CHAPTER 6

SCRIBAL PRACTICES, SYNTAX AND MORPHOLOGY

Philippa M. Steele

6.1 Introduction

As other contributions to this volume show, it is quite clear that the rise of what we call Cretan Hieroglyphic is intrinsically linked with seals and sealing practices (Jasink and Weingarten, Valério and Flouda, this volume). The very genesis of the writing system has to be understood as a development from practices that began as pre-literate or proto-literate, stemming from iconographic repertoires where images themselves had systematic meanings, and moving from there towards an adaptable means of representing language. This system (or something closely linked with it) also began to appear incised directly on clay documents at an early stage, marking a new and fundamentally different means of recording. The coherence of what we call Cretan Hieroglyphic, appearing in these two contexts, may indeed be questioned – although there is considerable merit in attempting to reconcile the sets of signs found in each tradition to attempt to gain a more holistic view of the properties of this relatively poorly attested branch of the Aegean scripts (on these issues, see further Meissner and Salgarella, this volume). The attestation of sequences of signs that appear on both seals and clay documents indeed points towards these two types of writing support, and their inscriptions, existing within the same sets of administrative practices (also Civitillo, this volume).

The present contribution begins by considering the question of what happens as the system develops out of sealing practices and starts to be used on clay documents, first from a material and then from a cognitive perspective. This involves looking at the way that this new usage affects the system itself, as well as the practices surrounding and encompassing writing. Moving on from this consideration of changing scribal practices, we then turn to questions surrounding the language or languages underlying Cretan Hieroglyphic writing: given that the move to recording information on clay documents leads to some longer and more complex inscriptions, are we able to identify patterns that reveal linguistic features? As we will see, the potential for identifying such features is quite severely limited, if not entirely out of reach (also Davis, this volume, on related questions).

6.2 A 'Clay Turn'? Material Perspectives[1]

Considerations of the origins of Cretan Hieroglyphic writing have generally looked for its genesis in seals and the practices associated with them, growing out of a long-standing glyptic tradition. This would involve a progressive development of sematographic signs drawn from the glyptic repertoire, and surfacing in occasional archaeological finds that pre-date what is usually thought of as Cretan Hieroglyphic proper, most famously in the objects comprising the so-called 'Archanes formula'.[2] It has been argued that both Cretan Hieroglyphic and Linear A stem from a single, earlier pre-literate system,[3] although the relationship between those two scripts remains a subject of scholarly debate (see further, pp. 122–3). The regionalism evident in the ongoing development of writing is a further complicating factor, as Cretan Hieroglyphic and Linear A come to be strongly associated with different areas of the island.[4]

From a material perspective, while the emergence of writing from a pre-existing glyptic tradition could be seen as preserving a certain continuity from the Pre/Protopalatial period onwards, the use of clay as a medium for writing appears to be an innovation of the later part of the Protopalatial period as far as we can tell from surviving evidence. We have surviving clay documents from MM IIB through to MM III: deposits (or 'archives') are found principally at Malia, in both *Quartier Mu* (MM IIB) and the Palace (MM III); at Petras (MM IIB); and in the Palace at Knossos (MM IIB–III?).[5] The documents themselves are shaped pieces of clay that are in many cases designed specifically to carry inscriptions,[6] and are distributed across a number of types, comprising tablets, 2-sided lames, 4-sided bars, crescent-shaped nodules, medallions, cones and one example of a roundel. It may be assumed

[1] One important point to make at the outset is that we cannot know what we are missing in terms of writing on perishable materials. The existence of such a tradition can be inferred from the discovery of flat-based seals in contexts related to other archival material, but in the absence of direct evidence we are forced to evaluate writing on Crete almost exclusively based on what has survived.

[2] See Flouda 2013: 148–55; Civitillo 2016b; Decorte 2018a; 2018b; 2018c; Ferrara, Montecchi and Valério 2021c; Salgarella 2021; Valério and Flouda, this volume. On Cretan Hieroglyphic as an autonomous Cretan invention, see most recently Ferrara, Montecchi and Valério 2021a.

[3] Schoep 1999.

[4] Anastasiadou 2016a.

[5] Evans eventually dated this deposit to MM IIB, which has found general acceptance, but see Pini (1990; 2002: 6–7) for the suggestion that the Cretan Hieroglyphic Deposit at Knossos could date slightly later, to MM III or even MM III–LM IA.

[6] Apparent exceptions include the nodules, which can also be anepigraphic or can carry a seal impression without any incised writing.

that the range of document types corresponds with differences in usage and in types or quantities of information recorded.

Perhaps an obvious question is what prompted the move towards writing directly on clay. It might be tempting to see some inspiration from the contemporary Near East in the use of clay, especially for administrative purposes, given that clay had been in regular use there for more than a thousand years before the first appearances of verifiable writing on Crete. However, the very considerable differences in document shape and type (not to mention sealing practices)[7] make it impossible to draw any specific links. It is far from unthinkable that the use of clay in other spheres including ceramic production is what made the virtues of this highly available and reusable material clear to the first Cretan writers to use it,[8] or that the impression of seals on other clay surfaces (e.g. vessels and loom weights)[9] over time inspired the recording of information directly on clay, with clay then being shaped into document types designed specifically for carrying writing. In any case, we seem to be dealing with a very different scenario from the invention of writing in the Near East, where the progression towards texts directly written on clay documents evidently has its origins in a long-standing use of tokens with directly incised symbols or pictograms.[10]

Writing directly onto a clay surface with a stylus of some kind (on which, see p. 123) is a very different act from carving signs onto the hard surface of a seal, or using that seal to make an impression in another soft material. While carved signs on seals make use of depth to create a three-dimensional effect evident also in their impressions, drawn signs on clay are reduced largely to a two-dimensional outline of the thing depicted – although the use of round impressions (made presumably with the same stylus used to draw lines, perhaps with its reverse end?) as well as drawn lines in some sign shapes may well represent an attempt to capture something of the variant shapes and depths more evident in incisions on carved seals. It is perhaps unsurprising that a move

[7] There is, however, one cylinder seal with what seems to be a Cretan Hieroglyphic inscription whose shape and type is strongly reminiscent of Near-Eastern examples (#201 CR(?) S (1/1) 01; *CMS* XI 073); see also Kenna 1968 on the sporadic use of anepigraphic cylinder seals on Crete. The related Cypro-Minoan system attested in Late Bronze-Age Cyprus, situated much closer to the Levant and to areas using cuneiform, appears more frequently on cylinder-shaped seals.

[8] See also Karnava 2000: 227–8. On the idea that using clay was a useful way of protecting the archives from mice, see *Docs*², 109!

[9] Note however that the evidence for direct object sealing before MM IIB is very limited, which makes it challenging to reconstruct earlier sealing practices: see Krzyszkowska 2005: 77–8, 98–9.

[10] See e.g. Schmandt-Besserat 1996. For another view taking into account artistic and glyptic repertoires, see Cooper 2004.

from carving in the (also highly decorative) medium of the seal towards the linear outlines possible on a flat(ish) clay surface will also impact on iconicity, i.e. the ability (or indeed the desire) to make the sign visually resemble the thing that it is meant to be a depiction of. Just as any move between different media and implements creates new problems associated with sign shapes and their tolerable degree of variation – i.e. the degree to which the sign shape can be changed while remaining identifiably an example of its sign – so we see in Cretan Hieroglyphic perhaps some tension between the effectiveness of the new medium and the capability of scribes to maintain the visual properties of the writing system as established already on seals (particularly given the fact that seals are used alongside direct writing on clay documents). As has been emphasised in studies of other writing systems, the cognitive processes associated with developing new writing traditions also impact on sign shapes, motivating in some cases more standardised forms and/or a reduction in iconicity as users become accustomed to the regular – and increasingly abstracted – relationships between signs and the things denoted; a long-term comparison between Cretan Hieroglyphic, Linear A and Linear B may indeed reflect such changes over time, although they are less evident in this early period.[11]

One important question revolves around the relationship between Cretan Hieroglyphic and Linear A. Some scholars have seen Cretan Hieroglyphic as principally associated with seals while Linear A represents writing as intended for administrative documents,[12] but such a suggestion clearly under-represents the considerable numbers of clay documents inscribed with Cretan Hieroglyphic writing. A better way of understanding the relationship between Cretan Hieroglyphic and Linear A might be to see them as two different or divergent traditions of writing on clay, following on from the systematic sets of meaningful sign associations that had grown up principally in the context of seal usage. The differences between them are both visual/stylistic (in terms of sign shapes, the degree of iconicity/abstraction, text layout, etc.) and material (in terms of document types and even probably methods of inscription or tools used). Seeing a sort of divergent synergy between Cretan Hieroglyphic and Linear A as they develop might also help us to understand why there exist some documents whose identification as belonging to one or the other tradition is difficult or contentious.[13] A recent palaeographic assessment of the two traditions places Linear A as significantly more innovative in its features,[14] which may not be unrelated

[11] E.g. Overmann 2021 on cuneiform. [12] E.g. Godart 1979: 32–3; Perna 2014.
[13] See Petrakis 2017a: 81–2. [14] Ferrara, Montecchi and Valério 2022.

to its relative success and longevity, while Cretan Hieroglyphic has been argued to represent a short-lived phenomenon whose 'gradual abandonment is due to the fact that it proved less suited to administrative requirements'.[15] The archaeological record gives us the impression that Cretan Hieroglyphic gave way quite suddenly to the more enduring Linear A tradition, but there remain some open questions surrounding the potential influence of Cretan Hieroglyphic administrative practices even on the development of Linear B as late as LM II.[16] It is also very difficult to be certain of the exact duration and distribution of Cretan Hieroglyphic writing, particularly in archival contexts, since our evidence comes mainly from 'snapshots' of unintentionally baked sets of documents from destruction horizons.

Another question surrounds the administrative practices and tools associated with Cretan Hieroglyphic writing. Cretan Hieroglyphic seals are evidently the products of skilled craftsmen working with tools developed for working soft and hard stones, in some cases perhaps using visual aids to magnify the often very small surfaces to which they added inscriptions.[17] Writing in administrative archival contexts will have been done by different individuals in different circumstances (although whether the writers might have also been seal-bearers is more difficult to tell), using different tools for their professional duties. No identifiable examples of a writing implement have been found from contexts that have produced Cretan Hieroglyphic inscriptions, but from the surviving documents it is possible to reconstruct the shape of the stylus, which would have been round with a tapering point, with varying thickness:[18] documents are incised by a combination of drawing the tip of the implement through the clay for lines and curves and impressing the point (or perhaps sometimes the reverse end?) of the implement into the clay to create small round 'strokes'. Unlike in Linear A, where the appearance of anything similar is more sporadic, these round impressions seem to be a fairly standardised element of some sign shapes. While it is difficult to reconstruct the extent of Cretan Hieroglyphic literacy, it should be noted that writing does appear occasionally either incised or painted on vessels, and the administrative document from the sanctuary at Kato Syme also suggests the presence of literate individuals outside of archival contexts.[19]

[15] Flouda 2015b: 73. [16] Tomas 2017.
[17] On seal production, see e.g. Krzyszkowska 2012.
[18] See Karnava 2000: 98–109; Steele 2020: 6.
[19] SY Hf 01: see Lebessi, Muhly and Olivier 1995.

6.3 Text Layout, 'Syntax' and Cognitive Developments

Writing is a phenomenon closely bound up with cognitive processes, involving not only the processing of information and language, but also knowledge of the relationships between a series of signs and their associated meanings, developed skills in reproducing the signs and laying them out in meaningful arrangements, embodied tool use and numerous other aspects. Cognitive studies of writing and reading have, unsurprisingly, usually focused on modern and overwhelmingly literate societies, meaning that their relevance to early developing systems of writing is questionable. Nevertheless, at this very early stage in the development of writing traditions in Crete we can observe some palpable trends in the development of writing that point also towards developments in the cognitive processes surrounding these practices.[20] A move from variable orientation and arrangement of signs towards linear writing is particularly striking.

The first point to make is that writing on seals and writing on clay documents certainly involve different types of cognitive behaviour. As noted above, a seal is carved, presumably by an expert craftsman, working sometimes very finely at a very small scale; whether the craftsman is himself literate/fully acquainted with the signs and their meaningful relationships, or whether he might simply be working from a template drawn up by another literate person, is an open question, although there are some indications that engravers had some understanding of the rules and structure of the writing system as well as the shapes of its signs.[21] However, the carver of the seal is presumably unlikely to be its intended owner, and so we must envisage a situation where the person using the seal in meaningful contexts is not the person who 'wrote' the sequence it bears (although it is obviously possible that they commissioned the content of their seal in some sense).[22] Meanwhile, the sequence on the seal remains fixed, and has to be transferred to a sealed surface as a whole, which is itself an act that is meaningful to both the sealer and to other individuals and groups involved in administrative practices.[23]

Writing a sequence of signs on a document made of clay (or for that matter a document made of a perishable material designed for the purpose) is done directly and immediately by a person involved in administrative practice, and the act of writing requires that they have

[20] Cf. Overmann 2016; 2021; 2022 on the reorganisation of neural activity associated with the development of writing in ancient Mesopotamia; also Malafouris 2012 on Linear B, and Malafouris 2013 more generally on materiality and cognition.
[21] See e.g. Younger 1990: 88–92; Karnava 2000: 230–1; Flouda 2013: 146; Civitillo 2021b: 89–91.
[22] On seal-owners, see Ferrara and Jasink 2017. [23] Civitillo 2016a; 2021a; 2021b.

knowledge of the system of signs and their shapes and meanings, as well as an ability to reproduce them using the tools and media required. Where impressing a seal is constricted by the engraved sequence, writing directly on clay allows creativity in terms of the content of an inscribed sequence, as well as other features such as the length and lay-out of text. It is also likely that writing on clay documents was intended to be less permanent than a sequence engraved on a seal, thus making it well suited to quotidian administrative practice, just as the clay itself could be archived or re-used as required.

The arrangements of signs on seals (generally referred to as their 'syntax')[24] often defy easy interpretation (Flouda, this volume) – to the extent that signs have sometimes been divided, on highly questionable grounds, between the meaningful and the purely decorative.[25] Their relative orientation can vary, such that even a common 'formula' or group of signs can be found in multiple different arrangements (all presumably sharing the same meaning), making a 'linear' reading of the sequence of signs difficult – although this should not cause us to assume that they cannot be read in a meaningful way, as early scholarship often did. Linearity is simply not a property of most seals, especially the ones with round or oval sealing surfaces, even as what has been called 'frieze syntax' develops in the later Protopalatial period.[26] Even seals with rectangular sealing surfaces, which might lend themselves to a linear arrangement of signs,[27] tend not to have their signs arranged in a line along the longest side (unlike, for example, the clay labels or bars), favouring something closer to a columnar arrangement while the orientation of signs continues to vary.

Strikingly, although some clay documents display a decisive move towards linear writing (i.e. signs arranged into lines read usually from left to right), there remain some that do not. Document types with rectangular or roughly rectangular surfaces most obviously have lines of text, sometimes just one line (as for example on labels and most bars), but sometimes featuring two lines with a ruling (as occasionally attested on bars and more commonly on tablets): see Figures 6.1 and 6.2.

Clay documents with larger rounded surfaces, i.e. particularly the medallions (less so the nodules with their very constrained writing surfaces), vary somewhat in their arrangements of signs. Some feature arrangements not so different from, and perhaps influenced by, the sorts of arrangements found on rounded seal surfaces, with variable

[24] See Yule 1980: 185–8. This is the sense in which the word 'syntax' is usually applied to Cretan Hieroglyphic; given the restricted nature of the corpus, any linguistic investigation into sentence-level syntax would be premature, to say the least.
[25] See Jasink 2009; Decorte 2017. [26] Yule 1980: 65–8. [27] Flouda 2013: 155.

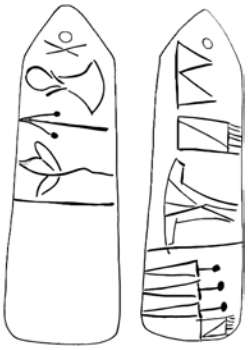

Figure 6.1 *CHIC* #089 MA/M Hf (04) 01, a label featuring linear text

Figure 6.2 *CHIC* #113 MA/P Hh (07) 02, 4-sided bar with linear text, with two sides showing ruled lines of text

Figure 6.3 *CHIC* #031 KN He (01) 02 (left) and #076 MA/M He (01) 05 (right), medallions showing complex orientations/arrangements of signs

alignment and orientation (e.g. Figure 6.3). Others feature curving lines of text, which are undoubtedly intended to be read in a line despite the way they accommodate the shape of the writing surface. Where quite a long sequence of signs is required, the writer sometimes leaves space in the middle of the medallion and writes the line of text around the outside – presumably to preserve its linearity, since the signs are obviously intended to be read in order from the beginning to the end of

Figure 6.4 *CHIC* #039 KN He (04) 06, medallion inscribed on both sides showing linear writing curved around the outside of the round writing surface

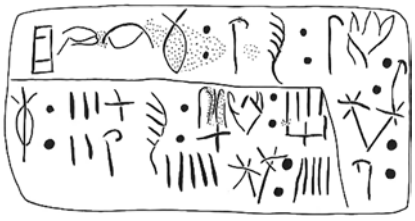

Figure 6.5 *CHIC* #122 PH Hi 01, showing mixed orientation of lines of text

the sequence (e.g. Figure 6.4). Despite the curvature of the line of text on such a medallion, this linearity is a property closely shared with the rectangular-surfaced clay documents, and it seems quite likely that there was some influence from one type of document to another. Wherever the move towards linear writing originates, multiple document types appear to have been affected by this trend in writing.

The use of clay documents, and the developments in fitting sequences of writing onto a range of different surface shapes, clearly affects the ways in which those sequences are laid out in order to be read. Nevertheless, we still have to see the genesis of some of these practices as already present in seal usage, just as sealing and writing clearly continue alongside each other in administrative practice throughout MM IIB–III. The use of the X mark to indicate the beginning of a sequence, for example, is found in and perhaps originates in the seals, but its use is carried over into writing on clay documents, even sometimes in circumstances where it is less obviously needed. The original tension between laying out the signs in an arrangement that matches the shape of the inscribed surface (in some cases probably with a further aesthetic element), and making it clear in what order the signs should be read, seems to have been a long-standing concern. The existence of more 'columnar' arrangements on seals with rectangular surfaces might also help to explain why a tablet such as PH Hi 01 can split up its lines of text such that the first line effectively seems to spill over into a column (Figure 6.5).

Ironically, it was the existence of Cretan Hieroglyphic writing in documents with more obvious linear arrangement of text that had convinced more sceptical scholars of the existence and independence of this writing system in the first place, although this went hand in hand with the unfortunate relegation of sequences on seals to a status of something less than 'real writing'. This has quite rightly led to a backlash from scholars arguing for the interpretation of signs and sign sequences on seals as being meaningful and constituting examples of writing.[28] However, this does not necessarily mean that writing on seals and writing in clay documents work in exactly the same way: a pressing case can be made for at least some signs in seals to function logographically or iconically,[29] while for the clay documents we can demonstrate more clearly that the majority of signs are syllabic in nature, functioning also alongside logograms and numerals. If it is correct to see a progression of phonetisation of the signs in the development of Cretan Hieroglyphic, then it is also important to observe the degree to which this process seems to go hand in hand with the progressive linearity of text in the longer inscriptions. Linear A could very well be seen as a system whose origins – however closely related or not to the development of Cretan Hieroglyphic – include just such processes of progressive phonetisation and linearity.

Writing on clay documents is also marked by the use of logograms, numerals and fraction signs, whose presence in administrative contexts is easy to interpret and shows considerable similarities with administrative practice in Linear A and B, except for the use of some different signs associated with counting and measuring. Cretan Hieroglyphic numerals are somewhat different from those of Linear A and B (though still apparently done on a decimal basis), with upright lines for single units but dots for tens (made by sinking the stylus into the clay in the same way as the round 'strokes' incorporated into some signs) and lozenge shapes for thousands. The so-called 'klasmatograms' in Cretan Hieroglyphic, i.e. a set of signs used probably as fractions for measuring both dry and liquid amounts, are shared with Linear A and are presumably used in a similar way, though the number of attestations is too small to analyse effectively.[30] Some of these fraction signs are in fact also found among the seal inscriptions, though it has been argued that they should not be understood as fraction signs in this context but rather as syllabic signs.[31] The layout of information in the clay documents

[28] For critical discussions see e.g. Younger 1996–7 [1998]; Karnava 2000; Jasink 2009; Decorte 2017.
[29] See Civitillo 2016a: 200–1, as well as Meissner and Salgarella, this volume.
[30] See Karnava 2001; Montecchi 2017. [31] Jasink 2005.

(mostly the 4-sided bars and the tablets) looks very similar to what we find in Linear A, with sequences of syllabic signs sometimes followed by a logographic sign and then a fraction sign and/or numeral.

We should finally note that the concept of the logogram (or ideogram) could well have two different, although perhaps overlapping, existences within the Cretan Hieroglyphic corpus. In the seals, as we have already observed, it is very difficult to establish sequences of signs that should be read syllabically, and we may very well guess that many signs are, rather, sematographic: i.e. that they convey meaning but are not necessarily intended to be read phonetically. We assume that writing on the clay documents is different, and that syllabic-looking sequences are just that. So, many signs in seals may well be logographic/ideographic in the sense that the reader is intended to access the meaning as a whole word/concept, and it is clear that they co-exist in meaningful configurations that also have a degree of variation. Logographic signs in the clay documents, on the other hand, are most obvious when they are followed by a numeral or fraction sign, where they evidently function in a similar way to logograms in Linear A and B: while syllabic sequences spell out words phonetically, the logograms aid the accounting process by visually symbolising the commodity in question so that it can be measured or counted. There are apparent logograms that appear without concomitant fraction signs or numerals, but in these cases it is more difficult to demonstrate that they are acting as logograms (especially in cases where we might suspect the sign also has a syllabic value, such as the fig tree sign classified as sign *024* as a syllabogram and **155* as a logogram, with parallels in Linear A and B).

6.4 Looking for Morphology

Although we have no linguistic means of identifying the meaning of Cretan Hieroglyphic words or phrases, some progress can be made through studying highly repetitive attested sequences in the seals (most of which are usually identified as 'formulae', a few of which can also be found in the clay documents) and looking closely at their contextual associations (Civitillo, this volume). Any attempt to classify or describe the language(s) underlying Cretan Hieroglyphic writing is, however, far more difficult (also Davis, this volume). One possible way forward is to try to identify possible linguistic features in the sequences attested on surviving documents. However, in a relatively poorly attested writing system, especially one with the issues seen in Cretan Hieroglyphic with regard to the difficulties of establishing the full repertoire of signs,

this is a highly problematic task. The issues are somewhat similar to those of identifying language features in the related Cypro-Minoan writing system, whose repertoire remains difficult to establish with certainty and whose inscriptions are small in number (ca. 250) and mostly very short.[32]

One important and well-established method is to compare sequences of signs that share most of the signs but differ in one or two, which could help us to identify morphological features such as prefixes, infixes or suffixes – beginning with an open mind as to how such features might work, given that we have no knowledge and no obvious starting assumptions we can make concerning the typology of language(s) that may be represented in the corpus. Indeed, Alice Kober's investigations into Linear B sequence patterns employed exactly such a methodology and paved the way for the identification of sign values and morphological features represented in that writing system, which of course turned out to be recognisably Greek. The fact that Linear B happened to represent a well-understood language was highly serendipitous, and it is unfortunately highly unlikely that Cretan Hieroglyphic shares such an advantage.

To avoid chance similarities when using this method to identify possible morphological features, longer sequences are preferred (i.e. three shared signs rather than one or two); unfortunately, however, the corpus preserves only one pair of sequences that share three signs: 049-041-006-025 in #316 and 049-041-006-057 in #327, both on clay vessels; however, the final sign in the second vase is uncertain as it is mostly missing with just traces of the top and bottom surviving). It is difficult to be certain that sequences sharing only two signs and differing in the addition or lack of a third, are actually cognate in the first place. Consider the sets of sequences in which 031 can appear as a final sign, according to the 'word' lists in *CHIC*:

036-092 (in #109, #131, #229, #263, #265, #267, #288, #299)
036-092-031 (in #254, #257, #258, #262, #272, #308, #309, #312, #314)

038-010 (in #181, #212, #214, #228, #249, #253, #258, #260, #265, #268, #275, #286, #288, #311)
038-010-031 (in #162, #169, #195, #218, #242, #248, #250, #254, #257, #261, #262, #263, #269, #272, #274, #279, #284, #293, #298, #299, #300, #302, #309, #312, #314)

042-019 (in #134, #135, #136, #137, #201)
042-019-031 (in #301)

[32] See Steele 2013: 66–71.

047-070 (in #286)
047-070-031 (in #058)

076-013 (in #312)
076-013-031 (in #304)

The temptation would certainly be to isolate a suffix of some sort in -031, and to assume that its appearance or absence is linguistically motivated, perhaps representing some sort of optional morphological suffix – although there would then be numerous possibilities as to how to interpret its significance, for example as inflectional or agglutinative suffixing. The number of different sequences apparently sharing this pattern could be seen to lend weight to such an argument. However, there remains a possibility that this is not a morphological pattern at all. Consider, for comparison, how easy it would be in English to assume that a final -e was a morphological suffix if we knew nothing about the language structure – and yet we can easily think up numerous pairs of sequences in which the presence or absence of a final -e is not morphologically motivated at all:

mat
mate
hat
hate
dam
dame
bar
bare
cut
cute

But this is not the only problem with interpreting -031 as some sort of possible suffix. Most of the inscriptions in which the sequences listed above are found are seals (with 047-070-031 in #058 being the only exception). In order to preserve frequently repeated combinations in its lists of sign groups, *CHIC* often reorders the signs found in seals or interprets them as a simple linear sequence despite questionable orientation, and even misses out repetitions of signs or extra signs dismissed as decorative motifs. Even a cursory glance at pictures of the inscriptions shows that the orientation of the signs can vary, and even more strikingly that the sign -031 can be positioned in questionable alignment with respect to the other signs, or indeed in the middle of the other two signs (#254, #272)! Given that the signs on seals are very

difficult to interpret as syllabic sequences, as already noted above, not to mention the difficulties with understanding the 'order' of signs in many examples, we simply cannot view -031 as a Cretan Hieroglyphic suffix with any kind of linguistic value.

In the absence of repeated sequences that can be studied for variations, sign frequency in a particular position could also be called on as a way of identifying morphological features, but again we should beware. Looking again to Cyprus for comparison, we may see some hope for such a method, as the very high frequency of sign -023 (the one certainly representing the syllable *ti* as in related systems) in final position is almost certainly morphologically significant: this is a feature observable also in the later and very probably related 'Eteocypriot' language, where we have longer sequences (including Greek names with Eteocypriot endings) available for study.[33]

On the other hand, sign frequency in word-initial position could be indicative of sound value rather than any morphological feature. For example, sign 042 (the double axe) appears almost exclusively at the beginning of words, again as listed in *CHIC*'s list of sign groups (some of which are drawn from seals, but a good number are from the clay documents). However, this is surely not for any morphological reason (such as a prefix). Rather, the explanation has to be sought in the typology of the system, which is usually assumed to encode open syllables in the same way that can be demonstrated for Linear A and Linear B: in this type of system, a sign that has high frequency in word-initial position but low frequency elsewhere is very likely to be a vowel-only sign (V) rather than a consonant-plus-vowel sign (CV), because in mid-sequence the vowel would not need to be written with a separate sign. Sure enough, the sign derived from the double axe shape represents the vowel *a* as in all other related systems, and this is one example where we can be quite certain of a Cretan Hieroglyphic sign's value.

So, a note of caution is important when looking for morphological features in any linguistic sense, and in the absence of long inscriptions, and especially of repeated sequences long enough to establish significant kinds of variation, we are currently unable to identify morphologically significant sequences. The Cretan Hieroglyphic corpus unfortunately gives us very little to go on when looking for linguistic features, but the most important point to be made is that an examination of the inscriptions themselves and their 'syntax' or layout is crucial in trying to make sense of the way they make meaning. The division of the corpus between seals on the one hand and clay documents on the other

[33] Valério 2016: 397–401; Steele 2018: 104–6.

(with just a small number of inscribed clay and stone vessels beyond this) makes it challenging to present any comprehensive overview of the ways in which signs are meaningfully combined, and it is probably right to see the seals and the clay documents as forming meaningful arrangements of signs in different – if related – ways to each other. This should be viewed against a background of developing administrative practices where seals and clay documents have different functions and are used in different ways but nevertheless in synergy.