

CRETAN HIEROGLYPHIC SEALS AND SCRIPT: A VIEW FROM THE EAST

SILVIA FERRARA · JUDITH WEINGARTEN

ABSTRACT · The focus of this paper is to present a new methodology that examines Cretan Hieroglyphic seals from both epigraphic and glyptic standpoints to be understood as parts of an integrated and multimodal system of communication. As our premise, we consider the newly published material from Myrtos-Pyrgos (Ferrara, Weingarten, Cadogan, 2016), and then compare and contrast local trends impacting the presence and use of inscribed seals from reasonably well provenanced Middle Minoan contexts in the East of the island. The goals are: 1) to throw light on the cultural significance of the administrative and symbolic functions played by Hieroglyphic seals and seal impressions; and 2) to gain a synoptic appreciation of the emergence and use of this relatively short-lived writing system.

KEYWORDS · Cretan Hieroglyphic, Linear A, Sealstones, Sealings, Administrative Practices, Wool, Cloth.

A FORMULAIC SCRIPT?

THE first evidence of writing to appear on the island of Crete is the so-called Arkhanes ‘formula’, which represented a self-standing inscription on a number of seals. We cannot call it a proper writing system or script and it is still uncertain if it appeared in the latest Prepalatial period or contemporary with the foundation of the first palace at Knossos (Sakellarakis and Sapouna-Sakellarakis 1997; Macdonald 2007, 137; discussion in Decorte 2018, 364). Perhaps it was on an unverifiable archaeological cusp, a leading indicator of the palatial future. Our material is extremely scanty, because the evidence for this ‘writing’ is entirely limited to seals (usually made of bone or steatite), for there are no extant inscriptions on clay from this time.

The evidence is extraordinarily repetitive, in that the seals repeat the same five signs conventionally transcribed as A-SA SA-RA-NE, which most scholars see as the Hieroglyphic predecessor of the so-called ‘libation formula’ of later Linear A (Godart 1999).¹ Some of these seals also depict animals, humans, and geometric designs. On a fourteen-sided seal, for example, the leg, hand, and sistrum signs are also engraved, which will end up in the developed Hieroglyphic script of the later Protopalatial period (Weingarten forthcoming).²

At the end of MM IIB, or in some places possibly a little later, we find relatively rich deposits of clay documents written in Cretan Hieroglyphic as well as Hieroglyphic seal impressions at Malia Quartier Mu, the Hieroglyphic Deposit at Knossos, and, more recently, at Petras in the East. Sealstones engraved with Hieroglyphic signs are found scattered throughout eastern Crete, with occasional outliers elsewhere. There are three main seal shapes, the Petschaft – a stamp seal with a handle, usually engraved on its flat base (FIG. 1a and FIG. 1b), the three-sided prism, and the four-sided prism. The Petschaft is really the best designed of the three for making seal impressions, especially on clay, because it is easy to hold by its handle, to stamp with, and lift out cleanly (Ferrara, Jasink 2017). It does seem designed, in fact, for a career of palatial administration.

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¹ KARNAVA (2016, 352) argues that the inscription appears to be two separate words, A-SA and SA-RA-NE, and not the single word that appears in Linear A; and she notes (346, n. 5) the distinction between the last sign in the two scripts: ME (AB 13) vs possibly NE. A-SA might itself be divisible, given that an A-like sign appears stamped on one side of a nodulus with SA on the other (Knossos Southeast Pillar Room): WEINGARTEN 1994, 178, n. 25, and table 2, Td = CMS II.8 54, 51.

² Another early hand-sign appears on a Hieroglyphic seal impression securely dated to MM IIA, from a workshop just outside the palace at Knossos (WEINGARTEN 2007, 137-138, fig. 4.6, 67). Stamped by a seal made of ivory or bone, it shows a very naturalistic hand with an attached ivy-shaped sign, a sign which does not recur in the later script but known from later iconography.






FIG. 1a. Silver Petschaft (CMS VI 126, CHIC #192), 'from East Crete'.



FIG. 1b. Green jasper Petschaft (CMS II.2 282), from 'Piskokephalo'. Photographs courtesy of CMS.

With that as a very brief background, what can we say about the script itself? Reading and interpreting Cretan Hieroglyphics is obviously problematic, a difficulty faced across the board in all early writing systems – whether Egyptian, cuneiform, Chinese, Mayan, or probably any other. But the Cretan situation is particularly complicated because of the difficulty of distinguishing between signs for words (logograms) and signs for sounds (phonograms). This is especially valid when we try to 'read' the seals. In fact, the signs engraved specifically on the seals have not been considered to be true writing (Olivier 1986, 1989, 1990). The claim is that true writing was recorded only on administrative documents, such as those incised on clay bars, medallions, etc. The symbols on the seals were demoted to what was called 'ornamental writing'. That distinction was based on two main points: first, several sign sequences were found only on seals and not ever on the archival clay documents; and second, many such sequences were so often repeated in the seal corpus that they came to be defined as 'formulas'.

This is where the problems begin. The catalogue of Cretan Hieroglyphic inscriptions published in 1996, *Corpus Hieroglyphicarum Inscriptionum Cretae*, popularly known as CHIC (Olivier, Godart 1996), chose to disregard all the signs that disrupt the harmony of the formulas, dismissing them as 'insignificant', and omitting them in the transcriptions, or placing them within parentheses, another way of saying 'Dubious. Do not read this'. For example, one of the most frequent of formulas is the combination of two signs, one shaped like a human eye sign 005 , and the other seemingly an instrument or tool, conventionally called a trowel, sign 044 . As becomes apparent from even a cursory look at the catalogue of inscriptions, other symbols are added on some seals, such as a double axe, or the head of an animal, spirals, scrolls and the like (FIG. 2a and FIG. 2b). These signs allegedly operate according to no rules and pirouette about, changing their positions and order – in ways which, for the authors of CHIC, are not phonetic. The combina-

tion of ‘trowel’ and ‘eye’  is just one example, but such omissions are applied throughout the corpus, with signs that should be recognized in the repertory being systematically struck out.

READING HIEROGLYPHIC SEALS: FIRST STEPS

A counter-reaction has set in. In 2009, Anna Margherita Jasink published *Cretan Hieroglyphic Seals: A New Classification of Symbols and Ornamental/filling Motifs*. This rehabilitated a number of signs and symbols that had not been included in *CHIC*. In reviewing this corpus, she partially harked back to the first edition of the repertory of signs, by following Arthur Evans who had originally included many of these signs in his *Scripta Minoa* – such as the full-bodied cat or cat mask, and various other animals and designs. Her approach stimulated a number of younger scholars to reopen this and many of the other questions pertaining to the nature of the Hieroglyphic script, especially as it appears on sealstones. Discussion also revived about the occurrences of single signs on seals (Ferrara, Cristiani 2016). Such isolated signs go back, as we have seen, to the bone seals of the Arkhanes script. Oddly enough, many of these same signs *are* recognized as part of the Cretan Hieroglyphic script, but only when they are not isolated. When they stand alone, they fall outside the conventional definition of an inscription (which is ‘at least two consecutive signs aligned together in coherent succession’) – and therefore were, arguably unjustly, banished from *CHIC*.

Indeed, when we look at them closely, we notice features that point to the images possibly representing some form of grammatical notation. The small crosses scattered on the faces of some of the seals are defined by the *CHIC* authors as stiktograms (or punctuation marks), normally understood to indicate reading direction. Incidentally, the same function is said to apply when stiktograms appear on clay documents. It must be noted at the outset that this cross is also engraved on seals which carry just one symbol (FIG. 3a and FIG. 3b). If this is the case, how can it possibly indicate the reading direction? Arguably, a single sign has no direction to be read. In such cases it must have a different purpose. Moreover, a different explanation is needed when the cross stiktogram, as it happens several times on single-sign seals as much as on proper Hieroglyphic sequences, is doubled or even tripled.

We contend that the explanation must lie on the fluid boundaries between icons and images, and that the cross may be the distinguishing feature, a deictic marker that points out the difference between the two realms, namely art and language. The question is admittedly broader for all early writing that is iconic and call for a set of parameters to guide interpretation: when does an image become a sign? (Ferrara, Cristiani 2016, Civitillo 2016, 133-144; Weingarten 1989, 36 and n. 30). For Cretan Hieroglyphic, we believe the answer is rather simple, if not unproblematic, when it comes to the specific meaning conveyed. We suggest, with a certain degree of confidence, that the Minoans applied a conventional cross to distinguish what is iconic and what is writing *stricto sensu* – to underline and literally mark the symbol as not just an ornamental picture but a proper sign carrying a specific sound. In other words, the stiktogram can indicate on seals not the direction of reading but the way that the symbols are to be understood. If this is the right explanation



FIG. 2a. ‘Trowel-eye’ sign combination (signs 044-005): Side 1 of green jasper 4-sided prism from Myrtos-Pyrgos (MP/75/3; HM Σ 2595; CHIC #309).



FIG. 2b. Green jasper prism from Lastros (CMS IV 136c, CHIC #305). Modern impressions. Photographs courtesy of CMS.



FIG. 3a. Seal impression from Eastern Temple Repository, Knossos (CMS II.8 38).



FIG. 3b. Green jasper Petschaft (CMS VII 34). Drawings courtesy of CMS.

of these single-sign seals, we clearly need to develop a new methodology for understanding the intention of such script on seals.

TINKERING WITH HIEROGLYPHIC SIGNS

One vital approach entails much closer attention to detail, as forcefully suggested by Decorte (2017), and to consider every single element that is engraved on the seal face; not disregarding or dismissing any mark that meets the eye. We would further argue that Minoan engravers made every single mark on the seal for some reason and that this reason




might be to record what are, until now, unappreciated but specific linguistic features. We believe that we can now detect patterns that help to elicit meanings and phonological realisations. These patterns will be critical in potentially reading the script in its entirety. Needless to say, this does not immediately offer the instruments to ‘decipher’ the script itself, which would imply a total and incontrovertible reconstruction of the linguistic nature of the script, but to come to terms with applying phonetic values to its signs (basically, reading it) and detect – to a certain extent – grammatical features. Although fraught with problems, patterns do emerge. And, we believe, it is our job to try to understand such patterns rather than neglect or understate them. With this in mind, we had another look at some of the common formulas.

Beginning again with the ‘trowel’ and ‘eye’, now viewed through a more comprehensive filter, we note that the cross stiktogram ✕ is at times repeated, and that other ornaments, such as small dots, intersperse the signs, accentuating some as if singling them out. The effect is often one of separation of elements, rather than of unity. The ‘trowel’ sign 044 🪓 appears particularly emphasised, as if it were an entity on its own, and not meant as the initial sign in a two-sign text. A good example of how this appears to work is from Myrtos-Pyrgos, on a jasper prism (FIG. 2a). On it, the trowel and the eye are not only divided by a cat sign, but the trowel is ‘cartouched’ by S-spirals, while the eye is encapsulated by fillers (Ferrara, Weingarten, Cadogan 2016). All these extra elements seem to accentuate the separation of the signs. If this is indeed the purpose of the S-spirals and ‘fillers’, it is effective whether or not the cat has a phonetic meaning in itself. We consider such clusters of functional additions as visual ‘tinkering’.

On seals with the ‘trowel’ and ‘eye’ combination (signs 044 🪓 and 005 🪓), such tinkering is really very common, so much so that ‘trowel’ and ‘eye’ are never laid out plainly on the seal face. From this viewpoint, we never actually have a straightforward formula on seals. This phenomenon needs a close explanation. According to figures originally published in Ferrara and Cristiani 2016, and here reported again (TABLES 1 and 2), there are a number of decorative or supplementary elements either in initial position (10 instances), in in-between position (3 instances), in final position (7 instances); several times one of the two signs is either rotated or cartouched, or is marked by the cross stiktogram. So we never actually have an unmolested ‘trowel-eye’ sequence on seals.

TABLE 1. Supposed ‘formula’ with signs 044 and 005 🪓 - 🪓.

‘Formula’ 044-005 🪓 - 🪓	
Aligned ‘linear formula’	---
Decorative or Supplementary Elements in <i>initial</i> position	CHIC #147, #246, #247, #250, #253, #261, #264, #266, #268, #288
Decorative or Supplementary Elements in <i>in-between</i> position	CHIC #140, #158, #309

‘Formula’ 044-005 	
Decorative or Supplementary Elements in <i>final</i> position	CHIC #138, #145, #165, #295, #297, #301, #308
Sign 044  rotated or ‘cartouched’	CHIC #144, #165, #174, #194, #254, #261, #263, #274, #287, #299, #305, #308, #309, #311
Stiktogram 	CHIC #138, #158, #247, #283, #295, #301, #309




Very similar tinkering happens to the combination of ‘trowel’ and ‘arrow’ (signs 044  and 049 ), the most common ‘formula’ on Hieroglyphic seals (FIGS. 4a and b). Something almost always sets the signs apart: a sign or stiktogram may be placed between the ‘trowel’ and the ‘arrow’, or a sign is rotated, or ‘cartouched’ between ornamental fillers, in similar fashion to the other ‘trowel-eye’ combination. In fact, just *three* seals have the signs in supposedly readable, linearly aligned form (Ferrara and Cristiani 2016, TABLE 2), and one of these three instances is uncertain. All the others are tinkered!

TABLE 2. Supposed ‘formula’ with signs 044-049 .




‘Formula’ 044-049 	
Aligned ‘linear formula’	#210, #233, #297?
Decorative or Supplementary Elements in <i>initial</i> position	CHIC #157, #161, #188, #208, #209, #217, #230, #237, #240, #244, #249, #253, #258, #260, #264, #266 (x2), #274, #285
Decorative or Supplementary Elements in <i>in-between</i> position	CHIC #261, #266, #270?, #300, #301, #314
Decorative or Supplementary Elements in <i>final</i> position	CHIC #207, #215, #278, #293, #295
Sign 044  rotated or ‘cartouched’	CHIC #150, #159, #170, #213, #216, #220, #221, #223, #224, #225, #231, #247, #277, #278, #284, #287, #290, #293, #296, #299, #301, #303, #305, #311
Stiktogram 	CHIC #207, #211, #219, #235, #258, #274, #283, #301



FIG. 4a. Agate 4-sided prism (CMS XII 106a, CHIC #301).



FIG. 4b. Chalcedony 4-sided prism (CMS XII 111b, CHIC #278). Modern moulds. Photographs courtesy of CMS.

In short, the Minoan engravers almost always tinkered with the ‘trowel’, either by adding an iconographic symbol that might look to us like decoration – whether at the beginning, or in between, or following the two signs of the supposed sequence; or they rotated the ‘trowel’ by 90

degrees; or they wrapped it up in a swirl of decorative dots, grids, little stars or mini-spirals, that seem to separate it from the ‘eye’ sign 005 (☼) or ‘arrow’ sign 049 (↑); at a pinch, they added a cross stiktoqram, which might be duplicated or triplicated. Surely, something is telling us to look at the ‘trowel’ sign in a more systematic way, to capture – rather than dismiss – the richness of the glyptic message. In almost all cases, what we actually see is that the ‘trowel’ is formally emphasised, if not virtually isolated. There is, in other words, a deliberate attempt to make it stand out, as a singular feature. And despite the ‘trowel’ being so frequently found on seals, it is always accompanied by *only* one of two other signs, either the ‘eye’ or the ‘arrow’; nothing else.

In all likelihood, ‘trowel’-‘eye’ and ‘trowel’-‘arrow’ should not be classed as formulas (pace Olivier 1986, 1989, 1990; Godart 1999; Poursat 2000; Anastasiadou 2016). Rather, the sequences that depend on the ‘trowel’ sign (with either the ‘eye’ sign or the ‘arrow’ sign) ought to be decoupled and deconstructed. If we are correct, that means that we are probably confronting logographic writing, not syllables.



There are half a dozen more such ‘formulas’ (TABLE 3). The next step was to extend holistic analysis to all such sequences on seals to determine if formulaic readings could be justified. The third most common combination is the famous ‘gate’ 038 \mathbb{H} and ‘leg’ 010 \mathcal{L} , usually – but not always – followed by a ‘three-branched plant’ 031 Ψ . Arthur Evans interpreted this formula as a mark of princely status, with ‘leg’ representing a leader, and the ‘gate’ the sign of a guardian. Rather more soberly, the analysis showed that the ‘gate’ and ‘leg’ 038-010 $\mathbb{H}\mathcal{L}$ formula normally behaved in a linear manner; that is, as a sequence of signs to be read consecutively, rather than as single signs meant to be isolated from each other. Compared to the graphic disarray of ‘trowel’-‘eye’ and ‘trowel’-‘arrow’ combinations, the ‘gate-leg-[plant]’ 038-010-031 $\mathbb{H}\mathcal{L}\Psi$ juxtaposition looks quite literally straightforward. This points to the sequence resembling more of a ‘formula’, but see below for a more nuanced perspective.

TABLE 3. The ‘gate-leg-[plant]’ 038-010-031 $\mathbb{H}\mathcal{L}\Psi$ sequence and its configurations on the seals.

‘Formula’ with signs 038-010 $\mathbb{H}\mathcal{L}$ and 038-010-031 $\mathbb{H}\mathcal{L}\Psi$	
Aligned ‘linear formula’	CHIC #162, #169, #195, #242, #248, #250, #254, #258, #261, #262, #263, #264, #269, #270, #274, #279, #284, #293, #299, #300, #302, #312, #314
Decorative or Supplementary Elements in <i>initial</i> position	CHIC #288
Decorative or Supplementary Elements in <i>in-between</i> position	Petrus TSK05/259c
Decorative or Supplementary Elements in <i>final</i> position	CHIC #275
Any Sign Rotated or ‘Cartouched’	CHIC #309, #257
Stiktoqram \times	CHIC ##265, #271, #272, #298










On the prism from Myrto-Pyrgos (FIG. 2a) with the ‘trowel’ and ‘eye’ signs 044-005 $\uparrow\text{☼}$, discussed above, a second seal face shows ‘gate-leg-[plant]’ 038-010-[031] $\mathbb{H}\mathcal{L}\Psi$ juxtaposition, a combination we have chosen to call for expediency ‘the gate formula’. A third face depicts yet another ‘formula’, with signs that Evans called ‘template’ (sign 036 \mathbb{A}) and ‘pronged instrument’ (sign 092 ☿) (Evans 1909), which usually, but not always, ends with the same three-branched plant (sign 031 Ψ). We have called this ‘formula’ 036-092-[031] $\mathbb{A}\text{☿}\Psi$, again for expediency, the ‘template formula’, the fourth most common combination. Obviously, on this prism, the ‘gate’ and ‘template’ sequences do not appear as dry signs by themselves on seal faces, but are engraved within a rich and meaningful visual context (discussed in detail in Ferrara, Weingarten, Cadogan 2016).

STATISTICAL COMBINATIONS: NETWORK ANALYSIS OF THE SEQUENCES

But this is not all. We have worked on the statistics in which these two sequences appear in terms of provenance and other details (seal shape, seal material, and combinations of sequences) and clear patterns emerge. It is noteworthy that both share the moveable ‘ending’ sign 031 , which may function as a suffixal entity of sorts, but this should be taken with caution, because we cannot be certain that these ‘formulas’ are to be read as sequences or proper ‘words’. To say this in a different way, the signs could be read as logograms, just like the ‘trowel’ sign with the eye sign, or the arrow sign. For instance, the occurrence of sign 031  on face d of seal *CHIC* #301 appears completely isolated and ‘cartouched’ in fillers, thus to be read as a logogram.

Be that as it may, while the ‘template formula’ appears frequently on seals from eastern Crete (when provenance is known), curiously, it never shows up at Knossos. Perhaps its absence there is pure coincidence but it is also possible that this sequence has a regional function. What might that function be? Notably, of sixteen seals with the ‘template formula’, no fewer than thirteen also depict the ‘gate formula’.³ In other words, the great majority of seals with the ‘template formula’ work together, in some sense, with the ‘gate formula’. The opposite, however, is not true. The ‘gate formula’ frequently appears on its own without an accompanying ‘template formula’. So, it seems reasonable to hypothesize that the function of the ‘template’ sequence all but requires the additional presence of the ‘gate’ sequence.⁴ Whatever official position or rank the ‘template formula’ represents, the simultaneous presence of the ‘gate formula’ is usually necessary for whatever it is doing (or authorized to do); but not the other way round. We can surmise that the two sequences often work in combination and that they create a hierarchy of functions together with the sequences that bear the ‘trowel’ signs.

In general, we can conclude the following:

1. All the sequences with the so-called ‘trowel’ sign 044  (be it accompanied by sign 005  or sign 049 ) are not to be considered formulas, but ought to be decoupled and treated as logograms.
2. There is a regional flavour to the sequences with the ‘gate formula’ (‘gate-leg-[plant]’ 038-010-[031] ) and the ‘template formula’ (‘template-pronged instrument-[plant]’ 036-092-[031] ), which appear in frequent association in eastern Crete.
3. Instead, the ‘trowel’ sign 044  seems a pan-Cretan way of stamping transactions. Ferrara and Cristiani (2016) suggest it may refer to the most common shape of seal, the *Petschaft*, by synecdoche with the act of stamping *par excellence*.
4. The ‘trowel’ sign 044  indicates an area of administration or possibly an act of administration of the basic kind. This may be the first step of reporting. It most commonly appears together with the ‘eye’ sign 005  or the ‘arrow’ sign 049 , occasionally even with both ‘combinations’ on different faces of the same seal,⁵ which suggests that the same seal-owner could oversee both tasks at different times. The other sequences, which work in clear conjunction, may be more region-specific, but this would need further evidence.

The next step is to study in more detail the variations within sequences and other combinations to see how they work in terms of their semantic status, in terms of seal types (whether *Petschafte*, three- or four-sided prisms, hard or soft stones), and other factors that might be part of the interplay of Cretan Hieroglyphic glyptic. For example, a recent study investigated the 26 *Petschaft* type seals (loop signet, aka *Griffösesiegel*), inscribed with a sign or signs of the Cretan

³ For example, the two ‘formulas’ appear together on a jasper seal from Petras, Tomb 2 (KRZYSZKOWSKA 2012, inv. P.TSK05/259b,c), on which the interpolation of signs, usually called ‘fillers’, gives the seal a visual structure very much like that of the full ‘template formula’ on the Myrtos-Pyrgos prism – yet the two seals are stylistically diverse.




⁴ The three instances in which the ‘template’ stands on its own are attested at Malia (*CHIC* #229), Palaikastro (*CHIC* #308), and Kythera (*CHIC* #267).





⁵ Only once together (*CHIC* #283) on the same face and once in presumably abbreviated form ‘arrow-trowel-eye’ on the same face (*CHIC* #135c).


Hieroglyphic script (Ferrara and Jasink 2017, see esp. Table 1).⁶ Remarkably, nine of the Petschafte depict a cat or cat mask (FIG. 1b), meaning that a cat sign appears on 36% of all Petschafte with Hieroglyphic sign(s).⁷ This is not likely to be due to chance since the comparable figures for cats or cat-masks on 3- and 4-sided prisms with Hieroglyphic signs are significantly lower: 6% of 3-sided prisms (4 examples) and 14% of 4-sided prisms (8 examples). We believe that this overweighting of felines is meaningful.

A PRIDE OF CATS

Yet, the cat sign on the seals was mysteriously expunged from the repertory of signs in the *CHIC* catalogue. Not only should it now be reinstated in its own right, but it happens to give us an avenue into explaining what category it may represent. We can be certain that this sign on the seals is a phonogram which has a long life throughout the Aegean tradition of scripts, ending up as our deciphered AB 80 sign for the syllable /ma/, where it is also used as the logogram for 'wool' sign AB 80 (FIG. 5) – having been transmitted from Hieroglyphics through Linear A (Younger 197; Civitillo 2007, 636-637; Steele 2017, 166; Weingarten 2017, 106).⁸ Its genealogy can be reconstructed diachronically, and phonologically. There is every reason to believe that /ma/, by a precise onomatopoeic strategy, was exactly what a Minoan cat would sound like.

But we can take this further. We contend that Petschafte – that most perfect Minoan bureaucratic tool – engraved with a cat or cat mask may well stand for an office that deals with wool or woollen products. Given the subsequent involvement of palaces and villas with sheep, wool, and textiles, this seems a reasonable hypothesis. As a consequence, our next step was to look at the Petschafte with Hieroglyphic sign(s) which did *not* depict either a cat or cat mask. Three depict another single sign, the dog's head with lolling tongue, sign 018 , again marked by the stiktogram  (FIG. 3a), and a sign that, when isolated, was banished from *CHIC*. Therefore, by analogy with the cat or cat mask sign, we might expect that the isolated dog's head on Petschafte could also be a phonogram/logogram, most likely representing another administrative department or product group.⁹ The same may be argued for two Petschafte depicting an isolated bucranium [CMS VI 132 and CMS VII 34 (FIG. 3b)], the latter with a stiktogram  on either side of its horns), in which case one could expect that these seal-owners would be concerned with a commodity whose specific name may be represented by the bovine possibly through acrophony or onomatopoeia (CH 012:AB 23 – /mu/?), just as 'wool' /ma/ is represented by the cat sign).¹⁰

The remaining eleven Petschafte are engraved with undisputed Hieroglyphic signs (Jasink 2017), and two of which, in whole or in part, have known sequences ('formulas'): CMS III 103 (*CHIC* #180) 'trowel-arrow' with the addition of other signs (sequence 044-049-050-056) and CMS VII 255 (*CHIC* #181) with the 'gate-leg' signs 038-010 . ¹¹ Strikingly, seven of the seals could be differently interpreted, with one sign as an iconic sign combined with two or three clear linear signs (FIG. 6): twice each the 'ship' sign 040  and 'goat's head' sign 016 , and thrice the 'frontal bucranium' sign 011 .

⁶ Including single or isolated signs that belong to the Hieroglyphic repertory, thus not adhering to the conventional definition of 'script', as given above. In future analyses, we would be inclined to add two seal impressions from Knossos, very likely stamped by Petschafte: CMS II.8 37 (Hieroglyphic Deposit) and II.8 38 (Eastern Temple Repository), each depicting a solitary dog with lolling tongue, the latter marked with the stiktogram  (FIG. 3a).

⁷ Excluding CMS II.2 24, probably not a cat mask, the nine are: CMS I 423, II.2 3, II.2 282, III 104, VI 131, VI 138, VIII 34, X 280, XII 100.

⁸ The syllable /ma/ may have rendered acrophonically the full sequence ma-ru (AB 80 + AB 26) which could plausibly refer to *μαλλός* the later Greek word for 'wool', whose etymology, according to Chantraine's etymological dictionary is unknown. See also PETRAKIS (2012), 82-83.

⁹ CMS VIII 103, CMS VI 127, both of hard stone, and TUOS06/104, a chlorite Petschaft from Petras (Krzyszowska 2012, 146-147). Above the dog's head on the first two is a spiral, and on the third a circle with outgoing elements (Jasink 2009, 23-26; see CMS VI 92a), with possibly sign 016 behind the head. Cf.: Knossos sealing probably stamped by a Petschaft (FIG. 3a).

¹⁰ Cf. <http://people.ku.edu/~jyounger/LinearA/>

¹¹ Two Cretan Hieroglyphic Petschafte, CMS VI 125 from Kalo Horio (*CHIC* #186: sequence x 028-061-049-047) and CMS XII 102 (*CHIC* #184: sequence x 044-013-070; but the damaged 013 is dubious), have unexceptional signs but no known 'formulas'.



FIG. 5. Linear A sign variations of AB 80 (after GORILA 5, XLI), to which VRY Za 1 needs to be added.



FIG. 6. A selection of Petschaft seals with both iconic and linear Cretan hieroglyphic signs. Top row left to right: CMS II.2 249 from Mochlos, CMS VI 126, CMS VI 124 from Sta Límnia/Sto Dhásos (near Ziros), P.TSKo6.145 from Petras (now Sitea Museum inv. no. 13533); bottom row left to right: CMS X 53, CMS XII 101, CHIC #185. CMS photographs courtesy of CMS; permission to publish and the photograph of the Petras Petschaft kindly provided by O. Krzyszkowska; drawing of CHIC #185 after CHIC.

One cannot but wonder if these iconic signs, too, are to be understood as logograms or even determinatives that, quite literally, illustrate the seal-owner's specific duties, a suspicion already raised by the accumulation of animal heads on medallions and noduli at Quartier Mu, Malia (Weingarten 1995, 287-290). In other words, we should consider the possibility that, on Petschafte, the ship, goat and bovine are not, in fact, to be read just as syllabic signs, but might still be visually, semantically and, more likely than not, phonologically meaningful.

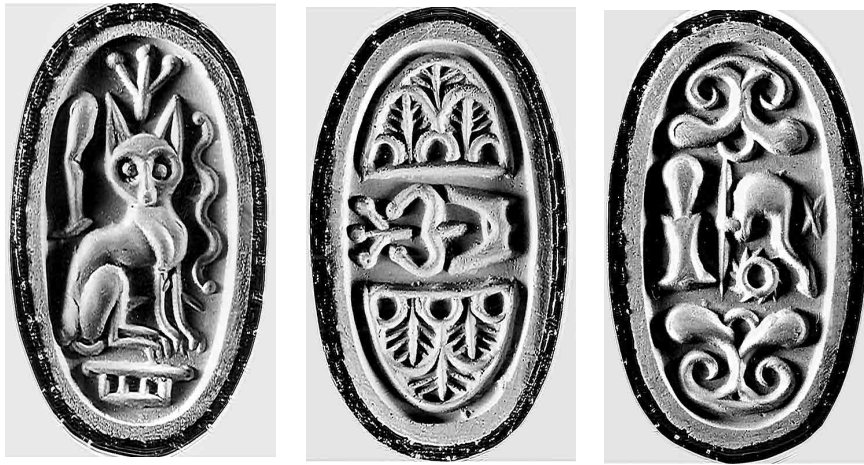


FIG. 7. Red carnelian 3-sided prism from Lasithi(?) (CMS VI 93, CHIC #257).

We close with one irresistible example from our investigation, the famous carnelian ‘cat’ seal, CMS VI 93 – now tracked with a strong likelihood to ‘the Lasithi district’ (CMS VI, p. 10), and thus the very picture of an eastern feline (FIG. 7). The 3-sided prism contains both the full ‘template formula’ (side b) and the full ‘gate formula’+ 061? (side a), the latter with the ‘cat’ in the middle (Ferrara, Weingarten, Cadogan 2016, 89-90, and Table 1). We suggest that this cat is already saying /ma/; and that it could well already be the logogram connected with the Cretan wool industry. More investigation of the iconic signs is needed, to discover if, when used as logograms, they may unlock further interpretations that can cast light on Cretan industrial or productive activities.

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