INTRODUCTION TO THE AEGEAN PRE-ALPHABETIC SCRIPTS

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ABSTRACT

This paper presents an introduction to the family of five syllabic scripts used in the Aegean and Cyprus before the introduction of the Greek alphabet: Cretan Hieroglyphic, Linear A, Cypro-Minoan, Linear B, and the Cypriot Syllabary. The sections on each script include descriptions of (1) the corpus of inscriptions, (2) the syllabary and its structure, (3) the spelling conventions (if known), and (4) the standard editions of the corpus. The paper concludes with an evaluation of the problems that are hindering the decipherment the three earliest scripts.

RESUMEN

Este artículo presenta una introducción a la familia de cinco sistemas de escritura silábicas que se utilizaron en el Egeo y Chipre antes de la introducción del alfabeto griego: jeroglífico cretense, lineal A, chipro-minoico, lineal B, y el silabario chipriota. Las secciones sobre cada sistema de escritura incluyen descripciones (1) del corpus de las inscripciones, (2) del silabario y su estructura, (3) de las reglas de ortografía (si son sabidas), y (4) de las ediciones oficiales del corpus. El artículo concluye con una evaluación de los problemas que están impidiendo el desciframiento de los tres silabarios más tempranos.

Before the advent of the Greek alphabet, the written records of Mainland Greece, Crete, and Cyprus were recorded using a family of five related scripts. The earliest of these was Cretan Hieroglyphic, devised by the Minoans on Crete at the end of the 3rd millennium BCE; their later script,

Linear A, is based on Cretan Hieroglyphic. Linear A in turn served as the model for two more scripts near the end of the Bronze Age: Cypro-Minoan, the script of the pre-Greek inhabitants of Cyprus; and Linear B, the script of the Mycenaeans, used for writing Mycenaean Greek. Finally, in the early Iron Age, the Greek-speaking peoples of Cyprus used Cypro-Minoan as the model for a new script, the Cypriot Syllabary, and employed it to write in their own dialect of Greek.[1]

The following figure illustrates the family relationships of these five scripts, and the periods during which each of the scripts flourished:
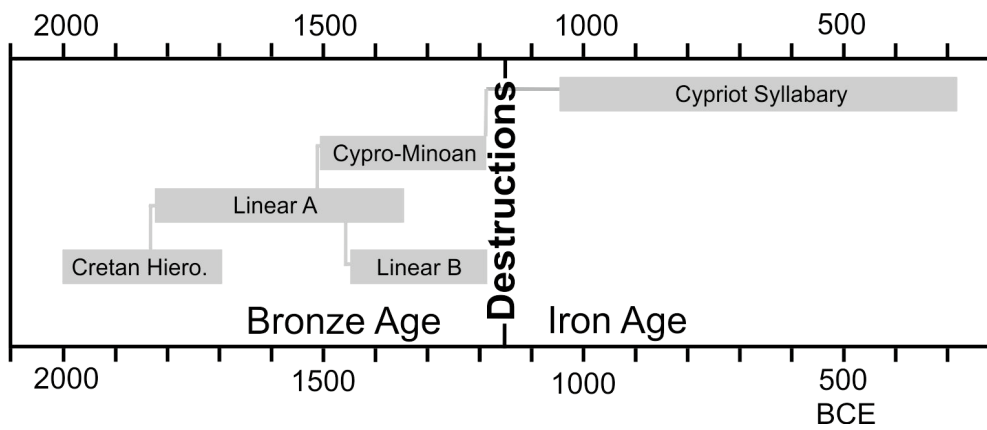
Fig. 1. Relationships between Aegean pre-alphabetic scripts, and main periods of use.

Only two of these five non-alphabetic scripts have been deciphered: the Cypriot Syllabary and Linear B.

THE CYPRIOT SYLLABARY

Of all the surviving inscriptions in the four earlier scripts, none are later than the destructions at the end of the Bronze Age; yet in Cyprus in the 11th c. BCE, a new script emerged that was clearly based on Cypro-Minoan, suggesting that knowledge of Cypro-Minoan must have survived at least

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[1] Two further pre-alphabetic Aegean scripts are not dealt with in this article, as each is attested on just a single object: the Phaistos Disk (241 signs; MM II-IIIb, 1900-1700 BCE in the Aegean high chronology: Rehak and Younger 1998), and the Arkalochori Axe (15 signs; transition between MM III and LM I, ca. 1700 BCE). Both these Minoan objects are inscribed with scripts that resemble (but are not the same as) Cretan Hieroglyphic. The two objects may themselves be inscribed in the same script, though the brevity of the inscription on the axe makes this difficult to demonstrate. There is currently no way of determining whether the writing on these two objects was a precursor of Cretan Hieroglyphic, or was derived from it. Thorough descriptions of the objects and their inscriptions can be found in Duhoux (1977) and Godart (1995).

into the Early Iron Age. This new script was the Cypriot Syllabary, which appears to have been used primarily to create records in the Arcado-Cypriot dialect of Greek that was spoken on Cyprus. Some Cypriot Syllabic inscriptions, however, are in *Eteocypriot*, an unknown indigenous language that may have been a surviving descendant of the language(s) that the earlier Cypro-Minoan script was created to record. Eteocypriot inscriptions are attested from the 5th c. onwards, but earlier examples must have existed. Despite the introduction of the Greek alphabet into Cyprus sometime before the middle of the first millennium, the Cypriot Syllabary proved remarkably resilient, continuing to be used alongside it to record Greek and Eteocypriot until falling finally out of use at the beginning of the 3rd century (Karali 2007: 239).

Summary of the corpus

About 800 inscriptions in the Cypriot Syllabary are known from Cyprus, as well as another 80 or so from Egypt. The Egyptian inscriptions consist of graffiti, mostly personal names. The Cypriot inscriptions are incised in stone, clay and metal (including a number of coins), and painted on pottery; they vary greatly in length, with only a few being longer than 100 signs. The longest is the clear and unbroken inscription on the bronze tablet of Idalium (ICS 217), at over 1000 signs. Other lengthy inscriptions include a bilingual document from Idalium (ICS 220) incised with the same text in Greek and Phoenician; the clearly-incised votive relief of Golgi (ICS 264, 78 signs); the Salamis Ostracon (ICS 318, ca. 600 BCE, 216 painted signs); and the Bulwer Tablet (ICS 327, 163 signs), though 1/4 to 1/3 of the latter is missing (Mitford and Masson 1982: 71–72).

Eteocypriot inscriptions in the Cypriot Syllabary come mostly from the area around Amathus, on the south coast. Perhaps the most famous (ICS 196) is a bilingual document incised with the same text in Eteocypriot and alphabetic Greek—though this document has been of little help in understanding Eteocypriot, as the Greek text is much shorter than the Eteocypriot one (O. Masson 2007: 243–244).

Structure of the syllabary

The decipherment of the 55-sign Cypriot Syllabary began in 1871 with the brilliant English Assyriologist George Smith's analysis of the Phoenician bilingual of Idalium (Mitford and Masson 1982: 71). Smith and

those that followed him showed that in most instances, the Cypriot Syllabary was being used to write Greek, and that the 55 characters of the syllabary all represented *open syllables*—that is, syllables consisting either of a lone vowel (V), or a consonant plus a vowel (CV):

		J	K	M	N	P	R	L	S	T	W	KS	Z
A	✳	◯	⤊	✖	⊤	✚	Ω	✓	V	⊢	✕	)(	⅄
E	✳	⤨	✕	Ѡ	↯	⇑	8	Ш	↓	I	(-		
I	✕		⤋	✓	⇟	∨	Ǝ	∠	⤒	↑	✕		
O	⤓	∿	∏	Φ	⁊	⑨	Ω	+	⤓	F	⤊		⧚
U	⤒		✳	⋈	⟩|	⊻	)|	⊍	⤼	⊞			

Fig. 2. The Cypriot Syllabary.

For example, the values of the signs in the first column are *a, e, i, o,* and *u*; in the second column, *ja* and *jo*; in the third column, *ka, ke, ki, ko,* and *ku*; and so on.

Spelling conventions

Greek, however, does not consist solely of open syllables: it also contains *closed syllables*, which end in a consonant (CVC). As a result, consonants can occur contiguously within Greek words (παν̱τα 'all', αν̱θρωπω 'of man', αρ̱γυρω 'of silver'); and many Greek words end in consonants (παιδων̱ 'of the children'). It is also common for Greek words to begin with contiguous consonants (Σ̱τασανδρος, a man's name).

For writing contiguous and word-final consonants, the Cypriot Syllabary therefore adopted a spelling strategy that can be summarized in the following four rules (Woodard 1997: 112–132):

1. If the first member of a word-internal cluster C_1C_2 is a nasal [m, n], the nasal is omitted from the spelling: *pa-ta* /παντα/ 'all'.

2. Other word-internal clusters are spelled in one of two ways, depending on the relative position of the two consonants within the following 'hierarchy of orthographic strength':
    stops [p, t, k; b, d, g; p^h, t^h, k^h] > *fricatives* [s, z] > *nasals* [m, n] > *glides* [w, y] > *liquids* [l, r]

a. If the orthographic strength of C_2 is less than or equal to that of C_1, then the cluster is spelled by separating the consonants with an 'empty' vowel borrowed from the following syllable ('progressive spelling'): *a-t(o)-ro-po* /ανθρωπω/ 'of a man'

b. If the strength of C_2 is greater than that of C_1, then the cluster is spelled by separating the consonants with an 'empty' vowel borrowed from the preceding syllable ('regressive spelling'): *a-r(a)-ku-ro* /αργυρω/ 'of silver'.

3. Word-initial clusters are always spelled with progressive spelling: *s(a)-ta-sa-to-ro* /Στασανδρω/ 'of Stasandros'

4. Word-final consonants are spelled with an 'empty' vowel [e]: *pa-i-to-n(e)* /παιδων/ 'of the children'.

The spelling strategy used in the Cypriot Syllabary has the advantage of resulting in the omission of very few phonemes from the orthography, thus reducing the number of alternate ways in which an inscribed word can be interpreted.

Standard editions

The standard edition of Greek inscriptions in the Cypriot Syllabary is O. Masson (1983), commonly referred to as 'ICS'; however, additional inscriptions have been discovered in the 25 years since its publication. Hirschfeld (1996) lists all Cypriot Syllabic inscriptions, both Greek and Eteocypriot, discovered up through 1995. This list is also available online at: http://paspserver.class.utexas.edu/cyprus/index.html.

CYPRO-MINOAN

Cypro-Minoan, the script on which the Cypriot Syllabary was based, was devised by the pre-Greek inhabitants of Cyprus around the middle of the second millennium BCE. As Cyprus was part of a flourishing Near Eastern, Levantine and Egyptian trade network from at least the 16th through the 13th c. (Niemeier 1998: 38), it is rather surprising that the pre-Greek Cypriots chose to base their new script on Linear A, the script of the Minoans on Crete (E. Masson 1987: 368; Palaima 1989b: 40–41; Kanta

1998: 37), rather than on a more widely-used script such as cuneiform. Perhaps the relative simplicity of Linear A (with about 100 signs) recommended it over the more complex cuneiform system, which employs hundreds of signs and requires a knowledge of both Akkadian and Sumerian (Palaima 1989a: 161–162).

The language of the Cypro-Minoan inscriptions remains entirely unknown.

Summary of the corpus

The inscriptions are typically classified according to the *variety* of Cypro-Minoan that they contain. In the early 1970s, Masson published a classification of signs, in which she distinguished between four different varieties of the script: 'archaic CM', 'CM1', CM2', and 'CM3' (E. Masson 1974: 12–15). She identified 'archaic CM' on four of the oldest inscribed objects, dating from the last half of the 16th c. through 15th c. BCE (E. Masson 1974: 11). These objects include a clay weight from Enkomi (6 signs), a cylinder seal from Enkomi (4 signs), a jug from Katydhata (3 signs), and the clay tablet Enkomi 1885 (23 signs). The entire body of attested archaic CM inscriptions thus consists of 36 signs on four objects.

Masson characterized CM1 signs as similar to archaic CM, yet more 'supple', and drawn with a 'certain elegance' (E. Masson 1974: 15). She assigned this variety to the majority of Cypro-Minoan inscriptions, including a total of 378 signs on clay cylinders and tablets, 100 signs on pottery, 83 signs on metal, 44 signs on stone, 35 signs on ivory and faience, and an additional 359 signs on small clay balls of unknown purpose found at various sites . In all, the corpus of CM1 inscriptions amounts to just under 1000 signs on around 160 objects (83 of which are clay balls).

In contrast to the 'supple' ductus and 'elegant' look of CM1 signs, Masson characterized CM2 signs as 'square and squat' (E. Masson 1974: 15). The evidence for this variety of Cypro-Minoan is limited to three clay tablets, containing a total of about 1310 signs.

Masson distinguished CM3 as a separate variety of Cypro-Minoan used only at Ugarit, noting that this variety appears to include some signs not present in other varieties (E. Masson 1974: 16). As is the case with CM2, objects containing CM3 inscriptions are very few in number. They include two clay tablets, a pithos rim, and a silver bowl from Ras Shamra, as well as a cylinder seal from Latakia, for a total of 228 signs.

The entire corpus of inscriptions of all four varieties thus amounts to no more than 2570 signs, despite the script's use over a period of several centuries. One of the chief reasons for the small size of the corpus is that many of the largest Bronze Age Cypriot sites were simply abandoned (Drews 1995: 12; Gates 2003: 156; Iacovou 2006: 325–326); they were not destroyed in final conflagrations, like the Minoan and Mycenaean palaces. As a result, the clay records at these Cypriot sites were not baked into a durable ceramic: they remained clay, and would not have survived long once exposed to moisture.

Some Cypro-Minoan documents are clearly administrative records (Smith and Hirschfeld 1999: 130); but the use of the script on objects such as votive copper ingot, a votive liver, and a bull figurine (E. Masson 1973: 96) shows that the script had ritual uses, like its parent Linear A—but unlike Linear B, which seems to have been used solely for administration.

Structure of the Syllabary

Masson extracted a list of 30 signs from the objects inscribed in 'archaic CM':

Fig. 3. Masson's 'Archaic CM' signs (after E. Masson 1974: 12, fig. 1)

From the inscriptions containing 'CM1', 'CM2' and 'CM3' inscriptions, she isolated 85, 59, and 44 individual signs, respectively:

Fig. 4. Masson's Cypro-Minoan signs 1–57 (after E. Masson 1974: 13–15).

Fig. 5. Masson's Cypro-Minoan signs 58–114 (after E. Masson 1974: 13–15).

Masson's sign lists are useful attempts to classify the Cypro-Minoan signs by shape, but their validity as definitive sign-lists was long ago called into question, as was the division of the script into four varieties (Palaima 1989a: 121). The reason is that Masson's work was not based on a formal and comprehensive paleographic study of the entire corpus of inscriptions; indeed, it could not be, for such a paleographic study must in turn be based on a universally-accepted standard edition of the entire corpus, and such a standard edition does not yet exist.

Without a formal, comprehensive paleographic study of the whole corpus, scholars cannot objectively determine whether two similar signs are actually *different* signs, or simply variants of the same sign. This makes it impossible to create a sign-list upon which everyone can agree: even such valiant attempts as Masson's must necessarily involve subjective decisions based on incomplete data (Palaima 1989a: 146).

As an illustration, first consider the evolution of the Cretan Hieroglyphic 'cat face' sign through Linear A and into Linear B:
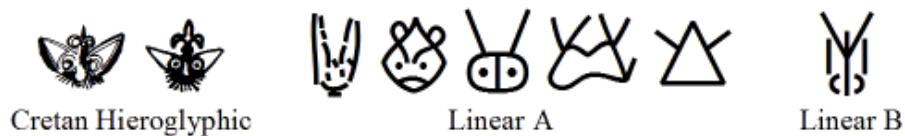
Fig. 6. The evolution of the Cretan Hieroglyphic 'cat face' sign.

This evolution has been established through a comprehensive paleographic analysis of the corpus of all three scripts, and as can be seen, the range of variation in Linear A is quite large. Now compare this range of variation to that of Masson's signs 50 through 55:

Fig. 7. Masson's Cypro-Minoan signs 50–55 (after E. Masson 1974: 14).

Masson here distinguishes six different signs in three different scripts, yet all these signs bear a resemblance to the 'cat face' sign in Linear A. Given this sign's range of variation in Linear A, it is quite possible that Masson's signs 50 through 55 are in fact all variants of the same sign in Cypro-Minoan; but I cannot demonstrate this beyond a reasonable doubt, any more than Masson can demonstrate that the signs are actually different. Only a comprehensive paleographic analysis of the entire corpus can resolve such issues (Palaima 1989a: 162); and until they are resolved, decipherment of the script cannot even begin.

One observation about the script remains safe, however, despite the lack of a standard edition of the corpus: with somewhere around 100 signs, Cypro-Minoan has too many signs for an alphabet, but too few for a logographic system, in which signs represent whole words. The script must therefore be a *syllabary*, like its descendant, the Cypriot Syllabary—and like its parent, Linear A—with a sign for each possible syllable in the language it expresses.

Standard editions

In 1996, Joanna Smith and Nicolle Hirschfeld founded the *Cypro-Minoan Corpus Project*, whose aim is to create a standard edition and paleographic study of the entire corpus (Smith and Hirschfeld 1999: 129). Though still incomplete, the project has already borne fruit, in a collection of studies on script and seal use on Cyprus (Smith 2002). Until the corpus and the paleographic study become available, Ferrara (2009) and Olivier (2007) are currently the best available sources on the Cypro-Minoan corpus and its paleography. Hirschfeld (1996) lists all Cypro-Minoan inscriptions discovered up through 1995; this list is also available online at http://paspserver.class.utexas.edu/cyprus/index.html.

LINEAR B

Sometime during or shortly after the period in which Cypro-Minoan was being created on Cyprus, the Mycenaeans devised their own script based on Linear A, and began using it to create administrative records in Mycenaean Greek. This new script was Linear B. Its decipherment by Michael Ventris in 1952 without the aid of a bilingual document (Chadwick 1958) was a remarkable achievement, and the news that Linear B was a

Greek script caused a sensation, as it extended Greek literacy a further 500 years into the past.

Summary of the corpus

Linear B inscriptions occur primarily on clay tablets: over a thousand of them from Pylos, and more than four thousand from Knossos. Other sites have been less productive: Thebes has yielded a few hundred tablets, and another hundred or so come from Mycenae, Tiryns, and Chania (on Crete). In addition, Linear B inscriptions have been found on about 180 vessels and sherds. At the time that Ventris deciphered the script, the Linear B corpus consisted of about 30,000 signs; this number is now around 72,000 (Younger 2009).

The content of the inscriptions is entirely administrative: the tablets record goods and people moving in and out of the palaces, while the vessels are labelled with the names of people and places. Though some Linear B tablets contain evidence of ritual activity—lists of goods dedicated to various gods, for example—no ritual inscriptions in Linear B have yet been found.

Structure of the syllabary

Ventris' decipherment (Ventris and Chadwick 1973) showed that the Linear B syllabary was structured very much like the Cypriot Syllabary, in that its characters all represented *open syllables* consisting either of a lone vowel, or a consonant plus a vowel:

		D	J	K	M	N	P	Q	R	S	T	W	Z
A													
E													
I													
O													
U													

Fig. 8. The Linear B Syllabary.

This main syllabary was supplemented by an additional, less systematic group of signs standing for more complex types of open syllables, such as

dwe, *nwa*, *pte*, *rai*, *ryo*, *tya*, and so on. Following are those whose values are known:

	H	Dᵂ	Nᵂ	P₂	PT	R	Rᵞ	Tᵂ	Tᵞ
A	ʊᴛʊ		⌢	⊟			⑀		⊞
E		⚷			⌂			ꓭ	
I				⌐					
O		𝝣					♆	⬠	
U				♆					
AI	⚇						𝚿		
AU	⚲								

Fig. 9. The Linear B Syllabary: supplementary syllabograms

The values of about a dozen additional syllabograms remain unclear (Melena forthcoming).

Linear B also incorporated a number of ideograms, or signs standing for whole words. Ideograms for people and animals are differentiated by gender (except for "person" and "man"), with female signs incorporating two vertical strokes, and male signs incorporating two horizontal strokes:

Neutral	Female	Male	Neutral	Female	Male
person	woman	man	goat	nanny	billy
horse	mare	stallion	pig	sow	boar
sheep	ewe	ram	ox	cow	bull

Fig. 10. Linear B ideograms: people and animals.

Other ideograms represent various crops, commodities and products:

grain	flax	figs	honey	cloth	gold
wheat	safflower	tree	cheese	hide	bronze
barley	saffron	olive oil	unguent	spice	corslet
cyperus	olives	wine	wool	helmet	armor

Fig. 11. Linear B ideograms: crops, commodities, and products.

All numerals are expressed by means of five symbols:

1	10	100	1000	10,000

Fig. 12. Linear B numerals

Each symbol is simply written as many times as necessary to produce the desired number. For example:

47,589
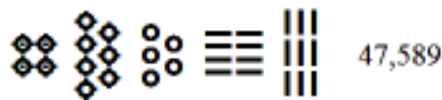
Spelling conventions

Like the inventors of the Cypriot Syllabary, the creators of Linear B also devised a strategy for representing the contiguous and word-final consonants that are so common in Greek. The Mycenaean strategy is simpler than the Cypriot one, but results in the omission of more phonemes from the spelling:

1. Contiguous consonants, no matter where they occur, are spelled in one of two ways, depending on the relative position of the two consonants within the following 'hierarchy of orthographic strength' (Woodard 1997: 112–132): *stops* [p, t, k; b, d, g; p^h, t^h, k^h] > *fricatives* [s, z] > *nasals* [m, n] > *glides* [w, y] > *liquids* [l, r]

    a. If the strength of C_2 is less than or equal to that of C_1, then the cluster is spelled with progressive spelling, as in the Cypriot Syllabary: *k(u)-ru̱-so-jo* /k^{h}rusoio/ 'of gold';

k(e)-se̱-n(i)-wi̱-ja /Ksenwia/, a woman's name

b. If the strength of C_2 is greater than that of C_1, then C_1 is omitted from the spelling ('partial spelling'): *a-ro-ta* /alo̱sta/ 'unsewn'.

2. Word-final   consonants   are   also   omitted   from   the   spelling: *ku-mi-no* /kuminoṉ/ 'cumin'.

Rules (1b) and (2) often operate in tandem within a word, producing very elliptical spellings: two phonemes, for example, are omitted from the spelling of *pa-ko-we* /sp̱ʰakoweṉ/ 'sage-scented', while three are omitted from *ko-no* /sḵʰoi̱nos̱/ 'lemongrass'. The word *ko-wo* can be read either as /kowos̱/ 'fleece' or /koṟwos̱/ 'boy', depending on context. The Mycenaeans' elliptical spelling conventions continue to cause problems for scholars trying to interpret Linear B texts.

Standard editions

The bulk of the Linear B corpus is documented in the standard editions of the inscribed vessels (Sacconi 1974) and of the tablets from Knossos (Chadwick et al. 1986–99), Pylos (Bennet and Olivier 1973–76), and Tiryns, Thebes and Mycenae (Melena and Olivier 1991). The second edition of Ventris and Chadwick's original exposé of the script (Ventris and Chadwick 1973) remains a standard reference.

LINEAR A

Linear A was derived directly from Cretan Hieroglyphic, and was used by the Minoans to record their language(s) from the beginning of Middle Minoan IIb (ca. 1825 BCE in the Aegean high chronology: Rehak and Younger 1998) until the Mycenaeans began to dominate Crete at the end of Late Minoan I (ca. 1490 BCE), though there are scattered survivals of the script in contexts as late as Late Minoan IIIa1–2 (ca. 1320 BCE) (Duhoux 1998: 8).

The language of Linear A remains unknown. Much later on Crete, from the middle of the 7th c. through to the 3rd (and perhaps the 2nd) c. BCE, the Greek alphabet was used to record a few inscriptions in *Eteocretan*, a pre-Greek language that may have been a surviving

descendant of the language of Linear A (Duhoux 1998: 16). Eteocretan resembles no known language.

Summary of the corpus

The corpus of Linear A currently consists of about 7150 signs on 1427 objects, 90% of which are clay administrative documents such as tablets, sealings and roundels (small inscribed clay disks). The remaining 10% of the inscriptions are mostly on stone and pottery vessels; the findspots of many of these indicate that the vessel (and thus the inscription) served a ritual purpose. Inscriptions are also found on metal objects (a bronze bowl, gold and silver hairpins, a gold ring); and a few graffiti on plaster are preserved (Duhoux 1998: 8; Younger 2009).

Though the majority of Linear A inscriptions come from Crete, a few have been found on other islands (Kythera, Thera, Melos, Kea, Samothrace), as well as on the Greek mainland (Mycenae, Tiryns, Argos), at Miletos on the western Anatolian coast, and in the Levant (Tel Haror, Tel Lachish: Finkelberg et al. 1996).

Structure of the syllabary

As Linear A served as the model for Linear B, a large number of Linear A signs naturally resemble Linear B signs. Based solely on these resemblances, Linear A signs have been *provisionally* assigned the phonetic value of their Linear B counterparts, and arranged into a grid like the Linear B signs:

		D	J	K	M	N	P	Q	R	S	T	W	Z
A	⊤	⊢	⊟	⊕	⚇	⊤̇	‡	♀	2⌋	Y	⊏	⊓	♀
E	⅄	⚇	人	⋇	Ψ	⊈		⊙	Ψ	Ш	≢		⊳≡
I	Ψ	ⅲ		▽	⅃	Ϋ	⊿	♀	?	⅏	∧	⋀	
O	⌐			♀		4		+		⊤̱		⇑
U	⅁	⅄	⋃	→	Ⴤ	⊟	⋀		ᕪ	⊏	⊎		ᴥ

Fig. 13. The Linear A Syllabary.

In addition, a few Linear A signs resemble *supplementary* Linear B signs:

		N^W	P₂	R^Y	T^W	T^Y
A		48	56	76		66
E					87	
I			22			
U			29			
AU	85					

Fig. 14. The Linear A Syllabary: supplementary syllabograms.

It is most important to remember, however, that the provisional phonetic values shown in the figures above are actually those of a *later script* (Linear B) expressing a *different language* (Mycenaean Greek). It is almost certain that at least some Linear A signs did not have precisely these values. There is evidence, for example, that the D-series in Linear A may represent a Minoan dental fricative /ð/ (see Yakubovich 2002: 108-109), and that the Mycenaeans (who did not use this sound) redefined its value as /d/. The Q-series, used by the Mycenaeans to express the distinctively Indo-European phoneme /kʷ/, may have been used by the Minoans to express a similar but different sound. Only six O-series syllabograms have been identified in Linear A, and all but RO are rare; the Mycenaeans seem to have invented the rest, which suggests that the Minoans did not have a phoneme /o/. Instead, the O-series may have originally represented something like a non-phonemic Minoan /ɔ/, perhaps from the fusion of a diphthong such as /au/ (though there are other possibilities).

Nevertheless, some sequences in Linear A do appear to match person- and place-names attested in Linear B, often with a different final vowel:

Linear A tablet "Zakros 10":
        da-i-pi-ta   *pa-ja-re*   *ta-na-te*

Linear B person-names:
        da-i-pi-ta   *pa-ja-ro*   *ta-na-to*

Thus we can be reasonably certain that at least some Linear A signs had the same values as their later Linear B counterparts (Godart 1984)—or at least values that were phonetically close, as might be suggested by Min. *da-i-pi-ta* ~ Myc. *da-i-pi-ta*, if it is true that the Mycenaean /d/ is here transcribing a Minoan /ð/.

The similarities between the two scripts do not end with the syllabograms: many Linear A ideograms also resemble Linear B ideograms, and the system of numerals in Linear A is identical to that in Linear B. On many Linear A tablets, we can see quite clearly that the scribe is recording transactions in such commodities as barley, wine, olives and oil. Nevertheless, all attempts to decipher Linear A have so far been unsuccessful, as have all attempts to demonstrate an affiliation with any known language (Schoep 2002, 43).

Standard editions

There are two different standard editions of the Linear A corpus: Godart and Olivier (1976–85), commonly referred to as 'GORILA', and Raison and Pope (1994). Points of disagreement between these two works are relatively minor, except for the unfortunate use of different numbering-systems for the Linear A signs. Both editions are valuable: Raison and Pope include a fuller set of archaeological and bibliographic references, while GORILA's photographic reproductions of the objects are useful for studying Linear A paleography.

Aegean archaeologist John Younger has rendered an immense service to scholars of Linear A by posting the entire corpus on his website: http://people.ku.edu/~jyounger/LinearA. The website is updated at the slightest addition or change to the corpus.

CRETAN HIEROGLYPHIC

Cretan Hieroglyphic, the earliest of the Aegean pre-alphabetic scripts, and the progenitor of the family, was devised on Crete at the end of the third millennium BCE, and was used to record the language(s) of the Minoans during the Middle Minoan period (ca. 2000–1700 BCE in the Aegean high chronology: Rehak and Younger 1998), though there are

scattered survivals of the script in contexts as late as Late Minoan Ib (ca. 1450 BCE) (Duhoux 1998: 3–4).

As with Linear A, the language of Cretan Hieroglyphic remains unknown.

Summary of corpus

The corpus of Cretan Hieroglyphic consists of fewer than 1000 signs on about 360 objects, mostly from Knossos and Malia. Many of these objects are administrative, such as tablets, sealings, and inscribed clay bars and cones; but inscriptions are also found on more durable materials, such as ivory, metal and stone (Duhoux 1998: 3–4; Younger 2009). At least one inscription is on a ritual object, a stone offering-table from Malia.

Structure of the Syllabary

The standard list of Cretan Hieroglyphic signs is shown in the following figure:

Fig. 15. Cretan Hieroglyphic sign list (Olivier & Godart 1996).

As is the case with all its descendant scripts, Cretan Hieroglyphic has too many signs to be an alphabet, but too few to be a logographic system, with a separate sign for every word. Thus, like its descendants, Cretan Hieroglyphic must be a syllabary, with a separate sign for each syllable in the language it expresses. It is probable that this syllabary consists exclusively of open syllables (V or CV), again like its descendants.

However, the formal similarities between Cretan Hieroglyphic signs and Linear A signs are not numerous enough to enable scholars to arrange the Cretan Hieroglyphic signs into a grid and assign them tentative phonetic values, as has been done with Linear A. Younger has posited phonetic values for a number of the Cretan Hieroglyphic signs; these values are available on his website, whose URL is given in the following section.

Standard editions

The standard edition of the corpus of Cretan Hieroglyphic inscriptions is Olivier and Godart (1996), commonly referred to as 'CHIC'. As with Linear A, Younger has posted the entire Cretan Hieroglyphic corpus on his website: http://people.ku.edu/~jyounger/Hiero.

CONCLUSION: PROSPECTS FOR DECIPHERMENT

The current prospects for decipherment are very different for the three undeciphered pre-alphabetic Aegean scripts. Some Cypro-Minoan tablets contain very long inscriptions that should reveal something of the structure of the language spoken by the scribes who wrote them; yet the lack of a universally-accepted Cypro-Minoan sign-list means that any analysis of these tablets will be based on one person's identification of the signs, and will thus be open to question. The eventual publication of the Cypro-Minoan corpus should remedy this situation by supplying a definitive sign-list, and will no doubt lead to a substantial advance in the study of the script and language of the Bronze-Age Cypriots.

Otherwise, the chief obstacle to the decipherment of both Cypro-Minoan and Cretan Hieroglyphic is the relatively small amount of material to work with: about 2500 signs in the former, and less than 1000 signs in the latter. Chadwick once suggested that undeciphered syllabaries of the Aegean type might begin to become decipherable once the number of

attested signs reaches the square of the number of syllabograms (Robinson 2002: 36). Thus Cypro-Minoan and Cretan Hieroglyphic might now be decipherable if they were to contain no more than 50 and 32 syllabograms, respectively; yet each script clearly employs many more than this.

Better prospects for decipherment might be offered by Linear A. The phonetic values of about 60 syllabograms have been tentatively identified, and about 30 additional signs appear to operate as syllabograms as well; thus Linear A probably contains about 90 syllabograms, suggesting that Chadwick's hypothetical 'critical mass' for decipherment may lie at around 8100 signs. The corpus is currently about a thousand signs short of this total. In view of the slow but steady trickle of new inscriptions brought to light over the past few decades, it seems quite possible that Linear A will be at least partially deciphered sometime in the current century, despite the brevity of many of the existing texts; and given the relatedness of the three undeciphered scripts, the decipherment of any one of them will no doubt aid in the study of the others. Eventually, we will begin to hear these Bronze-Age peoples speak again after their long silence.

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