1 Introduction

In the late fourth century AD, the last hieroglyphic inscriptions were carved on the walls of the Egyptian temple of Philae, in the deep south of Egypt. The latest hieroglyphs that can be dated precisely are from AD 394 (Devauchelle 1994; see Figure 1). They followed the rules of an especially intricate variant of the hieroglyphic script that had been current among Egyptian priests under Ptolemaic and Roman rule, a code used to record and transmit expert knowledge regarding Egyptian temple religion which had been accumulated over thousands of years within a narrow priestly circle.[1] Indeed, by AD 394, its readership had become so narrow that an explanatory note in a more widely known Egyptian script, Demotic, was added on the same wall, beneath the columns of hieroglyphs.[2] Demotic, a cursive script distantly related to hieroglyphs, would come to an end not much later, in the mid-fifth century AD, in the same Philae temple. At that point, the traditional pharaonic scripts gave way to alphabetic Greek, which had been used increasingly in Egypt since the early third century BC and which inspired the creation of the Coptic alphabet that would henceforth be used for writing the native Egyptian language, itself also heavily influenced by Greek (Quack 2017).

The traditional scripts that had been used in Egypt for thousands of years fell into oblivion. The principles of hieroglyphic writing and its cursive variants, hieratic and Demotic, would not be rediscovered until the early nineteenth century AD, when scholars such as Antoine Silvestre de Sacy, Johan Åkerblad, Thomas Young and especially Jean-François Champollion made the first significant steps towards the decipherment of the Ancient Egyptian scripts and an understanding of their language (Parkinson 1999: 12–45). Egyptologists regard the work of Champollion in particular as the birth of their specialism as a scholarly field in its own right. From that point onward, it would take many more years of research to elucidate the intricate workings of the hieroglyphic script. Today, that script and its various uses are largely understood by Egyptologists, although the grammatical principles of the older stages of the Egyptian language, Old and Middle Egyptian, remain hypothetical to a considerable degree (see e.g. Loprieno 1995: 8–10; Allen 2014: 455–62).

For the purpose of this Element, it is significant that, during the almost 1,500 years between their last use as an active writing system and their modern-day decipherment, hieroglyphs retained considerable graphic and symbolic appeal

---

[1] See Section 3.2 for this particular variant of the hieroglyphic script, called 'Ptolemaic'.

[2] It is, in fact, the Demotic text that supplies the date, a 'year 110', referring to an era counting from the accession of Emperor Diocletian in 284. Initially an era introduced by the Egyptian priesthood, it became the 'Era of the Martyrs' in Coptic Christianity and is still used as such today (Cannuyer 2018).
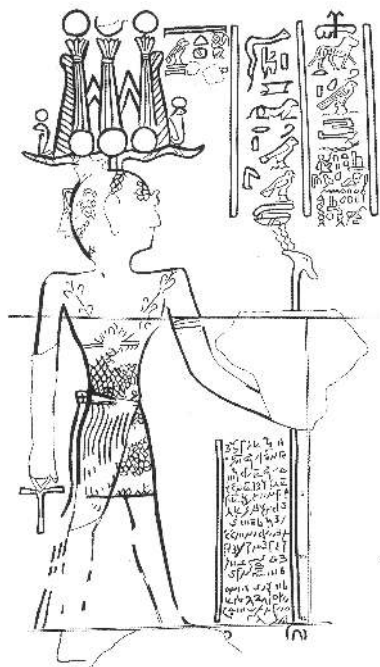
Figure 1 The last dated hieroglyphic inscription, with Demotic text underneath.
After Griffith (1935–7: pl. LXIX)

to audiences from different cultures and periods. Middle Eastern and European intellectuals and artists, in particular, felt attracted to Egyptian hieroglyphs and their mysteries (Iversen 1993; El-Daly 2005: 57–73). Symbolic explanations of hieroglyphs have been proposed since late antiquity, the most widely known compilation being *The Hieroglyphics of Horapollo*. This Greek text was purportedly translated from an Egyptian original, and in Latin translation it enjoyed great popularity in the learned circles of Renaissance Europe with their thirst for allegory and emblematic images (see Boas 1993 for an English translation with illustrations).[3] Although many of the explanations given, indeed several of the 'hieroglyphs' themselves, seem to have non-Egyptian origins, the work is currently thought to include much authentic priestly knowledge of the last centuries of pharaonic religion (Iversen 1993: 48; Leal 2014). *Hieroglyphics* is certainly among the most direct sources for premodern scholarship on Ancient Egypt and its writings, whose tradition was otherwise dominated by

---

[3] The original date and authorship of the text (divided into two books) are uncertain. Its attribution to a grammarian or a philosopher named Horapollo of the fourth or fifth century AD may be pseudepigraphic; Fournet (2021) argues that *Hieroglyphics* as we know it was composed much later, while being based on ancient sources, mainly the first-century AD *Hieroglyphics* of Chaeremon of Alexandria.

classical Greek and Roman texts. The words referring to the different pharaonic monumental and cursive scripts – 'hieroglyphic', 'hieratic' and 'Demotic' – are illustrative of that tradition.[4]

Today, Egyptian hieroglyphs survive as symbols in artistic and popular imagination, even as emoji in digital communication. A splendid example is ☥, which retains much of its Ancient Egyptian meaning (*ankh* 'to live' and related words) in its modern uses. The purpose of the present Element is not to discuss the use of hieroglyphs in post-pharaonic scholarly and popular traditions, however interesting in themselves they may be. The principal aim is to show how and why hieroglyphs (and to a lesser extent, hieratic and Demotic) also enjoyed popularity outside a narrow circle of professional scribes and priests *during pharaonic history.* After discussing the ways in which hieroglyphs were used by Egyptian scribal and priestly specialists, the focus will be on uses of hieroglyphs by non-specialists, from apprentice or amateur scribes and draughtsmen, and semi-literate workmen, to the inventors of non-pharaonic codes and scripts partly inspired by Egyptian hieroglyphs. By examining a number of relevant examples, one can deduce what made hieroglyphs attractive to non-specialists and how they were used to develop different types of graphic communication, some of which may be called writing, while others were limited to using individual signs in isolation or to accumulations of signs that may appropriately be called 'pseudo-script'. Together, these widely different case studies will reveal aspects of the impact the hieroglyphic script had on individuals and societies in Ancient Egypt and its surroundings.

2 Hieroglyphs, Hieratic and Demotic: The Work of Specialists

Egyptian hieroglyphic writing was developed in the last centuries of the fourth millennium BC and the first centuries of the third. Isolated signs or small groups of them, appearing on tags of bone, ivory and wood from the thirty-third century BC, are regarded by some Egyptologists as (proto-)hieroglyphs. But their supposed phonetic reference is the subject of debate, and the use of hieroglyphs to record entire sentences in Egyptian only emerged slowly during the course of the Early Dynastic Period, circa 2900–2600 BC (Vernus 2016: 109; Stauder 2022: 251).[5] To be clear about what is meant by 'writing', the latter notion is

---

[4] From the Greek *grammata hieroglyphika* 'sacred carved letters', *hieratikos* 'priestly' and *grammata demotika* 'popular letters', respectively.

[5] The tags are those from tomb U-j in the cemetery of Umm el-Qaab; basic edition in Dreyer 1998. The signs on them are also known from rock inscriptions (e.g. Darnell 2017), sculpture and prestige objects found elsewhere in Egypt. For a critical appraisal, see Baines 2004 and Vernus 2016: 117–24. According to Stauder (2022: 227–31), the signs do not belong to a writing system but to a formal visual code that would start including phonetic notation in the decades after the U-j deposits. For the palaeographic development of the earliest hieroglyphs, see Regulski 2010.

understood here as the graphic or material encoding of utterances in a specific human language, including the indication of sounds of that language.[6] It is interesting to see that signs resembling the characters of what would become hieroglyphic writing made their first appearance in isolation as a means of expressing notions such as kingship, deities and perhaps the names of individuals, institutions or places. Such emblematic uses would remain an important characteristic of hieroglyphs throughout their history, in addition to their role as characters in written texts (see Section 3.1).[7]

Throughout the Pharaonic and Greco-Roman Periods of Egyptian history, hieroglyphs would be the script for monumental texts, occurring chiefly on stone surfaces, but also on objects of metal and wood, as well as on papyri. For the last, however, more cursive scripts would be developed that allowed the writing of administrative, religious and literary texts to be quicker. In the early third millennium BC, painted cursive hieroglyphs would develop into hieratic, a script with distinctive characteristics that set it apart from hieroglyphs, the most obvious being ligatures, the graphic joining of characters that is found in so many handwriting systems worldwide. Another feature is the orientation of hieratic characters, which invariably face right, with the consequence that hieratic texts are always read from right to left. The same orientation and reading direction were the usual ones in hieroglyphic writing, but since this script was mainly used to inscribe monuments, there was potential for hieroglyphic signs to be mirrored, as a means of adapting the texts and their reading order to the architectural or iconographic context. (This, for instance, could occur in units of text placed symmetrically on either side of a doorway, or in captions which adhere to the orientation of pictures they refer to.) A third important characteristic of hieratic is, obviously, the development of its own graphic shapes of signs, which in time became ever more simplified with respect to their corresponding hieroglyphs and, as opposed to the latter, lost much of their iconicity. Between monumental hieroglyphs and hieratic is another type of writing, called cursive or semi-cursive hieroglyphic. The characters of this script, which was mainly used for funerary texts on papyri and wooden coffins, are somewhat simplified when compared with their monumental equivalents. A feature they share with hieratic is that the signs are not reversed, but consistently face right, and so are to be read from right to

---

[6] Definitions in this sense are often given in grammatological literature – for example, Daniels 2018: 126. Sound, however, is not necessarily the single aspect of language that is referred to by writing. Logograms refer to words of a language, with or without additional phonetic specification (see Section 2.1 and Robertson 2004: 20–1).

[7] For the different semiotic modes among which writing emerged, see Morenz 2004, Vernus 2016 and Stauder 2022.
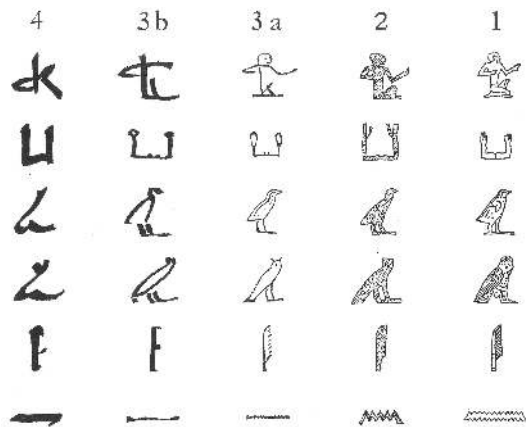
Figure 2 Monumental hieroglyphs (nos 1–2), cursive hieroglyphs (3a–b) and
hieratic (4). From Fischer 1979: 41. Copyright © 1979 The Metropolitan
Museum of Art, New York. Reprinted by permission.

left.[8] See Figure 2 and Fischer (1979: 39–44) for the scripts mentioned in this
paragraph.

By the seventh century BC, another cursive script had developed, which may
have originated from a particular form of hieratic current in northern Egypt.
That later script is called Demotic, and as we have seen in the Introduction, it
was in use until the mid-fifth century AD, outlasting hieroglyphs by only half a
century. The hieratic script, which remained in use together with Demotic, is
attested until the third century AD (Wente 2001: 210; Grandet 2022: 69).[9] In the
last millennium of its existence, it came to be reserved for religious texts – hence
its Greek designation *hieratikos*, distinguishing it from the 'popular' Demotic
script. However, the latter's use, which was initially administrative, could also
be extended to religious and literary domains.

Writing any of these scripts was the specialization and prerogative of a tiny
elite minority of Ancient Egyptian society: administrators, priests and artists. It
is assumed that 1 or 2 per cent of the population at most attained full literacy in
pre-Hellenistic Egypt, and this was mainly in a cursive script (hieratic or
Demotic), for use in administrative duties (Ray 1994: 64–5; Baines & Eyre
2007: 64–7). The hieroglyphic script, by virtue of its monumental and decora-
tive uses, was the specialization of an even smaller group, that of draughtsmen

---

[8] Funerary texts frequently reverse the order of vertical columns in which cursive hieroglyphs are
written, but *within* the columns, the normal writing and reading direction is observed.

[9] A variant of hieratic called 'abnormal hieratic' was in use for administration and literature in
southern Egypt together with Demotic until the late sixth century BC (Donker van Heel 2022:
70–1).

and sculptors. These specialists also mastered the cursive writing used by a
wider circle of literati, but the reverse was not true: most of the people who read
and wrote hieratic or Demotic would not have been capable of composing an
error-free hieroglyphic text. The fact that knowledge of the cursive scripts was
more widely spread than hieroglyphic expertise becomes clear in hieroglyphic
inscriptions produced by less-accomplished artists, where cursive, semi-cursive
or pseudo-hieroglyphic forms and groupings of signs appeared when the correct
hieroglyphic versions did not come to the writer's mind. This would not
normally happen in workshops of the royal residence, but it could and did
occur in regional and local workshops producing private monuments (e.g.
Haring 2010: 33–4). This was especially the case in periods without centralized
kingship, and it had the potential to lead to orthographic innovations (see e.g.
Vernus 1991). Drafts in hieratic and cursive hieroglyphic may have been
important in the preliminary stages of the composition of hieroglyphic texts,
but examples in monumental hieroglyphs were also available on papyri and
ostraca (Haring 2015a; Laboury 2022b: 43–6). It remains unclear, however,
how exactly draughtsmen went about composing fresh hieroglyphic texts.

2.1 Hieroglyphs As Characters of Writing: Sound and Meaning

The Egyptian hieroglyphic script is a complex mixture of phonetic and ideo-
graphic writing, and the same is true for hieratic and Demotic, which follow the
same basic principles.[10] A hieroglyphic sign can be used to express only sound
(e.g. the owl 𓅓 for *m*, not for 'owl'), it can transmit meaning without sound
(e.g. the sealed papyrus scroll 𓏛 can denote various scribal and mental activ-
ities and their products, and abstract notions), or it can express both sound and
meaning at the same time (e.g. a cow's ear 𓄔 for *sḏm* 'to hear'). Hieroglyphic
orthographies for words of some length (mostly nouns and verbs) often include
signs of all three categories – for example, 𓏛𓅓𓄔 *sḏm* 'to hear/listen'.[11] This
spelling includes, from right to left, a logogram (the ear, sound and meaning of
the verb 'to hear'), a phonogram[12] (the owl, sound *m* only) and a determinative
(papyrus scroll, category of meaning: mental activity). It is, in fact, the most
common way to write this verb in hieroglyphic as well as in cursive texts. But its
orthography can vary, especially in hieroglyphic, so that the same verb may also

---

[10] This section mainly serves to explain the principles of hieroglyphic writing to a non-
    Egyptological audience.

[11] The characters of Egyptological transliterations like *sḏm* are approximations (at best) of the
    sounds of spoken Egyptian. Ancient Egyptian scripts basically express consonants only; see
   Section 2.1.2.

[12] Also called 'phonetic complement' or 'phonemographic interpretant' (the latter term was
    introduced by Frank Kammerzell; Polis & Rosmorduc 2015: 167–8), since it is used to support
    the interpretation of an adjoining sign, in this case, the preceding logogram.

be written ⌗ ⌗ ⌗, with the determinative ⌗, a sitting man with a hand raised to his mouth to indicate oral or mental activity, instead of ⌗. Since the signs used in a full orthography overlap in meaning (logogram and determinative) and in sound (logogram *sḏm* and phonogram *m*), the verb can also be abbreviated to just one sign: the logogram ⌗. Such variability is highly convenient when arranging hieroglyphs within the spatial confines of lines or columns on a wall or a statue; it is less urgent in texts written in *scriptio continua* on papyrus. The latter offer more space for full writings. What is more, because the cursive scripts have simplified forms that make the identification of individual signs difficult, they favour full, standardized orthographies which help the writer and reader to recognize words.

This would appear to be Ancient Egyptian orthography in a nutshell, but the accurate taxonomy of hieroglyphs and the principles of their use are more complicated than the examples given here might suggest (for an overview and discussion, see Polis & Rosmorduc 2015). To begin with, the terminology used here (phonogram, logogram, determinative) includes only three words of a more extensive vocabulary used by Egyptologists when discussing hieroglyphic writing. The category of signs called 'logogram' in the preceding paragraph, for instance, is otherwise called 'ideogram' or 'radicogram'. The former word is also applied to determinatives and indicates the capacity of both logograms and determinatives to express meaning directly through their pictorial quality, without phonetics in between (as opposed to the fully phonetic English orthography used to write this Element). For the same reason, they may also be called 'semograms'. The word 'determinative' will be discussed later in this section.

The word 'radicogram' (introduced by the Egyptologist Wolfgang Schenkel) would seem to be a more appropriate term than 'logogram', since it most often applies to the stem or 'root' (*radix*) of a word, rather than to one word specifically.[13] This becomes apparent from the previously mentioned example of ⌗ in *sḏm* 'to hear', since the different possible inflections of this root, resulting in different words (e.g. ⌗ *sḏm.n* 'we hear', ⌗ *sḏmw.s* 'she is heard'), all use the same sign. Thus, the 'logogram' or 'word-sign' does not necessarily express a word, although it may do that when used autonomously – that is, for the writing of one specific word, when it includes no additional signs (Polis & Rosmorduc 2015: 166). Such autonomous use may be made explicit by one particular sign: the so-called stroke determinative, a

---

[13] In Egyptology as in Semitic studies, word bases are called 'roots' (referring to a string of consonants) rather than 'stems' (including consonants and vowels, as in European languages), since in Egyptian and Semitic languages, vowels *within* a root/stem follow the inflected form. Compare the root *qtl* in the classical Hebrew *qaṭōl* 'to kill' (infinitive), *qatal* 'he killed' (perfect), *qatūl* 'killed' (passive participle), *qoṭēl* 'who kills' (active participle).

simple vertical stroke ı which is also used to denote the number '1'. Thus, the human face combined with this stroke ı☺ means *ḥr* (/ħ/ followed by /r/) 'face'. Without it, it can be used (and is very often used) phonetically for *ḥr* in words which incorporate these two consonants, whether or not these have anything to do with the human face. To complicate things further, the same group ı☺ is used for the preposition *ḥr* 'on'. It is quite possible that this preposition is related to the word *ḥr* 'face', but it functions as a different word, and so even the 'autonomous' sign is capable of being semantically ambiguous, a 'radicogram' rather than a 'logogram'. To be more precise, the radicogram is not autonomous at all: it represents a sequence of consonants, not necessarily a lexical unit (lexeme). Polis and Rosmorduc (2015: 157, 166–7) therefore propose to distinguish between non-autonomous radicograms and autonomous logograms, the latter referring to lexemes as well as to clusters of consonants.

It should have become clear by now that the taxonomic terms refer to functions of signs in context, not to the signs themselves as graphically defined (graphemes). The same grapheme may be phono-, logo- or radicogram, or determinative, depending on its position in a string of signs and on its intended meaning there. The 'autonomy' mentioned in the previous paragraph is relative. A sign's meaning depends on its position in the string – that is, on its syntagmatic relations with the surrounding signs. Only in combination do hieroglyphs represent human language, according to the principle of double articulation that characterizes writing systems in general: signs that are 'meaningless' in themselves, such as alphabetic characters, acquire linguistic meaning only when combined with other signs. Sign systems other than writing include systems of single articulation in which individual signs convey meaning directly by themselves as, for instance, marks and emblems.[14] 'Meaningless' is not to be taken in an absolute sense. Characters of writing can be used in isolation and still have meaning. This is even true for the abstract alphabetic characters used to type this text although, when used individually, they still refer to linguistic sounds, often as abbreviations of words (e.g. P for 'parking'), or with reference to the characters' positions in alphabetic sequence (e.g. for the purposes of numbering or grading). Pictorial signs like hieroglyphs present many more possibilities for autonomous use. We will see some important examples of this in later sections of this Element (especially Sections 4.2 and 5.1).

In addition to being part of systems of double articulation, characters of writing tend to be relatively closed sets of signs – that is, there is a more or less fixed repertoire of signs in a writing system. In alphabetic writing systems,

---

[14] For single and double articulation, see, for example, Nöth 1990: 237, Depauw 2009b: 207–8 and Haring 2018: 91–2.

this principle seems fairly rigid: the English alphabet has twenty-six characters and users are not at liberty, in principle, to add more.[15] Pictorial writing systems like Egyptian hieroglyphs appear to be more flexible. Although a certain set of current signs existed and had to be mastered by users of the script, new signs could marginally make their appearance for ad hoc use, and could even become 'canonized' and kept in the repertoire for centuries.[16]

Determinatives especially represent a category open to the invention of new graphs. Determinatives are often generic, so as to be applicable to broad semantic categories of words. The papyrus scroll ▭, used for categories which one might label as 'abstract', 'mental' and 'written', is a fitting example. On the assumption that their function is the same as or similar to that of classifiers in spoken languages (even though Egyptian itself was not a classifier language), some Egyptologists prefer to use the latter term instead of 'determinatives' (e.g. Goldwasser 2002; Lincke & Kammerzell 2012; Polis & Rosmorduc 2015: 157–8, 165–6). The notion has been taken even further by Orly Goldwasser, who argued that classifiers reflect categorization ('knowledge organisation') in the minds of Ancient Egyptian speakers and scribes. The theory is attractive and has been admirably presented, with much supporting evidence (Goldwasser 2002), but it has also met with reservations. Eliese-Sophia Lincke and Frank Kammerzell, although in favour of the analogy of linguistic and written classifiers, do not see the latter as a 'reflection of mind', but as a 'result of sign usage' (Lincke & Kammerzell 2012: 80). There is perhaps no better illustration of this than the differences between the uses of determinatives/classifiers in the highly pictorial hieroglyphic script on the one hand, and in its cursive pendants, hieratic and Demotic, on the other.[17] Overall, the way these scripts select and deploy determinatives appears to be very similar, but in monumental hieroglyphs, often very specific determinatives are

---

[15] There are exceptions, of course, such as words borrowed from other languages featuring characters typical for non-English alphabets (e.g. ç in façade), or the use of additional signs, including pictograms, in (electronic) informal writing (e.g. emoji).

[16] It is difficult to say what exactly that set would have been for users of the hieroglyphic script at any point in Egyptian history. The repertoire of hieroglyphic font types established by Alan Gardiner (1957: 438–548) represents the current set accepted by Egyptologists, although its 769 graphs include rare signs and different graphic variants of the same signs, often from different periods. It concentrates on Middle and early New Kingdom repertoires (appr. 2000–1300 BC); its graphic forms are mainly inspired by monumental hieroglyphs of the Eighteenth Dynasty (1539–1292 BC). More extensive lists include the increased hieroglyphic repertoires of the Late and Greco-Roman Periods – for example, Daumas 1988–95; Grimal, Hallof & Van der Plas 2000; see Section 3.2. Collombert (2007), justly critical about quantitative inferences made from modern sign lists, arrives at a total of circa 1,500–2,000 signs for the Old Kingdom, but estimates a more restricted set of truly current signs at circa 600.

[17] This is in addition to the graphic differences between the hieroglyphic signs and their supposed cursive counterparts, not only in the degree of cursiveness or simplification, but also in what they actually represent; see Meeks (2015: 41–2).

employed (including signs which visually represent the signifieds of the pre-
ceding words, so-called repeaters),[18] whereas cursive scripts more often favour
generic signs.[19] One example is the headrest ⊐, an important piece of furniture
in Ancient Egyptian households and burial equipment. Its pictorial representa-
tion exists among the hieroglyphic sign repertoire and was used as a determina-
tive (more specifically: repeater) of *wrs* 'headrest', although the generic sign ⌒
for wood and woodwork could also be used in hieroglyphic within the same
word. Hieratic uses of repeaters and other very specific graphs were much more
infrequent than their hieroglyphic counterparts, and whenever the word *wrs*
'headrest' makes its appearance in hieratic inventories of household and tomb
furniture, the determinative ⌒ is used consistently (Haring 2018: 32). The
differences in uses of signs by scribes of monumental and cursive texts require
more research and may throw important light on determinatives as reflections of
semantic categories as well as scribal conventions and innovations.

2.2 Phonographic Writing: Consonants and Syllables

Ancient Egyptian phonographic writing was essentially consonantal, but ortho-
graphic strategies existed to indicate the presence and quality of vowels –
although never sufficient to reconstruct ancient pronunciation. Since the same
hieroglyphic signs and orthographies were used for thousands of years, during
which the Egyptian language changed considerably, their reference to actual
sounds, and their understanding as such by modern readers, can only be
approximations (see e.g. Loprieno 1995: 28). The sound represented by
𓄿 (the Egyptian vulture), for instance, is thought to have been /r/ or /l/ in the
earliest documented stages of the language, but /ʔ/ (glottal stop, *'aleph*) in later

---

[18] For instance, two detailed renderings of craftsmen's instruments (level and plumb rule) as
determinatives in Siut tombs I and IV (sketchily drawn in Griffith 1889: pl. 6, col. 265; pl. 13,
col. 32; precise forms in Kahl & Shafik 2021: 246–7, nos. U39H and U97; for the former, see also
Haring 2018: 222–3) are two rare signs whose use may have been prompted by the equally rare
words they follow.

[19] There are examples of very specific and detailed determinatives in hieratic, such as the occa-
sional use of the horse 𓃗 (reversed for unknown reasons) as determinative of *ḥtr* 'chariot-span'
in a manuscript that otherwise uses the generic 'animal' determinative 𓃡 (P. Sallier III col. 1, lines
6 and 9: Kitchen 1979: 29 and 31; Budge 1923: pl. LXXVII – note the sketches of horses in the
upper margin of the manuscript, as exercises?). Hieratic scribes frequently chose to abbreviate
complex signs to a diagonal stroke, but were not always averse to adding an elaborate deter-
minative – for example, in *ḥḏt* 'white crown' in P. Chester Beatty I verso B 19: ⟍ ⟨ (with stroke
and the actual crown); recto col. 16, line 1: ⟨ (mistakenly with the double crown), recto col.
8, line 4: ⟨ with the generic determinative for divinity instead of a crown, highlighting the
divine qualities of the king and his attributes. The last determinative looks very simple in its
cursive form. Hieratic originals can be found in Gardiner 1931: pl. VIII, XVI, XX. Like
hieroglyphs, cursive scripts sometimes insert more or less detailed pictograms on the same
scale as the surrounding signs, functioning as ad hoc logograms, the phonetic rendering of which
often escapes us (examples in Polis & Rosmorduc 2015: 159–61).