CHAPTER 7

THE RELATIONSHIP BETWEEN CRETAN HIEROGLYPHIC AND THE OTHER CRETAN SCRIPTS

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7.1 On the Nature and Unity of the Cretan Hieroglyphic Script

There is no general agreement as to the nature of the Cretan Hieroglyphic script nor to the number of characters belonging to it, nor indeed is it clear that all writing traditionally called 'Cretan Hieroglyphic' is in fact a unified whole. From a typological perspective, Cretan Hieroglyphic is traditionally classified as a logo-syllabic script (like the Aegean Linear scripts), meaning that its signs are subdivided into the functional categories of 'syllabograms' (signs representing syllables, e.g. /pa/, /e/), and 'logograms' (signs standing for an entire word) or 'ideograms' (iconic signs standing for objects or ideas that could then be interpreted as entire words).[1] As we have already seen (Ferrara, Valério, this volume), the total number of characters of the writing system proper, explicitly identified as syllabograms, is given as ninety-six in *CHIC*: 17, to which are added thirty-three different logograms/ideograms, nine klasmatograms (i.e. signs representing units of measurement and fractions thereof), four signs for numerals and two stiktograms (i.e. signs used to mark the beginning of a sign sequence). By categorising the signs found on the Cretan Hieroglyphic documents in this way, the entire script is implicitly brought into the vicinity of the Linear scripts A and B to such an extent that it could reasonably be interpreted as their direct ancestor. However, we must be aware that such a categorisation of Cretan Hieroglyphic signs may not actually be accurate, inasmuch as it is the result of extrapolating backwards from a comparison with Linear A and

[1] The terms 'logogram' and 'ideogram' are both found in the literature (at times interchangeably), with the former being preferred over the latter in traditional scholarship (Thompson 2012). A logogram implies a reference to a lexeme (or lexical morpheme) in a given language, whereas an ideogram expresses semantics without reference to a given word in a given language. In Linear B there is evidence for the use of both (less so in Linear A and Cretan Hieroglyphic): e.g. Linear B sign **201* depicts a 'tripod' cooking pot and its name is also spelled out fully (*ti-ri-po*) on tablets, hence this is a logogram; Linear B sign **173* is a half-moon and stands for the concept 'month', hence this is an ideogram. In the present discussion, we will use both terms in compliance with the definitions set out above to the extent that is possible on present evidence. If the sign's context of use and function is unclear, we will leave both options open (logogram/ideogram).

Linear B. But if the total number of Cretan Hieroglyphic signs is indeed in the region of ninety-six, then this figure is very close to the number of signs in Linear A and Linear B and would provide an additional argument for an essentially syllabic nature of the script.

In establishing the sign list and, in doing so, the characterisation of the nature of the Cretan Hieroglyphic script and its workings, the editors of *CHIC* base themselves essentially on the evidence from the incised clay documents (*CHIC:* 12–15), working on the premise that all signs on evidently administrative and inherently non-prestigious documents are supposed to be readable and read (as happens in Linear A and Linear B). On seals, on the other hand, the situation is more complicated, as it is difficult to distinguish the nature and structure of the written message, if any, and the inclusion of a 'decorative' or 'explicatory' ('*explétifs*') character. In principle, this two-pronged approach does have merits. The inscribed Cretan seals stand in a tradition of iconography and glyptic that goes back to the Early Minoan period (see chapters by Valério and Flouda, this volume). Originally characterised by simple, often geometric designs,[2] representations become more complex and elaborate at the beginning of the Middle Minoan period, suggesting somewhat more complex 'meaning making' on the seals.[3] A good number of the motifs employed here eventually lead to characters of the writing system *sensu stricto*, but to what extent this has happened on the seals is difficult to determine.[4] The approach taken by the editors of *CHIC* can thus be characterised as cautious. However, it is also the case that some certain or likely elements of the writing system (i.e. those that are repeatedly attested in sign sequences and are not in any way marked out as special) are attested only on seals (signs CH 014, 048, 076 and 095). Although this is acknowledged in *CHIC*, this very circumstance only goes to show that simply basing oneself on the signs attested on clay documents risks distorting the picture and giving an unrepresentative view of what Cretan Hieroglyphic 'can do' and 'looks like'. Chance (due to the extreme dearth of evidence) may also be a factor in the non-attestation of signs 014, 048, 076 and 095 on clay documents. In any event, it would seem obvious that the Cretan Hieroglyphic on seals is in many ways closer to the glyptic tradition than the 'developed' Cretan Hieroglyphic on the administrative clay

[2] See Decorte 2017. [3] See Anastasiadou 2011.

[4] See Jasink 2009 for a list of motifs left out by *CHIC*. On the role of glyptic iconography in the creation of Cretan Hieroglyphic signs, see esp. Yule 1980; Sbonias 1995; Webb and Weingarten 2012; Flouda 2013; Ferrara 2015; Anastasiadou 2016a; Civitillo 2016a; Ferrara and Jasink 2017; Schoep 2020; Salgarella 2021; Ferrara, Montecchi and Valério 2022.

documents is. Notwithstanding this, it is also true that a purely developmental and evolutionary explanation of the slightly different character of Cretan Hieroglyphic on administrative documents if compared with seals may be somewhat dismissive of the different contexts of use (and therefore different purposes) of the two document typologies. In other words, we should be open to consider that the administrative context, requiring a distinct yet competing method of recording information, may have had a bearing on (at least some of) the structural characteristics of the script and may not necessarily imply a developmental relationship. Put differently, the meaning-making on seals may well work according to different principles, at least in part, from those employed on incised clay documents. This, in turn, then raises the question of the unity of Cretan Hieroglyphic: to what extent is it actually legitimate to speak of the Cretan Hieroglyphic script? Do we have to assume two rather different types, with one still firmly rooted in the glyptic tradition and possibly operating according to different principles than the strictly administrative type on clay documents? We must be careful not to open up too large a gap here. It is evident that several 'formulae', i.e. complete sign sequences, are found on both seals and clay documents (e.g. 044-005 or 044-049; see Civitillo, this volume), and of course the use of inscribed seals was part of the administrative practice as were the clay documents. The fact that the number of signs only found on incised clay documents is substantial (thirty-two according to *CHIC*) may be partly due to chance attestation, misidentification (it seems unlikely, for example, that sign 032, only attested on the clay documents, is to be differentiated from 031) or misinterpretation (074 and 075 are probably numerals and 071 may be a stiktogram, i.e. a divider).[5] On the other hand, a good number of other signs are *hapax legomena* (79, 80, 81, 84, 86, 87, 89, 90, 91) and their nature is hard to evaluate. However, these signs could be testament to an increasingly sophisticated graphic rendering of administrative records if, as seems reasonable, the seals are innately more conservative and restricted in their breadth of use, given that they are made of stone (predominantly semi-precious stone such as steatite and jasper).

The number of signs attested on seals (55–60, depending on the interpretation) and on incised clay documents (about 85–90, with uncertainty concerning the *hapax legomena*) differs considerably and, in view of the above, one might question whether it is legitimate simply to add them together so as to get to one total number of about ninety as is usually done.[6] Doubts as to the internal unity of the Cretan

[5] See Younger 2003–2012. [6] See the list in *CHIC*: 17.

Hieroglyphic script have been expressed above all by Olivier, who considered the use of Hieroglyphic on seals as '*une écriture ornementale*'.[7] In fact, there can be little doubt that, while the use of the script shows a supplement of signs that may be decorative or emblematic or both,[8] the basic inventory of signs is the same on seals and on other supports, lending support to the hypothesis that the seal inscriptions can be read according to the same linguistic principles as the remainder of Cretan Hieroglyphic inscriptions.[9] Contrariwise, the use of logograms/ideograms on Cretan Hieroglyphic documents other than seals is no obstacle to regarding Cretan Hieroglyphic as one unit, as these signs clearly form part of the writing system but not of the script and may instead be seen as an 'evolved' use of the Hieroglyphic writing system. The view is thus taken here that Cretan Hieroglyphic should be considered as one script, independent of the support on which it is found.

7.2 How to Relate Scripts

The term 'script relationship' is not unproblematic. In its simplest form it can mean a derivative relationship between two scripts. By way of example, the Roman alphabet was developed out of the Etruscan alphabet, keeping almost all of its signs (with the appropriate sound values if possible) and introducing or developing new signs over time (such as <G> from <C>) for sounds that the language from which the script was adapted (i.e. Etruscan) did not possess.[10] In this case, a script was adopted by speakers of another language (although, given that Etruscan was the prestige language in Rome at the time, these speakers may well have been bilingual), and both the principle of writing (alphabetic) and the inventory and the morphology of the signs were preserved as much as possible and changed only where the phonology of the new language required an adaptation. In the context of the Aegean scripts, a similar situation is found between Linear A and Linear B, the latter having developed out of the former[11] to write Greek. Also in this case, both the principle of writing (syllabic) and the morphology of the

[7] Olivier 1981: 105, 115; similar Olivier 1990: 13: 'I am more strongly convinced than ever that the script on the seals is a decorative one.'
[8] On the nature, role and re-evaluation of the so-called 'decorative motifs', see esp. Jasink 2009; Decorte 2017; 2018a–b.
[9] For a complete re-evaluation of the question, see Civitillo 2016a.
[10] See Wachter 1987, in particular 324–33; Haarmann 2002.
[11] See most recently Salgarella 2019; 2020.

majority of signs was kept, together with, as far as we can see, a good number of phonetic values. However, a close phonetic correspondence is difficult to evaluate with certainty, above all because the phonology of the Minoan language is not well understood.[12] Equally importantly, while the script itself remains relatively stable on the way from Linear A to Linear B, the writing system as a whole does undergo a number of important changes, such as the near-complete abandonment of Linear A ideograms, the creation of new logograms/ideograms in Linear B, the introduction of a completely new system of numerical fractions, etc.[13] These two examples may suffice to illustrate that both the *kind* and the *degree* of innovation can vary during the script transfer via adaptation.

Sometimes, considerable changes even occur when the script is not adapted for another language but continues to be used for the same language. Thus, Sumerian cuneiform starts off as a pictographic system but quickly develops into an essentially logographic script which over time gets progressively more phonetic inasmuch as the overall number of signs is reduced radically from ca. 1500 signs at the beginning of the third millennium BC to about 600 signs in the second half of the third millennium. While a logographic element is kept, the remaining signs now predominantly indicate open and closed syllables.[14] However, two scripts may also be less directly related. As an example, we shall look at the Old Persian cuneiform script. Despite its name, it is not as such derived from the 'Classic' Babylonian cuneiform, which by the time Old Persian is recorded (probably the last quarter of the sixth century BC) was used for a considerable number of languages, the adjacent Akkadian and Elamite chief among them. While the signs of the Old Persian script look wedge-shaped, the individual signs bear no relationship to the corresponding sign, or indeed any sign, of the Classic cuneiform script.[15] The Old Persian script also works according to different principles: while it does contain a few logograms just like Babylonian cuneiform, the main body of signs indicates open syllables only and there are contrasting syllabic signs such as *da, di, du*. Notwithstanding

[12] See Davis 2014: 193–245 for an attempt at a closer phonological characterisation of the language; Davis, this volume, on the syllabotactic analysis of the Linear A and Cretan Hieroglyphic scripts.

[13] On the Linear A to Linear B transmission process, see lastly Salgarella 2020; on the mathematical values of Linear A fractional signs, see Corazza *et al.* 2021.

[14] See Schmandt-Besserat 1996; Houston 2004a; Rogers 2004.

[15] The sole exception is the sign for *la* which, however, does not occur in genuine Old Persian words but rather in Akkadian loan words, meaning that the sign together with the sound was borrowed from the Babylonian cuneiform script. For the development of the Old Persian script, see Brandenstein and Mayrhofer 1964: 17–18.

this, it is incorrect to call it a syllabic script because, except for *a*, all vowels (*i, u*) are explicitly written, either with the help of a discrete sign (as above), or, more commonly, by modifying the basic sign with the vowel signs *i* and *u*. For the great majority of consonant-vowel sequences, Old Persian has only one sign which renders the consonant plus the vowel *a*. In other words, the unmarked vowel *a* can be said to be inherent to a sign while the other two vowels are not and are indicated by a completely different sign (clearly syllabic behaviour) or by modifying the basic sign (similar to an abugida, as found in many scripts used to write other Indo-Iranian languages, e.g. Devanāgarī). Thus, e.g. *di* is a syllabic sign in its own right while a sequence /pi/ is written *p(a)-i*; an actual sign *pi* does not exist in the Old Persian script. This, then, means that /pi/ is written with two signs, one effectively indicating the consonant /p/, the other the vowel /i/. In other words, this is similar to the contemporary Greek alphabet, with which the Persians had certainly come into contact by the end of the sixth century, but also similar to the Aramaic script which, as a West Semitic script, principally wrote consonants only but could indicate vocalic values with the help of *matres lectionis*.[16] The Old Persian script, often called a 'semi-syllabary' thus defies an easy classification. It is clearly not derived from Babylonian cuneiform, but its creation is partly (general shape of signs, use of logograms) dependent on it. The principles according to which the script is used, however, are closer to the alphabet that was used to the west and the Indo-Iranian abugidas that would come to be used to the east of Persia. There is thus some form of relationship between Babylonian cuneiform and Old Persian cuneiform, but this relationship is of a very different kind to that between the Etruscan and Roman alphabets. There are multiple different ways in which scripts can be related and thus no universal algorithm exists to evaluate them. Rather, each analysis of a relationship between two or more scripts needs to take into account not just linguistic and graphological data, but also the socio-historical background and context. This also means that script invention and script adaptation are best seen not as polar opposites but as forming part of a spectrum of complex creative processes leading to a conventionalised, codified form of meaning-making with the help of graphic symbols.

[16] It should be noted that the Aramaic language, together with the Imperial Aramaic script, rather than Old Persian was used as the *lingua franca* of the Persian administration; see again Brandenstein and Mayrhofer 1964: 17.

7.3 The Workings of the Cretan Hieroglyphic Script

Before examining the relationship between Cretan Hieroglyphic and the other Cretan scripts, it is worth investigating how Cretan Hieroglyphic works, i.e. which (functional and linguistic) entities the Cretan Hieroglyphic signs actually stand for and render. We need to remind ourselves that the way in which a writing system works is not necessarily a reliable indicator when it comes to evaluating the relationship with the other scripts, as we have just seen. Although it is true that the principles on which a system works may give us some clues as to script relations (if comparable principles, especially if 'marked', can be identified), no straightforward connection can be demonstrated given the lack of an accurate understanding of the socio-historical context within which any two systems were developed. Nevertheless, in the Aegean context, it may well be that some of the underlying principles are shared between Cretan Hieroglyphic and the Linear scripts, which is a theory that needs to be proved. Given that in script development over time there is a general trend towards increasingly phonetic character,[17] it could thus be that any script developed out of Cretan Hieroglyphic may be more phonetic than Cretan Hieroglyphic itself. Cretan Hieroglyphic is usually taken as a syllabic script writing open syllables only, assuming therefore a typological interpretation that brings it close to Linear A (and Linear B), with which it co-existed for about 200 years. This assumption is so well established in the scholarship that the typological nature of Cretan Hieroglyphic is usually not even discussed, nor questioned, in the mainstream literature.[18] There are, of course, obvious reasons for taking Cretan Hieroglyphic signs as syllabic and/or logographic/ideographic in character: first of all, the considerable graphic resemblance between Cretan Hieroglyphic and Linear A that will be explored further below, and secondly, and arguably more importantly, the total number of signs in the Cretan Hieroglyphic graphic inventory. While the overall state of documentation is poor and almost certainly incomplete, and while there may be several gaps and misidentifications, the number of ninety-six different signs as given in *CHIC* is highly compatible with the sign inventories of Linear A and Linear B. Even though there are good reasons to take issue with the sign classification found in *CHIC*, it is unlikely that any coherent alternative classification will alter the picture so dramatically as to sever any connection

[17] See Valério and Ferrara 2019. However, while clearly widespread, this trend is not universal: for a good example of the reverse of this process, see Petrakis 2012.

[18] See e.g. the sign list in *CHIC*: 17, or Davis, this volume.

between Cretan Hieroglyphic and the Linear scripts in this respect.[19] Moreover, this numerical range of signs is compatible with a syllabic system, but with neither a fully ideographic one (expect substantially more than 100 signs) nor an alphabetic one (fewer than fifty signs). Still, Ferrara, Montecchi and Valério[20] admit the possibility that Cretan Hieroglyphic may be partly logographic, on the grounds that 'in all potentially newly created iconic scripts (i.e. scripts with novel shapes in the repertoires of their signs) words were spelt logographically, and sometimes logo-phonetically, especially at their earliest stages of development'. This point needs to be borne in mind, and that Cretan Hieroglyphic, at least on patently administrative documents, made use of logograms (and/or ideograms) is not in serious doubt. But apart from this, the logographic character of the script is not evident and the total number of different signs, at least those attested to date, militate against Cretan Hieroglyphic being an essentially logographic/ideographic script and might instead suggest the basic syllabic nature of the script. However, we must not forget that more than half of all occurrences of Cretan Hieroglyphic script-signs are attested on seals and seal impressions.[21] This type of document, characterised by a very small physical space, frequently displays, typologically speaking, 'abbreviated' writing. In this context, it is important to note that Civitillo[22] has proposed to interpret a number of 'isolated' or 'marked-off' Cretan Hieroglyphic signs on seals as 'icons'/'badges' and not as logograms *sensu stricto*. This suggestion might then be considered in light of the fact that abbreviations (in the form of individual signs standing by themselves) are frequently found in both Linear A and Linear B: for example, in Linear A the use of 'monosyllabic signs' ('transaction' and 'single'), that are often 'marked off' by a dot placed before and after the sign,[23] and in Linear B the frequent use of adjuncts to ideograms (e.g. the sign for /o/ being the abbreviation of ὄφελος/op^{h}elos/'deficit'). If this proposal is correct, this abbreviated writing might conceivably contain names but also administrative processes, as the potential parallels with Linear A and Linear B might suggest. On the basis of this interpretation, we may speculatively suggest taking the frequent Cretan Hieroglyphic

[19] The most radical re-analysis of Cretan Hieroglyphic signs is Jasink 2009, who considers as potentially meaningful a number of motifs occurring on seals which have not been included in *CHIC*.

[20] Ferrara, Montecchi and Valério 2022: 89.

[21] Based on the documents published in *CHIC*, out of a total of 1,753 attested identified Cretan Hieroglyphic signs, 911 (52%) occur on seals and sealings, 773 (44%) on clay documents and 51 (3%) on other supports. The authors would like to express their deep gratitude to Matilde Civitillo for providing these figures.

[22] Civitillo 2016a: 158–9, 200–1.

[23] See Schoep 2002a: 37–9, 135–43; Salgarella 2020: 50–4.

'formula' 044-005 (depicting a *Petschaft* seal and an eye) as standing for the concept 'inspected and approved' *vel sim.*

7.4 Cretan Hieroglyphic and the Phaistos Disk

A first comparandum to the Cretan Hieroglyphic script is provided by the Phaistos Disk (PD), found in 1908. Unfortunately, much regarding the disk remains unclear to this date. This starts with the dating. The object was not found *in situ* but, according to the excavator Pernier, had fallen from a higher level and was mixed, *inter alia*, with vase fragments typical for the last phase of the first palace at Phaistos,[24] although this may only be a *terminus ante quem* and scholars routinely used to allow for a wider chronological span;[25] more recent research, however, seems to suggest MM IIIA as the most likely date.[26] At the time of its discovery, pretty much everything about it was unique: the signs themselves which seemed to bear little resemblance to any other writing system known from Crete (i.e. Cretan Hieroglyphic, Linear A or Linear B); the type of object (large clay disk); the way the signs were applied (stamped); and the way the information is arranged (running in a spiral from the rim to the centre) and divided (into cells, long known from the cuneiform writing tradition but until then not attested on Crete, containing between two and seven signs). Because of its peculiar character and uncertain dating, the Phaistos Disk has been suspected to be a forgery[27] but convincing arguments in favour of its authenticity have since been put forward.[28] However, as a result of further studies and discoveries over the years, much of its uniqueness has been eroded.

In this respect, the single most important discovery may have been the bronze axe from the Arkalochori cave (henceforth AA), found in 1935. Its date is uncertain because of the highly disturbed context and the lack of stratigraphy that might help place it chronologically.[29] The excavator Marinatos assumed a Neopalatial date of MM III or LM I;[30]

[24] Pernier 1908: 644.
[25] See e.g. Duhoux 2000: 597, who states that: '[t]he object's archaeological context indicates that it was deposited at Phaistos some time in MM II–IIIB (ca. 1850–1600 B.C.).'
[26] Anastasiadou 2016b: 15, with further references.
[27] Eisenberg 2008a; 2008b.
[28] See Hnila 2009 and, for a sound and effective refutation of Eisenberg's arguments, Anastasiadou 2016b. For a general overview of the Phaistos Disk see Duhoux 1978; Godart 1995; Younger 2005–21.
[29] See Flouda 2015a: 45–8 for a thorough discussion of the content and context of the Arkalochori Cave assemblage.
[30] Marinatos 1935: 250–9.

other scholars either accept this date[31] or regard the axe as contemporary with the Phaistos Disk (PD).[32] The main reason for the latter dating may be the striking resemblance between several signs on the axe and the disk: the axe contains only ten or eleven different signs, and fifteen signs in total, while the Phaistos Disk displays forty-five different characters, and 241 (or 242) signs in total. Still, not only is the general appearance of the signs on the two objects undeniably similar, at least three of the signs – the 'plumed head' (AA 01 = PD 02, following the numeration found in Godart 1995), the 'plane' (AA 02 = PD 19) and the arrow sign (AA 09 = PD 10) – look so similar that they should be taken as shared signs between the two scripts.[33] Two further equations are plausible: signs AA 05 and 06 may correspond to PD 39 and 22 respectively,[34] and if sign AA 04 and its probable variant AA 4b really are a divider as suggested by Younger (*ibid.*), then this may be paralleled by the similarly shaped device on the outermost circle on both sides of the Phaistos Disk. Even if we only accept the identity of signs AA 01, 02 and 09 with their obvious Phaistos Disk correspondences, this is a highly remarkable degree of similarity, especially given that neither the Phaistos Disk with its forty-five different signs nor, in particular, the axe with only ten (or eleven) different signs is likely to display anything near the total number of characters.[35] While it cannot be established with any certainty whether the signs on the axe and the Phaistos Disk do indeed belong to the same writing system,[36] it is also interesting to note that the 'plumed head' is the most frequent sign on both the axe (three, or possibly four times) and the Phaistos Disk (nineteen times).

Other 'unique' features now have parallels elsewhere on Crete: Phaistos Disk 21 (the 'comb') is found on a Minoan seal also from Phaistos (*CMS* II 5, 246) found in 1955; the spatial organisation of the writing into a spiral running from the rim to the centre is also found on the Linear A inscribed gold ring from the cemetery of Mavro Spilio (KN Zf 13)[37] and

[31] Flouda 2015a: 48. [32] Thus Younger 2005–2021.
[33] Flouda 2015a: 50; Duhoux 1998: 14–16. [34] See again Younger 2005–2021.
[35] Duhoux 2000: 599 assumes about sixty signs for the Phaistos Disk script, using the formula established by MacKay 1965. However, in the context of the Arkalochori axe, where the application of the same formula would predict a total number of about thirty signs (and therefore a likely alphabetic character of the script), Duhoux admits that 'if applied to very restricted samples of a syllabic script, MacKay's 1965 formula may dramatically over- (113) or under- (30) estimate the number of its signs' (Duhoux 1998: 15). We remain agnostic about the total number of characters.
[36] Duhoux 1998: 14 maintains that '[t]he axe's script is clearly cognate to the Phaestos disc's writing […]. Nevertheless, the two systems are basically distinct, although they share the same graphic ambience.'
[37] *GORILA* IV: 152–3, 162 (MM III–LM IA).

two painted conical cups (KN Zc 6–7);[38] the use of stamps is now well documented on pots from the MM period;[39] and finally, the organisation of text into cells is now also found on the ivory sceptre Linear A inscription from Knossos, as yet unpublished.[40] These parallels not only make the disk lose quite a lot of its unique character, but also, taken together, they should be seen as a strong indicator of its authenticity. However, it must also be stated that the sign distribution across the two sides of the disk does not conform with what one would expect of a natural language. Trauth observes that twenty-one (out of forty-five) signs occur on one side only, and others are much more frequent on one side than the other.[41] Also, the length of words (if this is what the individual cells indicate) varies much more (between two and seven signs, with an average of just under four signs) than would be expected.[42] However, it is not clear whether the individual sign groups really do always indicate one word only. Furthermore, it is worth pointing out that the words (or 'sign units') on the Linear A libation tables are also much longer than in the administrative texts: word 1 usually contains six signs; word 2 up to eight signs; word 3 (which varies the most) is almost unfailingly the shortest; while words 4 and 5 usually consist of five or six signs. Nevertheless, if we try to compare the script with Cretan Hieroglyphic, then it is evident that both are highly pictorial in character, i.e. they frequently depict real-world referents in a recognisable and naturalistic manner (cf. e.g. PD sign 15 is self-evidently an axe, and CH 008  a hand). In the absence of further information regarding the nature of the Phaistos Disk script, it is certainly possible that these writing systems are laterally related; in other words that there was a stimulus leading to the creation of one of them in a way not too dissimilar to what we saw above regarding Old Persian cuneiform writing. However, it has also been suggested that there may be more to it. Duhoux[43] reckons that there 'are no more than ca. ten syllabograms on the disk which could possibly match Linear A or 'hieroglyphic' signs'. More optimistic is Owens, who in an oral presentation[44] tried to equate

[38] *GORILA* IV: 118–25 (MM III?).
[39] See Anastasiadou 2016b: 27 and 37.
[40] In the view of these authors, the so-called Linear B 'simili joins' of the KN Vc series (on which, see in the first instance Driessen 1987) can also be regarded as examples of the organisation of information into individual cells. This archaic trait is entirely in keeping with the fact that these tablets came from the *Room of the Chariot Tablets*, and it was Mühlestein (1963: 1) who first saw that these tablets had incised vertical lines from the top to the bottom of the tablet along which they were broken up into individual 'mini-tablets'. It may further be suggested that the word divider found in the linear scripts is none other than a shortened version of this dividing line.
[41] Trauth 1990: 159 and table on p. 160.
[42] By way of comparison, in the languages of Western Europe between 85% and 95% of words contain 1–3 syllables.
[43] Duhoux 1998: 11–12.
[44] Owens, online (youtube.com/watch?v=6Chcplx3tZ8).

about 90% of the Phaistos Disk signs with signs in Cretan Hieroglyphic and the Linear writing systems and sees an 'epigraphic continuity' from the Phaistos Disk all the way down to Linear B. This was critiqued effectively by Younger[45] who, in the absence of proper argumentation on the part of Owens, is prepared (not unlike Duhoux) to accept eight equations between the Phaistos Disk, Cretan Hieroglyphic, Linear A and Linear B. These are as follows:

Table 7.1 *Comparisons between Phaistos Disk, Cretan Hieroglyphic, Linear A and Linear B signs*

PD	CH (seal and clay forms resp.)	LA/B	Owens ID
08	009	AB 28 I	B 52 NO
12	047	AB 77 KA or 78 QE	AB 78 QE
14	034	AB 59 TA	AB 59 TA
15	043	B 12 SO	B 12 SO
19	027	AB 01 DA	AB 01 DA
23	062	AB 06 NA	AB 06 NA
34	021	AB 39 PI	AB 39 PI
35	025	AB 04 TE	AB 04 TE

It goes without saying that even in these least controversial equations there is a considerable degree of uncertainty in many instances. Due to the extreme dearth of evidence, variation within the evidence and our inability to interpret the writing linguistically, we are reduced to a judgement on the basis of general plausibility, and this will be applied differently on an individual basis. While some may wish to accept all of these equations, others (these authors included) are more sceptical when it comes to equating PD 12 with CH 047 and AB 77/*ka* (implausible in our view) or 78/*qe*; PD 14 with CH 034 and AB 59/*ta*; PD 23 with CH 062; and AB 06/*na* or PD 34 with CH 021 and AB 39/*pi*. Owens' further proposals are also discussed by Younger, but as the links to Owens' work are dead and they do not seem to feature on the author's website (https://daidalika.hmu.gr), it would not seem appropriate to discuss them further here. Suffice to say that the suggested identifications clearly form a sliding scale of plausibility. If, however, Owens were right and more than 90% of the Phaistos Disk signs could be equated with signs from Cretan Hieroglyphic, Linear A and Linear B (and on this basis given a sound

[45] Younger, online (people.ku.edu/~jyounger/misc/Owens_response.pdf).

value) then the Phaistos Disk script would, in effect, be nothing more than a peculiar form of Cretan Hieroglyphic, and indeed Owens explicitly states that 'The Cretan Hieroglyphic script (ca. 2000–1600 BC) was an invention of the First Palaces and is found in inscriptions of both an administrative and religious context/nature. The best-known example of this is the (in)famous the Phaistos Disk […].'[46] But if we were to believe that the Phaistos Disk and Cretan Hieroglyphic are so closely related as to represent, essentially, the same script then we immediately run into problems. For example, one of the clearest and most frequent signs in Cretan Hieroglyphic (CH 042) is not actually found in the Phaistos Disk inventory at all, and its putative sound value /a/ is, in Owens' view, realised on the disk by PD 01  , which is entirely unrelated. Caution is clearly advised here. While an independent origin of Cretan Hieroglyphic and of the Phaistos Disk script from Early Minoan glyptic cannot be ruled out, a closer link between the two scripts has yet to be demonstrated. In a recent article, Davis has put forward phonotactic arguments to argue that Cretan Hieroglyphic and the Phaistos Disk encode the same (or very closely related) language(s).[47] This may well be right, but in itself this has little bearing on any relationship between the scripts which remains an open question.

7.5 Cretan Hieroglyphic and the 'Archanes Script'

A small number of seals and seal impressions (fifteen examples in total) loosely dated to 2000–1900 BC (EM III–MM IA) bear a formulaic inscription traditionally called the 'Archanes script',[48] after the place where its first examples were unearthed (the cemetery of Phourni near Archanes on north Crete).[49] Elevating these inscriptions to the level of a 'script', however, is a questionable leap (Jasink and Weingarten, this volume). For the inscriptions only ever show the same four characters and, at present, there is no contextual evidence of any additional signs that might have complemented those attested to form a potential early syllabary. Hence, more recently scholars have taken to referring to these early examples of writing, taken altogether, as the 'Archanes formula' or 'Archanes inscriptions',[50] which is traditionally tentatively read as A-SA-SA-RA-NE[51] (by applying the phonetic values we have for the homomorphic Linear A/B signs). The debate surrounding the

[46] Owens, online (https://daidalika.hmu.gr/wp-content/uploads/2020/10/enigma.pdf, 187).
[47] Davis 2018. [48] Yule 1980: 170; Sbonias 1995; Karnava 2000: 195–8.
[49] Valério, this volume. [50] Esp. Karnava 2016a; 2021.
[51] There are, however, good reasons to question this reading, cf. in particular Ferrara, Montecchi and Valério 2021b.

nature of the Archanes formula and the role it played in the formation of Cretan scripts is still ongoing: while most scholars seem to regard it as an early form of Cretan Hieroglyphic,[52] the formula has also been argued to have a close connection with Linear A,[53] to be the ancestor of both Cretan Hieroglyphic and Linear A,[54] or even a script *sui generis* though with strong connections to Cretan Hieroglyphic.[55] For the purposes of this chapter, we shall now briefly review the main arguments in support of a possible relationship of the Archanes inscriptions with Cretan Hieroglyphic and/or Linear A. Among the elements that support a connection with Cretan Hieroglyphic are: a) the very early date of most of the seals carrying the formula, which is compatible with an early form of Cretan Hieroglyphic but much less so of Linear A (no attestations of Linear A date this far back in time and proponents of a close relationship between Archanes and Linear A are faced with an unexplained chronological gap); b) the 'seal' writing support, that is typical of the Cretan Hieroglyphic writing tradition, but barely ever used in Linear A;[56] c) the shape of the carved signs and their general ductus, including the use of other signs such as the 'x' stiktogram (see Valério, this volume), which is much closer to Cretan Hieroglyphic than to Linear A. However, there are also elements that distance the Archanes script from Cretan Hieroglyphic, such as the length of the inscription (either two words, or a very long sign group)[57] and that the last two signs of the formula do not have a parallel in Cretan Hieroglyphic.[58] If the last sign of the formula is indeed attested in Linear A as AB 24/*ne*, this would strengthen the links with Linear A. Another argument that has been put forward in support of a possible Linear A connection is the occurrence of the formula on a number of votive Linear A inscriptions (bearing the so-called 'libation formula'), where the formula may also show the alternation *a-/ja-* at sequence-start and *-ne/-me* at sequence-end.[59] However, the claim that the sequence *a-sa-* may be

[52] E.g. Sbonias 1995: 108; *CHIC*: 18; Perna 2014: 252; Karnava 2016a: 81; Ferrara 2021; Ferrara, Montecchi and Valério 2021b; Valério, this volume.

[53] Godart 1999; Anastasiadou 2016a: 177–82.

[54] See in particular Schoep 1999: 266, 270–3.

[55] Decorte 2018a. In fact, this may be tantamount to saying that the 'Archanes script' is nothing other than an early form of Cretan Hieroglyphic, although some decorative signs (not carried over into 'classical' Cretan Hieroglyphic) may have interacted meaningfully with the formula and given it its particular shape.

[56] The only known examples of a sphragistic use of Linear A are: ARM Zg 1, KN Zg 55, CR (?) Zg 3 (see Del Freo 2005: 663–5).

[57] For a comparison of the Archanes formula with the Cretan Hieroglyphic 'formulae' and the Linear A 'libation formula' see esp. Civitillo 2016b.

[58] The penultimate sign of the formula is equated with CH 095, which, however, is only attested as part of the formula and never elsewhere.

[59] These are: IO Zb 10, PR Za 1c, PK Za 11b–c, PK Za 2, PL Zf 1, PO Zg 1. On the 'libation formula', see most recently Davis 2013; Karnava 2016b.

a typical morphological feature of Linear A has recently been subject to criticism[60] by showing that the sequence has parallels elsewhere in Cretan Hieroglyphic, and even if the equation were entirely correct then this might say more about language identity than script relationship. This, together with the chronological gap between the Archanes inscriptions and Linear A, the markedly different contexts of their use and the further features observed by Valério (this volume), puts the Archanes inscriptions closer to Cretan Hieroglyphic than to Linear A. Nonetheless, questions as to the exact relationship remain and that the Archanes script should be the direct and immediate ancestor of the Cretan Hieroglyphic script as attested on seals is by no means certain.

7.6 Cretan Hieroglyphic and Linear A

Cretan Hieroglyphic is now commonly seen as an original script indigenous to Crete, quite conceivably having come about by stimulus diffusion.[61] Because of the more simplified (i.e. stylised or schematic) graphic appearance of Linear A signs compared with Cretan Hieroglyphic, Linear A was initially thought to have derived straight out of Cretan Hieroglyphic within an evolutionary framework envisaging a unidirectional development from pictographic to more cursive (and phonetic) writing over time.[62] This evolutionary model in script development, however, has since been called into question,[63] and more nuanced views are now expressed by recent scholarship, routinely taking a more cautious approach and withholding judgement until conclusive evidence is either found or put forward.[64] The viewpoint of Linear A as derivative from Cretan Hieroglyphic is further enhanced by the fact that the earliest Cretan Hieroglyphic attestations (MM IB seals) predate the earliest recognisable Linear A inscriptions (MM IIA–B), and the primacy of Cretan Hieroglyphic is clear also from the fact that Cretan Hieroglyphic is grounded in earlier Minoan glyptic.[65] However, it is also sometimes argued that Cretan Hieroglyphic and Linear A are parallel systems since they show chronological overlap (MM II–III, ca. 1800–1600 BC) but geographically are in near-complementary

[60] Ferrara, Montecchi and Valério 2022. For a defence of the nature of *(j)a-sa-* as a prefix, given that it is often physically separated from the rest of the text, see people.ku.edu/~jyounger/LinearA, 17 'hyphenization'.
[61] See in particular Ferrara 2015 and 2021: 214; Decorte 2018b; Schoep 2020.
[62] Evans 1894b: 275, 324, 333.
[63] See esp. Houston 2004b.
[64] See esp. Schoep 1999; 2020; Flouda 2013; 2015a; Perna 2014; Ferrara 2015; Karnava 2015; Anastasiadou 2016a; Decorte 2018a–c; Salgarella 2021; Ferrara, Montecchi and Valério 2021b.
[65] See in the first instance Decorte 2018a–c.

distribution, with Cretan Hieroglyphic being at home in north and east Crete (with focal points at Knossos, Malia and Petras), while Linear A in this early period is predominantly found in south-central Crete (esp. Phaistos), before becoming more widespread after Cretan Hieroglyphic ceased to be used (MM III). There are, in fact, a number of clay documents that cannot be unquestionably classified as either Cretan Hieroglyphic or Linear A as they show features compatible with both scripts: the 'dubitanda' from the Knossos 'Hieroglyphic Deposit' and the Malia 'Dépôt Hiéroglyphique'.[66] If Linear A and Cretan Hieroglyphic were parallel systems, then, given the undeniable similarity of many of the signs, the question of a common origin arises, leading back to the 'Archanes script' dealt with in the preceding section.

To establish script relations, it is constructive to compare and contrast both script-internal and script-external features of each script under examination. Among the former, we have script typology (in our case, arguably logo-syllabic, although with a number of reservations as illustrated earlier on in this chapter), total number of signs attested and their functional use (e.g. syllabograms, logograms/ideograms, icons, klasmatograms, word-dividers), graphic rendering of signs and their variants (i.e. palaeographical features). Among the latter, we have the type and function of the material supports (and media), pinacological features (in the case of clay documents), context of use of the inscribed document, not to mention chronological and geographical distribution of the evidence. Linguistic comparison is an area of investigation we are not touching upon in the present contribution, given that both Cretan Hieroglyphic and Linear A remain to date undeciphered in the sense that the underlying language(s) is/are unknown.

When comparing the Cretan Hieroglyphic and Linear A scripts (and especially their sign inventories), we face a number of obstacles from the very outset of our examination: the paucity of evidence (ca. short of 300 inscriptions in Cretan Hieroglyphic and 1,400 in Linear A), often in a poor and fragmentary state of preservation; the short and significantly formulaic nature of the texts; and, most crucially, the absence of sign sequences that are shared between the two scripts.[67]

For the purposes of this contribution, we will focus on script-internal features (especially sign comparison), with a view to assessing the plausibility of the proposals put forward to date and testing the

[66] *CHIC*: 18; Petrakis 2014.

[67] By way of contrast, Linear A and Linear B do share a number of sign sequences, mostly anthroponyms and toponyms; see Steele and Meissner 2017.

methodologies so far used to identify cognates and draw meaningful sign comparisons. Our goal is to evaluate the total reconstructable number of signs, and their typology, that can be taken as shared between the two scripts with a reasonable degree of likelihood. The higher the number of securely identifiable cognates, the higher the likelihood that Linear A is directly derived from Cretan Hieroglyphic. If this is not the case, then this might be an argument in favour of those who argued for parallel traditions between Cretan Hieroglyphic and Linear A. The list of potential Cretan Hieroglyphic–Linear A parallels can be viewed in Table 7.2.[68] These parallels are collected from both *CHIC* and later scholarship.[69] Where more than one Linear A sign has been suggested as a continuation of a Cretan Hieroglyphic sign and there is no agreement on which one has the edge over another,[70] proposals are listed in decreasing order of likelihood in the present authors' view. Proposals put forward in this paper by the authors are in bold.

Table 7.2 *Cretan Hieroglyphic and Linear A signs and their real-world referents*

CH Sign (clay variant if available)	LA Comparanda	Referent	Semantic Field
CH 001	AB 100/*VIR*	Man	Human body
CH 002	AB 70/*ko*	Man's bust	Human body
CH 003		Man's bust + branch	Human body
CH 004	AB 102/*MUL*?	Woman	Human body
CH 005	AB *79	Eye	Human body
CH 006	AB 48/*nwa*, A 342	Crossed arms	Human body
CH 007	AB 73/*mi*	Bent arm	Human body
CH 008	AB 28/*i* > *i*, A 28b, B 52/*no*	Hand with fingers	Human body
CH 009	AB 01/*da*	'Glove' hand	Human body
CH 010	AB 53/*ri*	Leg	Human body

[68] Following *CHIC* sign classification and numbering. It has to be noted, however, that in the *CHIC* list signs are often 'multiplied' in case they are understood to function as both 'syllabograms' and 'logograms/ideograms' (see e.g. the sign representing a calf's head: as syllabogram it is CH 013, as logogram/ideogram it is CH 152). This classification method may well be in need of revision for future editions. Note also that this table focuses on sign shapes only; it does not take into account sign functions.

[69] For specific references to the scholar(s) who put forward each proposal see Ferrara *et al.* 2021b. Salgarella 2021 puts forward the proposals: CH 009 = AB 01/*da*, CH 011 = AB 05/*to*, CH 013 = AB 61/*o*, CH 025 = AB 04/*te*, CH 026 = AB 09/*se*, CH 046 and/or CH 087 = A 301.

[70] This is not only because we are still unsure as to the precise derivation of a number of Linear A signs, but also because more than one CH graphic antecedent may have given rise to a single Linear A sign, as suggested in Ferrara, Montecchi and Valério 2022.

Table 7.2 *(cont.)*

CH Sign (clay variant if available)	LA Comparanda	Referent	Semantic Field
CH 011	AB 05/*to*	Ox head (frontal)	Animal/Cattle
CH 012	A 306 (= B 42/*wo*), AB 23/*mu*	Ox head (lateral)	Animal/Cattle
CH 013	AB 61/*o*	Calf's head	Animal/Cattle
CH 014–15	-	(animal's head)	Animal/Cattle
CH 016	AB *22	Goat's head	Animal/Cattle
CH 017	AB 85/*au*	Pig's head	Animal/Cattle
CH 018	A 336	Dog's head	Animal/Pet
CH 019	AB 31/*sa*	Fish	Animal/Sea
CH 020	B 15/*mo*, AB 13/*mu*, (A?) B 43/*ai*	Bee/wasp	Animal/Bug
CH 021	AB 39/*pi*	Fly/moth	Animal/Bug
CH 022	AB 39/*pi*	Fly?	Animal/Bug
CH 023	A 122, B 33/ra_3	Crocus?	Plant
CH 024	AB 30/*ni*	Fig-tree branch	Plant
CH 025	AB 04/*te*	Tree branch	Plant
CH 026	AB 09/*se*	Tree branch	Plant
CH 027	A 316	Tree branch	Plant
CH 028	AB 09/*se*, AB 38/*e*	Tree branch	Plant
CH 029	AB 30/*ni*	Tree branch	Plant
CH 030	AB 29/pu_2	Tree branch	Plant
CH 031	AB 27/*re*, A 328	Flax plant	Plant/Textile industry
CH 032	**variant of CH 031**, AB 29/pu_2	-	Plant
CH 033	AB *79, AB *47	-	-
CH 034	A 356, A 305, AB 87/*twe*, AB 59/*ta*	Mountains?	Landscape
CH 035	AB 58/*su*	-	-
CH 036	A 305, AB 38/*e*, B 62/*pte*, B 72/*pe*	-	-
CH 037	AB 123/*AROM*, AB 40/*wi*, AB 54/*wa*	-	-
CH 038	AB 57/*ja*, AB *56, A 327	-	-
CH 039	AB 55/*nu*, AB *56	-	-
CH 040	AB *86, A 359	Boat	-

Table 7.2 *(cont.)*

CH Sign (clay variant if available)	LA Comparanda	Referent	Semantic Field
CH 041	AB 54/*wa*	Loom	Tool/Textile industry
CH 042	AB 08/*a*	Double axe	Cultic
CH 043	A 364 (= B 12/*so*), A 363, A 324, AB 11/*po*	Stunning axe	Cultic
CH 044	B **19*, AB 17/*za*	*Petschaft*	Tool
CH 045	AB 74/*ze*	Comb	Tool/Textile industry
CH 046	A 301	Nautilus? Adze?	Animal/Sea Tool
CH 047	A 309, AB 78/*qe*	Sieve?	Tool
CH 048	variant of AB 81/*ku*, A 305	Flying bird	Animal
CH 049	AB 20/*zo*, AB 37/*ti*, A 304	Arrow?	Weapon
CH 050	A 304, AB 20/*zo*, AB 37/*ti*	Arrow	Weapon
CH 051	A 312, **AB 03/*pa***	Dagger	Weapon
CH 052	AB 24/*ne*	Spouting jug	Vessel
CH 053	A 412 (= B 204), AB 60/*ra*?	One-handle jug	Vessel
CH 054	AB 16/*qa*, A 325	Two-handle jug	Vessel
CH 055	-	-	Vessel
CH 056	variant of CH 044?	-	-
CH 057	A 355, A 354, AB **65*, AB 67/*ki*	Sistrum? Cup	Musical instrument Vessel
CH 058	AB 29/pu_2, AB 69/*tu*	-	-
CH 059	A 704, AB 10/*u*	Plough	Tool
CH 060	-	-	-
CH 061	AB 11/*po*, B 75/*we*	-	-
CH 062	**AB 70/*ko***, AB 06/*na*	Spindle with whorl	Tool/Textile industry
CH 063	Variant of 062? **AB 70/*ko***, AB 03/*pa*, AB 02/*ro*	Spindle with whorl	Tool/Textile industry
CH 064	AB 03/*pa*	-	-
CH 065	A 319	-	-
CH 066–7	-	-	-
CH 068	AB 03/*pa*	-	-
CH 069	AB 76/ra_2	-	-

Table 7.2 *(cont.)*

CH Sign (clay variant if available)	LA Comparanda	Referent	Semantic Field
CH 070	AB 02/*ro*	-	-
CH 071	A 314	-	-
CH 072	A 353, AB 66/*ta*$_2$	-	-
CH 073	A 309a, AB 78/*qe*, AB 77/*ka*	-	-
CH 074/75	AB 78/*qe*	-	-
CH 076	AB 61/*o*	-	-
CH 077 (= CH 178)	A 311, AB 40/*wi*	-	-
CH 078	B 14/*do*	-	-
CH 079–82	-	-	-
CH 083	AB 55/*nu*	-	-
CH 084	-	-	-
CH 085	AB 40/*wi*, AB 41/*si*	-	-
CH 086	-	-	-
CH 087	A 301, B 36/*jo*	-	-
CH 088–91	-	-	-
CH 092	AB 26/*ru*	Lyre? Scorpion?	Musical instrument Animal
CH 093	AB 37/*ti*	-	-
CH 094	AB 38/*e*	-	-
CH 095	AB 60/*ra*, AB 10/*u*	Man's head[71]	Human body
CH 096	AB 16/*qa*, AB **79*	Two-handled jug?	Vessel?
Logograms/ideograms			
CH 153	AB 120/*GRA*, A 339	Wheat	Agriculture
CH 154	AB 122/*OLIV*	Olive tree for 'olives'	Agriculture
CH 155 (= CH 024)	AB 30/*FIC*	Fig-tree branch for 'figs'	Agriculture
CH 156	AB 131a/*VINa*	Vine shoot for 'wine'	Agriculture
CH 157	AB 123/*AROM*	Spice jar? For 'spices'	Agriculture

[71] The shape of AB 60/*ra* as a 'bearded man's face' (profile view) is clearly recognisable as such in the KN ivory sceptre and CH 095 may actually be the conflation of more than one shape/sign (cf. 'seated bird' and 'hand'; the discussion in Salgarella 2021: 88, n. 72).

Table 7.2 *(cont.)*

CH Sign (clay variant if available)	LA Comparanda	Referent	Semantic Field
CH 158	A 303 , B 130/*OLE* (NB: A 302 = B *OLE*)	Olive-tree branch for 'oil'	Agriculture
CH 159	-	-	-
CH 159*bis*	B 33/*ra*$_3$, B 144/*CROC*	Crocus flower	Agriculture
CH 160	B 209	Amphora	Vessel
CH 161	-	-	Vessel
CH 162	-	-	-
CH 163	AB 54/*TELA*	Loom	Tool/Textile industry
CH 164–5	AB 180	-	-
CH 166–73	-	-	-
CH 174 (= CH 031)	AB 27/*re*	Flax	Agriculture
CH 175 (= CH 042)	AB 08/*a*	Double axe	Cultic
CH 176 (= CH 050)	A 304 (= B 231/*SAG* or B 254/*JAC*?)	Arrow	Weapon
CH 177 (= CH 062)	**AB 70/*ko*** , AB 06/*na*	Spindle with whorl	Tool/Textile industry
CH 179–80	-	-	-
CH 181	AB 38/*e* , B 134 (=190)	-	-
CH 182 (cf. 180)	-	-	-

7.7 Towards Further Identifications

The way of equating Cretan Hieroglyphic and Linear A signs is controversial. To be sure, in a number of instances the signs are graphically so similar that it seems impossible to deny them: that the 'double axe' symbol CH 042 corresponds to AB 08/*a* is as evident as it is uncontroversial, and that CH 024 'fig tree' is reflexed in AB 30/*ni* is likewise obvious. But it is clear that *a priori* much is in the eye of the beholder as the changes invoked on the way from Cretan Hieroglyphic to Linear A range from the modest to the radical. *CHIC* (p. 19) accept thirty equations of syllabograms between Cretan Hieroglyphic and Linear A, but many further proposals have been put

forward.[72] Again, scholars will make up their own minds as to what they regard as plausible here and what not. Suggestions for equations are usually made on the basis of putative graphic similarities, with little control of what constitutes a plausible development. In order to rein in the speculations and put the sign development on a sounder methodological footing, Ferrara, Montecchi and Valério 2021b group together signs that underwent similar graphic changes and, on this basis, establish seven different ways (or categories) in which signs can plausibly change their shape. This attempt at imposing a degree of control over what constitutes a plausible graphic change and what does not is certainly very welcome. However, seven different ways which, in addition, are not mutually exclusive but may occur concomitantly, is still a large number given the total number of signs under discussion. In what follows, we shall explore a different approach to the problem, which takes into account the complex relationship between script and the contemporary iconographic background as well as material culture production.[73] It is evident that many Cretan Hieroglyphic signs are close depictions of real-world referents, such as the 'double axe' or the 'eye'. But in a larger number of cases, the identification of such a referent is uncertain. In this instance, a specific object underlying the creation of a Cretan Hieroglyphic sign can be motivated, and the suggestion gains more plausibility if it can be shown to belong to the same semantic field as another established and uncontroversial one. Thus, in a recent article, Nosch and Ulanowska drew attention to the central role that the textile industry played in the creation of Cretan Hieroglyphic signs and identified, amongst other motifs, the flax plant (amply attested on Middle Bronze-Age seals from Crete) as underlying Cretan Hieroglyphic sign 031.[74] As a second step, the sign development from Cretan Hieroglyphic to Linear A/Linear B needs to be motivated and, as a result, an approximate sound value can be obtained for this sign (with the proviso and the limitations regarding Linear A set out above). Finally, the plausibility of the proposed identification can then be significantly enhanced if the resulting sign can be shown to match the beginning of a word (acrophonic principle)[75] for

[72] See the list in Table 1 and the discussion in Ferrara, Montecchi and Valério 2021b.

[73] See esp. Salgarella 2021 for a theoretical framework of motif transferral across different media.

[74] Nosch and Ulanowska 2021: 79.

[75] On this principle, the sound value associated with a sign corresponds to the first syllable of the word standing for the real-world referent the sign represents. For example, sign AB 30, graphically representing a branch with fig-tree leaves (Weilhartner 2014: 299–300; 2015: 256), is read with the syllabic value /ni/ and is also used as the logogram for 'fig'. This sign has been demonstrated (Neumann 1962) to be the acrophonic abbreviation of νικύλεον /nikyleon/, probably the Minoan word for 'fig' as strongly suggested by the gloss: Ἑρμῶναξ δ' ἐν γλώσσαις Κρητικαῖς σύκων γένη ἀναγράφει ἀμάδεα καὶ νικύλεα 'Hermonax in the Cretan glosses records as kinds of figs the ἀμάδεα [/hamadea/] and the νικύλεα [/nikylea/]' (Athenaios 3.76e).

the underlying real-world referent in Greek (provided that this Greek word has no likely etymology and is plausibly a loan word and, in addition, sits well in the Aegean Bronze-Age material and cultural context). Applying this method, in what follows we shall look at a number of selected case studies.[76]

CH 042 = AB 08/*a*[77]

(Referent: Double Axe; Semantic Field: Cultic, Weapons)

The most iconic of all 'Minoan' symbols, the double axe, has a long and unbroken history in the development of the Cretan scripts. It is well attested on seals as the sole sign (e.g. *CMS* II 2, 155c, Malia, *Atelier des sceaux*), or as part of a pictorially represented scene (held by an individual, e.g. *CMS* II 3, 008, Knossos, Court of the Stone Spout), or indeed as the very shape of the seal (e.g. *CMS* VS, 3, Moni Odigitria?). Further on the road to script creation, it surfaces on Cretan Hieroglyphic inscriptions both on seals and on clay before passing into Linear A and Linear B, in both of which it has the sound value /a/.[78] This identification is not new, of course; rather it seems entirely uncontroversial and universally accepted. The sign development is as simple as it is modest, reducing the x-shaped internal strokes to a single horizontal line. But it may even be possible to connect it to an attested Greek word. In Homer, one of the words for a short-range weapon is ἄορ /aor/. This is traditionally translated as 'sword', presumably because it is used in the same way and contexts as a ξίφος /ksip^{h}os/. Closer inspection shows, however, that to a large extent ἄορ is simply a rare metrical alternative to ξίφος in a formulaic context.[79] The word is also attested in Hesiod, but apart from a single Homeric reminiscence in Euripides (*El*. 475) it disappears from Greek and is never attested in prose until much later epic poets start using it again but use it for any weapon, e.g. Poseidon's trident in Callimachus *Del.* 31 or even the horn of a rhinoceros (Oppian, *Cyn.* 2.553). It is evident that the word is fading in meaning and use from Homer onwards. In Mycenaean, the word is not attested as such, but does appear in the personal name *a-o-ri-me-ne* Ἀοριμένης /Aorimene:s/ on a tablet from Pylos (PY Qa 1296). As far as the etymology is concerned, two proposals have been put forward. Already the Greeks

[76] Further proposals are put forward in Salgarella 2021.

[77] Palaeographic charts: for CH 042, see *CHIC*: 401–2; for AB 08 in Linear A, see *GORILA* V: xxix and *SigLA* (look up 'AB08'); for AB 08 in Linear B, see *Docs*^{2}: 41, fig. 9.

[78] Cf. e.g. the name equation Linear A *a-ra-na-re* (HT 1.4): Linear B *a-ra-na-ro* (masc. anthrop. on KN As 1516.1).

[79] See *LfgrE s.v.*

connected it with ἀείρω /aeiro:/ 'raise, hang',[80] but this etymology is problematic not just because of the semantics but more importantly for formal reasons. ἀείρω has no known cognates, but if it is old then the root would seem to require a reconstruction *h_2u̯er-, which is incompatible with Mycenaean *a-o-ri-me-ne*. If it is not old then the extremely archaic formation (neuter root noun with ablaut in the root vowel) is hard to accept. The alternative etymology, commonly ascribed (see *EDG* s.v.) to Ruijgh 1970 but in fact already found in Prellwitz 1892 s.v., connects it with Lat. *ensis* 'sword' and Skt. *así-* 'butcher's knife', containing the zero grade *n̥s- < *nes- 'to save'. In fact, this is, if anything, more difficult than the traditional etymology. The stem formation *n̥s-r̥ remains entirely unexplained, the zero grade of the root is unexpected and from a morphological point of view such a reconstruction is unacceptable. Furthermore, the inflection as an r-stem is incomprehensible as we would rather expect a heteroclitic inflection.[81] The conclusion must thus be that neither etymology is acceptable. This leads us to reconsider the entire problem. It can be observed that the ἄορ has strong cultic connections. The epithet χρυσάωρ /k^hry:sa:o:r/, -ορος /-oros/, also thematised as χρυσάορος /k^hry:sa:oros/, -ου /-u:/ 'with a golden ἄορ', is an epithet of Apollo in the *Iliad* and in Hesiod and, uniquely, even surfaces as a personal name Χρυσάωρ /K^{h}ry:sa:o:r/ (Hesiod *Th.* 979). This use in a personal name is mirrored in Mycenaean *a-o-ri-me-ne* 'who has spirit through the ἄορ' quoted above – and that this is the name of a priest in Linear B is rather telling; as a weapon that is actually used in battle, however, the word is conspicuously absent in Mycenaean. The suggestion put forward here, then, is that ἄορ is in origin the word for the double axe and a Minoan loan word, and that sign CH 042 = AB 08/*a* is the acrophonic rendering of this.

CH 051 = AB 03/*pa*[82]

(Referent: Dagger; Semantic Field: Cultic, Weapon)

A very frequent sign in both Linear A and Linear B, *pa* is so far lacking an antecedent in Cretan Hieroglyphic. The standard way of drawing it

[80] Cf. *Lexicon anepigraphum quod incipit a voce αἰμωδεῖν* p. 619: ἄορ σημαίνει τὸ ξίφος παρὰ τὸ ἀείρω, 'aor means the sword, from the verb aeiro:'.

[81] Ruijgh 1970: 313 invokes μεγαλήτορος/ /megale:toros/, μεγαλήτορι /megale:tori/ < *ἦτορ /e:tor/ as a parallel for the inflection, but this does not work. In a compound, this way of creating an animate form is entirely regular and expected, and the resulting μεγαλήτωρ /megale:to:r/ has close inflectional parallel in the agent nouns of the type ῥήτωρ /r^{h}e:to:r/; for a neuter noun to inflect in this way, however, is without parallel.

[82] Palaeographic charts: for CH 051, see *CHIC*: 409; for AB 03 in Linear A, see *GORILA* V: xxviii and *SigLA* (look up 'AB03'); for AB 03 in Linear B, see *Docs*^{2}: 41, fig. 9.

in both Linear A and Linear B is a vertical line with two horizontal lines crossing it in the middle: 𐄪. But this is probably not the oldest shape of the sign. At Phaistos and Ayia Triada, this sign sometimes shows a significant variant inasmuch as the lower horizontal stroke is, in fact, a large dot, e.g. PH 7a (dating from MM IIB)  [83] and it can furthermore be observed that if the lower stroke is indeed a stroke at these two sites it is often significantly shorter than the upper one. This is certainly not accidental, and now also has a clear parallel on the Linear A inscribed ivory sceptre ring from Knossos (preliminarily dated to about 1600 BC), as yet unpublished, where the lower 'stroke' towards the bottom of the vertical line is clearly a relatively large round dot. A good number of signs on this ring look 'hieroglyphicised', not dissimilar to some of the signs on the libation table IO ZA 2,[84] providing a remarkable bridge between Cretan Hieroglyphic and Linear A. The early date of the PH attestation speaks clearly in favour of this being the older shape of the sign and it is much more plausible to argue that it was 'linearised' by transforming the dot into a second horizontal line (eventually of roughly equal length) than vice versa. It is suggested here that the real-world referent for this sign is a dagger or short sword, with the pommel at the bottom and the cross-guard a bit further up. This might make it comparable to CH 051, which is clearly a short sword or dagger. The graphic change on the way from Cretan Hieroglyphic to Linear A would simply have been the merging of the diagonal lines, i.e. the edges of the blade, into one vertical one (which is what the sword/dagger looked like from the side). The fact that in the Linear scripts the sign is attested in a pretty much unchanged form as a logogram/ideogram need not contradict this. Logogram/ideogram and syllabogram sometimes went their own ways; or of course the logogram/ideogram could have been re-created at any point in time. But it is interesting to note what the logogram/ideogram stands for. On KN Ra 1540 the logogram for daggers is explicitly referred to as *pa-ka-na* φάσγανα /p^{h}asgana/. In later Greek, φάσγανον /p^{h}asganon/ is clearly a highly poetic word, found from Homer onward, and not attested in prose. It is practically impossible to explain this word in any credible way as inherited.[85] The root shape and structure with its a-vocalism and the sequence -σγ- /-sg-/ looks thoroughly non-Indo-European. This is shown even more clearly by the fact that we get an irregularly metathesised root form σφαγ- / sphag-/ in σφάζω /sp^{h}azo:/, σφαγή /sp^{h}age:/ etc. It is highly significant that in Homer the verb does not mean 'to kill' in a general sense,

[83] Source: Image from *SigLA*, courtesy of the authors. [84] *GORILA* V: 18–19.
[85] See also *EDG* s.v.

but is always used to refer to slaughtering cattle by cutting the throat (i.e. exactly what a short weapon would be used for), and generally so for sacrificial purposes. This meaning of the root is also attested in Mycenaean in the place name *pa-ki-ja-ne* /Sp^{h}agianes/ *vel sim.*, apparently the most important religious site at Pylos, as well as in the later name of the island Σφακτηρία /Sp^{h}akte:ria:/. It is thus suggested here that AB 03/*pa* represents the dagger, that this sign has an antecedent in CH 051 and that this refers to a weapon that is used in a cultic or religious context,[86] just like CH 042 = AB 08/*a* for ἄορ /aor/.

CH 062/063= AB 70/*ko*[87]

(Referent: Spindle Whorl; Semantic Field: Textile Industry)

CHIC lists CH 062 and 063 as two different signs. This is possible because there are no shared sequences between these two signs, i.e. no sequence in which 062 occurs is ever written with 063. Still, there are reasons to think that they are, in fact, the same sign. The shapes of CH 062 and 063 vary solely by the position of the dot on the vertical line. CH 062 has it at the top, the much more rarely attested CH 063 in the middle. It would be highly unusual for two signs to be differentiated in such a minimal way and that they are simply variants of one and the same sign seems highly plausible. No certain successor to this sign (assuming it is just one) has been identified in the Linear scripts and in what follows a very tentative suggestion will be made. In their influential article already mentioned, Nosch and Ulanowska have identified the textile industry as a core semantic field for the creation of Cretan Hieroglyphic signs.[88] They argue compellingly for CH 062 and 063 to be the spindle with a whorl. This would, incidentally, also neatly account for the difference in graphic representation as, depending on the technique employed, the whorl might sit in different positions on the spindle; the usual CH 062, therefore, would depict the drop spindle. In the Linear scripts, the sign graphically closest to this might be AB 70/*ko* 𐀞. The Greek word for 'spindle' is ἄτρακτος /atraktos/ and thus cannot acrophonically be equated with AB 70/*ko*, though the word, in this sense, is not attested until the fifth century BC. But in many languages, the word for spindle, although originating in textile production, is then also used for a variety of unrelated (from a practical point of view) but

[86] See e.g. the Mycenaean daggers from the Grave Circles at Mycenae (Karo 1930–1933; Papadopoulos 1998).

[87] Palaeographic charts: for CH 062/063, see *CHIC*: 413–14; for AB 70 in Linear A, see *GORILA* V: xxxix and *SigLA* (look up 'AB70'); for AB 70 in Linear B, see *Docs*^{2}: 41, fig. 9.

[88] Nosch and Ulanowska 2021.

similarly shaped objects. Thus, in English, 'spindle' also signifies the long metal bolt to which the door-knob is attached. In Greek, there is a word κόλλοψ /kollops/ (gen. sing. κόλλοπος /kollopos/) signifying the peg of a lyre around which the string is wound (*Od.* 23.407+). This word is clearly a loan word[89] (just like the word itself, and CH 092 = AB 26/*ru* may very well acrophonically stand for the lyre); this is clearly confirmed by the existence of the variant κόλλαβος /kollabos/ (Lucian, *DDeor.* 7.4.+) with the typical oscillation between voiceless and voiced stop and o/a vowel interchange. Furthermore, it is tempting to connect it with σκόλοψ /skolops/ (gen. sing. σκόλοπος /skolopos/) 'palisade, prickle', in other words, another wooden implement with a sharp point. The use of the 'spindle and whorl' motif in Middle Minoan iconography is not in any doubt[90] and the depiction of the spindle and whorl on several seals[91] looks virtually identical to standard renderings of AB 70/*ko*. The only significant change along the way from Cretan Hieroglyphic to Linear A and Linear B would have been the standardisation of the position of the whorl at the top. This is unsurprising as Linear A and Linear B signs tend to have their most diacritic feature either at the very top or at the very bottom of the sign. Although it is not as straightforward as the first two signs considered, there are good reasons to think that CH 062/063 = AB 70/*ko* and that the word underlying it meant 'spindle' or, more generally, given the slightly different reflexes in Greek, 'pointed peg/pole'.

CH 019 = AB 31/*sa*[92]

(Referent: Fish; Semantic Field: Nature, Seascape)

Attested on both seals and clay documents, CH 019 has a long history of use, as its shape is also recognisable in the second and third signs of the earlier Archanes inscription (traditionally read A-SA-SA-RA-NE).[93] A frequent symbol on seals, it has been suggested that CH 019 represents some kind of fish, possibly a 'sepia'[94] or 'cuttlefish.'[95] Although the

[89] Just like the word for the lyre itself: λύρα /lyra:/ is clearly not an inherited word (see *EDG* s.v.). Remarkably, CH 092 = AB 26/*ru* has exactly the shape of the lyre and, given that the sound value /ru/ is secure in both Linear scripts (cf. e.g. Linear A *ku-ru-ku* HT 87.4, a personal name appearing in Linear B as *ku-ru-ka* KN Vc 5510), it is very plausibly acrophonic. Conceivably, therefore, both signs, CH 062/063 and 092, belong not just to the same semantic sphere but to the very same object.

[90] See Nosch and Ulanowska 2021: 89.

[91] E.g. *CMS* IV, 136a = *CHIC* #305α (Nosch and Ulanowska 2021: 90 (f)).

[92] Palaeographic charts: for CH 019, see *CHIC*: 392–3; for AB 31 in Linear A, see *GORILA* V: xxxiv and *SigLA* (look up 'AB31'); for AB 31 in Linear B, see *Docs*²: 41, fig. 9.

[93] See section 7.5. [94] Thus *SM* I: 205. [95] Jasink 2009: 69–71, 146.

precise identification remains uncertain, an iconographic interpretation of this sign's shape as 'fish' makes it belong in the semantic fields of 'nature' and, more precisely, 'seascape'.[96] Seascapes, with naturalistic designs of plants and marine life alike, permeate the visual culture of Middle and Late Bronze-Age Crete, culminating in the development of the 'Marine Style' (ca. MM III–LM IA). Thus, in addition to being a real-world referent, fish is a well-established and common motif appearing on a variety of media, such as glyptic, pottery decoration, frescoes. We may therefore reconstruct a pattern of motif transferral from the naturalistic world (animal), through material culture production (esp. glyptic context), to script, where the motif 'fish' became further stylised to become a script-sign.[97] This sign continued on into the Linear tradition, as sign AB 31/*sa*, which is read with the phonetic value /sa/.[98] We can be reasonably certain that the Linear sign is a continuation of the Cretan Hieroglyphic sign not only for the remarkable formal similarity (although it underwent further stylisation in Linear A), but also because the so-called 'Archanes formula' is also attested in a number of inscriptions clearly identifiable as Linear A (from non-administrative contexts) (see section 7.5). Here we would like to go a step further and suggest that the phonetic value /sa/ associated with this sign originated by way of acrophony from a word belonging to the Pre-Greek substratum that stood for the real-world-referent 'fish' (either a generic name or that of the specific type of fish represented, that still escapes us). Remarkably, in Greek there are a number of words beginning in /sa/ which do not have a clear etymology. We have σάνδαλον /sandalon/ (alternating with σάμβαλον /sambalon/) 'name of a flat fish' (*EDG* s.v., in *DELG* compared to Lat. *soleas*),[99] σαλαμάνδρα /salamandra/ 'salamander, kind of newt' (*EDG* s.v.) and a number of nouns generically defined as 'name of a fish' (*EDG* ss.vv.), namely σαπέρδης /saperde:s/, σαργός /sargos/, σάρδα /sarda/[100]. In addition to these, there is also the noun σαγήνη / sage:ne:/ 'large fishing net, trawl' (*EDG* s.v.), whose etymon is understood to be Pre-Greek. That the name of 'fish' or 'of a fish' (or a way

[96] Other signs belonging in the semantic field 'nature / seascapes' are: AB 50/*pu* (without Cretan Hieroglyphic antecedent) and A 301 (= CH 046 or 087), said to be the stylisations of an octopus and a nautilus respectively (Salgarella 2021: 78–81). To these, we propose to add AB 41/*si* (without Cretan Hieroglyphic antecedent), which is likely to be the stylisation of the real-world referent 'trident' (see e.g. image in Andreadaki-Vlasaki *et al.* 2008, vol. I, item no. 60).

[97] In Cretan Hieroglyphic there are at least two other symbols (not numbered in *CHIC*) representing fish (Jasink 2009: 48, 146), whose precise function in the script is, however, unclear (signs, decorative elements, other?).

[98] Graphic parallel first put forward by Evans 1921 and accepted in *CHIC*.

[99] See also Strömberg 1943: 37.

[100] See also ibid.: 86 (σάρδα /sarda/), 134 (σαργός /sargos/).

of referring to the semantic field of 'fish') may have begun with /sa/ in the Minoan language(s) is therefore a plausible and rather appealing suggestion, which may deserve further critical consideration. For the time being, however, a degree of uncertainty remains.

7.8 Conclusions

In this chapter, we have argued that from a purely graphic point of view, Cretan Hieroglyphic is clearly closest to Linear A. The recent find of the ivory sceptre ring from Knossos (see section 7.4), which shows for the first time Linear A signs that are carved as if on seals, only serves to confirm their relatedness. However, it is important to stress that a close graphic similarity does not imply that Cretan Hieroglyphic functions just like Linear A. To what extent the acrophonic 'syllabic principle' was already being used by the people who carved and used the seals remains unclear. Moreover, we do well to remember that, in addition to signs rendering syllables, Linear A uses a large number of logograms/ideograms (some of them still clearly close depictions of real-world referents) and individual (single and transaction) signs having a meaning probably at word (or conceptual) level. Finding parallels for these functional categories in Cretan Hieroglyphic may not necessarily prove a fruitful approach, as we should not confuse the graphic with the functional level when comparing scripts and their writing conventions (and systems). Graphic connections between Cretan Hieroglyphic and Linear A signs can be motivated in significantly more cases than *CHIC* – who understandably took a rather conservative approach here – would suggest and admit. This has potentially serious implications for our view of script development. It seems plausible to suggest that, in principle, most signs of the Linear A script are based on and derived from those found in Cretan Hieroglyphic.[101] Recent analyses, including the present chapter (see Table 7.1), strongly suggest that the number of shared signs may be larger than hitherto admitted, which brings Cretan Hieroglyphic and Linear A even closer than previously assumed. However, the whole matter will not be entirely settled until further sign equations (or the clear proof of the lack thereof) are established. That a certain degree of fluidity had to be reckoned with here is beyond doubt. For, on the one hand there may well be signs and motifs used in Cretan

[101] This is true for almost all Linear A simple signs (see Salgarella 2020: 300–56 for significant exceptions), whereas Linear A composite signs do not find parallels in Cretan Hieroglyphic and are genuine Linear A innovations.

Hieroglyphic that have not yet been found (or identified as such), and on the other hand some Linear A signs might have more than one Cretan Hieroglyphic antecedent, especially given that the sign classification of Cretan Hieroglyphic is in many ways uncertain.

It is thus plausible to assume that within Cretan Hieroglyphic script formation was not yet complete. Cretan Hieroglyphic is not just chronologically earlier than Linear A, it is also rooted in earlier Middle Minoan glyptic, both as far as visual motifs are concerned and as regards the supports on which it is employed.[102] The same cannot be said for Linear A. There are no matching clay documents or any of the other supports on which Linear A is found that are written in anything (other than in Cretan Hieroglyphic) that could plausibly be regarded as the ancestor of Linear A (see section 7.5 for a discussion of the 'Archanes script'). As the gap between Cretan Hieroglyphic and Linear A seems to be narrowing with the most recent advances in the field, the most plausible scenario regarding the historical reconstruction of the script formation and transmission process may be set out as follows. Cretan Hieroglyphic develops out of earlier Minoan glyptic by standardising motifs and creating new signs based on real-world referents, and by conventionalising their use on seals. To what extent Cretan Hieroglyphic already possesses a phonetic, more specifically syllabic, character at this stage in the way Linear A does is not clear. At some point, Linear A was developed essentially on the basis of Cretan Hieroglyphic, most probably to meet more complex administrative needs. The obvious alternative, the derivation of Linear A out of the 'Archanes script group' cannot ultimately be excluded but faces serious difficulties (as illustrated in section 7.5). Put differently, there is insufficient evidence for an earlier stage with two parallel writing traditions, although it remains entirely possible that differences in the signs, sign shape, use and function of Cretan Hieroglyphic across different sites on Crete existed.

The creation of a fully fledged script, indeed a complex writing system, namely Linear A, was a major step, involving the wholesale application of the acrophonic principle (most likely among others),[103] and may well have been a reaction to the increased need for recording more complex economic transactions than the traditional sealing practice could afford. This increased need, in turn, may have been the result of an increasing economic complexity in key areas, above all an upswing in textile production, in MM II/III. Another reaction to this need was the transfer of Cretan Hieroglyphic onto clay for more

[102] See Decorte 2018c; Ferrara 2021: 218–21.
[103] See e.g. 'analogical principle' in Salgarella 2021.

complex administrative purposes, resulting in a script that was so similar to Linear A in appearance that a number of 'dubitanda' exist (see section 7.6) and meaning that the early clay documents are not tied to a single script. This simple transfer of Cretan Hieroglyphic to clay remained geographically restricted to the north-eastern part of the island and, although it may well have involved a degree of development of Cretan Hieroglyphic in itself, it proved ultimately unsuccessful: neither in geographical nor in chronological terms, nor in the breadth of use and the kind of supports could Cretan Hieroglyphic match the flexibility of Linear A. This does mean that for a short period of time, perhaps 100 years or so, Cretan Hieroglyphic and Linear A were indeed used as parallel systems (with Cretan Hieroglyphic at home in north and north-east Crete, and Linear A primarily in central-south Crete), and it is also possible the Cretan Hieroglyphic on the north-east coast continued to influence the shape of Linear A, providing part of the reason for the differences in Linear A across the various sites. Leaving aside the difficult question regarding the position of the 'Archanes script', it would appear that Cretan Hieroglyphic has the strongest connections with Linear A. In fact, the gap between the two scripts seems to be getting ever smaller. While *CHIC* only accepts fifty-four sign equations (thirty-four syllabograms, thirteen logograms/ideograms, seven fractional signs),[104] other scholars have put forward additional candidates, and in section 7.7 we add a number of further suggestions. Taken together they mean that Linear A parallels have been put forward for the great majority of Cretan Hieroglyphic signs. Not all of them will be acceptable to all scholars, but the gap between Cretan Hieroglyphic and Linear A has undoubtedly narrowed over the last few decades, to the extent that a straight derivation of Linear A out of Cretan Hieroglyphic now seems the most plausible scenario.

[104] *CHIC*: 19.