have been used for coding information. The question must therefore be raised:

- *What different kinds of coding were used in an early writing system, and what were the different kinds of coding used for?*

RANGE OF CONVENTIONALIZATION

This brings me to a further, closely related characteristic of proto-cuneiform writing, which concerns the conventionalization of the signs and sign combinations. Apparently, the writing of the signs already followed at an early time strict conventions which seem to have been com-

monly accepted within a fairly large geographical range. The statistics of the use of the signs shows, however, an extremely irregular pattern that can be explained by assuming that proto-cuneiform writing was extremely inhomogeneous with regard to such conventions (see table 1).

Table 1: Statistics of the use of non-numerical proto-cuneiform signs based on ca. 40,000 occurrences of 1,617 non-numerical signs in ca. 6,000 texts and text fragments

Number of attestations	Number of signs
1	530
2 - 10	610
11 - 100	370
more than 100	104

Proto-cuneiform consists of more than 1500 non-numerical signs attested by more than 40,000 occurrences of these signs in the corpus of approximately 6000 preserved texts and textfragments. Among these signs there is a comparatively small group of frequently used signs; about 100 signs are attested more than 100 times, the two most frequent ones, the signs EN-a and GAL-a, even more than 1000 times. There is, however, on the other side a much larger group of signs which were used very seldomly; more than 500 signs are attested only once, some further 600 signs less than ten times.



Figure 5. Discarded and incompletely erased administrative document (MSVO3, 81). The reverse was apparently used to „invent“ new signs by modifying the sign KALAM.

This remarkable irregularity of sign usage suggests that proto-cuneiform writing was based on a core of standardized signs, which could however be flexibly complemented by modifications of existing signs or by the creation of new signs which were used only in specific contexts and never developed into standardized signs of cuneiform writing.

Further evidence for this assumption is provided by another statistical irregularity (see table 2). There are signs and sign variants which are well attested but were nevertheless preferably used by scribes of specific groups of texts. Such a text group is defined by the texts of the former Erlenmeyer collection together with some other texts in private collections (MSVO 3, 1-90). From persons and institutions represented in these texts can be inferred that they must have been written at the same place and at the same time. The statistics of the signs in these texts shows that some of the signs are frequently used in this small group of 90 texts, but are rarely used in the approximately 6,000 other proto-cuneiform texts.

Table 2: Statistics of proto-cuneiform signs specifically used in the text group MSVO 3 (90 texts) in comparison to the use in the total text corpus (ca. 6,000 texts)

Sign	Total number of attestations	Number of attestations in MSVO 3
AZ	13	12
KU _{b2}	29	14
SA _c	34	34
SAGŠU	15	8
SI _{4f}	40	35
ŠEN _b	42	26
ŠEN _{c.tenu}	18	17
ŠIM _a	49	28

The general question which is suggested by this example is the following:

- *How were the signs of early writing systems standardized by conventions and to what extent was the standardization process successful at the different stages of development from proto-writing to a real writing system?*

This question introduces a new dimension into my arguments: The development of writing cannot be adequately described on the technical level of coding information only. The social environment has to be taken into account because it obviously had a great influence on *what* was written down *how*. Writing is not only a technique which was developed to serve a universal human need but rather a social process of knowledge representation, based on human interaction and historical continuity.

From this point of view, it cannot be considered only an incidental condition of proto-cuneiform writing that it was initially used predominantly or even exclusively to document administrative activities. This restricted context of application which influenced its formal structure and its semantic may even be considered as constitutive of its origin. For any early writing system the questions have to be raised:

- *Was there any restriction of proto-writing to specific contexts in the period of its emergence? and*
- *How did the writing system attain the full-fledged applicability of real writing?*

PRECURSORS OF WRITING

This brings me to another characteristic of the role of proto-cuneiform writing in its social context. It is well known that in the last decades—unexpectedly—precursors of proto-cuneiform writing have been identified that were used for the same or similar purposes.



Figure 6. Precursors of proto-cuneiform writing: cylinder seal; sealed bulla with tokens; sealed numerical tablet

Clay tokens were used to record objects and quantities. Normed containers were used to standardize quantities. Seals were used to represent legitimacy and property based on social power in a form which makes them independent of personal confrontation. The invention of proto-cuneiform writing turned out to have been only the last step in a long tradition of developing pre-historic means of administration.

The discovery that such means developed into proto-cuneiform with virtually no discontinuity is in good accordance with the limited function proto-cuneiform seems to have had in the period immediately after its emergence towards the end of the fourth millennium B.C. The general question implied by this observation concerns any introduction of writing into a culture:

- *If any early writing system was introduced or invented and if it was used to serve some relevant social needs, by what means were these needs met before its introduction or invention?*
- *What continuity or discontinuity occur with the emergence of a proto-writing system?*

ADAPTATION TO ORAL LANGUAGE

A similar question arises also with regard to the later development of proto-writing into a real writing system. Again proto-cuneiform can serve as a model. Unfortunately, however, the development of proto-cuneiform into the fully developed cuneiform writing systems cannot be traced in detail because the early period is only scarcely documented by archeological findings. Nevertheless, the differences between proto-cuneiform writing and cuneiform writing of the Fara period some 500 years later makes evident, that in the meantime not only the technique of writing had changed but as a consequence of the partial introduction of phonetic coding also its relation to oral language and subsequently also the range of its application. In the administrative documents the number of signs was reduced by partially substituting proto-cuneiform signs and sign combinations for persons or qualifications of objects by phonetic writing of names or Sumerian designations. In addition, new types of documents occur which obviously represent attempts to write oral language by means of a still insufficiently developed phonetic writing.

Thus, cuneiform writing apparently developed in two stages. At the first stage, writing was fairly independent of phonetic coding, but its application was restricted to narrowly defined contexts and its signs and sign combinations did not yet represent universally applicable words but specific entities and activities in the context of administration. At the second stage, phonetic

coding made a new type of application possible, the written representation of information in the same way as it was previously transmitted orally. Whereas at the beginning, this new application played only a minor role, in the course of later history fostered further by the application to the Akkadian language, the relative importance of the different elements of the writing system changed and in its turn the nature of cuneiform writing.

This model of the development of early writing is surely specific to the development of proto-cuneiform into cuneiform writing. It shows, nevertheless, a further aspect of the development of writing that has to be taken into consideration. This development is not necessarily a linear process but may have different tracks combined with internal reorganizations of the total writing system in certain periods. In any case, the model challenges the historical reconstruction of the origins of writing by suggesting the general question:

- *Does the emergence and development of a particular system of writing have to be conceived of as a one-dimensional process or does it have to be reconstructed as an interaction and final integration of different, relatively independent processes?*

CONCLUSION

I come to the end of my attempt to specify the approach of historical epistemology to the origins of writing. Let me briefly summarize the general questions which I have derived primarily from characteristics of the proto-cuneiform example. I have argued that proto-writing may represent knowledge in various ways that do not necessarily presuppose the ability of the system to represent language in the sense of developed writing. This focusses my questions on an often neglected facet of the origins of writing, that is, the role of non-linguistic structures and mechanisms.

- *The questions which are specific to this approach concern three different aspects of the origins of writing: the changing structure of the coding system for representing knowledge, the social context which determines the functions of writing, and the historical dynamics which stimulates the development of these functions.*

With regard to the *structures of early writing systems*, these questions are focussed on two areas. The weakness of philological methods applied to proto-writing shows, first, that it is necessary to pay special attention to non-linguistic structures of syntax. The specific use of proto-writing shows, second, that the nature of the semantic fields of early writing systems and the various techniques used to represent meanings have to be carefully analyzed.

With regard to the *social contexts* of early writing systems, the questions focus on the social mechanisms that establish shared meanings and on the explanation of the structures of proto-writing that can be derived from the social context of its emergence.

With regard to the *historical dynamics* of the development of writing these questions are focussed on the continuities and discontinuities in the development from pre-literate means for representing knowledge to proto-writing and, finally, to the representation of oral language. This development has to be analyzed in view of the important fact that in pre-literate societies there exist many techniques of representing knowledge other than writing which finally merge by substitution or integration into real writing.

Given this great variety of non-linguistic structures, functions, and techniques of knowledge representation, it no longer makes sense to speak about *the* origins and *the* development of writing. The term *origins of writing* is related to historical developments in huge geographical areas over a time-span of some 2000 years. Already the comparatively small region of the Near East from which I took my examples shows an enormous richness of different developments which all contributed to the emergence of writing. If one takes into account developments in such different settings as those of Egypt, China or Mesoamerica the complexity of different developments is increased even more.

This brings me back to the problem of monogenesis or polygenesis of writing that I raised at the beginning. Whatever the solution will be that can hopefully be found to this problem, this answer has to take into account the quite different ways writing in one culture may influence the emergence of writing in others. Even if we accept the monogenesis hypothesis, the complexity of the historical emergence and development of writing will not be significantly reduced. It is not in the same way that proto-Elamite developed under the influence of proto-cuneiform, Hittite or Minoan writing under the influence of cuneiform, or Japanese writing under the influence of Chinese, to say nothing of developments such as the emergence of the Indus script, of Chinese itself, or of Maya writing, which cannot easily be related to their possible models. Even the final outcome of the development, that is, the developed system of real writing, can be quite different in different cultures, depending on the different structures of the languages which are finally represented.

We should keep this historical variety in mind when we compare developments of writing in different cultures during the following two days. In fact, due to this historical variety, to answer questions such as those I have raised requires the cooperation of specialists from different fields as they have been brought together here by our host for this challenging symposium. I am glad that I am here to take part in this cooperation, and I am looking forward with great interest to your contributions and arguments in the discussions of the coming two days. For the moment, I have just to thank you for your attention!

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