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## THE STATUS OF LINEAR B IN THE HISTORY OF ANCIENT GREEK<sup>1</sup>

In the following we shall summarize the phonological changes from Indo-European into the Attic dialect of Ancient Greek of ca. 200 BC. We have ordered these changes in what we believe to be their relative chronology of occurrence. We shall then attempt to locate the position of Minoan (also called Mycenaean) Linear B Greek within this chronology.

### The changes

The stages on the time line are ordered. The changes within each stage may have occurred in any order or be roughly simultaneous. We list the changes within each stage in the alphabetical order of our abbreviations of them.

Stage 1 (? ca. 3000 BC).

(1a) Purported reflexes of laryngeals (Laryngeals).

$h_1, h_2, h_3 \rightarrow e, a, o$ ; or  $\bar{e}, \bar{a}, \bar{o}$  in various specific environments. E.g., IE 1 sing. pres. *\*h<sub>1</sub>esmí* 'I am' (Laryngeals) > *\*esmí* (3e s-h-Ø below) > Attic Greek *ēmí* written <eimí>. IE 1 sing. pres. *\*s<sub>1</sub>+steh<sub>2</sub>+mi* 'I stand' (Laryngeals) > *\*s<sub>1</sub>s<sub>1</sub>tāmi* (3e s-h-Ø) > *\*h<sub>1</sub>s<sub>1</sub>tāmi* (6a ā-to-Ē) > Attic Greek *hístĒmi*.

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(1b) Shortening of a vowel before a sonorant consonant plus an obstruent ( $\bar{V}$ +Son Shortening). This is sometimes called “Osthoff’s Law”. E.g., IE 3 pl. aorist \* *e’gnō+nt* ‘they knew’ ( $\bar{V}$ +Son Shortening) > \**e’gnont* (2e WF Stop Dele) > Attic Greek *e’gnon*.

Stage 2 (date ?).

(2a) Devoicing of the IE voiced aspirated consonants (Aspirate Devoicing).  $b^h, d^h, g^h, g^{wh} \rightarrow p^h, t^h, k^h, k^{wh}$ . The later change of  $p^h, t^h, k^h$  to  $f, \theta, x$  (written <  $\phi, \theta, \chi$  >) occurs much later at about 300 AD. E.g., IE 1 sing. pres. \**b^h e’rō* ‘I carry’ (Aspirate Devoicing) > \**p^h e’rō* (2b  $\bar{e}/\bar{o}$ -to- $\bar{E}/\bar{O}$ ) > early Greek *p^h e’rō* (later) > *f e’rō*.

(2b) The change of + tense / $\bar{e}, \bar{o}$ / to –tense / $\bar{E}, \bar{O}$ / ( $\bar{e}/\bar{o}$ -to- $\bar{E}/\bar{O}$ ).

It is generally assumed that IE closed or +tense / $\bar{e}, \bar{o}$ / became more open or –tense / $\bar{E}, \bar{O}$ / (see on this Atkinson (1952:31)). E.g., IE 1 sing. pres. \**d^h i’+d^h e+mi* ‘I put’ (2a Aspirate Devoicing) > \**t^h i’ e’mi* (2b  $\bar{e}/\bar{o}$ -to- $\bar{E}/\bar{O}$ ) > \**t^h i’ E’mi* (7b Grassmann) > Attic Greek *t i’ E’mi*.

(2c) A change of /o/ to /u/ (o-to-u). This change is sometimes called “Cowgill’s Law”. Its exact environment is not clear: it seems to apply between a labial consonant and a sonorant consonant. E.g., IE nom. sing. neuter \**b^h oljom* ‘leaf’ (2a Aspirate Devoicing) > \**p^h oljom* (o-to-u) > \**p^h uljom* (3a C+j Changes) > \**p^h ullom* (3d m-to-n) > \**p^h ullon* (6d u(:)-to-y(:)) > Attic Greek *p^h yllon*.

(2d) The change of the syllabic sonorant consonants / $m̥, n̥, l̥, r̥$ / to /a, am, an, al, la, ar, ra/ in various environments (Syl Son). E.g., IE nom. sing. \**g^w m̥+tis* ‘a step’ (Syl Son) > \**g^w atis* (4b t-to-s) \**g^w asis* (5a Labiovelars) > Attic Greek *b asis*.

(2e) Loss of word-final obstruent stops (WF Stop Dele). E.g., IE voc. sing. \**pawid* ‘boy’, \**gunaik* ‘woman’, \**wanakt* ‘prince’ (WF Stop Dele) > \**pawi*, \**gunai*, \**wana* (6d u(:)-to-y(:), 7c w-Dele) > Attic Greek *pai* (written <  $\text{pāi}$  >, i.e. <  $\text{pāi}$  >), *gynai*, *ana*.

(2f) The word-stress rule (Word Stress). This rule essentially retains the IE word stress except in those well-defined instances where it must be moved to

the right. E.g., IE 2 pl. imperf. \**é+leik<sup>w</sup>+ete* ‘you left’ (Word Stress) > \**eleik<sup>w</sup>ete* (5a Labiovelars) > Attic Greek *eleípete*.

Stage 3 (date ?).

(3a) Changes of a consonant followed by /j/ (C+j changes). t<sup>(h)</sup>j → ss, p<sup>(h)</sup>j → pt, k<sup>(w)</sup>(h)j → ss, g<sup>(w)</sup>j or dj → dz, lj → ll, mj → nj (all of which if preceded by a sonorant segment or if word-initial). E.g., IE nom. sing. masc. adj. \**méd<sup>h</sup>jos* ‘middle’ (2a Aspirate Devoicing) > \**mét<sup>h</sup>jos* (C+j Changes) > early Attic Greek *méssos*, later *mésos*.

(3b) Changes in word-initial /j/ (##j-Changes). j → h and sometimes dz word-initially. E.g., IE nom. sing. masc. \**jós* ‘who’ and nom. sing. neuter \**jugóm* ‘yoke’ (##j-Changes) > \**hós* and *dzugóm* (3d m-to-n, 6d u(:)-to-y(:)) > Attic Greek *hós* and *dzygón* written < *zygón* > = < *Zvγón* >.

(3c) Metathesis of VCj/w to Vj/wC (j/w-Metathesis). E.g., IE \**mórja* ‘part’ (j/w-Metathesis) > \**mójra* = Attic Greek *moîra*; IE gen. sing. \**gonw+ ós* ‘knee’ (j/w-Metathesis) > \**gownós* = Attic Greek *gounós*.

(3d) The change of word-final /m/ to /n/ (m-to-n). E.g., see the derivation of IE \**b<sup>h</sup>óljom* ‘leaf’ under 2c o-to-u above.

(3e) The changes of /s/ to /h/ and its eventual conditioned disappearance (s-h-Ø). E.g., IE 1 sing. pres. \**ség<sup>h</sup>ō* ‘I have’ (2a Aspirate Devoicing) > \**sék<sup>h</sup>ō* (2b ē/ō-to-Ē/Ō) > \**sék<sup>h</sup>Ō* (s-h-Ø) > \**hék<sup>h</sup>Ō* (7b Grassmann) > Attic Greek *ék<sup>h</sup>Ō*.

Stage 4 (date ?).

(4a) Insertion of word-initial “prothetic” vowels (Prothesis). The exact formulation of this change is not clear. An approximate formulation is that /a, e, o/ are inserted – perhaps optionally – word-initially before /r, l, m, n, or w/ followed by a vowel. E.g., IE 1 sing. pres. \**mélgō* ‘I milk’ and the nom. sing. masc. adj. \**rud<sup>h</sup>rós* ‘red’ (2a Aspirate Devoicing) > \**mélgō* and \**rut<sup>h</sup>rós* (2b ē/ō-to-Ē/Ō) > \**mélgŌ* and \**rut<sup>h</sup>rós* (Prothesis) > \**amélgŌ* and \**erut<sup>h</sup>rós* (6d u(:) to-y (:)) > Attic Greek *amélgŌ* and *eryt<sup>h</sup>rós*.

(4b) The change of /t/ to /s/ before a high vowel or word-initially before /w/ (t-to-s). E.g., IE \**g<sup>w</sup>m̥tis* ‘step’ > Attic Greek as derived under 2d Syl Son above.

Stage 5 (date given below).

(5a) Changes in the labiovelars (Labiovelars). The basic change is /k<sup>w</sup>, k<sup>wh</sup>, g<sup>w</sup>/ → (a) /t, t<sup>h</sup>, d/ before /e(:) or i(:)/, (b) /p, p<sup>h</sup>, b/ before /a(:) or o(:)/ and (c) /k, k<sup>h</sup>, g/ before /u(:)/. E.g., IE \**k<sup>w</sup>is* ‘who’ (Labiovelars) > Attic Greek *tís*, IE 1 sing. pres. \**sék<sup>w</sup>omai* ‘I follow’ (3e s-h-Ø) > \**hék<sup>w</sup>omai* (Labiovelars) > Attic Greek *hépomai*.

(5b) Changes in the sequence /Vns/ (Vns-Changes). The sequence /Vns/ changes to / $\bar{V}$ s, Vs or  $\bar{V}$ n/ in specific environments. E.g., IE acc. pl. masc. \**tóns* ‘those, them’ (Vns-Changes) > Attic Greek *tós*, written <Toûs >.

(5c) Various vowel-sequence contractions (V-Contraction). E.g., earlier Greek 1 pl. pres. ind. *tīmáomen* ‘we honor’ (V-Contraction) > later Attic Greek *tīmŌmen*.

Stage 6 (400-200 BC).

(6a) The conditioned change of /ā/ to open /Ē/ (ā-to-Ē). This change occurs in Attic and Ionic, but not in Doric. E.g., IE \**mātēr* ‘mother’ (2b ē/ō-to-Ē/Ō) > \**mātĒr* (ā-to-Ē) > Attic *mĒtĒr* vs. Doric *mātĒr*.

(6b) Changes in consonant clusters (C-Cl Changes). There are several of these, such as IE nom. sing. neuter \**ók<sup>w</sup>m̥t* ‘eye’ (2d Syl Son) > \**ók<sup>w</sup>mat* (2e WF Stop Dele) > \**ók<sup>w</sup>ma* (5a Labiovelars) > \**opma* (C-Cl Changes whereby pm → mm) > Attic Greek *ómma*.

(6c) Conditioned shortening of certain IE long diphthongs (Diph Shortening). E.g., IE nom. sing. \**náus* ‘ship’, \**g<sup>w</sup>óus* ‘ox’ (5a Labiovelars) > \**náus* and \**bóus* (Diph Shortening) > Attic Greek *náus* <naûs> and *bous* <boûs>.

(6d) The change of /u(:)/ to /y(:)/ (u(:)-to-y(:)). See the derivation of IE \**jugóm* ‘yoke’ to Attic Greek *dzygón* under 3b ##j-Changes above.

Stage 7 (400-200 BC).

(7a) The change of /ei, ou/ to /ē, ō/ (ei/ou-to-ē/ō). E.g., IE nom. sing. \**spoudǎ́* ‘speed’ (6a ā-to-Ē) > *spoudḖ* (ei/ou-to-ē/ō) > Attic Greek *spōdḖ*, spelled <spoudḗ>.

(7b) Grassmann’s Law (Grassmann). Aspirated consonants are deaspirated when preceding one or more sonorant segments plus another aspirated consonant. E.g., IE 1 sing. pres. \**bʰéidʰō* ‘I persuade’ (2a Aspirate Devoicing) > \**pʰéitʰō* (2b ē/ō-to-Ē/Ō) \**pʰéitʰō* (2f Word Stress) \**pʰéitʰō* (Grassmann) > Attic Greek *peitʰō*.

(7c) Conditioned deletion of /j/ and /w/ (j/w-Deletion). This occurs in several environments, particularly between vowels. E.g., IE nom. sing. neuter \**dwéjos* ‘fear’ (j/w-Deletion) > Attic Greek *déos*.

Stage 8 (200 BC).

(8a) Addition of /h/ word-initially before /r or y(:)/ (h-Addition). IE Ø-grade ablaut \**wídōr* ‘water’ = \**údōr* (2b ē/ō-to-Ē/Ō, 6d u(:)-to-y(:)) > \**yídōr* (h-Addition) > Attic Greek *hýdōr*.

(8b) Vowel shortening and quantitative metathesis (V-Shortening/Q-Metathesis). E.g., early Greek gen. pl. *basilĒ+Ōn* ‘king’ (V-Shortening) > later Attic *basiléŌn*; early gen. sing. *nĒ+ós* ‘ship’ (Q-Metathesis) > later Attic *neŌs*.

## The relative chronologies

We have arrived at the above chronologies through a consideration of (a) the written records such as the occurrence of /j/ and /w/ in Homeric texts, which indicates that 7c j/w-Deletion is comparatively late; and (b) the linguistic evidence.

Some examples of the latter type of evidence are these. In view of the limited extent of the present article, we cite only a few examples of our methodology: (i) 2a Aspirate Devoicing must precede 7b Grassmann: IE 1 sing. pres. \**dʰúbʰō* ‘smoke’ (2a Aspirate Devoicing) > \**tʰúpʰō* (7b Grassmann, ev.) > Attic Greek *týpʰō*. If the sequence had been 7b Grassmann > 2a Aspirate Devoicing, the Attic Greek form would be \*\**dýpʰō*. (ii) 3e s-h-Ø

must precede 4b t-to-s: IE *\*dō̄+t+is* ‘gift’ (4b t-to-s, ev.) > Attic Greek *dō̄sis*. If the sequence had been 4b t-to-s > 3e s-h-Ø, the Attic Greek form would be *\*\*dō̄is*. (iii) Some changes such as 7a ei/ou-to-ē/ō, 7b Grassmann, 7c j/w-Deletion, 8a h-Addition, 8b V-Shortening/Q-Metathesis do not necessarily precede an other changes and so are presumably late.

## The Linear B evidence

We now turn to a consideration of the forms attested in the Minoan Greek of Linear B to see where this stage of Greek may have fit into our chronology. This Greek is attested from about 1800 BC in syllabary form on numerous clay tablets, which are catalogues of items from royal households. Not all of the tablets have been deciphered; and those which have present interpretive problems for various reasons such as the fact that syllable-final consonants are generally not written, /l/ and /r/ are not distinguished, nor for the most part are the obstruents /p<sup>h</sup>, p, b/, /t<sup>h</sup>, t, d/, /k<sup>h</sup>, k, g/ or /k<sup>wh</sup>, k<sup>w</sup>, g<sup>w</sup>/ (see on this Chadwick (1995); Hooker (1980) and Ventris and Chadwick (1953)).

In the following we shall list the changes enumerated in section 1 above and cite those Linear B forms which indicate the occurrence or non-occurrence of a particular change.

(1a) Laryngeals. If this change did in fact occur, it seems to have happened by the time of Linear B. E.g., Linear B *a-pu-do-si* ‘payment’ for *apudosis*, possibly from *\*h<sub>2</sub>epu+do+t+is* where there is no trace of the laryngeal (Ventris and Chadwick, hereafter V&C, (1953:100)). Likewise Linear B *a-pi* ‘around’ for *amp<sup>h</sup>i* from *\*h<sub>2</sub>emb<sup>h</sup>i* and *a-ke* ‘has’ for *agei* from *\*h<sub>2</sub>egeti* (Hooker 1980:49 and 160).

(1b)  $\bar{v}$ +Son Shortening. No evidence.

(2a) Aspirate Devoicing. Has occurred. V & C (1953:102) note: *The use of a separate series of signs for  $\underline{t}$ - and  $\underline{d}$ - makes it possible to show that the Indo-European \*dh has already become voiceless [...].*

(2b) ē/ō-to-Ē/Ō. No evidence.

(2c) o-to-u. No evidence.

(2d) Syl Son. Has occurred. Hooker (1980:67) notes, *Negative compounds are formed with the prefix a(n)- (< \*n̄-), just as in later Greek.*

(2e) WF Stop Dele. Has presumably occurred. Chadwick (1995:75) notes the following about the orthographic conventions of Linear B: *[...] the only final consonants admitted by Greek ( $\underline{n}$ ,  $\underline{r}$ ,  $\underline{s}$ ) are omitted [word-finally], and this practice is then extended to medial closed syllables [...] and to other sounds of*

these classes (*l*, *m*). If this analysis is correct, then WF Stop Dele has applied so that the only word-final consonants are indeed /n, r, s/.

(2f) Word Stress. No evidence.

(3a) C+j Changes. Has occurred. E.g., Linear B *me-zo* ‘larger’ for *medzŌn* from \**megjōn* (C & V (1953:89)); and Linear B *to-pe-za* ‘table’ for *torpedza* from \**torpedja* (Hooker 1980:54).

(3b) ##j-Changes. Has occurred. E.g., Linear B *ze-*, probably an abbreviation for *ze-uk-o* ‘yoke’ = *dzeugon* from \**jeugom* (Hooker 1980:165).

(3c) j/w-Metathesis. Has not occurred. E.g., Linear B *ko-wo* ‘boys’ for *korwoi* instead of \*\**kowroi*, in which case it would have been written \*\**ko-ro* (V & C (1953:89)). This change occurs in the development of Attic Greek, but not in that of the Doric dialects which presumably devolve from the dialect area of Linear B.

(3d) m-to-n. No evidence.

(3e) s-h-Ø. Has occurred. E.g., Linear B *e-qe-ta* ‘followers’ for *hek<sup>w</sup>etai* from \**sek<sup>w</sup>etai* (V & C (1953:96)). V & C (1953:102) note, *The loss of initial and intervocalic σ is amply attested.*

(4a) Prothesis. Has occurred. E.g., Linear B *e-ru-to-ro* ‘Red’ [proper name] for *erut<sup>h</sup>oros* from \**rud<sup>h</sup>oros* (Hooker 1980:68).

(4b) t-to-s. Has occurred. See the derivation of *apudosis* ‘payment’ from \**h<sub>2</sub>epu+do+t+is* under 1a Laryngeals above.

(5a) Labiovelars. Has not occurred. E.g., the Linear B enclitic *-qe* ‘and’ from \**-k<sup>w</sup>e*, later occurring as Attic Greek *te* (V & C (1953:90)). Also Linear B *qo-u-ko-ro* ‘cowherds’ for *g<sup>w</sup>oukoloi* from \**g<sup>w</sup>oukoloi*, later Attic Greek *boukoloi* (V & C *ibid.*).

(5b) Vns-Changes. No evidence. V & C (1953:102) note, [...] *the spelling rules allow so much scope that it is impossible to tell if the form e-ko-si* [‘have’] *corresponds to ἔχουσι, ἔχωσι, ἔχοσι, or even ἔχουσι.*

(5c) V-Contraction. Has not occurred. E.g., Linear B *e-re-ta-o* ‘rower’ for *eretaŌn* instead of *eretŌn* (Hooker 1980:56). V & C (1953:102) notes that in Minoan forms [...] *contraction seems to be unknown [...].*

(6a) a:-to-E:. Has not occurred. V & C (1953:102) notes that in Minoan forms [...] *ā is never changed to η [...].*

(6b) C-Cl Changes. No evidence.

(6c) Diph Shortening. No evidence.

(6d) u(:)-to-y(:). No evidence.

(7a) ei/ou-to-ē/ō. No evidence.

(7b) Grassmann. No evidence.

(7c) j/w-Deletion. Has not occurred. E.g., Linear B *ko-wo* ‘boys’ for *korwoi*, not *\*\*koroī*. Otherwise the word would be written as Linear B *\*\*ko-ro* (V & C (1953:89)). Also Linear B *wa-na-ka* ‘king’ for *wanaks* from *\*wanaks*, later Greek *ánaks* (V & C (1953:91)). And Linear B *to-jo* ‘of this’, later *toû* (Hooker 1980:60).

(8a) h-addition. No evidence.

(8b) V-Shortening/Q-Metathesis. No evidence.

## Conclusions

We draw three conclusions from the above data. First, Linear B Minoan Greek seems to commence from about the beginning of stage 5 in our chronology. Hence stage 5 dates from about 1300 BC.

Second, given that the IE phonological system was something like this:

p	t	k	k <sup>w</sup>	i(:)		u(:)
b <sup>h</sup>	d <sup>h</sup>	g <sup>h</sup>	g <sup>wh</sup>		e(:)	o(:)
b	d	g	g <sup>w</sup>		a(:)	
	s					
m	n and m̥	ṅ				
	l	ḷ				
	r	ṛ				

and given the changes up to stage 5, then the Minoan system of Linear B must have been something like this:

p	t	k	k <sup>w</sup>	i(:)		u(:)
p <sup>h</sup>	t <sup>h</sup>	k <sup>h</sup>	k <sup>wh</sup>		E(:)	O(:)
b	d	g	g <sup>w</sup>		a(:)	
	dz			h		
	s					
m	n					
	l					
	r					

Finally, the word for ‘horse’ *i-go* is attested in various Minoan sources (V & C (1953:100); Hooker (1980:167); Chadwick (1995:94)). This is probably for

*hik<sup>w</sup>os*. The later Greek form is *híppos*. The IE antecedent for both forms is something like *\*ek<sup>w</sup>os*. To our knowledge, it has not been noted in the literature on Minoan Greek that the historical derivation of this form is uniquely aberrant in both Minoan and in later Greek. That is, from an IE *\*ek<sup>w</sup>os* one would expect Minoan *\*\*ek<sup>w</sup>os*, namely *\*\*e-*qo**, and later Greek *\*\*épos*. Why Minoan *i-*qo** and Attic *híppos* occur is not clear. In any event, these forms in both Minoan as well as in later Greek indicate that both of these dialects belong to one and the same IE linguistic community which – at least for this form – underwent the same uniquely aberrant changes.

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