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THE SOUNDS OF A DEAD LANGUAGE
RECONSTRUCTING EGYPTIAN PHONOLOGY

Frank Kammerzell (Göttingen)

1. Written language and spoken language

Before talking about written signs and spoken sounds, it seems appropriate to lay open the theoretical framework. I assume that any language recorded by means of a writing system may be described as consisting of two subsystems, namely the written language and the spoken language. Both are mutually interrelated but should be analyzed independently of one other. Each subsystem comprises a complete set of grammatical components, that is, a morphological, a syntactical, a semantic, and a pragmatic component as well as a phonological or graphemic component, respectively. The relationships between the elements of written language and those of spoken language are governed by rules of correspondence. Different individual languages may be distinguished according to the predominant level at which the correspondence rules apply. Where each grapheme regularly corresponds to exactly one phoneme, the correspondence rules of higher levels become redundant. Such systems have often been described by grammatologists as being the most elaborate, and they do indeed seem

(A) **meaningful graphemes** *(semograms):*	**+MEANINGFUL**
(A1) autonomous (or potentially autonomous) meaningful graphemes *(logograms* or *"ideograms")*	+MEAN., +AUT.
ex.: OEg ⲷ in ⲷ ⟨ḥȝt-'⟩ /'huːrit/ 'front' ModEng ♥ in I♥U ⟨i-love-you⟩ /ai'lʌvjuː/ 'I love you'	
(A2) non-autonomous, interpreting meaningful graphemes *(classificators, semographic interpretants* or *"determinatives")*	+MEAN., –AUT.
ex.: OEg ⲷ in ⲷⲷ ⟨nb-t-WOMAN⟩ /'niːbat/ 'mistress' ModEng ® in **Coca-Cola®** ⟨c-o-c-a---c-o-l-a-TRADE MARK⟩ /kouke'koule/ 'Coca-Cola'	
(B) **meaning differentiating graphemes** (*phonograms* in the broader sense)	**–MEANINGFUL**
(B1) autonomous (or potentially autonomous) meaning-differentiating graphemes (*phonograms* in the stricter sense)	–MEAN., +AUT.
ex.: OEg ⲷ in ⲷⲷ ⟨nb-t-WOMAN⟩ /'niːbat/ 'mistress' ModEng x in **axiom** ⟨a-x-i-o-m⟩ /'æksiəm/ 'axiom'	
(B2) non-autonomous, interpreting meaning-differentiating graphemes (*phonographic interpretants* or *"complements")*	–MEAN., –AUT.
ex.: OEg ⲷ in ⲷ△ ⟨mr-ᵐ-ʳ-PYRAMID⟩ /'mVl/ 'pyramid' ModEng nd in **2nd** ⟨2-n-d⟩ /'sekənd/ 'second'	

Fig. 1: *Sign classes of the hieroglyphic writing system*

quite suitable from the writer's point of view. But in reality writing systems with absolutely regular correspondences between graphemes and phonemes are attested extremely rarely, if at all – which is probably due to the fact that writing normally implies reading, and what is ideal for the writer is not necessarily also ideal for the reader.

In spite of its appearance, the Egyptian hieroglyphic script does not constitute a pictographic system, but rather what may be called a *complex morphographic writing system*. The most prominent level of elementary correspondence between written and spoken signs is the morphological level. In the overwhelming majority of cases each morpheme boundary of a written utterance coincides with one in spoken language. A grammatical or lexical morph can be written either directly with the help of a meaningful sign or indirectly by means of a sequence of signs that distinguish meaning corresponding to phonological units in the spoken language, or a combination of both devices may be used. Thus, the signs of a written utterance may be attributed to two different classes according to their function (Fig. 1, A and B). A further distinction is gained if we take into account that hieroglyphic graphemes may occur autonomously or acting as interpretants of other signs.

At the very beginning of the history of "glyphographic data processing" only lexemes were put down in writing, inflectional morphemes and other grammatical elements being still absent from the earliest records. Since the Egyptian language shows a tendency at least to have lexical units solely consisting of (discontinuous) sequences of consonantal phonemes while the vocalic tiers supply additional grammatical information, the practice of representing nothing but lexemes led to the emergence – or invention – of a full set of graphemes corresponding to single consonantal phonemes and of approximately two hundred signs corresponding to discontinuous combinations of such, but prevented the development of signs corresponding to vowels. How this affected the relationship between the meaningful units of written and spoken Egyptian may be seen in Fig. 2. Although the second line in each example represents exactly what is often referred to as thr "defectiveness of the hieroglyphic writing system", I prefer instead to speak of a *graphemically empty graphomorpheme*. (A graphomorpheme is an abstract pair consisting of a written morph and the corresponding morph of the spoken language.) The next lines in the tables present just the opposite, a graphomorpheme that is phonologically empty and could well give cause to coin the term "defectiveness of spoken

written language	spoken language
{⟨⟩ 'go round'}^{lex.}	{/p_x_l/ 'go round'}^{lex.}
∅	{/_a_'i_/ 'PRETERITE STEM'}^{gramm.}
{△ 'MOVEMENT CLASS'}^{gramm.}	∅
{∿ 'PRETERITE AFFIX'}^{gramm.}	{/_na_/ 'PRETERITE AFFIX'}^{gramm.}
{⟨⟩ '2sf'}^{gramm.}	{/_c/ '2sf'}^{gramm.}
⟨⟩△∿⟨⟩ 'that you went round'	/pa'xilnac/

Fig. 2a: *Correspondences between written and spoken morphs of Egyptian utterances*

written language		spoken language
{⟨☐〰〰〰 'lateral relative'}^{lex.}		{/ʃ_n_/ 'lateral relative'}^{lex.}
∅		{/_a_'uː_/ 'PLURAL STEM'}^{gramm.}
{⟨☒ 'HUMAN CLASS'}^{gramm.}		∅
{⟨ııı 'PLURAL AFFIX'}^{gramm.}		{/_wəw/ 'PLURAL AFFIX'}^{gramm.}
☐☒ııı	'brothers'	/ʃaˈnuːwəw/

Fig. 2b: *Correspondences between written and spoken morphs of Egyptian utterances*

Egyptian"! In comparing the two sides it becomes obvious that the written form of a language may differ from its spoken counterpart in a way analogous to the differences between particular languages. Thus, for instance, written Egyptian exhibited a system of classifier morphemes (the so-called "determinatives") that did not exist in spoken Egyptian, and while spoken Egyptian apparently exhibitedcf, inflection morphology, written Egyptian is to be characterized as agglutinative or even isolating (cf. Kammerzell 1993 and 1994: 8-12). — A few more general assumptions are necessary:

- In the case of languages that have a set of correspondence rules governing the relations between elementary graphemes and minimal segmental units of the spoken language, there is a strong preference for such correspondence rules to apply to phonological, rather than phonetic, elements.
- The degree of regularity and simplicity of graphophonemic correspondence rules of a language (L_Q) at a given point of time (t_Q) depends on three parameters:
  - the *temporal distance* of t_Q to the time of emergence of the writing system (t_P);
  - the proportion of *typological distance* between L_Q and the language system L_P for which the writing system was first developed;
  - and the *retention rate* or its opposite, i.e., the rate of adjustment of the writing system to the particular characteristics of L_Q (Fig. 3).

  In general, the graphophonemic correspondence rules of an earlier diachronic state of a particular language are more regular than those of a later stage, if the writing system has not been modified. In the case of writing systems adopted from another language, the degree of regularity is usually higher the more similar the phonological inventories and phonotactic rules of the source language and the target language are. If an existing writing system is taken over by another language without adjustment, the graphophonemic correspondence rules will probably be less regular.

From these two hypotheses, which might be easily substantiated by empirical observations, it may be concluded that the degree of consistency of graphophonemic correpondences is relatively high immediately after the development of a new writing system, especially if it is achieved either indigenously without copying an existing prototype or with considerable adjustments to the specific characteristics of the language.
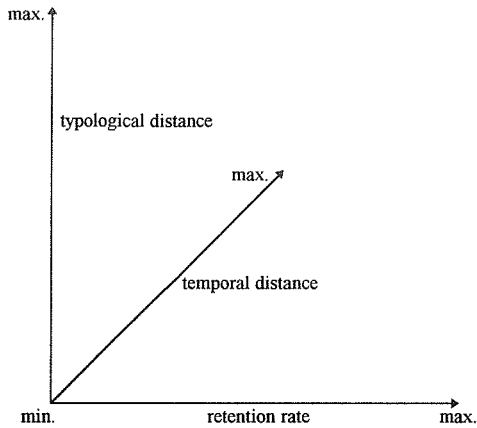
Fig. 3: *Parameters governing the complexity/irregularity of graphophonemic correspondence rules*

2. Reliability of Egyptological transcription systems

A delicate problem in dealing with the sound shape of Egyptian language elements has to do with the fact that every type of Egyptological transcription system is not only conventionalized to a high degree but also rather idiosyncratic. There is more than one transcription symbol that definitely does not represent the sound those familiar with the romanization of other scripts of the Ancient or Modern Near East would assume. As can be deduced from Fig. 4a, the fact that the letters *ḏ* and *ṯ* (underlined) are used to correspond to palatals – instead of representing interdental fricatives as the conventions of Semitic philology require – usually causes no problems. Statements on this matter are likely to be found in any description of the Egyptian language since the earlier years of this century and have been accessible to comparative philologists. However, it is not so easy to find information on the fact that, in general, neither simple *d* nor underlined *ḏ* reflect signs which corresponded to voiced consonants (but rather voiceless emphatics) or that the sign transcribed as *ᶜ* did not correspond originally to the same consonant as Semitic /ʕ/. As a consequence, quite often etymological identifications such as in (4a) have been proposed which must be rejected. On the other hand, there are equations like (4b); although – especially after what I have just said – one might feel

(a) OEg 𓂝𓍿𓏤𓀢 *ᶜḏ* ≠ /ʕVǰ-/ 'hack (vb.)' not < AA *ʕog- 'dig, cut'

    but: *ᶜḏ* /dVcˀ-/ 'hack (vb.)' perhaps < AA *dakˀ-/dukˀ- 'break, pound (vb.)' (?)

(b) LEg 𓂧𓆓𓈎 *db* 'horn' < AA *dub- 'horn' even though usually Eg 𓂧 /tˀ/

    because of OEg 𓂧𓆓𓈎 *ᶜb* /ˈdib-/ 'horn'

Fig. 4: *Conventionalized Egyptological transcriptions as a source of misunderstandings*

bound to reject this proposal as well, it is as reliable as etymologies can be (see below, section 10).

What are the reasons for this confusing situation? A few peculiarities simply result from the modification of the Egyptological transcriptional alphabet proposed at the end of last century by Adolf Erman for nothing but typographical reasons, namely to keep transcriptions free of letters that have more than one diacritic. Originally, *d* und *ḏ* were not at all meant to refer to voiced consonants, but rather to emphatics. The "sound value" of the hand hieroglyph ⟨⟩ has long since been correctly recognized as resembling Semitic pharyngealized consonants and has been transcribed as a dotted *ṭ*. When it was recognized that the relationship between the sounds reflected in underlined *t* and simple *t* was identical with that between the sounds corresponding to the cobra hieroglyph ⟨⟩ and dotted *ṭ*, one could have chosen a *ṭ* (with dot *and* stroke) for transcribing the cobra hieroglyph. Instead of this typographical monster, Erman used a *ḏ* (with underlining), and by analogy dotted *ṭ* was replaced by the letter *d*, which was freely available because – according to the state-of-the-art of those days – Egyptian did not possess any voiced dental obstruent. The knowledge of these facts fell into oblivion and was restored only recently by Wolfgang Schenkel (1988: 29-34), although few scholars, such as Georg Steindorff and Otto Rössler, never ceased to propagate the older and better transcription. In many studies conducted between the 1940s and the 1980s the transcription symbols were treated as a reliable source of phonological information (e.g. Vergote 1945, Osing 1980). It is self-evident that any proposal about historical sound changes or etymological relationships based on this assumption is not justified.

Other oddities are less technical. They depend rather on the principles underlying transcription practices or are more or less inherent in the procedures of uncovering the sound shape of a dead language. First, conventional Egyptological transcriptions are ahistorical. In spite of some basic knowledge about historical sound changes, we are used to transcribe a particular morpheme of a hieroglyphic utterance always the same way and do not bother whether it belongs to a text recorded in the 3rd millennium or to one of the Ptolemaic Period. In general, lexical and grammatical morphs are referred to by means of what is held to be their "original" consonantal skeleton in Earlier Egyptian. There are, of course, several good – above all, practical – reasons for doing that, but there are a few disadvantages as well. Second, our identifications of sound shapes depend heavily on Coptic and foreign transcriptions of Egyptian words, as well as on the attestations of foreign language elements in hieroglyphic texts. Without a doubt, such cases of secondary recording are of eminent importance and indispensable in advancing theories about historical sound values of extinct languages. However, one should bear in mind that any information gained in this way is not direct evidence but rather the end of a chain of more or less well-founded conjectures. Thus we suppose, for instance, that the Egyptian elementary grapheme ⟨⟩ transcribed as *t* corresponded to a voiceless dental stop /t/, because speakers of Egyptian found it appropriate to use that very sign in writing down what they thought to be the equivalent of a particular Greek sound that corresponded to the Greek letter τ, which we analyze for various reasons as corresponding to a voiceless, non-aspirated dental stop. Of course, it is reasonable to assume that the Egyptian phoneme shared significant features with Greek

/t/ (probably more features than with any other consonant in that language), but the phonetic shapes of the two sounds are not necessarily identical. Some minor differences in articulation might have easily been screened at the interfaces between the two languages and scripts. In addition, we must take into consideration that the phonological form of any attestation of Egyptian in a foreign writing system has to be reconstructed indirectly as well. This results in a level of insecurity so high that many scholars are rather unwilling to reflect on the issue of sounds in a dead language at all.

In any case, I hope to show in this paper that there are additional methods for gaining information beyond those furnished by foreign language transcriptions. In doing so, I will display several procedures and illustrate their respective efficiency by discussing a small number of examples. For the sake of clarity, I shall concentrate on a very limited segment of the phonological system and deal primarily with apical consonants. A general impression of the discrepancies between transcription letters and phonological interpretations can be gained in advance from Fig. 5.

sonorants, sibilants			voiceless obstruents			voiced obstruents			emphatic obstruents		
⊓	⟨h⟩	/h/	▫	⟨p⟩	/p/	⟨j⟩	/ɟ/, /ʲ/, /j/		⟨f⟩	/pˀ/, /f/
�	⟨r⟩	/l/	⌂	⟨t⟩	/t/	⟨b⟩	/b/		⟨d⟩	/tˀ/
𓃾	⟨m⟩	/m/	—	⟨z⟩	/t͡s/, /s/	⟨ꜥ⟩	/d/		⟨ḏ⟩	/cˀ/
∿∿	⟨n⟩	/n/		⟨ṯ⟩	/c/					
𓇼	⟨w⟩	/w/		⟨š⟩	/ç/					
∏	⟨s⟩	/ʃ/	⌷	⟨k⟩	/k/	⟨g⟩	/g/		⟨q⟩	/kˀ/
𓃾	⟨ꜣ⟩	/r/	⊶	⟨ḫ⟩	/x/	⟨ḥ⟩	/ɣ/		⟨ḥ⟩	/ħ/ or /xˀ/

Fig. 5: *Elementary graphemes, traditional transcription symbols, and probable corresponding phonemes (Old Egyptian)*

3. Transcriptions of Egyptian words in other ancient writing systems

We start with ancient transcriptions of Egyptian language elements in foreign-language sources. Egyptian expressions – often proper names and titles – casually appear within documents written in Akkadian, Hittite, Old Persian and Elamite cuneiform writing as well as in Hebrew, Greek, Carian, Aramaic, Phoenician, Meroitic, Latin, Nubian, Ethiopian, and Arabic alphabetic script. (And it may be that this list is not complete!) The mid- and late second millennium renderings of Egyptian names and phrases in Akkadian cuneiform, which was then the medium of diplomatic correspondence throughout the Near East, are of particular importance.

The Middle Babylonian equivalent of the birth name of King Ramses II in Fig. 6 shows that at about 1200 BCE the arm hieroglyph ⟶ must have corresponded (at least in this word) to something

resembling a glottal stop or a glide. In Biblical Hebrew the second consonant of the same name appeared as an /ʕ/, and it was exactly this equation which led Egyptologists to the identification of the arm-hieroglyph ⳤ as corresponding to a voiced pharyngeal fricative. The same grapheme occurs in the word for pharaoh borrowed from Egyptian into Hebrew and Greek and from there into a large number of other languages (see Fig. 7).

Eg ⟨ⳤ⟩ ≈ /ʕ/ (c. 1200 BCE)

because of   LEg   𓉐𓂝𓅓𓋴𓅱 *Rᶜ-ms-sw* [name of several kings of the XIXᵗʰ and XXᵗʰ Dynasties]

           MBab   *ri-a-ma-še-ša* or *re-a-ma-še-ša*

           BHeb   רַעְמְסֵס /raʕəməses/ and רַעְמְסֵס /raʕaməses/

           Gr   Ραμσης, Ραμεσσης

Fig. 6: *Transcriptions of Egyptian words in foreign writing systems*

Eg ⟨ⳤ⟩ ≈ /ʕ/ (c. 700 BCE)

because of   LEg   𓉐𓉻 *pr-ᶜ3*   'Great House, Pharaoh'

           LAss   *pi-ir-u*   'Pharaoh'

           BHeb   פַּרְעֹה /parəʕoh/   'Pharaoh'

           Gr   Φαραω   'Pharaoh'

Fig. 7: *Loanwords of Egyptian origin in other languages*

Thus, for the time being, we may state that in Later Egyptian the arm hieroglyph ⳤ, the elementary grapheme ᶜ, probably corresponded to a sound similar to a voiced pharyngeal fricative.

4. Transcriptions of foreign words in hieroglyphic and/or hieratic script

Ancient transcriptions of foreign-language elements in Egyptian texts are a source of information that was of unique importance at the very beginning of Egyptological studies. Hieroglyphic representations of Greek and Roman proper names served as a key to the decipherment of the Egyptian script. As they reflect the phonetic situation of a rather late state of Egyptian language history, their value for reconstructing a phonological system that might serve as a starting point for comparative studies is limited. But there is some material allowing statements about earlier periods. In the time of the New Kingdom hundreds of foreign-language elements occurred in hieroglyphic and hieratic texts (cf. Hoch 1994). The majority of them are of Northwest Semitic origin, thus belonging to a well explored language family. Even so we should be careful not to think that identifying a loanword with its source form is all we need in order to determine the contemporary "sound value" of hiero-

glyphic graphemes. Foreign elements are often borrowed with considerable adjustment to the phonological system and phonotactic rules of the target language. In addition, the source of a particular loanword might have been a badly attested variety within a greater dialectal continuum. The different realizations of Proto-Semitic *ʕ in Fig. 8 indicate that there are several possibilities as to how the initial consonant of Late Egyptian 𓂝𓈖𓃀𓅱 ꜥnb.w 'grapes' might have sounded in its source language.

Eg ⟨𓂝⟩ ≈ /ʕ/ (c. 1200 BCE)			
because of	LEg 𓂝𓈖𓃀𓅱 ꜥnb.w 'grapes' (XIXth Dynasty) ← ... ← Sem *ꜥnb-		
	cf. Can	a-na-bi	'grapes' (Amarna)
	Ug	𒄀𒉈𒈨 ǵnb-m	'grapes'
	Ar	عنب /ʕinab/	'grapes'
	TAram	עִנְבָּא /ʕinabā/	'grapes'

Fig. 8: *Transcriptions of foreign words in Egyptian* (source: Hoch 1994: 72)

It stands to reason that we can simply reduce these difficulties by looking at a greater amount of material. In any case, Fig. 8 sufficiently supports our preliminary hypothesis that in Late Egyptian the arm hieroglyph could correspond to something similar to a voiced pharyngeal fricative.

5. The Coptic tradition

Next source: Egyptian elements attested in the Coptic script. Important facts about the phonological and/or phonetic structure of Egyptian words (including the vowel patterns) may be gained from those elements still existing in post-Pharaonic times and recorded by means of the Coptic alphabet. We have to take into consideration, however, that information on the sound shape of Coptic depends on indirect evidence, too. Moreover, the relationship between the letters of the Coptic script and the corresponding phonemes are not as simple and straightforward as grammatical descriptions often maintain. There is, for instance, some reason to believe that even though the classical Coptic alphabet had no specific letters equivalent to older /ʔ/ and /ʕ/, the corresponding sounds had not totally disappeared. Alternations between /ʔ/ and /ʕ/ are not uncommon in demotic texts of the Roman period and indicate that the two phonemes probably had merged. While in Old Coptic each of these consonants was still represented in writing by a special sign (see Fig. 9), later texts either exhibit a sequence of two vowel graphemes or nothing at all. Nevertheless, the successor of older /ʔ/ and /ʕ/ continued to exist as a glottal stop or glide. This becomes clear from an important discovering by Leo Depuydt, the knowledge of which I owe to an as yet unpublished paper by Wolfgang Schenkel: In carefully written Sahidic texts a sequence of two graphemes corresponding to a diphthong usually is not separated at the end of a line while, differently, the second sign within a sequence of two iden-

tical vowel graphemes often comes to stand at the beginning of a new line, this being possible be-
cause it corresponds to a consonantal phoneme.

Eg ⟨‿⟩ > OCopt ∠• > Copt ⟨VV~∅⟩ ≈ /ʔ/ (since the Roman Period)

because of   OEg 𓂝 𓏠 *mꜣꜥ* 'true, just'

     > OCopt ⲘH∠• /ˈmɛːʔ/ (pBM 10808, 48)

           Ⲙⲉ /ˈmeʔ/

     > Copt   ⲘHⲉ /ˈmeːʔ/ (S.A.A₂)

           Ⲙⲉⲉ /ˈmeʔ/ (S.M)

           Ⲙⲉ /ˈmeʔ/ (S)

     OEg 𓂝⊙ *rꜥ* 'sun(-god)'

     > Copt   ⲣH /ˈrɛːʔ/ (S.B)

Fig. 9: *Attestations of Egyptian words in the Old Coptic and (classical) Coptic script*

In the case of our example, the forms in Fig. 9 indicate that the phoneme normally corresponding to
the arm hieroglyph had developed into a glottal stop or glide in Coptic.

    Up to this point no evidence has been presented that would contradict the traditional interpreta-
tion of the arm hieroglyph ‿ as corresponding to something resembling a pharyngeal fricative.

6. Etymological evidence

Our preliminary sketch has to be altered after incorporating etymological assumptions. A consider-
able set of quite well established Afroasiatic etymologies that include Egyptian cognates provides
valuable insights into Egyptian phonology (cf. Rössler 1971, Schneider 1997). Otto Rössler found a
relatively large set of Egyptian-Semitic etymologies that are characterized by a correlation between
Egyptian /ʕ/ and Semitic /d/ or /ð/ (1971: 275-277 and 285-286). A few examples are presented in
Fig. 10. Other instances are Egyptian *ꜥff* 'fly' and Semitic ðbb- 'fly', or Egyptian *ꜥn.t* 'nail, claw' and
Beja *din* 'thorn'.

Eg ⟨‿⟩ /d/ < AA *d

because of, e.g.   OEg 𓂧 *ꜥ(w)* /du-/ 'arm, side, part'   Akk *idu* 'arm, part'

            OEg 𓂝𓃀 *ꜥbꜣ* /dbr-/ 'lead, steer'   Ar دبر /dbr/ 'lead'

            OEg 𓂝𓏤𓉐 *ꜥr* /dl-/ 'gate'   Akk *daltu* 'door, gate'

Fig. 10: *Etymological assumptions*

In view of this material, it is suggested that the consonant corresponding to the arm hieroglyph ‿
and Semitic /d/ originated from the same Afroasiatic phoneme. The proto-phoneme has to be recon-
structed as a /d/, since the phonetic development of a dental obstruent into a pharyngeal fricative is

much more probable than a sound change in the opposite direction. Thus, Rössler's etymologies relating the arm hieroglyph to Semitic /d/ are quite consistent with our previous assumptions: by loss of distinctive features an original voiced dental stop /d/ became a neutral consonant possessing only one marked feature, [+voice]. This process of weakening is not uncommon in natural languages, compare for instance realisations like [mæːʔm] or [mæːʕm], [mʌʔ] or [mʌʕ], and [ˈayʕno] for *madam* and *mother*, and *I don't know* in certain varieties of Modern English (source: Thompson & Hopper 1997: 7; cf. also t-glottaling in Cockney and in Glasgow English).

C_x\C_y	p	b	f	t	t?	d	t͡s	ʃ	c	c?	k	k?	g	ç	x	x?	ɣ	h	
p	0	−	−	+	+	+	+	+	+	+	−	+	+	+	+	+	+	+	p
b	−	0	−	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	b
f	−	−	0	+	+	+	−	−	+	+	+	+	+	−	−	−	+	−	f
t	+	+	+	0				+	−	−	+	−	−	+	+	+	+	+	t
t?	+	+	+		0			+	−	+	−	+	+	(+)	−	+	+	+	t?
d	+	+	+			0		−	−	+	−	+	+	+	+	+	+	−	d
t͡s	+	+	−				0	−	+	−	−	+	−	−	+	+	+	−	t͡s
ʃ	+	+	−	+	+	−	−	0	+	+	+	+	+	+	+	+	+	−	ʃ
c	+	+	+	+	−	−	+	+	0	−	−	−	−	−	−	+	−	+	c
c?	−	+	+	+	+	+	−	+	−	0	−	−	−	−	−	+	−	+	c?
k	+	+	+	+	−	−	+	+	+	−	0	−	−	−	−	+	−	+	k
k?	−	+	+	+	+	+	−	+	−	−	−	0	−	−	−	+	−	+	k?
g	+	+	+	−	−	−	−	+	−	−	−	−	0	−	+	+	−	−	g
ç	+	+	+	+	+	+	+	+	+	+	+	−	−	0	−	−	−	−	ç
x	+	+	−	−	+	+	+	+	−	−	+	+	−	−	0	−	−	−	x
x?	+	+	+	+	+	+	+	+	+	+	+	+	+	−	−	0	−	−	x?
ɣ	+	+	+	+	+	+	+	+	−	+	−	−	−	(+)	−	−	0	−	ɣ
h	+	+	−	−	+	−	−	+	+	+	+	−	−	−	−	−	−	0	h
	p	b	f	t	t?	d	t͡s	ʃ	c	c?	k	k?	g	ç	x	x?	ɣ	h	

Fig. 11a: *Compatibility of elementary graphemes (obstruents and sibilants)*

Notation: + "C_x and C_y may co-occur within the boundaries of a single morpheme (in this sequence, but not necessarily succeeding each other immediately)"; − "C_x and C_y do not co-occur within the boundaries of a single morpheme"; 0 "identical elements may co-occur within the boundaries of a single morpheme".

7. Phonotactic regularities

It has been observed that certain phonemes (in particular non-identical homorganic obstruents) do not occur together within the limits of a single morpheme. Rössler (1971: 175-177) found that the Egyptian elementary grapheme usually transcribed as ^{c} is absolutely incompatible with graphemes corresponding with dental obstruents (see Fig. 11a, hatched area). This fact provides welcome support to his theory that Egyptian ^{c} originally had been a dental rather than a pharyngeal consonant. Generalizations about the regularities of incompatibility allow the setting up of natural classes of sounds and the determiniation of at least some phonetic features of even poorly defined consonants. It is remarkable that this method is thoroughly independent of the aforementioned procedures, which provide only indirect evidence. With this in mind, we have been trying to improve the analysis of phonotactic regularities within the scope of the typology project. Fig. 11a shows the compatibilities of elementary graphemes in Earlier Egyptian (source: Roquet 1973). Fig. 11b lists the coefficients of correlation between the matrices of compatibility. By means these calculations the compatibility of one grapheme with all others can be compared as a whole with the respective characteristics of other graphemes. The table indicates for instance not only the trivial fact that each line or column of Fig.

	p	b	f	t	$t^?$	d	$\widehat{ts}$	ʃ	c	$c^?$	k	$k^?$	g	ç	x	$x^?$	ɣ	h
p	1.00	0.68	0.05	-0.42	-0.04	-0.10	-0.48	0.09	-0.22	-0.16	-0.43	-0.16	-0.37	-0.37	-0.29	-0.28	-0.10	-0.29
b	0.68	1.00	0.29	-0.33	-0.29	-0.33	-0.38	0.22	-0.43	-0.05	-0.43	-0.05	-0.56	-0.29	-0.10	-0.22	-0.33	-0.10
f	0.05	0.29	1.00	-0.63	-0.26	-0.13	-0.38	0.22	-0.63	-0.13	-0.63	-0.13	-0.67	0.10	0.02	0.36	-0.13	0.02
t	-0.42	-0.33	-0.63	1.00	0.31	0.20	0.62	0.07	0.42	0.16	0.52	0.16	0.60	-0.16	0.02	-0.51	-0.02	0.02
$t^?$	-0.04	-0.29	-0.26	0.31	1.00	0.59	-0.05	0.15	0.13	0.16	0.13	0.16	0.33	-0.33	-0.03	-0.15	0.10	0.07
d	-0.10	-0.33	-0.13	0.20	0.59	1.00	0.36	0.29	-0.26	-0.24	-0.26	-0.24	0.42	-0.42	-0.10	-0.22	-0.02	-0.36
$\widehat{ts}$	-0.48	-0.38	-0.38	0.62	-0.05	0.36	1.00	0.22	0.13	-0.38	0.13	-0.38	0.42	0.00	-0.13	-0.29	-0.13	0.02
ʃ	0.09	0.22	0.22	0.07	0.15	0.29	0.22	1.00	-0.36	-0.36	-0.36	-0.36	0.08	-0.15	0.15	0.00	-0.22	0.37
c	-0.22	-0.43	-0.63	0.42	0.13	-0.26	0.13	-0.36	1.00	0.50	1.00	0.50	0.52	0.26	-0.13	0.22	0.26	0.10
$c^?$	-0.16	-0.05	-0.13	0.16	0.16	-0.24	-0.38	-0.36	0.50	1.00	0.50	1.00	0.26	0.26	0.13	0.22	0.38	0.10
k	-0.43	-0.43	-0.63	0.52	0.13	-0.26	0.13	-0.36	1.00	0.50	1.00	0.50	0.52	0.26	0.00	0.22	0.26	0.10
$k^?$	-0.16	-0.05	-0.13	0.16	0.16	-0.24	-0.38	-0.36	0.50	1.00	0.50	1.00	0.26	0.13	0.26	0.22	0.26	-0.02
g	-0.37	-0.56	-0.67	0.60	0.33	0.42	0.42	0.08	0.52	0.26	0.52	0.26	1.00	-0.03	0.22	0.08	0.07	0.10
ç	-0.37	-0.29	0.10	-0.16	-0.33	-0.42	0.00	-0.15	0.26	0.26	0.26	0.13	-0.03	1.00	0.32	0.71	0.76	0.59
x	-0.29	-0.10	0.02	0.02	-0.03	-0.10	-0.13	0.15	-0.13	0.13	0.00	0.26	0.22	0.32	1.00	0.42	0.16	0.49
$x^?$	-0.28	-0.22	0.36	-0.51	-0.15	-0.22	-0.29	0.00	0.22	0.22	0.22	0.22	0.08	0.71	0.42	1.00	0.29	0.42
ɣ	-0.10	-0.33	-0.13	-0.02	0.10	-0.02	-0.13	-0.22	0.26	0.38	0.26	0.26	0.07	0.76	-0.16	0.29	1.00	0.16
h	-0.29	-0.10	0.02	0.02	0.07	-0.36	0.02	0.37	0.10	0.10	0.10	-0.02	0.10	0.59	0.49	0.42	0.16	1.00
	p	b	f	t	$t^?$	d	$\widehat{ts}$	ʃ	c	$c^?$	k	$k^?$	g	ç	x	$x^?$	ɣ	h

Fig. 11b: *Coefficients of correlation (comparison of matrices of compatibility)*
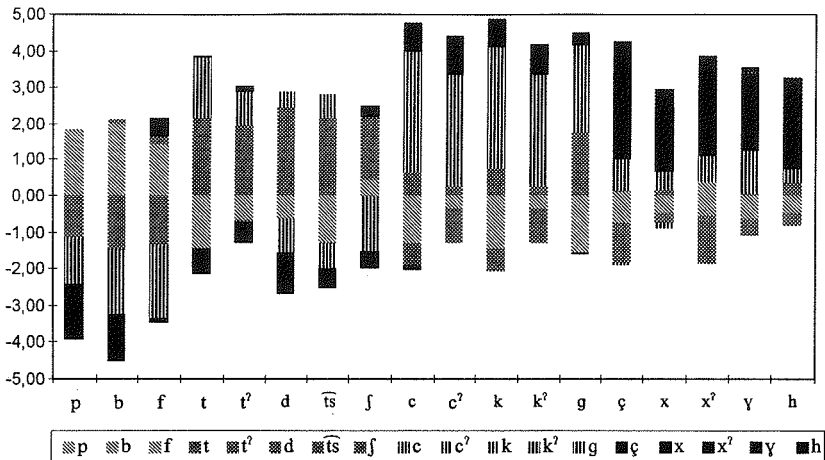
Fig. 11c: *Coefficients of correlation (comparison of matrices of compatibility)*

11a is identical with itself, but also that the velar stops behave in exactly the same way as their re-
spective palatal counterparts do (factor 1.00) and that, on the other hand, there is a maximal distance
between /g/ and /f/ (factor minus 0.67). In a further step, the data of Fig. 11b have been transformed
into a diagram (Fig. 11c). Solely on the basis of compatibility, the columns cluster into groups that
are the equivalents of natural classes defined by places of articulation. The column belonging to the
elementary grapheme ⸗, which is conventionally transcribed as ꜥ, is a typical representative of the
class of dentals (and, as a consequence, has been coded as /d/ in Fig. 11). This is a strong confirma-
tion of the picture gained by etymological considerations.

8. Typological considerations on naturalness

Typological assumptions on the basis of frequencies of graphonemes are a further means for recon-
structing the sound shape of dead languages. In the case of two alternatively feasible reconstruc-

series	labials	alveolars	palatals	velars	Σ
voiceless	10.2 %	29.5 %	14.1 %	10.2 %	63.9 %
voiced	10.4 %	8.6 %	??	2.4 %	>21.5 %
emphatic	0.1 %	4.4 %	8.3 %	1.8 %	14.5 %
Σ (=1123)	20.7 %	42.5 %	>22.4 %	14.4 %	100.0 %

Fig. 12a: *Percentages of stop consonants in Old Egyptian (Pyr. 276-294, 393-414, 609-621, 1587-1606)*

tions, preference should be given to the one that shows a higher degree of harmony with established typological considerations. Fig. 12a indicates that our reconstructions of the phonological shapes of Egyptian stops are in fair accordance with crosslinguistic theories about markedness: voiceless stops are least marked, emphatics most marked, and the emphatic labial occurs extremely rarely (cf. Greenberg 1976: 13-18).

sample	Σ_R	C_1	C_2	C_3
Egyptian /r/: PT (3-rad. verbs, tokens, 9024 phonemes)	503	2.4 %	44.5 %	53.1 %
(3-rad. verbs, types, 735 phonemes)	66	7.6 %	43.9 %	48.5 %
CT (3-rad., tokens, 85185 phonemes)	5584	4.2 %	54.7 %	41.1 %
(3-rad., types, 5655 phonemes)	498	7.6 %	54.6 %	37.8 %
lexicon (types, 55272 phonemes)	4228	7.3 %	51.6 %	30.5 %
Akkadian /r/: *GAG* (3-rad. roots, types)	185	20.0 %	34.1 %	45.9 %
cf. Akkadian /ʔ/: *GAG* (3-rad. roots, types)	154	42.9 %	37.0 %	20.1 %

Fig. 12b: *Under-representation of ⟨𓄿⟩ /r/ in initial position in Egyptian* (counts by F. Kammerzell and C. Peust)

Fig. 12b provides information about the frequency of the elementary grapheme 𓄿, conventionally transcribed as /ʔ/, in different positions within Egyptian lexemes. From the under-representation of the eagle hieroglyph 𓄿 in initial position it becomes apparent that the corresponding phoneme was in all probability originally not a glottal stop. The distribution fits better the sort of behaviour that we would expect of /r/. Thus we have gained further evidence that etymological hypotheses comparing the Egyptian elementary grapheme 𓄿 with Semitic *r (e.g. Schenkel 1990: 34 and 53) are well-founded. In addition, there is strong evidence that the Egyptian sound belonged to the class of sonorants (cf. Kammerzell 1992: 168 with n. 39; Schneider 1997: 193; *pace* Reintges 1994: 215-218).

9. Synchronic variation in written forms

Old Egyptian seems to have possessed more consonantal phonemes than those that correspond more or less constantly to a particular elementary grapheme. There are cases of different co-existing graphemic representations of one and the same lexical element, which superficially look as if they would correspond to distinctive phonological forms (compare the examples in Fig. 13). One might incline to the opinion that this phenomenon is due to dialectal or sociolectal variation. However, some of these cases occur within one and the same text, and a dialectal variation between a plain voiceless dental fricative /s/ and an emphatic dental stop /tʔ/ does not seem quite probable from a crosslinguistic point of view. Therefore, I would prefer to analyse the forms in Fig. 13 as exhibiting a graphematically polyvalent graphoneme.

Eg ⟨⸺ ~ ⸗⟩ /s?/

    pzs.t (pEbers)   *pds.t* (pEbers)   /ps?s-t/ 'small ball'

    ḥsq (pEbers)   *ḥdq* (pBM 10059)   /x?s?q/ 'cut off'

/s/ ⟨⸺⟩	/t?/ ⟨⸗⟩	/s?/ ⟨⸺ ~ ⸗⟩
⎡ −vocalic ⎤	⎡ −vocalic ⎤	⎡ −vocalic ⎤
+consonantal	+consonantal	+consonantal
+obstruent	+obstruent	+obstruent
+anterior	+anterior	+anterior
+coronal	+coronal	+coronal
−voiced	−voiced	−voiced
−emphatic	**+emphatic**	**+emphatic**
⎣ **+continuant** ⎦	⎣ *−continuant* ⎦	⎣ **+continuant** ⎦

Fig. 13: *Synchronic variation in written forms*

The corresponding consonant is an emphatic dental fricative that did not correspond regularly to a particular elementary grapheme but was written by way of an expedient either with a sign normally corresponding to /s/ or to a sign normally corresponding to emphatic /t?/. Each of these phonemes differs from emphatic /s?/ in exactly one feature, thus ⟨⸺⟩ and ⟨⸗⟩ are equally well suited to represent this sound.

10. Diachronic variation in written forms

Diachronic variation of written forms does not necessarily indicate that the corresponding spoken element underwent phonological modification, but under certain conditions (namely if the basic rules of graphophonemic correspondence had changed) may show that no sound change had taken place in the respective elements. An example is given in Fig. 14.

When original /d/ had changed into /ʕ/ in most positions at some time prior to the New Kingdom, the elementary grapheme ⟨⸺ᶜ⟩ normally would have been interpreted as corresponding to /ʕ/ rather than to an apical obstruent. There is a group of perhaps twenty words in which an older form with written ⟨⸺ᶜ⟩ – that is, spoken /d/ – seems to be replaced by a younger form with what we transcribe as *d* but have to interpret as an emphatic /t?/. For reasons of markedness an unconditioned sound change of voiced /d/ to emphatic /t?/ seems extremely improbable. A better explanation is suggested in Fig. 14: Old Egyptian /d/ had changed into something like /ʕ/ in most, but not all, distributions (cf. the bold arrow). By this time the standard rules of graphophonemic correspondence had changed, and the arm hieroglyph ⟨⸺ᶜ⟩ was no longer appropriate for representing an unchanged /d/. The graphemic change indicates that the usual phonemic change OEg /d/ > LEg /ʕ/ had not taken place in all positions. Since unchanged LEg /d/ shares more distinctive features with /t?/

than with the phoneme /ʕ/, which now normally corresponded to ⟨←⟩, it could be written by way of an expedient, such as ⟨⇐⟩. The emergence of makeshift writings shows that OEg /d/ already must have undergone the process of weakening into LEg /ʕ/.

OEg/MEg ⟨←⟩ may be replaceded by LEg ⟨⇐⟩ in certain distributions

cꜣ   dj   /ˈdir/ > /ˈdij/ > ⲧⲁϥ 'here'

cb   db   /ˈdib/ > ⲧⲁⲡ 'horn'

m-c- md-   /m̥du-/ > ⲛ̄ⲧⲉ- 'in the hand of; by'

OEg   /d/ ⟨←⟩

$$\begin{bmatrix} -\text{vocalic} \\ +\text{consonantal} \\ +\text{obstruent} \\ +\text{anterior} \\ +\text{coronal} \\ +\text{voiced} \\ -\text{emphatic} \\ -\text{continuant} \end{bmatrix}$$

LEg   /ʕ/ ⟨←⟩

$$\begin{bmatrix} -\text{vocalic} \\ +\text{consonantal} \\ -\text{obstruent} \\ -\text{anterior} \\ -\text{coronal} \\ +\text{voiced} \\ -\text{emphatic} \\ +\text{continuant} \end{bmatrix}$$

/d/ ⟨←⟩ ~ ⟨⇐⟩

$$\begin{bmatrix} -\text{vocalic} \\ +\text{consonantal} \\ +\text{obstruent} \\ +\text{anterior} \\ +\text{coronal} \\ +\text{voiced} \\ -\text{emphatic} \\ -\text{continuant} \end{bmatrix}$$

/tˀ/ ⟨⇐⟩

$$\begin{bmatrix} -\text{vocalic} \\ +\text{consonantal} \\ +\text{obstruent} \\ +\text{anterior} \\ +\text{coronal} \\ 0\text{voiced} \\ +\text{emphatic} \\ -\text{continuant} \end{bmatrix}$$

Fig. 14: *Diachronic variation in written forms*

11. Rhymes and puns

Two phonemes related to each other by a rhyme or pun necessarily share the bulk of their respective distinctive features. Of special interest are rhymes that are not totally neat, but show some minor irregularities. A famous example from German is Goethe's rhyming of *neige*, pronounced [ˈnaɪɡə] in Standard Modern High German, and ...*reiche*, that is, [ˈʀaɪçə], which tells us a lot about the poet's native dialect. Fortunately, there are similar phenomena in Egyptian texts which may be used for our purposes. The first example given in Fig. 15 is of no direct relevance to our topic but nicely illustrates the principle of chiastic alliterations, a poetic device not uncommon within certain passages of the Pyramid Texts.

jw	*dbn.n=f*	*p.t(j)*	*tm.tj*	/jw t²bnnf ptj tm.tj/
PTCL.	VB.–PRET.–3ms	SBST.–FEM.DU	STAT.–3df	
	went round–he	*two skys*	*completed–they two*	

jw	*phr.n=f*	*jdb.w(j)*	/jw pxlnf jt²bwj/
PTCL.	VB.–PRET.–3ms	SBST.–MASC.DU	
	went round–he	*two banks*	

'He has travelled around the whole of the Two Skies, he has circumambulated the Two Banks.'

Fig. 15: *Chiastic alliteration*

Fig. 16 clearly indicates that the pronunciation of what we transcribe as ᶜ must still have been that of a dental stop around 2300 BCE: ⟨⸗⟩ /d/ had not yet changed to ⟨⸗⟩ /ʕ/, since it is related to ⟨⸗⟩ /t²/ by alliteration.

jw	*wm.n=f*	*dšr.t*	/jw wmnf t²çlt/
PTCL.	VB.–PRET.–3ms	NPA.–FEM.SG.	
	ate–he	*red*	

jw	*ᶜm.n=f*	*w3d.t*	/jw dmnf wrcʔt/
PTCL.	VB.–PRET.–3ms	NPA.–FEM.SG.	
	swallowed–he	*green*	

'He has eaten the Red (Crown), he has swallowed the Green (Crown).'

Fig. 16: *Chiastic alliteration employing a rhyming of /d/ and /t²/*

Although a rhyme characterized by the equation of the voiced apical stop /d/ and its (voiceless) emphatic counterpart /t²/ is not completely perfect, it seems quite tolerable. The two phonemes share the overwhelming majority of distinctive features, while, on the contrary, /d/ and /ʕ/ do not have much in common (cf. above, Fig. 14). That ᶜm /dm/ 'swallow' does not belong to the small group of words exhibiting those allophones of original /d/ that never changed to /ʕ/ becomes apparent from the fact that the lexeme was still extant in Later Egyptian and developed into Coptic ⲉⲓⲙⲉ /'ʔiːmə/ 'know, understand'.

12. The consonantal phonemes of Old Egyptian and pre-Old Egyptian

By combining the different procedures it is possible to reconstruct a consonantal system that represents more or less the stage of Old Egyptian (compare Fig. 17). This system fits well what we might

		cAh	CAH	CaH	caH	cah
nasals		m	n		ŋ [7] ŋ w [8]	
laterals			l			
trills			r			
glides		w		j		
voiced	plosives	b	d	ɟ	g g w [9]	
	fricatives[1]		z [3]	ʝ [5]	ɣ	
emphatic	plosives	pˀ [2]	tˀ	cˀ	kˀ	
	fricatives[1]		sˀ [4]	çˀ [6]	xˀ	
voiceless	plosives	p	t	c	k	
	fricatives[1]	f	s	ç	x	
sibilants			ʃ			h

Fig. 17: *The consonantal system of Old Egyptian (c. 2200 BCE)*

Abbreviations: c = [–coronal], C = [+coronal], a = [–anterior], A = [+anterior], h = [–high], H = [+high].

Notes: 1) Or: affricates – d͡z, t͡sˀ, t͡s, etc.
2) Marginal, corresponds to ‵— or ‿.
3) Rare, belonging to the graphemically polyvalent graphoneme ⟨—~—⟩,/z/.
4) Rare, belonging to the graphemically polyvalent graphoneme ⟨◠~—⟩,/sˀ/.
5) Rare, perhaps belonging to the graphemically polyvalent graphoneme ⟨‵~◉⟩,/ʝ/.
6) Rare, perhaps belonging to the graphemically polyvalent graphoneme ⟨‵~—⟩,/çˀ/.
7) Rare, belonging to the graphemically polyvalent graphoneme ⟨—~▱~⬮~▥⟩,/ŋ/.
8) Marginal, belonging to the graphemically polyvalent graphoneme ⟨—~ʃ~◲~◱⟩,/ŋʷ/.
9) Rare, belonging to the graphemically polyvalent graphoneme ⟨◦ ~▱⟩,/gʷ/.

expect of an ancient Afroasiatic language: a relatively high number of consonantal phonemes, systematic contrasts between stops and fricatives (or affricates), and three series of articulation – voiced, "emphatic" and voiceless.

However, there is some evidence that the system under in Fig. 17 is not valid for the most ancient records of Egyptian. Some elementary graphemes were still missing before the end of the First Dynasty, and from my theoretical assumptions about the regularity of graphophonemic correspondence rules to be expected directly after the emergence of any indigenous writing system (cf. section 1 and Fig. 3) it may be concluded that the respective phonemes also did not yet exist at this early stage of the Egyptian language.

Analysing the sign inventory of the earliest hieroglyphic records and interpreting the rules of compatibility of elementary graphemes (cf. Fig. 11a) results in the following assumptions about the characteristics of the phonological system of pre-Old Egyptian (c. 3000 BCE):

• The contrast between velar and palatal obstruents is not phonologically significant, it is fully

reflected in writing rather late (c. 2600 BCE).

- Graphemes corresponding to two non-identical obstruents at the same place of articulation are absolutely imcompatible within the borders of a single morpheme (cf. above, section 7 and Fig. 11a).
- Graphemes corresponding to what later became [−anterior] plosives and fricatives – i.e. /ɟ, c², c, g, k², k/ and /ʝ, ç², ç, ɣ, x, x²/ – are not absolutely incompatible within the borders of a single morpheme (cf. above, section 7 and Fig. 11a). Thus, they originally formed two series, which are reconstructed as velars /g, k², k/ and as postvelars /ʁ, χ², χ/.
- ⟨—⟩,/s/ is one of the graphonemes not attested in the very earliest inscriptions (Kahl 1994: 71) and absolutely incompatible with other dental graphonemes (cf. above, section 7 and Fig. 11a); thus, it was a variant of /t/ originally.
- There is not a single contrast characterized by nothing but an opposition [−fricative] versus [+fricative]. Phonologically, even the postvelars /ʁ, χ², χ/ might be written as /ɢ, q², q/. The contrast between plosive and fricative/affricate obstruents is not significant.
- [ʃ] and [h] – and probably also originally [ɸ] – are allophonic variants in complementary distribution, ⟨□⟩/h/ being attested rather late (Kahl 1994: 71).

The consonantal system of pre-Old Egyptian is summarized in Fig. 18.

	cAh	CAH	CaH	caH	cah
nasals	m	n			
laterals		l			
trills		r			
glides	w		j		
voiced obstruents	b	d	g		ɢ [ʁ]
emphatic obstruents		t²	k²		q² [χ²]
voiceless obstruents	p	t [t] [ts]	k		q [χ]
sibilants	ɸ	ʃ			[h]

Fig. 18: *The consonantal system of pre-Old Egyptian (c. 3000 BCE)*

Pre-Old Egyptian exhibits a relatively small inventory of about twenty consonantal phonemes and has but few non-sonorant fricatives and/or sibilants. It is rather untypical of an Afroasiatic language, in

any case less typical than the phonological system of Old or Middle Egyptian. This observation is, at the very least, surprising and only explainable, if we assume that the language underlying the most ancient hieroglyphic records did not initially belong to the Afroasiatic stock but rather acquired its "Afroasiaticity" during the period in which the formation of the Egyptian state also took place. In more general terms, this process can be described as being governed by a tendency towards increasing typological homogeneity within the greater linguistic area.

Abbreviations

⟨ ⟩	enclose graphemic elements	C	any consonant
/ /	enclose phonemic elements	Can	Canaanite (14th cent. BCE)
[ ]	enclose phonetic elements	Copt	(Classical) Coptic (c. 3rd-12th cent.)
{ }	enclose morphological elements	CT	Coffin Texts (c. 2100-1800 BCE), ed.: de
{ }$^{lex.}$	lexical morph		Buck, Adriaan. 1935-61. *The Egyptian Cof-*
{ }$^{gramm.}$	grammatical morph		*fin Texts*, 7 vols., Oriental Institute
<	developed from		Publications 35 (1935), 49 (1938), 64
>	developed to		(1947), 67 (1951), 73 (1954), 81 (1956), 87
≠	does not correspond to		(1961), Chicago: The Oriental Institute of
1	first person		the University of Chicago
2	second person	d(u.)	dual
3	third person	Eg	Egyptian
A	Akhmimic dialect of Coptic	f(em.)	feminine
	(4th cent. CE)	*GAG*	von Soden, Wolfram. 1995. *Grundriß der*
A_2	Sub-Akhmimic (or: Asyutic, Lycopolitan)		*akkadischen Grammatik*, 3. erweiterte Auf-
	dialect of Coptic (4th cent. CE)		lage, unter Mitarbeit von Werner Mayer,
AA	Afro-Asiatic		Analecta Orientalia, 33, Roma: Pontificium
Akk	Akkadian (c. 2500 BCE – 1st cent. CE)		Institutum Biblicum
Ar	Arabic	Gr	(Ancient) Greek
AUT.	autonomous	LAss	Late Assyrian (c. 1000-600 BCE)
B	Bohairic (i.e. Northern) dialect of Coptic	LEg	Late Egyptian (c. 1500-1000 BCE)
	(still in use as liturgical language of the	M	Middle Egyptian dialect of Coptic
	Coptic Church)	m(asc.)	masculine
BHeb	Biblical Hebrew	MBab	Middle Babylonian (c. 1500-1000 BCE)

MEAN.	meaningful		*Ebers. Das hermetische Buch über die*
MEg	(Classical) Middle Egyptian (c. 2000-1500 BCE)		*Arzneimittel der Alten Ägypter in hierati-scher Schrift*, 2 vols., Leipzig: J.C. Hin-
ModEng	Modern English		richs
NPA.	neutral participle (active)	PRET.	preterite
OCopt	Old Coptic (c. 1st-5th cent.)	PT	Pyramid Texts (c. 2400-2200 BCE)
OEg	Old Egyptian (c. 2700-2200 BCE)	PTCL.	particle
p(l.)	plural	*Pyr.*	Sethe, Kurt. 1908-22. *Die altägyptischen*
pBM 10059	Papyrus British Museum 10059 (medical papyrus, c. 1350 BCE), ed.: Wreszinski, Walther. 1912. *Der Londoner medizinische Papyrus (Brit. Museum Nr. 10059) und der Papyrus Hearst in Transkription, Überset-zung und Kommentar mit Facsimile des Londoner Pap.*, Leipzig: J.C. Hinrichs	S	*Pyramidentexte*, 4 vols., Leipzig: J.C. Hinrichs) Sahidic (i.e. Upper Egyptian) dialect of Coptic (c. 5th-11th cent.)
		s(g.)	singular
		SBST.	substantive
		Sem	(Proto-)Semitic
pBM 10808	Papyrus British Museum 10808 (2nd cent.), ed.: Osing, Jürgen. 1976. *Der spätägypti-sche Papyrus BM 10808*, Ägyptologische Abhandlungen, 33, Wiesbaden: Otto Har-rassowitz	STAT.	stative
		TAram	Talmudic Aramaic
		Ug	Ugaritic (c. 1400-1200 BCE)
		V	any vowel
		vb. / VB.	verb
pEbers	Papyrus Ebers (medical papyrus, c. 1550 BCE), ed.: Ebers, Georg. 1875. *Papyros*		

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