

Hieroglyphic Writing During the Fourth Millennium BC: an Analysis of Systems

Jochem Kahl*

Résumé

Au cours de la dernière décennie, le nombre d'inscriptions publiées, antérieures à la 1^{ère} dynastie, a presque triplé. La principale raison en est la découverte des inscriptions de la tombe U-j (environ 3320 av.J-C) à Umm el-Qacab/Abydos (Naqada IIIa2/Naqada IIIA1). Les 525 inscriptions connues à présent et datant d'avant la 1^{ère} dynastie autorisent une « plongée » aux origines de l'écriture hiéroglyphique – relativement au matériel inscrit et écrit, tout aussi bien qu'en ce qui concerne les graphies des mots et le stock des signes.

La répartition des inscriptions s'est accrue au cours du temps, avant la 1^{ère} dynastie. Pour le règne de Nar-mer, elles sont déjà attestées sur 17 sites. Ceci prouve à l'évidence qu'il existait un corps constitué d'un grand nombre de scribes.

Les mots étaient écrits en différentes séquences de signes. Une tendance à la standardisation n'est pas encore certaine. Le nom d'Horus du roi Nar-mer, par exemple, est attesté sous 15 graphies différentes. Le choix d'une graphie cependant n'est pas apparue par hasard en dépit de la multiplicité des possibilités. Ainsi la forme longue du nom de Nar-mer se trouvait particulièrement exprimée sur des objets représentatifs, mais la forme courte „Nar“ occupait des supports plus fonctionnels.

Un examen de l'existence de certaines fonctions des signes hiéroglyphiques montre que, d'une part, le système d'écriture était déjà en usage au temps de la tombe U-j, avec de nombreuses caractéristiques connues des périodes plus tardives (logogrammes, déterminatifs, phonogrammes). D'autre part, d'autres caractéristiques manquent encore (compléments phonétiques et quelques principes de la création de logogrammes). En particulier, un syllabaire était présent, mais seulement dans une forme rudimentaire, avant le milieu de la 1^{ère} dynastie. Ainsi, l'écriture hiéroglyphique existait dans une forme „développée“ durant le règne de Den, mais dans sa forme „pleinement développée“, seulement à partir du début de la 3^{ème} dynastie.

Avant l'époque de la tombe U-j, l'écriture proprement dit n'est pas connue. D'un côté, les combinaisons de signes manquent, et d'un autre côté, le principe des rébus n'est pas reconnaissable. Néanmoins, il est probable qu'au moins durant une courte période avant l'établissement de la tombe U-j, l'usage de l'écriture existait, mais aucune évidence n'a survécu.

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Abstract

During the last ten years the number of published inscriptions from the time before the 1st Dynasty has almost tripled. The main reason is the discovery and publication of the early inscriptions from Tomb U-j (ca. 3320 BC) at Umm el-Qacab/Abydos (Naqada IIIa2/Naqada IIIA1). The 525 inscriptions known at present and dating before the 1st Dynasty allow an insight into the origins of hieroglyphic writing — in respect to writing materials and literacy as well as concerning the spelling of words and the stock of signs.

The distribution of inscriptions increased in course of time before the 1st Dynasty. For the reign of Narmer inscriptions from 17 sites are already attested. Due to circumstantial evidence, it can also be proved that there was a large official group of working scribes as well.

Words were written in different sign sequences. A tendency to standardization was not yet ascertainable. The Horus name of king Nar-mer, for example, was attested in 15 different spellings. The choice of a spelling, however, did not happen haphazardly in spite of the multiplicity of possibilities. Thus, the longer form of Nar-mer's name was especially reproduced on representative objects, but the shorter form „Nar“ on more functional substrates.

An examination of the existence of certain functions for the hieroglyphic signs shows, on one hand, that the hieroglyphic writing system was already in use during the time of Tomb U-j, with many characteristics that are known from later periods (logograms, determinatives and phonograms). On the other hand, some characteristics are still missing (phonetic complements and some principles of the creation of logograms). In particular, a syllabary was present only in a rudimentary way before the middle of the 1st Dynasty. Thus hieroglyphic writing existed in a „fully developed“ form during the reign of Den, but in a „fully developed“ form only at the beginning of the 3rd Dynasty.

From the time before Tomb U-j, hieroglyphic writing in its proper sense is not yet known. On the one hand, signs in combination are missing, and on the other hand, the rebus principle is not yet recognizable. Nevertheless, it is probable that at least a short time before Tomb U-j was equipped, the use of writing already existed however no evidence of it has survived.

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1. History of Research and the Question at Issue

In the course of the last century, and especially just in the last decade, our understanding of the origins and development of Egyptian hieroglyphic writing has changed dramatically. As new evidence has emerged, the date at which hieroglyphic writing can be said to have begun is being pushed back as far as the second half of the fourth millennium. Even as recently as one hundred years ago, inscribed objects from periods antedating the 4th Dynasty (ca. 2600-2465 BC) were not yet known or not yet recognised as such (MEYER 1887: 100), although the great antiquity of the hieroglyphs and their "invention" by the legendary founder of the Egyptian state, Mena, was known from the tradition of the ancient authors (Plinius the Elder VII, 56 [192]). But, beginning in 1895, a significant series of discoveries has transformed the field of evidence on which questions about the history, nature and meaning of hieroglyphic writing are based. The excavations at Umm el-Qacab/Abydos (AMÉLINEAU 1899; AMÉLINEAU 1902; AMÉLINEAU 1904; AMÉLINEAU 1905; PETRIE 1900; PETRIE 1901), Naqada (DE MORGAN 1897) and Hierakonpolis (QUIBELL 1900; QUIBELL - GREEN 1902) yielded numerous inscribed finds which immediately pushed back the age of the surviving evidence of writing by several hundred years. What are obviously the oldest written hieroglyphic characters were now dated from the reigns of King Iry-Hor (ca. 3060 BC) and King Sekhen/Ka (ca. 3050 BC). In fact, the volume of this early stock of hieroglyphic signs continued to grow up until the beginning of the 1990s, although no further significant changes in dating occurred. Up until 1992, 185 attestations of writing from the period predating the 1st Dynasty were published, as well as 46 inscriptions which could be set in Dynasty 0 or at the beginning of the 1st Dynasty.

Starting in 1988, the renewed excavations of the German Institute of Archaeology at Umm el-Qacab/Abydos brought about a dramatic change. Cemetery U there, which had begun to be used about 3600 BC and was followed seamlessly by the use of Cemetery B with the tombs of Iry-Hor, Sekhen/Ka, Nar-mer and Aha, yielded more inscribed material from so early a time than had been known before, from all of Egypt: 175 new labels and about 145 new pottery vessels (DREYER 1998a). Not only are the finds new, but their inscriptions are also older than those found in earlier discoveries: Tomb U-j, which yielded the largest number of inscriptions, has been dated by radiocarbon analyses to about 3320 BC (Naqada IIIa2 according to Kaiser's chronology [DREYER 1998a: 18; KAISER 1957: 69-77; KAISER 1990: 287-299]; this corresponds to Naqada IIIA1 according to Hendrickx' chronology [HENDRICKX 1999: 31, 76]). Thus, in the last decade alone, the number of published inscriptions from the time before the 1st Dynasty has almost tripled, largely due to finds from Tomb U-j alone (fig. 1).

¹ I would like to thank Barbara Emmel for her advice regarding English.

Fig. 1 : Number of published inscriptions predating the 1st Dynasty whose nature as writing would seem to be proven.

Dynasty 0 and older ¹	385
Iry-Hor ²	24
Sekhen/Ka ³	53
Nar-mer ⁴	63
total	525

Although these newly discovered inscriptions are very difficult to read — as is all evidence of writing predating the 1st Dynasty — their existence nevertheless demands a reinvestigation of the origin of hieroglyphic writing. The present paper will attempt to fulfil this task, from the perspective of graphetic and graphematic aspects, and with an especial emphasis on the following two questions: How early did a hieroglyphic writing system develop? And what stages of development are discernible in its early history?

The problem of defining the term « writing » is inseparable from this formulation of the question. General definitions are numerous and provide a first clue as to what is necessary in order to award the predicate "writing". For example, according to Gelb, writing can be understood as « *a system of human intercommunication by means of conventional visible marks* » (GELB 1952: 12). Hans Jensen defined writing as „*schriftliche Fixierung eines gegliederten sprachlichen Ausdrucks, wobei sprachlichen Einheiten schriftliche Einheiten entsprechen*“ (JENSEN 1969 : 33). Pascal Vernus argued in Archéo-Nil 3: « *Il y a écriture au sens propre lorsque le message fixé graphiquement peut être décodé hors de son contexte de production, pour peu qu'on possède les clefs du code. L'écriture a en effet la vertu de conférer aux énoncés linguistiques qu'elle véhicule une autonomie par rapport aux conditions de leur originelle profération.* » (VERNUS 1993: 76).

² 125 pottery vessels bear signs written in ink (DREYER 1998a: 47-84) and 175 labels from Tomb U-j in Umm el-Qacab/Abydos are incised with different hieroglyphs (DREYER 1998a: 113-136); additionally there are 11 labels from earlier excavations which may also originate from cemetery U (DREYER 1998a: 134-136; these labels correspond to KAHL 1994: Qu. 189-197, 205, 274) and more than 20 fragmentarily preserved vessels with inscriptions from other tombs from cemetery U (DREYER 1998a: 80-82).

KAHL 1994: Qu. 218 dates also to Dynasty 0.

In addition, there is some new evidence:

rock drawing with inscription, Gebel Sheikh Suleiman, MURNANE 1987: 285, fig. 1.A-B

pottery vessel, Tell Ibrahim Awad, VAN DEN BRINK 1992: 52, fig. 8.1

pottery vessel, Buto, VON DER WAY 1993: 100, fig. 22.6

jar stand, Abydos, "Osiris Temple", HARVEY 1996: 364

pottery vessel, Ezbet el-Tell, VAN DEN BRINK 1996: 146, fig. 3.18

pottery vessel, Palmahin Quarry, BRAUN - VAN DEN BRINK 1998: 88, fig. 3.A1-A2

pottery vessel, Horvat cllin Tahtit, BRAUN - VAN DEN BRINK 1998: 88, fig. 3.B1-B2

cylinder seal, Helwan, KÖHLER 1999: 50.

³ In addition to KAHL 1994: 171-172 (Qu. 5-24):

pottery vessel, Umm el-Qacab/Abydos, Bereich B 1/2, DREYER 1993: 56, fig. 12

seal impression, Umm el-Qacab/Abydos, B 0, DREYER 1996: pl. 9c

pottery vessel, Umm el-Qacab/Abydos (?), GILROY 2001: 72, fig. 3-4.

⁴ In addition to KAHL 1994: 173-176:

pottery vessel, Tell Ibrahim Awad, VAN DEN BRINK 1992: 52, fig. 8.2

pottery vessel, Umm el-Qacab/Abydos, Tomb U-j, DREYER 1998a: 166, fig. 98.247

pottery vessel, Umm el-Qacab/Abydos (?), GILROY 2001: 71, fig. 2.

⁵ In addition to KAHL 1994: 176-180 (Qu. 79-131):

pottery vessel, Tell Ibrahim Awad, VAN DEN BRINK 1992: 52, fig. 8.3

calcite-alabaster basin, Umm el-Qacab/Abydos, cemetery U, DREYER 1993: 38

label, Umm el-Qacab/Abydos, near B 0/1/2, DREYER 1998a: 139, fig. 83 b

year label, Umm el-Qacab/Abydos, B 16-2 Halde, DREYER 1998b: 139, pl. 5 c

pottery vessel, Umm el-Qacab/Abydos, near B 1/2, DREYER 1998b: 140, fig. 30

statuette, unknown provenance, GRIMM 1998: 227 (possibly to be read as *shn/kꜣ*)

pottery vessel, Tel Halif Terrace, VAN DEN BRINK 1998: 219, fig. 1a

pottery vessel, Tel Halif Terrace, VAN DEN BRINK 1998: 219, fig. 1b

pottery vessel, northeastern delta (?), DREYER 1999: 2, fig. 1

pottery vessel, Umm el-Qacab/Abydos (?), GRIMM - SCHOSKE 2000: 71.

In the specific case of the earliest Egyptian hieroglyphs, it is necessary to consider certain peculiarities of the writing system whose principles are well known from the later periods. The question at issue is whether these principles were already in existence during the fourth millennium, and, if so, when their existence can first be discerned. These principles of the ancient Egyptian writing system are discussed in detail below in section 6, but it may be stated preliminarily that the most important are: (1) the rebus principle of writing, whereby a depiction of one object is used to represent a word that sounds the same as, or similar to, the object depicted; (2) the alphabetic principle, whereby a set of uniliteral signs is used to represent the individually distinctive sounds (phonemes) of the language; and (3) the complement principle, whereby a uniliteral or biliteral sign is used to specify a part of the phonemic content of a sign which has more consonants than it itself has.

Consequently, it has to be determined when the stock of hieroglyphic signs first began to be freed from their specifically iconic or symbolic usage and thereby became abstracted from their original associations so that they could be used in different semantic contexts. It is at this point that the manipulation of hieroglyphs could result in the writing of all thinkable words and no longer just the words they represented pictorially.

2. Chronology

Before undertaking to examine the earliest evidence of Egyptian writing as such, it is important to note that the inscribed finds from Tomb U-j at Umm el-Qacab/Abydos not only have established new upper chronological boundaries for the detectable use of Egyptian hieroglyphs, but also have suggested a revised chronology for the sequence of early Egyptian kings. Simply on the basis of label and vessel inscriptions from this tomb, Günter Dreyer estimates nine rulers who reigned before the previously known kings of Dynasty 0. But then, through a comparison with the colossal Min statues from Coptos, the Cities-Palettes and some other small finds, Dreyer ultimately reconstructs a sequence of 15 rulers before Iry-Hor and therefore a total of 19 rulers before the 1st Dynasty (fig. 2 ; DREYER 1998a : 178-180).

Fig. 2 : The sequence of rulers before the 1st Dynasty as reconstructed by Günter Dreyer.

Oryx?standard	
Pteroceras	
Fish (?)	
Elephant	
Bull (= Bull's head standard?)	
Stork	
Canid	
Bull's head standard	
Scorpion I	(about 3320 BC)
Falcon (I)	
Min-standard + branched pole	
?	
? (Falcon II)	
Lion	
Double Falcon	
Iry-Hor	
Sekhen/Ka	
Scorpion II	
Nar-mer	(until about 3000 BC)

However, it is not yet clear whether Dreyer's interpretation of several sign groups as king's names is correct (cf. KEMP 2000). The present author considers them rather to be names of places and gods (KAHL, forthcoming). If this hypothesis proves correct, then the sequence of rulers predating the 1st Dynasty could still be traced back as far as Tomb U-j, but without our knowing the names of those rulers (fig. 3).

Fig. 3: An alternative chronology of the period with written evidence before 1st Dynasty

anonymous ruler, buried in Tomb U-j (about 3320 BC)	
other anonymous rulers from Abydos	Ny-Hor, Hat-Hor, „Trio“, „Double Falcon“(?)
Iry-Hor	Pe-Hor, Ny-Neit(?)
Sekhen/Ka	"Crocodile", "Bird and vertical sign", "Scorpion"
Nar-mer (until about 3000 BC)	

That would leave the well-known kings Iry-Hor, Sekhen/Ka and Nar-mer, known from Abydos, as well as the other kings, seen as local or opposing rulers: Ny-Hor and Hat-Hor (cf. to both KAISER-DREYER 1982: 260-268 and VON DER WAY 1993: 101), "Trio" (FISCHER 1963: 44-47), Pe-Hor (WILLIAMS 1986: 163, pl. 76; possibly to be read as Iry-Hor), "Crocodile" (DREYER 1992: 259-263), "Bird and vertical sign" (DREYER 1992: 260; PETRIE - WAINWRIGHT - GARDINER 1913: pl. 31.71), "Scorpion" (QUIBELL 1900: pl. 25 [below], 26.C), and perhaps "Double Falcon" (ENGEL, 2001) as well as Ny-Neit(?) (KÖHLER - VAN DEN BRINK, 2002 : 65-66, 76, fig. 1.2) and an obscure name (VON DER WAY 1993: 99, fig. 22.6).

3. Writing material

The oldest detectable materials used as a background substance (substrate; cf. MOUNTFORD 1969: 630 (X.); KAHL 1994: 35-36) are pottery vessels and small bone or ivory labels which were found in large numbers in Tomb U-j at Umm el-Qacab/Abydos (DREYER 1998a: 47-136). Stone was also inscribed as early as Naqada IIIa2/Naqada IIIa1 (DREYER 1998a: 135-136). Still earlier, at the time of Naqada IId/Naqada IID, pottery vessels with signs similar to writing have been found, although their meaning has not yet been clearly proved (cf. the definition of writing in 1. and the discussion in 7.). Whether other more perishable materials were inscribed, such as linen (cf. the painted finds at Gebelein from Naqada II: SCAMUZZI 1964: pl. 1-5; D'AMICONE 1994: 20-23), papyrus (cf. KAHL 1994: 36) or leaves (HELCK 1985: 396; cf. WELVAERT 1996: 101-107), is also not yet clear.

Ink, carving and relief were used as materials and/or techniques by which hieroglyphic signs could be made visible (constrate; cf. MOUNTFORD 1969: 630 (X.); KAHL 1994: 35-36). Two colours of ink, red and black, might be used on the same object (PETRIE 1901b: pl. 12.4; cf. KAHL 1997: 44-56). Incisions could be filled with coloured paste (e.g. DREYER 1998a: 137 [black or bluish-black paste]; QUIBELL 1900: pl. 30.7 [red ochre]). Relief was limited to prestigious objects: highly decorative palettes and maceheads, statues of gods, stone vessels, as well as gaming balls and a weight stone whose exact utilisation is unknown. Fig. 4 presents a summary of all attested materials with examples for all combinations of substrate and constrate.

	ink	incision	relief
pottery vessel	PETRIE 1902: pl. 1.1-13 KAISER - DREYER 1982: 234, fig. 10c-d PETRIE - WAIN- WRIGHT - GARDINER 1913: pl. 31.69	PETRIE 1902: pl. 3.36-38 GARSTANG 1907: pl. 3.1 DREYER 1999: 2, fig. 1	
label (bone)		DREYER 1998a: 115, fig. 74	
labels (ebony)	PETRIE 1901b: pl. 12.4	PETRIE 1901b: pl. 2.4	
labels (ivory)		DREYER 1998a: 117, fig. 75.39	
label (limestone)		DREYER 1998a: 135, fig. 82.191	
label (quartzite)		DREYER 1998a: 135, fig. 82.192 (incised?)	
cylinder seal (ivory)		PETRIE 1901a: pl. 10.34 BAINES 1989: 475, fig. 5	
cylinder seal (steatite)		KÖHLER 1999: 50	
seal impressions (indi- cations for cylinder seals)		DREYER 1996: pl. 9c SPENCER 1980: 53 (360)	
sculpture (limestone)			PETRIE 1896: pl. 3-4, 5.4
sculpture (calcite-alabaster)		SCHOTT 1969: 81, fig. 5	
sculpture (veined sedimentary rock)		GRIMM 1998: 226-227	
ceremonial palettes (slate)			QUIBELL 1900: pl. 29 FISCHER 1958: 73, fig. 2a ASSELBERGHS 1961: pl. 92
ceremonial macehead (slate)			QUIBELL 1900: pl. 25 (bottom), 26.B, 26.C

stone vessels (calcite-alabaster)		PETRIE 1901b: pl. 2.6	PETRIE 1901b:
stone vessel (slate)		QUIBELL - GREEN	pl. 52.359
stone vessel (basalt)		1902: pl. 30.7	KAPLONY 1968: 18.5
stone vessel (black porphyry)		KAPLONY 1963: III, fig. 826	DREYER 1993: 38
		KAPLONY 1973: pl. 7.24	
		LACAU - LAUER 1959: pl. 1.1	
palette		KAPLONY 1965: pl. 20.3	
stone weight (quartzite)			KAPLONY 1964: pl. II.1053
gaming balls (white stone)		KAPLONY 1973: pl. 6.5-6	
rock-inscription		WINKLER 1938: pl. 11.1	
		MURNANE 1987: 285, fig. 1.A-B	
faience object (inlay?)		SAAD 1947: 165, fig. 13	
box (ivory)		PETRIE 1901b: pl. 4.17	
unidentified object (ivory)		PETRIE 1901b: pl. 2.5	

4. Literacy

The distribution of the transmitted inscriptions indicates a concentration in the centre, in Abydos. Starting with the ruler buried in Tomb U-j, the distribution of the inscriptions outside of Abydos increases from Iry-Hor (fig. 5) to Sekhen/Ka (fig. 6) and Nar-mer (fig. 7). For Dynasty 0, inscriptions are attested from 30 different sites (fig. 8). During the reign of Nar-mer, the eleven inscriptions from Tarkhan give the first serious hint of the role played by the Memphite region during the following 1st Dynasty.

Legend to fig. 5-8:

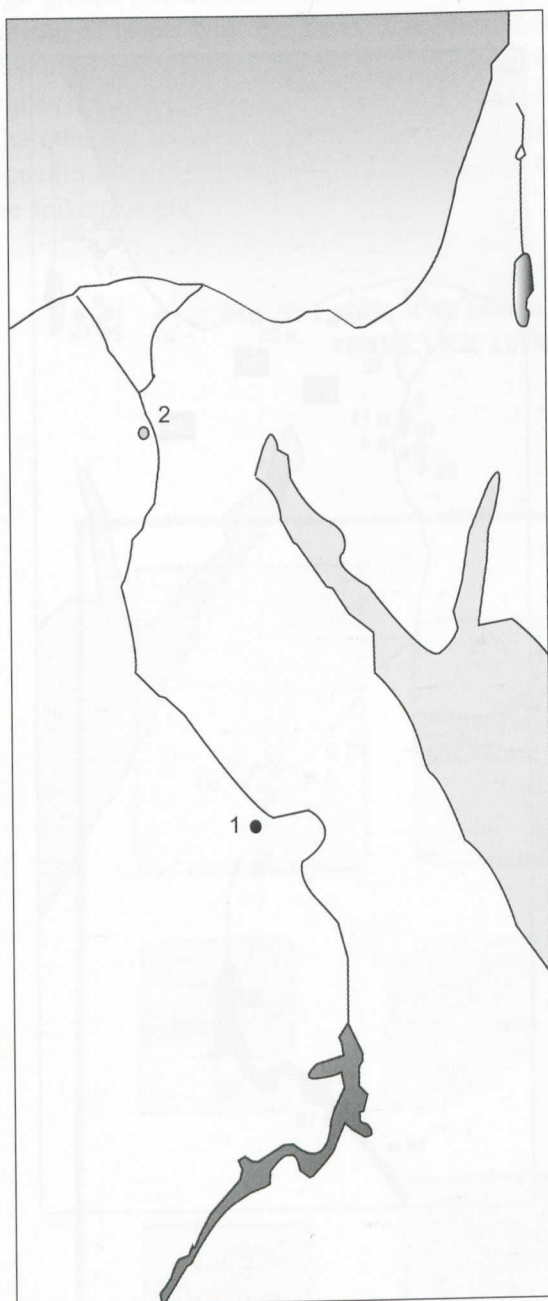
o less than 10 inscriptions

● more than 10 inscriptions

List of sites mentioned in fig. 5-8.

1 Umm el-Qacab/Abydos	13 Minshat Abu Omar	25 el-Beida
2 Zawiyet el-Aryan	14 northeastern delta	26 Sinai
3 Tarkhan	15 Arad	27 Raphia
4 Helwan	16 Tel Halif Terrace	28 Tel Macahaz
5 Tell Ibrahim Awad	17 Tel Erani	29 Horvat cillin Tahtit
6 Hierakonpolis	18 Gebel Sheikh Suleiman	30 Palmahim Quarry
7 Wadi el-Qash	19 Qustul	
8 Naqada	20 Abadiyeh	
9 Qift	21 Mahasna	
10 Saqqara	22 Abusir el-Meleq	
11 Tura	23 Buto	

**Fig. 5: Distribution of inscriptions
from the reign of Iry-Hor**



**Fig. 6: Distribution of inscriptions
from the reign of Sekhen/Ka**

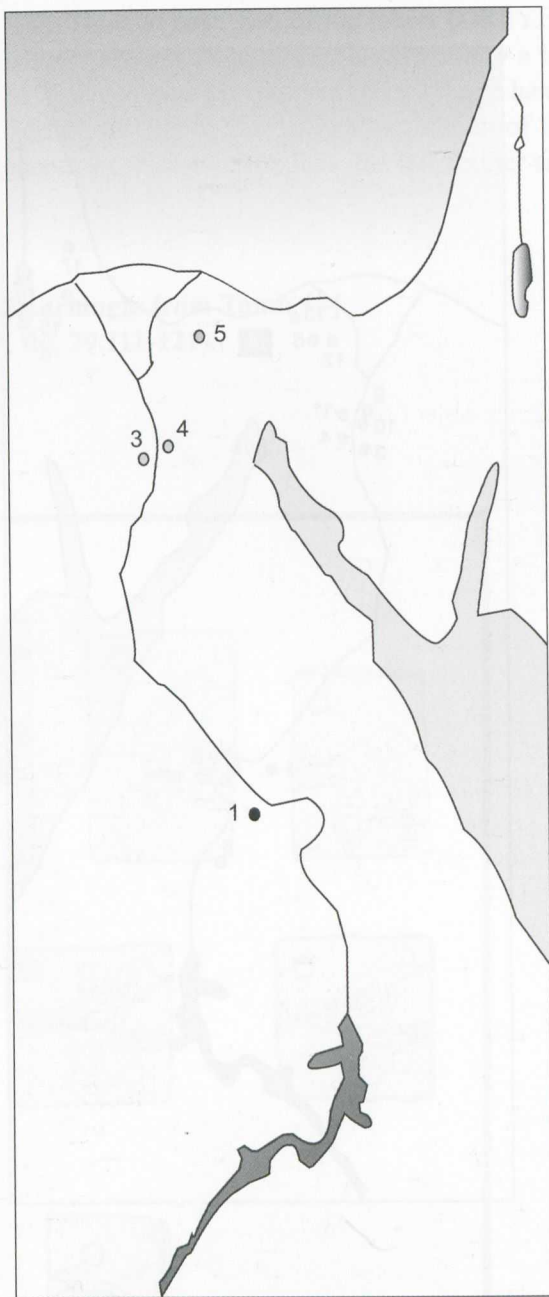


Fig. 7: Distribution of inscriptions from the reign of Nar-mer.

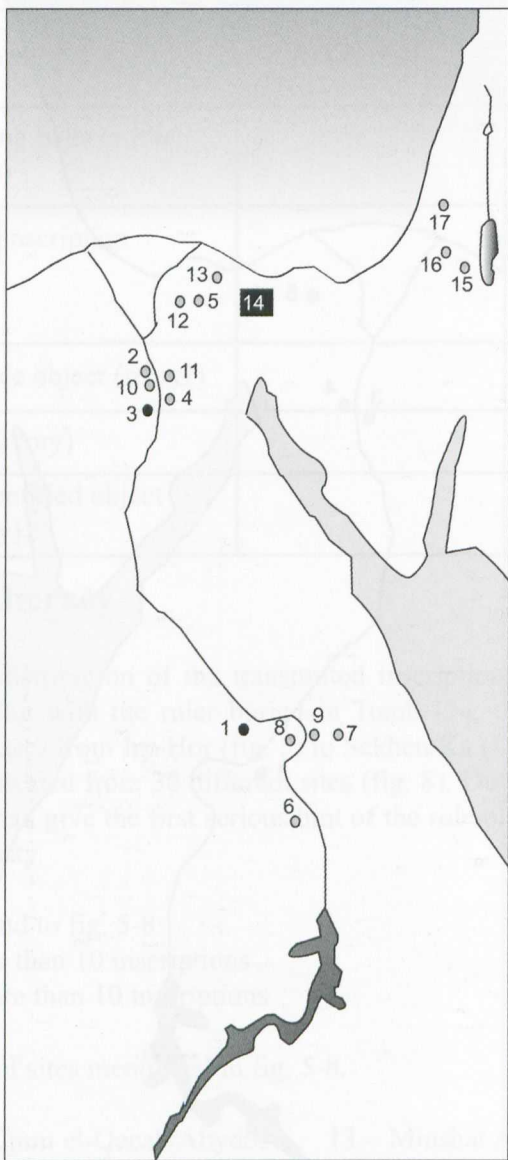
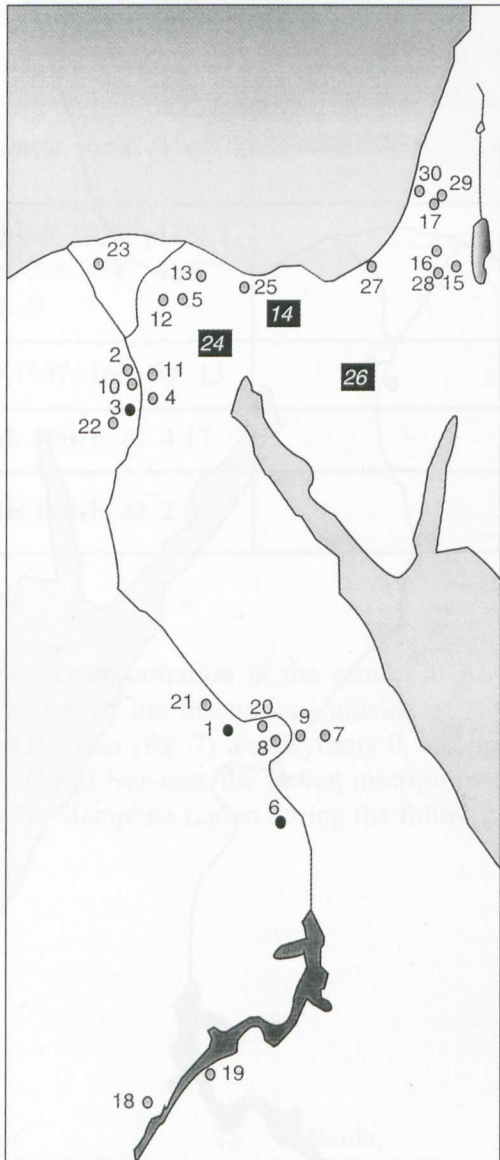


Fig. 8: Distribution of inscriptions before the 1st Dynasty.

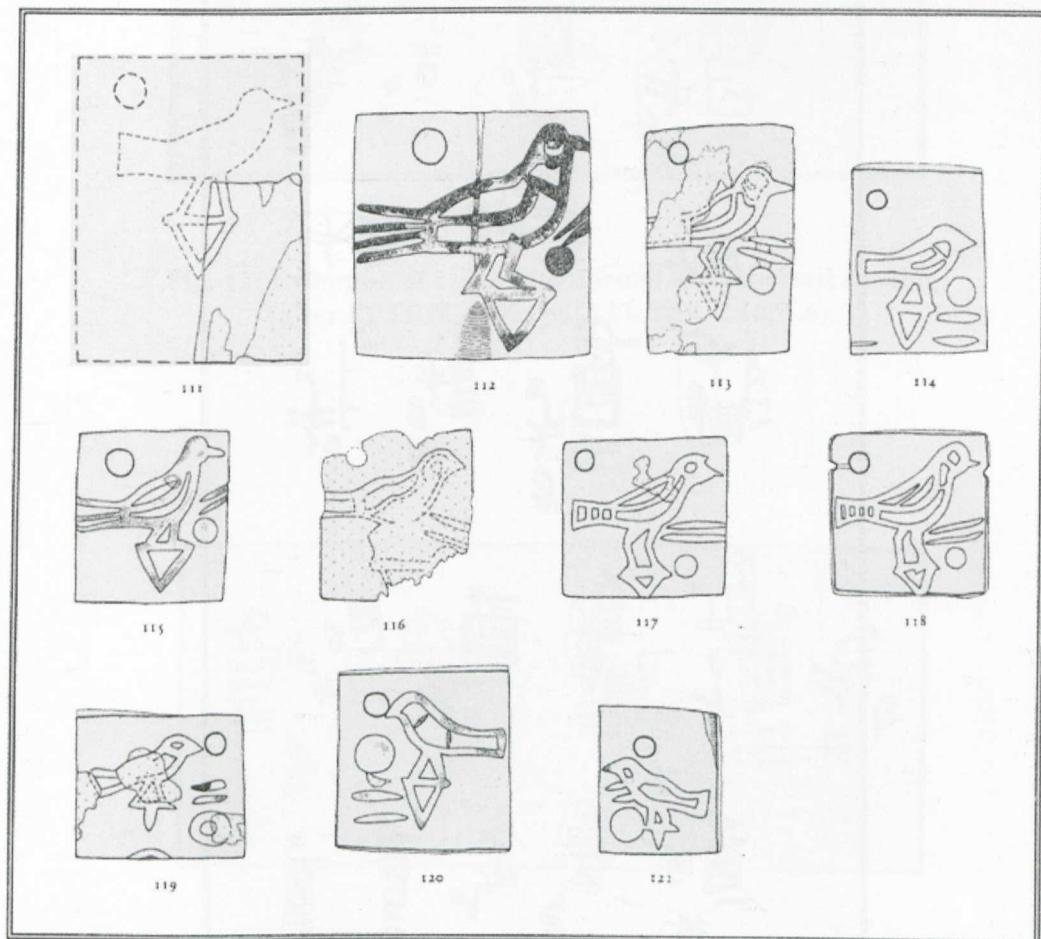


Knowledge of writing and reading might well have been very restricted during this initial phase of hieroglyphic writing. Certainly, fewer than 1% of the people (a number estimated for the Old Kingdom [BAINES – EYRE 1983: 67]) might have acquired this ability.

But it is also important not to underestimate the number of literates, for the following reasons:

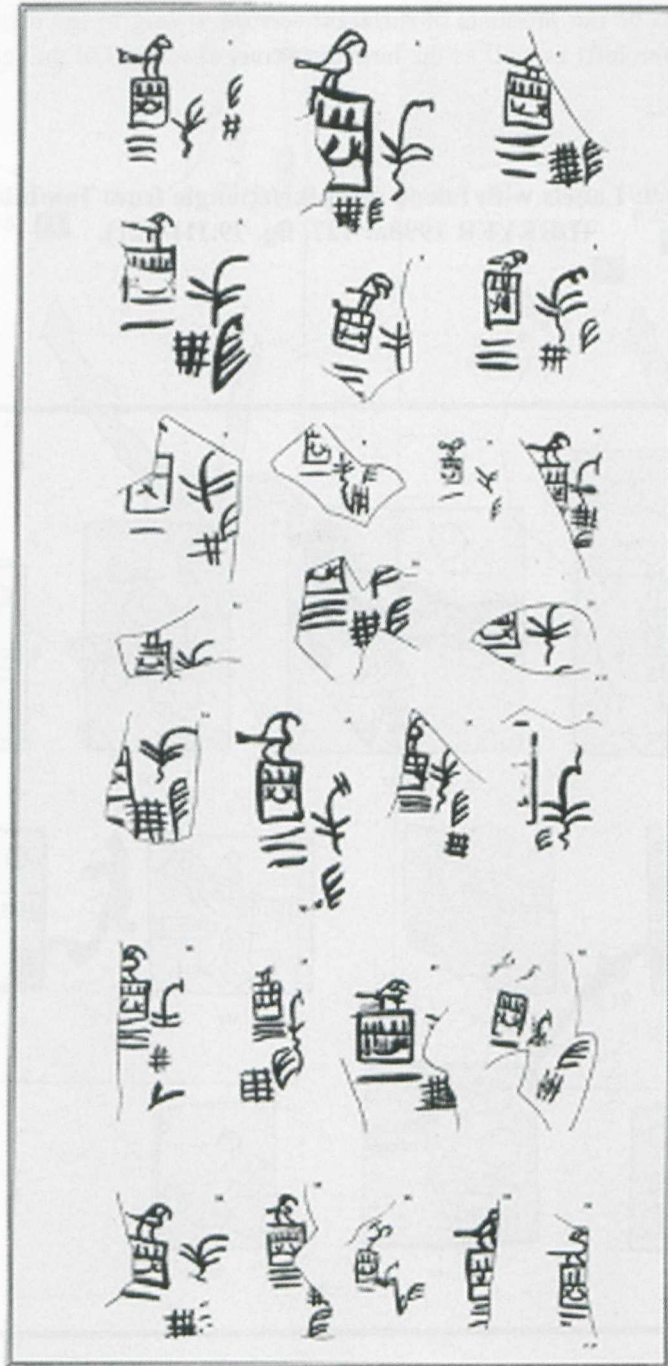
- Place names on labels from Tomb U-j could point to writing and reading in other sites during Naqada IIIa2/Naqada IIIA1. However, these place names could also have been recorded at Abydos (DREYER 1998a: 145).
- The labels from U-j might have been produced from plates of animal bones in series with identical sign groups (DREYER 1998a: 137). However, the signs were executed by different hands, as a comparison of labels with the same inscription shows (fig. 9): Thus, at best, two of the labels (DREYER 1998a: 127, fig. 79.117-118) with a falcon perching above an object which looks like a spike or a triangle (DREYER 1998a: 127, fig. 79.112-115 and fig. 117-121) appear to be incised by the same hand. The other labels seem to be the products of different scribes, owing to the distinct orientation of the signs (to the right or to the left) as well as the heterogeneous execution of the legs, the tail feather and the spike/triangle

**Fig. 9: Labels with falcon on spike/triangle from Tomb U-j
(DREYER 1998a: 127, fig. 79.111-121).**



- Even so, the palaeographical comparison of the ink inscriptions on cylindrical vessels from Umm el-Qacab, Tomb B 7, points to a larger number of scribes who worked on the equipment for the tomb of Sekhen/Ka (fig. 10). The different execution of the following signs is especially striking: the sign for Upper Egypt (Gardiner sign-number M 26), the hieroglyph for *p* (Q 3), the serekh (O 33) and the falcon (G 5) perching on the serekh. In each inscription, these hieroglyphs occur again and again in a new combination of forms. A comparable multiplicity of scribes' hands is attested from the reign of Aha: distinctions in the reproduction of signs (cf. SAAD 1939: 76) suggest that ink inscriptions from Tomb S 3357 at Saqqara (EMERY 1939: pl. 14, 20-23) were drawn by a larger number of scribes.

Fig. 10: Ink inscriptions from the reign of Sekhen/Ka
(PETRIE 1902: pl. 1-2).



5. Word spellings

The spelling of words could vary throughout the entirety of the Pre- and Early Dynastic Period: different graphemes were at times used for the notation of one and the same word (KAHL 1994: 56-61). For example, the word *nḥb* „a kind of gift or revenue“ (for the reading cf. KAHL 1994: 101-104; KAHL 1995: 168-176) is written in a different way on cylinder vessels during Dynasty 0 than on a year label from the reign of Den (cf. KAHL 1994: 102; DREYER 2000: 115, pl. 10.h).

Graphemes were also changed in their orientation, as occurred, for example, in the hieroglyphic group referring to the sandal-bearer on the Nar-mer-palette or on the Nar-mer-macehead (fig. 11). Or they could be changed in their sequence as, for example, in the note of delivery *ipw.t*, in which *p* was written in front of *i* (fig. 12).

Fig. 11: Sandal-bearer on the macehead and the palette of Nar-mer
(after KAISER 1983: 264, fig. 1; QUIBELL, 1898: pl. 13, 12).

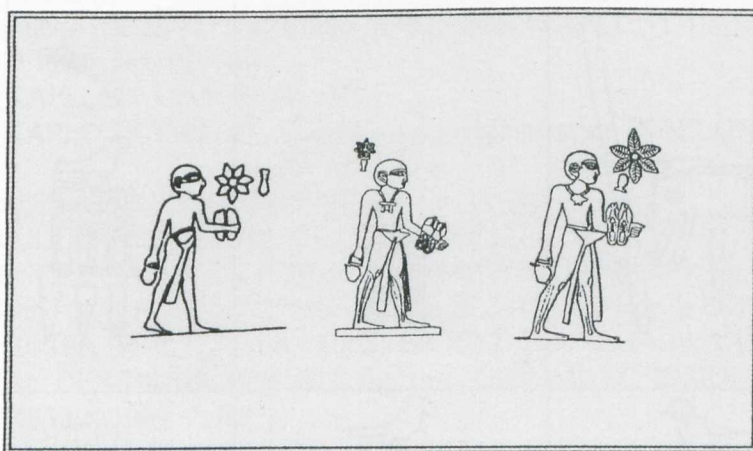
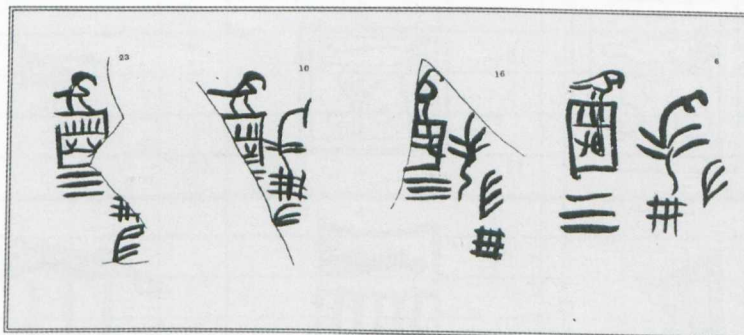
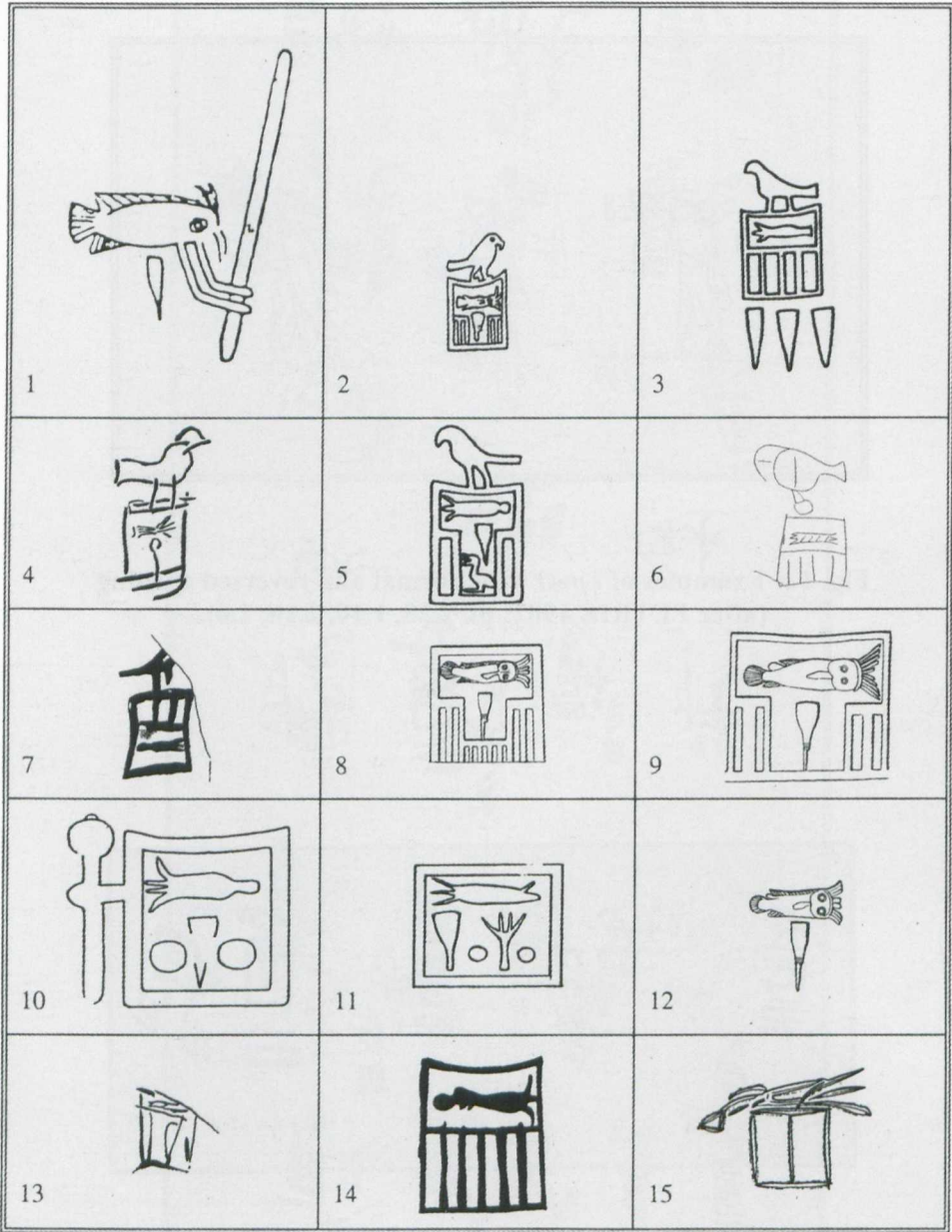


Fig. 12: Examples of *ipw.t* with normal and reversed spelling
(after PETRIE 1902: pl. 2.23, 1.10, 2.16, 1.6).



There are several possible reasons for such irregularities: the stock of hieroglyphic signs was still relatively incomplete (cf. 6.3) and it appears that the scribes took a certain pleasure in experimenting. The reproductions of king Nar-mer's name show that the rules of decorum (cf. BAINES 1985: 277-278) even then influenced word spellings. His name could be written in 15 different ways according to the attestations which are known at present (fig. 13). One categorizing mark is a respective inclusion or omission of the chisel (U 23): whereas the catfish (K 8 = Kahl sign-number k 4) was always written, the chisel could be left out. The explanation for this phenomenon might be found in the hierarchical importance of the sources: more representative sources, such as the Nar-mer-palette, the Nar-mer-macehead or stone vessels, show the full spelling of the name, complete with catfish and chisel, whereas more functional sources, such as product labels or pottery vessels, attest the shorter spellings without the chisel (fig. 14).

Fig. 13: Spellings of king Nar-mer's name.



- 1 cylinder seal (BAINES 1989: 475, fig. 5)
- 2 stone vessel (PETRIE 1901b: pl. 52.359); cf. highly decorative macehead (QUIBELL 1900: pl. 26.B); year label (PETRIE 1901b: pl. 10.1; DREYER 1998b: 139, fig. 29); stone vessels (DE MORGAN 1897: 241, fig. 811; PETRIE 1900: pl. 4.2; PETRIE 1901b: pl. 2.3; PETRIE 1914: pl. 9.2; LACAU - LAUER 1959: pl. 1.1; KAPLONY 1966a: fig. 1138; KAPLONY 1968: pl. 18.5; KAPLONY 1973: pl. 7.24); gaming balls (KAPLONY 1973: pl. 6.5-6); weight stone (KAPLONY 1964: fig. 1053); statue of baboon (SCHOTT 1969: 81, fig. 5); seal impression (KAPLONY 1963: III, fig. 77); ivory object (PETRIE 1901b: pl. 2.5)
- 3 seal impression (KAPLONY 1963: III, fig. 26A); cf. seal impression (KAPLONY 1963: III, fig. 26B)
- 4 pottery vessel (PETRIE - WAINWRIGHT - GARDINER 1913: pl. 31.68); cf. pottery vessels (PETRIE - WAINWRIGHT - GARDINER 1913: pl. 31.69; KAPLONY 1964: fig. 1061-1062; WILDUNG 1981: 37, fig. 33 [left])
- 5 seal impression (KAPLONY 1963: III, fig. 25)
- 6 pottery vessel (DUNHAM 1978: 26, pl. 16a); cf. rock inscription (WINKLER 1938: pl. 11.1); pottery vessels (KAISER - DREYER 1982: 263, fig. 14.36; BAKR 1988: 55, pl. 1a)
- 7 pottery vessel (DREYER 1998b: 140, fig. 30)
- 8 highly decorative palette (QUIBELL 1898: pl. 13)
- 9 highly decorative palette (QUIBELL 1898: pl. 12); cf. palette (KAPLONY 1965: pl. 20.3); faience object (inlay?; SAAD 1947: 165, fig. 13)
- 10 seal impression (KAPLONY 1963: III, fig. 34)
- 11 seal impression (KAPLONY 1963: III, fig. 35A); cf. seal impression (KAPLONY 1963: III, fig. 35B)
- 12 highly decorative palette (QUIBELL 1898: pl. 12)
- 13 pottery vessel (BAKR 1988: 55, pl. 1b)
- 14 ivory object (SPENCER 1980: pl. 52.454); cf. label (DREYER 1998a: 139, fig. 83b); pottery vessels (GARSTANG 1907: pl. 3.1; JUNKER 1912: 47, fig. 57.3-4 [= Ny-Hor?]; PETRIE 1914: pl. 20.1-2; YELVIN 1960: 195, fig. 2; KAISER - DREYER 1982: 263, fig. 14.40; VAN DEN BRINK 1992: 52, fig. 8.3; VAN DEN BRINK 1998: 219, fig. 1a-b; GRIMM - SCHOSKE 2000: 71)
- 15 pottery vessel (DREYER 1999: 2, fig. 1)

Fig. 14: Overview of the kinds of objects on which king Nar-mer's name is written in complete (Nar-mer) or shortened (Nar) spelling.

kind of object	Nar-mer	Nar
highly decorative palette	+	
highly decorative macehead	+	
sculpture	+	
stone vessels	+	
feast seal	+	
other seals	+	
year labels	+	
palette	+	
weight stone	+	
gaming ball	+	
ivory object	+	
faience object	+	
rock inscription		+
box (?)		+
label		+
pottery vessels	+	+

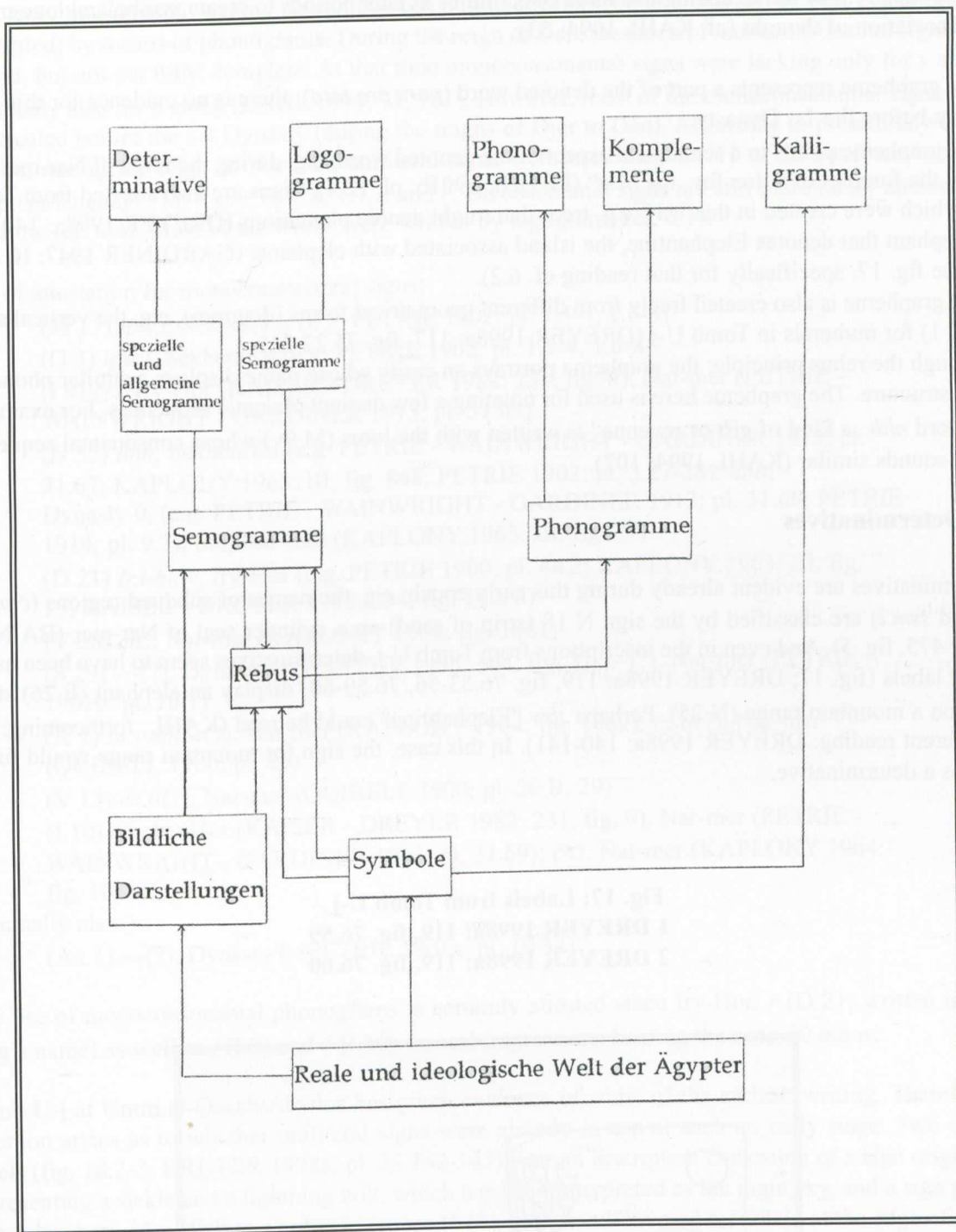


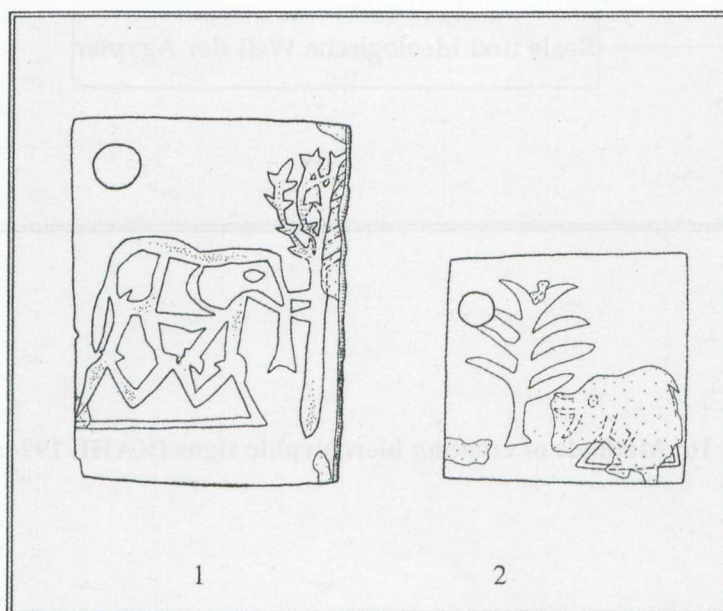
Fig. 16: Methods of creating hieroglyphic signs (KAHL 1994: 52).

- iconically: by reproducing the object itself; e.g. the hieroglyph O 19 *pr.w-wr* "Per-wer" (DREYER 1998a: 122, fig. 77.61-69)
- symbolically: one has to distinguish three possibilities in later periods to create symbolical logograms by association of thought (cf. KAHL 1994: 53):
 - The grapheme represents a part of the denoted word (*pars pro toto*); there is no evidence for this procedure before the 1st Dynasty.
 - The grapheme points to a semantical aspect of the denoted word; e.g. during the reign of Nar-mer *ḥ3.t* (F 4), the forepart of a lion for „the best“ (PETRIE 1901b: pl. 12.4). Signs are also attested from Tomb U-j which were created in that way, e.g. trees that might denote plantations (DREYER 1998a: 140), or an elephant that denotes Elephantine, the island associated with elephants (GARDINER 1947: II, 2* - 4*; see fig. 17, specifically for that reading cf. 6.2).
 - The grapheme is also created freely from different geometrical forms (diagram); e.g. the vertical stroke (Z 1) for numerals in Tomb U-j (DREYER 1998a: 117, fig. 75.22-31)
 - through the rebus principle: the grapheme portrays an entity whose name displays a similar phonological structure. The grapheme here is used for notating a few distinct phonetic sequences. For example, the word *nḥb* „a kind of gift or revenue“ is written with the lotus (M 9v) whose consonantal sequence *nḥb.t* sounds similar (KAHL 1994: 102).

6.2 Determinatives

Determinatives are evident already during this early epoch: e.g. the names of subdued regions (*čḥn.w*, *sti* and *šsm.t*) are classified by the sign N 18 (strip of sand) on a cylinder seal of Nar-mer (BAINES 1989: 475, fig. 5). And even in the inscriptions from Tomb U-j, determinatives seem to have been used. Some labels (fig. 17; DREYER 1998a: 119, fig. 76.53-56, 76.59-60) display an elephant (E 26) standing on a mountain range (N 25). Perhaps *čbw* "Elephantine" could be read (KAHL, forthcoming; for a different reading: DREYER 1998a: 140-141). In this case, the sign for mountain range would function as a determinative.

Fig. 17: Labels from Tomb U-j –
1 DREYER 1998a: 119, fig. 76.59
2 DREYER 1998a: 119, fig. 76.60



6.3 Monoconsonantal phonograms

That early hieroglyphic writing passed through a long developmental phase can be best evidenced (or illustrated) by means of phonograms: During the reign of Den, the stock of monoconsonantal signs was almost, but not yet fully, complete. At that time monoconsonantal signs were lacking only for *y* and *s*, eventually also for *h* and *k* (KAHL 1994: 71, 161). However, most of the monoconsonantal signs were not created before the 1st Dynasty (during the reigns of Djer to Den). According to present day information, during the reign of Nar-mer, uniliteral signs were used only for 10 of 25 consonants of the Egyptian language: for *i*, *p*, *f*, *n*, *r*, *h*, *ś*, *t*, *č* and *č̣*. Biconsonantal signs are still more rarely attested for that time (cf. 6.4). Most of the words were written by logograms (cf. 6.1).

List of attestation for monoconsonantal signs:

- i* (M 17) *ipw.t*, Sekhen/Ka (e.g. PETRIE 1902: pl. 1.1-4, 1.6-8)
- p* (Q 3) *ipw.t*, Sekhen/Ka (e.g. PETRIE 1902: pl. 1.1-4, 1.6-8)
- f* (I 9) *čf̣*, Iry-Hor (KAISER - DREYER 1982: 231, fig. 9); Nar-mer (PETRIE - WAINWRIGHT - GARDINER 1913: pl. 31.69)
- n* (N 35) *nḥb*, Sekhen/Ka (e.g. PETRIE - WAINWRIGHT - GARDINER 1913: pl. 31.67; KAPLONY 1963: III, fig. 848; PETRIE 1902: pl. 3.27-28); *nḥb*, Dynasty 0, (e.g. PETRIE - WAINWRIGHT - GARDINER 1913: pl. 31.66; PETRIE 1914: pl. 9.3); *mn*, Nar-mer (KAPLONY 1963: III, fig. 77)
- r* (D 21) *Ir.i-hr.w*, Iry-Hor (e.g. PETRIE 1900: pl. 44.2; KAPLONY 1963: III, fig. 13; KAISER - DREYER 1982: 234, fig. 10.a-d)
- h* (V 28) *čḥ*, Nar-mer (KAPLONY 1964: fig. 1061)
- ś* (S 29) ---(?), Dynasty 0 (HARVEY 1996: 364, fig. 3); ---(?), Nar-mer (PETRIE 1901b: pl. 10.1)
- t* (X 1) *iw.t mḥ.w(?)*, Nar-mer (KAPLONY 1964: fig. 1062); *č̣.ti(?)*, Nar-mer (QUIBELL 1900: pl. 29)
- č* (V 13) *č̣.ti(?)*, Nar-mer (QUIBELL 1900: pl. 26.B, 29)
- č̣* (I 10) *čf̣*, Iry-Hor (KAISER - DREYER 1982: 231, fig. 9), Nar-mer (PETRIE - WAINWRIGHT - GARDINER 1913: pl. 31.69); *čḥ*, Nar-mer (KAPLONY 1964: fig. 1061)

eventually also:

- h* (Aa 1) ---(?), Dynasty 0 (PETRIE 1901a: pl. 10.34)

The use of monoconsonantal phonograms is certainly attested since Iry-Hor: *r* (D 21; written in this king's name) as well as *f* (I 9) and *č* (I 10) on seal impressions bearing the note *čf̣ mḥ.w*.

Tomb U-j at Umm el-Qacab/Abydos has given evidence of some of the earliest writing. Therefore a question arises as to whether uniliteral signs were already in use at such an early stage. Two of the labels (fig. 18.2-3; DREYER 1998a: pl. 33.142-143) bear an inscription consisting of a sign originally representing a sickle and a lightning bolt, which has been interpreted as the night sky, and a sign group which has been identified as a cobra in repose (I 10) and a sand-covered mountain at the edge of green cultivation (N 26). Another label (fig. 18.1; DREYER 1998a: pl. 33.135) bears an inscription which once again shows the cobra and the mountain, but now in connection with a crested ibis (G 25). One suggested reading for the cobra and the mountain is *čw* "mountain" (written with a biliteral sign and a uniliteral phonetic complement).

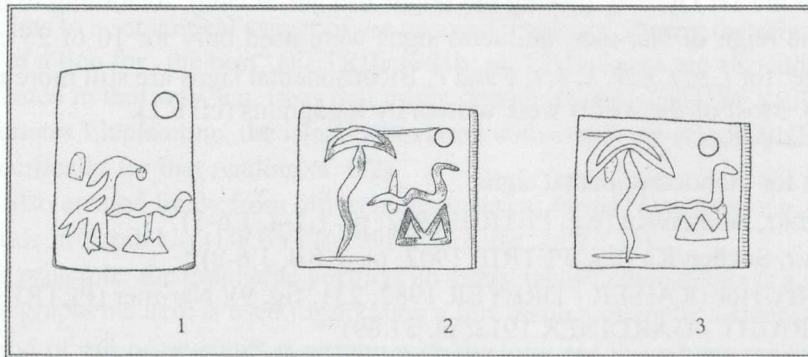
Both kinds of inscription would refer to place names, which allude to sunset and sunrise: *čw* in combination with the ibis would read "mountain of brilliance" or "eastern mountain", *čw* in combination with the night sky would read "mountain of darkness" or "western mountain" (DREYER 1998a: 139).

Fig. 18: Inscribed labels from Tomb U-j

1 DREYER 1998a: 130, fig. 80.135

2 DREYER 1998a: 130, fig. 80.142

3 DREYER 1998a: 130, fig. 80.143



Even if the proposed meaning of the reading seems appropriate for a label-inscription and therefore plausible, some doubts remain about its correctness:

1. The sign for *čw* is only once written with the mountain (N 26), but twice with the mountain range (N 25).
2. The stroke in DREYER 1998a: 130, fig. 80.135 is inexplicable in this position. Moreover it seems to exist in DREYER 1998a: 130, fig. 80.143, as can be seen on the photo DREYER 1998a: pl. 33.143.
3. There exists another word *čni.w*, which is derived from the verb *čni* "lift up" or "distinguish". It has three meanings: "mountains", "settled higher land at the desert edge" and "boundary" (EDEL 1956: 72).

This word is usually written with a serpent being raised by a bent stick (fig. 19). Sometimes there is a feather in the serpent's body. And in most cases the determinative is a boundary-stone, even if the word's meaning is not "boundary", but "mountains" (cf. Pyr. § 279 a).

So far this word is attested from the Old Kingdom on with the meaning of "mountains". And in all probability, it was also written in the First Dynasty, (HELCK 1987: 232), but without the determinative (cf. fig. 19.1).

Fig. 19: Examples for *čnī.w* (Kahl sign-number r 15).

1 - 1st Dynasty (EMERY 1958: pl. 39)

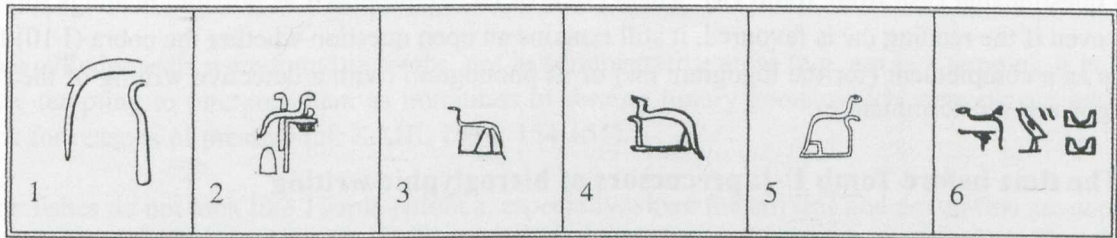
2 - 5th Dynasty (JUNKER 1938: 169, fig. 30)

3 - 6th Dynasty (JUNKER 1953: 71, fig. 40)

4 - 6th Dynasty (after VON BISSING 1911: pl. 5)

5 - 6th Dynasty (JAMES 1953: pl. 14)

6 - 19th Dynasty (KITCHEN 1975: 202.10; handcopy)



It is possible that the word *čnī.w* with the meaning of "mountains" or "settled higher land at the desert edge" was written on the labels in Tomb U-j. And the mountain or the mountain range were chosen as determinatives. Thus it would be a sign group consisting of the raised serpent and the mountain or mountain range, like the sign group of raised serpent and boundary-stone during the Old Kingdom

The implications of that proposed new reading are far reaching, because it would imply that complements were not included in these early inscriptions. Aside from these labels, there is no hint for the use of uniliteral signs in Tomb U-j. A label of stone (DREYER 1998a: 135, fig. 82.191) with unreadable signs was found on the surface near Tomb U-j (DREYER 1998a: 138, note 185). While this label could bear some uniliteral signs, their sense remains unintelligible.

All in all there is no definite proof for the existence of uniliteral signs during Naqada IIIa2/Naqada IIIA1.

6.4 Biconsonantal phonograms

The biconsonantal phonograms *bʒ* (G 29) and *št* (Q 1) (according to DREYER 1998a: 139) are used to write the place name Bubastis, as it appears to be recorded on two labels from Tomb U-j (DREYER 1998a: 125, fig. 78.103-104). These are the earliest biconsonantal phonograms known at present. Other representatives of this group of signs are not attested until the reign of Nar-mer.

List of attestation for biconsonantal signs:

<i>īw</i>	(E 9) <i>īw.t mḥ.w(?)</i> , Nar-mer (KAPLONY 1964: fig. 1062)
<i>bʒ</i>	(G 29) <i>bʒ.št</i> , Naqada IIIa2/Naqada IIIA1 (DREYER 1998a: 125, fig. 78.103-104)
<i>mn</i>	(Y 5) <i>mn</i> , Nar-mer (KAPLONY 1963: fig. 77)
<i>mr</i>	(U 23) <i>mr</i> , Nar-mer (e.g. QUIBELL 1900: pl. 26.B; KAPLONY 1963: III, fig. 26.A-B; BAINES 1989: 475, fig. 5; DREYER 1998b: 139, fig. 29)
<i>nw</i>	(W 24) <i>čḥn.w</i> , Nar-mer (KAPLONY 1963: fig. 5; DREYER 1998b: 139, pl. 5c)
<i>št</i>	(Q 1) <i>bʒ.št</i> , Naqada IIIa2/Naqada IIIA1 (DREYER 1998a: 125, fig. 78.103-104)

eventually also:

<i>ḥr</i>	(m 10) <i>ḥr.w</i> , "Scorpion" (QUIBELL 1900: pl. 26.C); Nar-mer (QUIBELL 1900: pl. 26.B, 29) [cf. the discussion KAHL 1994: 55-56 and SCHNEIDER 1997: 241-267].
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6.5 Phonetic complements

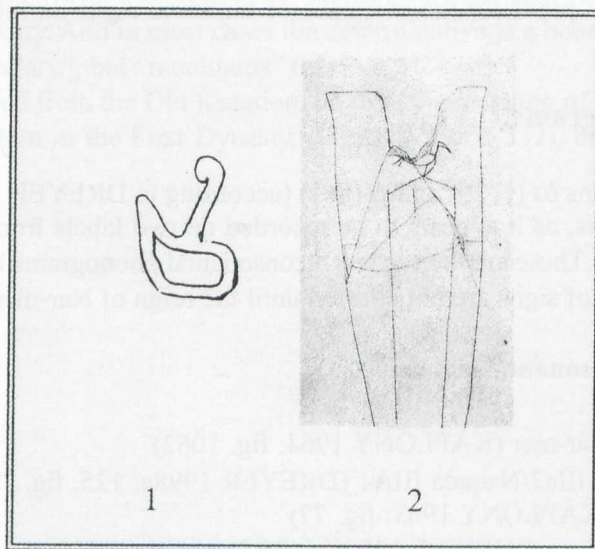
The earliest definitive attestations for phonographical markings with complements date from the time of „Crocodile“ / Sekhen/Ka: the ripple of water N 35 (*n*) supplements the sign M 9^v (lotus) in the note of delivery *nḥb* (PETRIE - WAINWRIGHT - GARDINER 1913: pl. 31.66; DREYER 1992: 259-263; for the reading cf. KAHL 1994: 101-104). The consonant *n* is also marked during the reign of Nar-mer (by N 35 in *mn*: KAPLONY 1963: III, fig. 77; by W 25 in *čḥn.w*: BAINES 1989: 475, fig. 5).

There are no attestations for the use of complements in earlier periods, apart from the above mentioned questionable case from Tomb U-j, where *čni.w* or *čw* are proposed as possible readings (cf. 6.3). But even if the reading *čw* is favoured, it still remains an open question whether the cobra (I 10) functions as a complement (for the logogram *čw*) or as phonogram (with a defective writing of the following *w* and a determinative).

7. The time before Tomb U-j: precursors of hieroglyphic writing

Objects which bear signs similar to hieroglyphs are known even from that period antedating Tomb U-j, i.e. before Naqada IIIa2/Naqada IIIa1 (cf. VERNUS 1993: 79-85). None of these signs hints at the existence of phonograms, phonetic complements or determinatives. At best these signs can be identified as logograms, such as, e.g., the red crown on a vessel from Naqada dating to Naqada I (fig. 20.1) which could point symbolically to a crowned authority figure (ENDESFELDER 1991: 12; KAHL 1994: 152) or the representation of a bird perching on a tall, narrow stand (fig. 20.2), also preserved on a vessel dating to Naqada I.

Fig. 20: Precursors of hieroglyphic writing.
1 PETRIE - QUIBELL 1896: pl. 52.75
2 BAUMGARTEL 1975: pl. 15.2



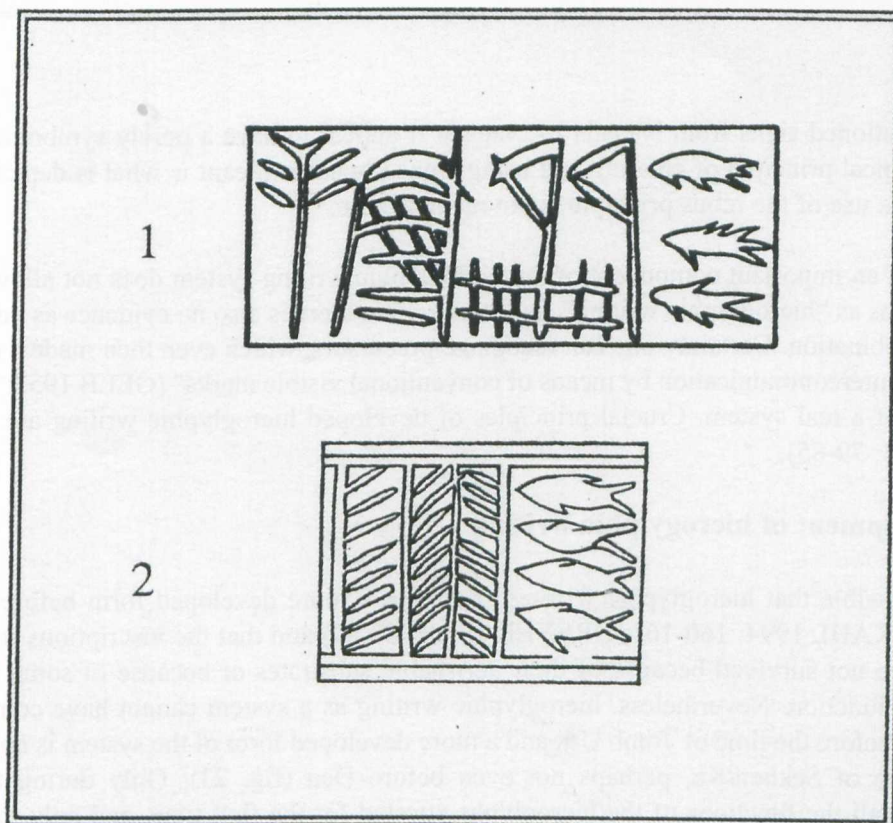
Cylinder seals executed in the Jamdat-Nasr-style and known from Naqada IIc-d/Naqada IIC-D and Naqada IIIa-b/Naqada IIIA-B show a row of three or four fishes, one on top of the other, next to a building identified as shrine or palace (fig. 21). The fishes are interpreted as spelling for *in.w* "tribute" (BOEHMER 1974: 495-514; KAISER 1990: 296-299). Assuming that this interpretation is correct, the writing would be phonographical: a single fish had the phonetic value *in* and would equal *Tilapia nilotica* (K 1). However, there are three objections that can be raised against this interpretation:

1. There are no impressions of these seals. Since tributes or deliveries would have been sealed in quantity, a great many impressions should exist (cf. for such impressions KAPLONY 1963: III, fig. 144, 160-161 and KAISER - DREYER 1982: 231, fig. 9).
2. The cylinder seals were found in tombs, not in administrative areas (e.g. not in a temple). It is, therefore, tempting to interpret them as imitations of foreign luxury goods which were placed into the tombs for reasons of prestige (cf. KAHL 1994: 154-155).
3. The fishes do not look like *Tilapia Nilotica*, especially where the tail fins and dorsal fins are concerned and which themselves alone argue against an identification with *Tilapia Nilotica*. The fishes resemble more *Mugil cephalus* or *Mugil capito* (cf. GAMER-WALLERT 1970: pl. 5.6 und 6.3-4).

Fig. 21: Cylinder seals with fishes.

1 KAPLONY 1963: III, fig. 37

2 KAPLONY 1964: fig. 886



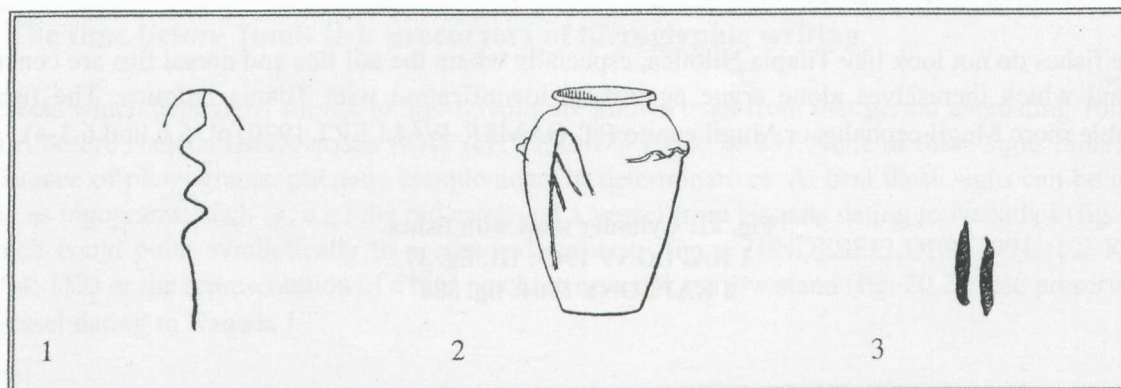
Single signs have been found on the sides of wavy handled pottery that date to Naqada IId2/Naqada IID2. These signs have parallels in Tomb U-j (cf. DREYER 1998a: 87). One of these signs (fig. 22.1) is explained as a sickle and a lightning bolt and thus serves as symbol for the night sky or darkness, and therefore for the west (DREYER 1998a: 87, 143). The meaning of the other sign (fig. 22.2) remains unresolved. A pair of short strokes is found on a vessel known from Abusir el-Meleq (fig. 22.3). These strokes can also be interpreted as characters (DREYER 1998a: 87) and would be evidence of a diagrammatical creation of signs.

Fig. 22: Naqada II ink inscriptions on pottery vessels.

1 RANDALL-MACIVER - MACE 1902: pl. 17.30

2 PETRIE 1896: pl. 32.41

3 SCHARFF 1926: 19, 35, fig. 15 (zu a).



The above mentioned signs from Naqada I - Naqada II appear to have a purely symbolical meaning. Even if an iconical principle of creating and using signs ("what is meant is what is depicted") is present as well, the use of the rebus principle is not recognizable.

The absence of an important component of the hieroglyphic writing system does not allow us to designate these signs as "hieroglyphic writing", especially since there is also no evidence as yet for the use of signs in combination. Certainly one can recognize precursors, which even then made a contribution to the "human intercommunication by means of conventional visible marks" (GELB 1952: 12), but one cannot speak of a real system. Crucial principles of developed hieroglyphic writing are lacking (cf. VERNUS 1993: 79-85).

8. The development of hieroglyphic writing

It is indeed possible that hieroglyphic writing existed in a more developed form before the time of Tomb U-j (cf. KAHL 1994: 160-161; DREYER 1998a: 87-89) and that the inscriptions from that earlier period have not survived because of their perishable substrates or because of some then-current administrative function. Nevertheless, hieroglyphic writing as a system cannot have come into existence too long before the time of Tomb U-j, and a more developed form of the system is not discernible before the time of Sekhen/Ka, perhaps not even before Den (fig. 23): Only during the reign of Sekhen/Ka are all the functions of the hieroglyphs attested for the first time, and only in the time of Den is the syllabary more or less complete.

Thus, hieroglyphic writing shows a period of development which lasted more than 400 years (fig. 23): from at least 3320 BC (Tomb U-j) to about 2900 BC (the beginning of the reign of Den). Furthermore, it is no longer possible to entertain the idea of a single inventor of hieroglyphic writing (e.g. SCHOTT 1950: 82; KAPLONY 1966b: 60-99; FISCHER 1990: 66). Rather it took several generations for hieroglyphic writing to emerge, especially those features which would be in use for more than 3000 years thereafter. Even during the reign of Den, its development was not yet finished. Further modifications and innovations were made during the 2nd Dynasty and especially during the reign of Zoser/Netjerikhet at the beginning of the 3rd Dynasty (KAHL 1994: 162-163), thereby creating the hieroglyphic writing system that is correctly so designated today.



	before U-j	U-j	Iry-Hor	"Crocodile" Sekhen/Ka	Nar-mer	post Nar-mer
monoconsonantal phonograms	-	?	+	+	+	+
biconsonantal phonograms	-	+	(+)	(+)	+	+
logograms	+	+	+	+	+	+
determinatives	-	+	(+)	(+)	+	+
phonetic complements	-	-	-	+	+	+
syllabar	-	-	-	-	-	+
creation of phonograms through rebus	-	+	+	+	+	+
creation of logograms: iconically	-	+	(+)	(+)	+	+
creation of logograms: symbolically, semantically	+	+	+	+	+	+
creation of logograms: symbolically, diagrammatically	+	+	+	+	+	+
creation of logograms: symbolically, pars pro toto	-	-	-	-	-	+
creation of logograms through rebus	-	-	+	+	(+)	+

Legend
+ attested
- not attested
(+) not attested but probable due to circumstantial evidence

Fig. 23 : Overview over the developpement of certain component of the hiéroglyphic writing system

Bibliography:

AMÉLINEAU 1899:

E. Amélineau, *Les nouvelles fouilles d'Abydos 1895-1896* (Paris 1899).

AMÉLINEAU 1902:

E. Amélineau, *Les nouvelles fouilles d'Abydos 1896-1897* (Paris 1902).

AMÉLINEAU 1904:

E. Amélineau, *Les nouvelles fouilles d'Abydos 1897-1898* (Paris 1904).

AMÉLINEAU 1905:

E. Amélineau, *Les nouvelles fouilles d'Abydos 1897-1898* (deuxième partie) (Paris 1905).

ASSELBERGHS 1961:

Henri Asselberghs, *Chaos en Beheersing* (Leiden 1961).

BAINES 1985:

John Baines, *Fecundity Figures* (Warminster 1985).

BAINES 1989:

John Baines, Communication and display: the integration of early Egyptian art and writing, in: *Antiquity* 63, 1989, 471-482.

BAINES- EYRE 1983:

John Baines - C.J. Eyre, Four notes on literacy, in: *GM* 61, 1983, 65-96.

BAKR 1988:

Mohammed I. Bakr, The new Excavations at Ezbet el-Tell, Kufur Nigm; the first Season (1984), in: Edwin C. M. van den Brink, *The Archaeology of the Nile Delta, Egypt: Problems and Priorities* (Amsterdam 1988) 49-62.

BAUMGARTEL 1975:

Elise J. Baumgartel, Some Remarks on the Origins of the Titles of the Archaic Egyptian Kings, in: *JEA* 61, 1975, 28-32.

BOEHMER 1974:

Rainer Michael Boehmer, Das Rollsiegel im prädynastischen Ägypten, in: *AA* 1974, 495-514.

BRAUN - VAN DEN BRINK 1998:

Eliot Braun - Edwin C.M. van den Brink, Some Comments on the Late EB I Sequence of Canaan and the Relative Dating of Tomb Uj at Umm el Gacab and Graves 313 and 787 from Minshat Abu Omar with Imported Ware: Views from Egypt and Canaan, *Ä&L* 7, 1998, 71-94.

D'AMICONE 1994:

Elvira D'Amicone, Le sepolture pre- e protodinastiche, in: Anna Maria Donadoni Roveri - Elvira D'Amicone - Enrichetta Leospo, *Gebelein: il villaggio e la necropoli* (Torino 1994).

DE MORGAN 1897:

J. De Morgan, *Recherches sur les origines de l'Égypte. Ethnographie préhistorique et tombeau royal de Négadah* (Paris 1897).

DREYER 1992:

Günter Dreyer, Horus Krokodil, ein Gegenkönig der Dynastie 0, in: Renée Friedman - Barbara Adams, *The Followers of Horus: Studies dedicated to Michael Allen Hoffman 1944-1990* (Egyptian Studies Association Publication No. 2; Oxford 1992) 259-263.

DREYER 1993:

Günter Dreyer, Umm el-Qaab : Nachuntersuchungen im frühzeitlichen Königsfriedhof. 5./6. Vorbericht, in: *MDAIK* 49, 1993, 23-62.

DREYER 1996:

Günter Dreyer, in: Günter Dreyer - Eva-Maria Engel - Ulrich Hartung - Thomas Hikade - E. Christiana Köhler - Frauke Pumpenmeier, Umm el-Qaab . Nachuntersuchungen im frühzeitlichen Königsfriedhof. 7./8. Vorbericht, in: *MDAIK* 52, 1996, 11-81.

DREYER 1998a:

Günter Dreyer, *Umm el-Qaab I: das prädynastische Königsgrab U-j und seine frühen Schriftzeugnisse* (AV 86; Mainz 1998).

DREYER 1998b:

Günter Dreyer - Ulrich Hartung - Thomas Hikade - Eva Christiana Köhler - Vera Müller - Frauke Pumpenmeier, Umm el-Qaab. Nachuntersuchungen im frühzeitlichen Königsfriedhof. 9./10. Vorbericht, in: *MDAIK* 54, 1998, 77-167.

DREYER 1999:

Günter Dreyer, Ein Gefäß mit Ritzmarke des Narmer, in: *MDAIK* 55, 1999, 1-6.

DREYER 2000:

Günter Dreyer, in: Günter Dreyer - Angela von den Driesch - Eva-Maria Engel - Rita Hartmann - Ulrich Hartung - Thomas Hikade - Vera Müller - Joris Peters, Umm el-Qaab. Nachuntersuchungen im frühzeitlichen Königsfriedhof. 11./12. Vorbericht, in: *MDAIK* 56, 2000, 43-129.

DUNHAM 1978:

Dows Dunham, *Zawiyet el-Aryan. The Cemeteries adjacent to The Layer Pyramid* (Boston 1978).

EDEL 1956:

Elmar Edel, Beiträge zum ägyptischen Lexikon III, in: *ZÄS* 81, 1956, 68-76.

EMERY 1939:

Walter B. Emery, *Hor-Aha* (Excav. Saqq.; Cairo 1939).

EMERY 1958:

Walter B. Emery, *Great Tombs of the First Dynasty III* (Excav. Saqq.; London 1958).

ENDESFELDER 1991:

Erika Endesfelder, Die Formierung der altägyptischen Klassengesellschaft. Probleme und Beobachtungen, in: Erika Endesfelder, *Probleme der frühen Gesellschaftsentwicklung im Alten Ägypten* (Berlin 1991) 5-62.

ENGEL, forthcoming: Eva-Maria Engel,
in: *ASAE* 77, 2001.

- FISCHER 1958:
Henry G. Fischer, A Fragment of Late Predynastic Egyptian Relief from the Eastern Delta, in: *Artibus Asiae* 21, 1958, 64-88.
- FISCHER 1963:
Henry G. Fischer, *Varia Aegyptiaca*, in: *JARCE* 2, 1963, 17-51.
- FISCHER 1990:
Henry George Fischer, The Origin of Egyptian Hieroglyphs, in: Wayne M. Senner, *The Origins of Writing* (Lincoln and London 1990) 59-76.
- GAMER-WALLERT 1970:
Ingrid Gamer-Wallert, *Fische und Fischkulte im Alten Ägypten* (ÄA 21; Wiesbaden 1970).
- GARDINER 1947:
Alan H. Gardiner, *Ancient Egyptian Onomastica* (Oxford 1947).
- GARSTANG 1907:
John Garstang, Excavations at Hierakonpolis, at Esna, and in Nubia, in: *ASAE* 8, 1907, 132-148.
- GELB 1952:
I. J. Gelb, *A Study of Writing. The Foundation of Grammatology* (Chicago 1952).
- GILROY 2001:
Thomas D. Gilroy, „Forgotten“ Serekhs in the Royal Ontario Museum, in: *GM* 180, 2001, 67-76.
- GRIMM 1998:
Alfred Grimm, in: Anna Maria Donadoni Roveri - Francesco Tiradritti, *Kemet: alle sorgenti del tempo* (Milano 1998) 226-227.
- GRIMM - SCHOSKE 2000:
Alfred Grimm - Sylvia Schoske, *Am Beginn der Zeit - Ägypten in der Vor- und Frühzeit* (München 2000).
- HARVEY 1996:
Stephen P. Harvey, A Decorated Protodynastic Cult Stand from Abydos, in: Peter Der Manuelian - Rita Freed, *Studies in Honor of William Kelly Simpson* (Boston 1996) I, 361-378.
- HELCK 1985:
Wolfgang Helck, Gedanken zum Ursprung der Schrift, in: *Mélanges Gamal Eddin Mokhtar I* (BdE 97/1, Le Caire 1985) 395-408.
- HELCK 1987:
Wolfgang Helck, *Untersuchungen zur Thinitenzeit* (ÄA 45; Wiesbaden 1987).
- HENDRICKX 1999:
Stan Hendrickx, La chronologie de la préhistoire tardive et des débuts de l'histoire de l'Égypte, in: *Archéo-Nil* 9, 1999, 13-81.
- JAMES 1953:
T.G.H. James, *The Mastaba of Khentika called Ikhekhi* (MASE 30; London 1953).

JUNKER 1912:

Hermann Junker, *Bericht über die Grabungen der Kaiserl. Akademie der Wissenschaften in Wien auf dem Friedhof in Turah*. Winter 1909-1910 (DAWW 56.1; Wien 1912).

JUNKER 1938:

Hermann Junker, *Bericht über die von der Akademie der Wissenschaften in Wien auf gemeinsame Kosten mit Dr. Wilhelm Pelizaeus† unternommenen Grabungen auf dem Friedhof des Alten Reiches bei den Pyramiden von Giza. Band III: Die Mastabas der vorgeschrittenen V. Dynastie auf dem Westfriedhof* (Wien und Leipzig 1938).

JUNKER 1953:

Hermann Junker, *Bericht über die von der Akademie der Wissenschaften in Wien auf gemeinsame Kosten mit Dr. Wilhelm Pelizaeus† unternommenen Grabungen auf dem Friedhof des Alten Reiches bei den Pyramiden von Giza. Band XI: Der Friedhof südlich der Cheopspyramide. Ostteil* (DAWW 74; Wien 1953).

KAHL 1994:

Jochem Kahl, *Das System der ägyptischen Hieroglyphenschrift in der 0.-3. Dynastie* (GOF IV/29; Wiesbaden 1994).

KAHL 1995:

Jochem Kahl, Zur Problematik der sogenannten Steuervermerke im Ägypten der 0.-1. Dynastie, in: Cäcilia Fluck - Lucia Langener - Siegfried Richter - Sofia Schaten - Gregor Wurst, *Divitiae Aegypti: koptologische und verwandte Studien zu Ehren von Martin Krause* (Wiesbaden 1995) 168-176.

KAHL 1997:

Jochem Kahl, Die Farbgebung in der frühen Hieroglyphenschrift, in: *ZÄS* 124, 1997, 44-56.




KAHL, forthcoming:

Jochem Kahl, in: *CdE*.

KAISER 1957:

Werner Kaiser, Zur inneren Chronologie der Naqadakultur, in: *Archaeologia Geographica* 6, 1957, 69-77.

KAISER 1983:

Zu den    der älteren Bilddarstellungen und der Bedeutung von *rpw.t*, in: *MDAIK* 39, 1983, 261-296.

KAISER 1990:

Werner Kaiser, Zur Entstehung des gesamtägyptischen Staates, in: *MDAIK* 46, 1990, 287-299.

KAISER - DREYER 1982:

Werner Kaiser - Günter Dreyer, Umm el-Qaab: Nachuntersuchungen im frühzeitlichen Königsfriedhof. 2. Vorbericht, in: *MDAIK* 38, 1982, 211-269.

KAPLONY 1963:

Peter Kaplony, *Die Inschriften der ägyptischen Frühzeit*. 3 Bde. (ÄA 8; Wiesbaden 1963).

KAPLONY 1964:

Peter Kaplony, *Die Inschriften der ägyptischen Frühzeit*. Supplement (ÄA 9; Wiesbaden 1964).

KAPLONY 1965:

Peter Kaplony, Eine Schminkpalette von König Skorpion aus Abu Umûri, in: *Or* 34, 1965, 132-167.

KAPLONY 1966a:

Peter Kaplony, *Kleine Beiträge zu den Inschriften der ägyptischen Frühzeit* (ÄA 15; Wiesbaden 1966).

KAPLONY 1966b:

Peter Kaplony, Strukturprobleme der Hieroglyphenschrift, in: *CdE* 41, 1966, 60-99.

KAPLONY 1968:

Peter Kaplony, *Steingefässe mit Inschriften der Frühzeit und des Alten Reiches* (Mon Aeg 1; Bruxelles 1968).

KAPLONY 1973:

Peter Kaplony, *Beschriftete Kleinfunde in der Sammlung Georges Michailidis. Ergebnisse einer Bestandsaufnahme im Sommer 1968* (Istanbul 1973).

KEMP 2000:

Barry Kemp, The Colossi from the Early Shrine at Coptos in Egypt, in: *Cambridge Archaeological Journal* 10, 2000, 211-242.

KITCHEN 1975:

K.A. Kitchen, *Ramesside Inscriptions: Historical and Biographical I* (Oxford 1975).

KÖHLER 1999:

E. Christiana Köhler, Re-assessment of a Cylinder Seal from Helwan, in: *GM* 168, 1999, 49-56.

KÖHLER - VAN DEN BRINK, forthcoming:

E. Christiana Köhler - Edwin C.M. van den Brink, Four Jars with Incised Serekh-Signs from Helwan Recently Retrieved from the Cairo Museum, in: *GM*.

LACAU - LAUER 1959:

P. Lacau - J.-Ph. Lauer, *La pyramide à degrés. IV: Inscriptions gravées sur les vases. 1er fascicule: planches* (Fouilles à Saqqarah; Le Caire 1959).

MEYER 1887:

E. Meyer, *Geschichte des alten Aegyptens* (Berlin 1887).

MOUNTFORD 1969:

J. Mountford, "writing", in: A.R. Meetham - R. A. Hudson, *Encyclopaedia of Linguistics, Information and Control* (1969).

MURNANE 1987:

William J. Murnane, in: Bruce Williams - Thomas J. Logan, *The Metropolitan Museum Knife Handle and Aspects of Pharaonic Imagery before Nar-mer*, in: *JNES* 46, 1987, 245-285.

PETRIE 1896:

W. M. Flinders Petrie, *Koptos* (London 1896).

PETRIE 1900:

W. M. Flinders Petrie, *The Royal Tombs of the First Dynasty, Part I* (EEF 18; London 1900).

- PETRIE 1901a:
W. M. Flinders Petrie, *Diospolis Parva. The Cemeteries of Abadiyeh and Hu. 1898-9* (London 1901).
- PETRIE 1901b:
W. M. Flinders Petrie, *The Royal Tombs of the Earliest Dynasties. Part II* (EEF 21; London 1901).
- PETRIE 1902:
W.M.F. Petrie, *Abydos. Part I* (EEF 22; London 1902).
- PETRIE 1914:
W. M. Flinders Petrie, *Tarkhan II* (BSAE 26; London 1914).
- PETRIE - QUIBELL 1896:
W. M. Flinders Petrie - J. E. Quibell, *Naqada and Ballas* (ERA 1; London 1896).
- PETRIE - WAINWRIGHT - GARDINER 1913:
W. M. Flinders Petrie - G. A. Wainwright - A. H. Gardiner, *Tarkhan I and Memphis V* (BSAE 23; London 1913).
- QUIBELL 1898:
J. E. Quibell, Slate palette from Hierakonpolis, in: *ZÄS* 36, 1898, 81-84.
- QUIBELL 1900:
J.E. Quibell, *Hierakonpolis I* (BSAE 4; London 1900).
- QUIBELL - GREEN 1902:
J. E. Quibell - F. W. Green, *Hierakonpolis. Part II* (BSAE 5; London 1902).
- RANDALL-MACIVER - MACE 1902:
D. Randall-Maciver - A. C. Mace, *El Amrah and Abydos* (London 1902).
- SAAD 1939:
Zaki Y. Saad, Pottery Inscriptions, in: Walter B. Emery, *Hor-Aha* (Excav. Saqq. 1937-1938; Cairo 1939) 74-76.
- SAAD 1947:
Zaki Youssef Saad, *Royal Excavations at Saqqara and Helwan (1941-1945)* (CASAE 3; Le Caire 1947).
- SCAMUZZI 1964:
Ernesto Scamuzzi, *Museo Egizio di Torino* (Torino _1964).
- SCHARFF 1926:
Alexander Scharff, *Die archäologischen Ergebnisse des vorgeschichtlichen Gräberfeldes von Abusir el-Meleq nach den Aufzeichnungen Georg Möllers* (WVDOG 49; Leipzig 1926).
- SCHENKEL 1997:
Wolfgang Schenkel, *Tübinger Einführung in die klassisch-ägyptische Sprache und Schrift* (Tübingen 1997).

SCHNEIDER 1997:

Thomas Schneider, Das Schriftzeichen "Rosette" und die Göttin Seschat, in: *SAK* 24, 1997, 241-267.

SCHOTT 1950:

Siegfried Schott, *Hieroglyphen: Untersuchungen zum Ursprung der Schrift* (AAWLM 24; Wiesbaden 1950).

SCHOTT 1969:

Erika Schott, Die Sockelinschrift des Narmeraffen, in: *RdE* 21, 1969, 77-83.

SPENCER 1980:

A. J. Spencer, *Catalogue of Egyptian Antiquities in the British Museum. V. Early Dynastic Objects* (London 1980).

VAN DEN BRINK 1992:

Edwin C. M. van den Brink, Preliminary Report on the Excavations at Tell Ibrahim Awad, Seasons 1988-1990, in: Edwin C.M. van den Brink, *The Nile Delta in Transition; 4th. - 3rd. Millennium B.C.* (Tel Aviv 1992) 43-68.

VAN DEN BRINK 1996:

Edwin C.M. van den Brink, The incised serekh-signs of Dynasties 0-1. Part I: complete vessels, in: Jeffrey Spencer, *Aspects of Early Egypt* (London 1996) 140-158.

VAN DEN BRINK 1998:

Edwin C.M. van den Brink, Late Protodynastic-Early First Dynasty Egyptian Finds in Late Early Bronze Age I Canaan: an Update, in: C.J. Eyre, *Proceedings of the Seventh International Congress of Egyptologists* (OLA 82, Leuven 1998) 215-225.

VERNUS 1993:

Pascal Vernus, La naissance de l'écriture dans l'Égypte ancienne, in: *Archéo-Nil* 3, 1993, 75-108.

VON BISSING 1911:

Friedrich Wilhelm von Bissing, *Die Mastaba des Gem-Ni-Kai*. Band II (Berlin 1911).

VON DER WAY 1993:

Thomas von der Way, *Untersuchungen zur Spätvor- und Frühgeschichte Unterägyptens* (SAGA 8; Heidelberg 1993).

WELVAERT 1996:

Eric Welvaert, On the Origin of the Ished-scene, in: *GM* 151, 1996, 101-107.

WILDUNG 1981:

Dietrich Wildung, *Ägypten vor den Pyramiden. Münchner Ausgrabungen in Ägypten* (Mainz 1981).

WILLIAMS 1986:

Bruce Beyer Williams, *The A-Group Royal Cemetery at Qustul: Cemetery L. The University of Chicago Oriental Institute Nubian Expedition. Volume III. Excavations between Abu Simbel and the Sudan Frontier. Part I* (Chicago 1986).

WINKLER 1938:

Hans A. Winkler, *Rock-drawings of Southern Upper Egypt I*. (London 1938).

YELVIN 1960:

S. Yelvin, *Early Contacts between Canaan and Egypt*, in: IEJ 10, 1960, 193-203.