

The Continuation of Proto-Indo-European Lexical Accent in Ancient Greek: Preservation and Reanalysis¹

Ronald I. Kim

1 Introduction

In recent years, certain scholars have questioned whether the accentual system found in the Attic-Ionic dialects of ancient Greek, in particular the mostly archaic Ionic of the Homeric epics or the Attic of classical Athens, continues that reconstructed for Proto-Indo-European (PIE).² In his study of Indo-European nominal accent, Lubotsky (1988:121) states:

“The original accentual distribution, however, was most disturbed not by the phonetic shifts but by analogical patterning. Already in prehistoric times Greek had generalized a uniform accentuation for many categories and suffixes. A well-known example is the recessive accentuation of the finite verb. Moreover, all neuters (including those in *-on*) became barytone, with only few excep-

¹This paper is a preliminary version of a chapter of my forthcoming dissertation, “Topics in the Reconstruction and Development of Indo-European Accent.” An earlier draft was presented at the 24th annual Penn Linguistics Colloquium, University of Pennsylvania, 26-27 February, 2000. I wish to thank my advisors Don Ringe and Rolf Noyer, as well as Gene Buckley, Jay Jasanoff, Masato Kobayashi, and especially the two anonymous reviewers for the *University of Pennsylvania Working Papers in Linguistics* for their useful suggestions and criticisms. All opinions and errors remain entirely my responsibility. H.V.S.

Greek forms are cited in Roman transcription, including those quoted in Lubotsky 1988. A colon denotes vowel length; ´ and ˆ represent acute and circumflex intonation on long vowels. The vowels η and ω are transcribed as ε: and ο: and the “spurious diphthongs” ei and ou as e: and o: (vs. “genuine” *ei, ou*), reflecting their likely pronunciations in Attic Greek of the 5th century BC.

Abbreviations: sg.=singular, pl(ural); nom(inative), acc(usative), gen(itive), dat(ive), instr(umental), loc(ative), voc(ative); masc(uline), fem(inine), neut(er); pres(ent), impf.=imperfect, fut(ure), aor(ist), pf.=perfect; act(ive), mid(dle), pass(ive), mp.=mediopassive; subj(unctive), opt(ative), iptv.=imperative; ptcp.=participle, inf(initive); Anat(olian), Att(ic), Cz(ech), Gmc.=Germanic, Goth(ic), Gr(eek), H(ieroglyphic) Luv(ian), Hitt(ite), Hom(eric), Lat(in), Luv(ian), O(ld) C(hurch) S(lavonic), O(ld) E(nglish), O(ld) H(igh) G(erman), O(ld) Ir(ish), O(ld) N(orse), O(ld) Pr(ussian), P(roto-), P(roper) N(ame), Skt.=Sanskrit, S(erbo-)C(roatian), Sl(avic), T(ocharian) A/B, Ved(ic).

²Data from other dialects will be mentioned below where relevant.

tions; also barytone are feminines in *-a*, *i*-stems and substantives in *-us*, while adjectives in *-us*, *-los*, *-nos*, and *-ros* show pervasive oxytonesis. There are several indications that this process of generalizing a single accentuation pattern for every category went on in historical times. A good example is the suffix of nomina actionis *-mo-*, which shows both types of accentuation in Homer but is almost exclusively oxytone in later texts.”

Immediately afterwards, in his discussion of Greek *i*-stems, he concludes that “in this light, the identical accentuation found in Gk. *pósis* ‘husband’ and Skt. *páti-* ‘id.’ or in Gr. *óis* ‘sheep’ and Skt. *ávi-* ‘id.’, which is mentioned time and again as proof of the original identity of the Sanskrit and Greek accentual systems (cf., e.g. Kuryłowicz 1968:20), is not significant. The accentuation of these Greek words is ambiguous; it might be old, but it might also be analogical” (Lubotsky 1988:121).

Thus, according to Lubotsky, even the earliest (alphabetic) Greek of Homer had undergone major analogical shifts of accent and generalized a single accentuation for most nominal or adjectival formations, preserving little of the original PIE pattern. This view is adopted by Halle (1997:301, 304-5), who goes so far as to claim that the accentual system of ancient Greek had no historical connection with that of PIE: “...Greek reintroduced lexically accented morphemes. The lexical accentuation of Greek, however, is an original development that is unrelated to the accentuation of the protolanguage” (Halle 1997:301).

According to the latter view, the PIE system of underlyingly accented or unaccented roots, stems, and endings, supposedly reflected in Vedic Sanskrit and Balto-Slavic, was entirely lost in the ancestor of Greek; in other words, ancient Greek holds little or no relevance for the reconstruction of PIE accent. Halle (1997:303-5) explicitly proposes that prehistoric Greek first passed through a stage like Archaic Latin or contemporary Czech, in which all underlying lexical accentuation was lost and initial accent generalized according to the prosodic rules given below for PIE (§2). Subsequent undefined developments then led to the contrast observed in Homeric and Attic Greek between e.g. barytone (stem-stressed) and oxytone (ending-stressed) *o-* or *ā-*stems.

2 Was PIE Accent Preserved in Ancient Greek?

Lubotsky (op. cit.) is certainly correct when he notes that most Greek words sharing a particular suffix also exhibit the same accentuation. For instance, most (all?) *u*-stem adjectives are oxytone, whereas most *u*-stem substantives are barytone, e.g. *barús* ‘heavy’, *brak^hús* ‘short’, *eurús* ‘broad, wide’, *platús*

'flat, broad' vs. *pē:k^hus* 'forearm', *ástu* 'city'. Similarly, most adjectives in *-ros* (< PIE **-ro-*) are accented on the "thematic" vowel *o*, e.g. *eruh^hrós* 'red', *elaph^hrós* 'light, nimble', as opposed to the mostly root-accented nouns in *-mos* (< PIE **-mo-*), e.g. *ógmos* 'furrow'.

Some of these patterns are undoubtedly due to the generalization of particular surface patterns and their corresponding underlying accentual representations within the prehistory of Greek; for some likely examples, see §7. To conclude on the basis of these distributions that Greek has almost entirely given up any trace of PIE accent, however, is demonstrably wrong. Many of the patterns known to earlier generations of scholars of Greek and emphasized by Lubotsky are at least partially inherited from the parent language. For example, there is strong evidence that the nominal suffix **-ro-* was underlyingly accented in PIE; the reconstructed PIE adjective in **-ro-* was marked by "zero-grade" vocalism of the root and oxytone accent.³ If we find that Greek adjectives in *-ros* are as a rule oxytone, the obvious inference is that Greek has inherited and preserved the underlying accent of the PIE suffix **-ró-*.

More importantly, Lubotsky omits any mention of intraparadigmatic alternations of accent and ablaut and their significance for the reconstruction of (pre-)Greek accent. To cite only one classic example, the contrast between sg. nom. *pó:s*, acc. *póda* and gen. *podós*, dat. (<— loc.) *podí* exactly matches that between Ved. sg. nom. *pā́t*, acc. *pādam* and gen. *padás*, dat. *padé*, instr. *padā́*, loc. *padí*. Ablaut alternations, such as we find in athematic verbs (i.e. verbs lacking the thematic vowel *-o-* ~ *-e-*) or archaic *r-*, *n-*, *r/n-*, *i-*, and *u-* stem nouns, are especially valuable for recovering what might have been the PIE or pre-Greek state of affairs prior to the various accent shifts that produced the attested Greek forms, e.g. columnarization of accent in nominal paradigms. In the *r-* stem kinship nouns, for instance, the ablaut contrast between pl. nom. *patér-es*, acc. *patér-as* and dat. *patrá-si* suggests that the last of these forms continues **patṛ-sí* <— PIE **ph₂tṛ-sú* (cf. Ved. *pitṛṣu*, which has likewise undergone columnarization).

Finally, the sheer number of matches in lexical accent and paradigmatic patterning between Greek and Vedic—not to mention Anatolian and the indirect evidence of Verner's Law in Germanic⁴—absolutely excludes the pos-

³Excepting a handful of archaic root-accented forms with "full-grade" *e-* vocalism (Vine 1999a), of which at least some are backformed to substantivized collectives.

⁴In pre-Proto-Germanic, prior to the generalization of word-initial stress, the voiceless stops **p*, **t*, **k* (< PIE **k*, **k*), **k^w* developed to voiceless fricatives **f*, **þ*, **χ*, **χ^w* in word-initial position and after a stressed vowel, but otherwise became voiced **β*, **ð*, **γ*, **γ^w*. Cf. PIE **b^hréh₂tē(r)* > PGmc. **brōþer* 'brother' vs. PIE **ph₂tē(r)* > PGmc. **faðer* 'father' in the examples below. This conditioning has given rise to new grammatical alternations, especially in the

sibility that Greek could have lost and then reintroduced underlying accent of morphemes. In addition to the paradigmatic alternations given just above, note the following small sample of accentual word equations:⁵

- Gr. *híppos* (<— *íppos, cf. PN *Álk-íppos*), Ved. *ásvaḥ* (ON *jór*, OE *eoh* < PGmc. *eχ^waz) < PIE *ékwos 'horse';
- Gr. *néos* (< *néwos), Ved. *návaḥ* (Hitt. *nēwaš*, Luv. *nāwaš* < PANat. *néwos) < PIE *néwos 'new';
- Gr. *lúkos*, Ved. *vṛkaḥ* (Goth. nom. pl. *wulfōs*, OHG *wolf* < PGmc. *wulfaz) <— PIE *w^lk^wos 'wolf'; cf. Ved. *vṛkī*, ON *ylgr* (< PGmc. *wulγ^wiz) <— PIE *w^lk^wih₂ 'she-wolf';
- Gr. *alp^hós* 'white leprosy', Hitt. *alpāš* 'cloud' (cf. Lat. *albus* 'white') < PIE *albós 'white';
- Gr. *klutós* 'famous', Ved. *śrutá-* 'heard' < PIE *k^llu-tós 'audible' to the verbal root *k^llew- 'hear'; likewise other verbal nouns in *-tó- with zero-grade of the root;
- Gr. *he-katón*, Ved. *śatám* (Goth. *hund*, OHG *hunt* < PGmc. *hundā by Verner's Law) < PIE *k^mtóm 'hundred';
- Gr. *zugón*, Ved. *yugám* (Hitt. *iukan*, never "iūkan") < PIE *yugóm 'yoke';
- Gr. *ókris*, *ákris*, Ved. *ásriḥ* < PIE acrostatic *h₂ókris, obl. *h₂ékri- 'point';
- Gr. *pósis*, Ved. *pátih* < PIE *pótis 'master, husband';
- Gr. *dóru* 'spear' (Hom. gen. *do:rós* < *dorwós), Ved. *dāru*, gen. *dróh* 'tree' < *dóru, obl. *dréw- 'tree';
- Gr. *paté:r*, Ved. *pitá* (Goth. voc. *fadar*, OE *fæder*, OHG *fater* < PGmc. *faðer- by Verner's Law) < PIE *ph₂tē(r) 'father';
- Gr. *p^hrá:te:r* 'member of a clan/phratry', Ved. *bhrātā* (Goth. *brōþar*, OE *brōðor*, OHG *bruoder* < PGmc. *brōþer-) < PIE *b^hréh₂tē(r) 'brother'.

To be sure, there are apparent Vedic-Greek cognates in which the attested stresses do not correspond. Many such pairs, however, raise other phonolog-

preterite of so-called "strong" verbs (those which continue PIE unsuffixed thematic presents in *^e/o-), e.g. post-PIE perf. 3sg. *we-wórt-e, 3pl. *we-w^lt-ér 's/he has, they have turned' (cf. Ved. *vavárta*, *vav^ltúr*) —> *wóрте, *w^lt^lt > *wórtpe, *wurðúnd > PGmc. pret. *warþ, *wurðun > OE pret. sg. *wearþ*, pl. *wurdon* 'became'.

⁵Other examples may be found in Schwyzer 1939:380-1 and throughout Euler 1979.

ical difficulties or are suspect of being independent post-PIE creations; moreover, systematic discrepancies in accent may often prove useful in reconstructing the original accentual pattern of the ancestral language.⁶ The weight of impeccable equations such as those just listed clearly demonstrates that Greek inherited lexical accent from the parent language in at least some forms, and strongly disfavors the hypothesis of Lubotsky and Halle. Given the principle that phonological mergers are irreversible by internal linguistic means (cf. Garde 1961:38-9, Labov 1994:311ff.), it would have been impossible for Greek to eliminate the distinctive lexical accent of PIE, then somehow recreate or recover the correct distribution of, say, barytone vs. oxytone *o*-stem nouns in so many cases—much less the alternation of stem-stress in the nom. and acc. vs. ending-stress in the gen. and dat. of monosyllabic consonant-stem nouns.

Of course, the accentual system of Homeric and Attic Greek, as described by the grammarians of Hellenistic Alexandria, *has* undergone several well-known innovations, e.g. limitation of surface stress to the last three syllables of the word (the Three-Syllable Rule, henceforth abbreviated TSR) and near-total restriction of nominal stress alternations to monosyllabic stems. As a result of these extensive changes, the PIE accentual system survives into ancient Greek only to a limited degree. Nevertheless, Greek does preserve the underlying accentual representations of a number of PIE nominal and verbal morphemes and nominal stems, as I demonstrate below.

3 Theoretical Background

For the following study, I have adopted the “brackets-and-edges” framework proposed by Idsardi (1992) and elaborated by Halle and Idsardi (1995) for modeling underlying accent and the computation of surface stress.⁷ In their

⁶Thus, while inherited Greek deverbal abstract nouns in *-sis* < PIE **-tis* all share barytone accent and “zero-grade” of the root, e.g. *dósis* ‘gift’, *p^hásis* ‘assertion’ < **dh₃-*, **b^hh₂-*, the existence of accentual alternants in Vedic (e.g. usual *matí-* vs. rare *máti-* ‘thought’), forms with and without Verner’s Law in Germanic (e.g. Goth. *ga-qumb-* ‘assembly’, lit. ‘coming together’ vs. *missa-dēd-* ‘misdeed’; cf. fn. 4), and fluctuation between full- and zero-grade of the root (e.g. Lat. *mēns* ‘mind’ < **ment-* vs. Ved. *mat-* < **mṛt-*; Goth. *qumb-* < **g^wm̥-* vs. *dēd-* < **d^heh₁-*) all indicate that this class was originally proterokinetic: nom. **mén-ti-s* (> Lat. *mēns*), gen. **mṛ-téy-s* → Ved. *máti-* or *matí-*. Cf. Schindler 1975a and 1975b for classic examples of reconstruction of PIE paradigms from their various reflexes in the daughter languages.

⁷Earlier analyses of ancient Greek accent may be found in Kiparsky 1967, 1973:796-805 and Steriade 1988. Cf. also Noyer 1997 on the need for intermediate representations in the derivation of Greek surface stress (see fn. 13). In the following discussion, “word” is understood in the sense of “accentual

analysis, the feet of earlier theories (e.g. Hayes 1985, 1995) are replaced by *metrical grids*, composed of *elements* (denoted by asterisks), which represent all those segments capable of bearing surface stress; and a set of left or right *brackets*. These brackets group the elements into larger units called *constituents*, but unlike feet in older models, such constituents play no independent role of their own. This approach allows the simple computation of most (all?) stress patterns found in the world's languages, based on the settings of just a few parameters; in addition, it does not appear to overgenerate, i.e. predict stress patterns unattested in human language.⁸

The main benefit of the brackets-and-edges model lies in what Halle and Idsardi (1995:407-8) term Syllable Boundary Projection, which allows syllables with a particular phonological property to be distinguished for metrical purposes, e.g. syllables containing a long vowel, ending in a particular segment, or lexically specified as underlyingly accented. This last option allows us to account for the idiosyncratic properties of individual lexical items reconstructed for Proto-Indo-European (PIE) and found in IE languages with lexical accent such as Vedic Sanskrit, Lithuanian, or Russian. Halle and Idsardi (1995) and Halle (1997) postulate that roots, stem suffixes, and inflectional endings in the aforementioned languages are either accented or unaccented; it is this underlying specification of morphemes that characterizes the reconstructed PIE system of accent, with its various types of stress alternations.

As already noted, stress in the brackets-and-edges model is computed by a series of constructions on a metrical grid. Languages are distinguished by their choice of particular parameters, noted below in italics.

1) **Line 0 Projection**

Grid marks, or elements, are projected from *certain segments* in the phonological structure. Most languages limit Line 0 Projection to syllable heads — typically vowels — but other phonemes may also project a grid mark, e.g. sonorants in Lithuanian syllables containing vowel + sonorant.

2) **Syllable Boundary Projection** (optional)

Project the *left/right* (L/R) boundary of *particular syllables* onto line 0. The relevant feature may be phonetic, e.g. length,

word", i.e. a phonological unit, typically composing a single nominal or verbal form and one or more proclitics or enclitics, upon which stress is assigned. As the following study is devoted to demonstrating the historical continuity of PIE accent in Greek, I will not discuss the accentuation of clitics here: cf. Schwyzler 1939:386-9, Lejeune 1972:299, Rix 1976:43-4 for details.

⁸Certain types of extrametricality do not seem to lend themselves readily to an analysis with edge- and head-marking. For two examples, cf. Buckley 2000.

or lexical specification of underlying accent, as in Russian, ancient Greek, and PIE (see below).

- 3a) **Edge-Marking Parameter**
Insert a *L/R* bracket to the *L/R* of the *L/R*-most element in line 0. The brackets define the line 0 grid marks into metrical constituents, similar to the types of feet specified in earlier theories. Here, however, the constituents are not themselves the parameter, but are determined by the placement of brackets within the grid.
- 3b) **Iterative Constituent Construction** (optional)
Beginning from the *R/L*-most *L/R* bracket, insert a *L* or *R* bracket, respectively, after each pair of elements.
- 3c) **Head Location Parameter**
Project the *L/R*-most element of each constituent onto line 1.
- 4a) **Edge-Marking Parameter**
Insert a *L/R* bracket to the *L/R* of the *L/R*-most element in line 1.
- 4b) **Head Location Parameter**
Project the *L/R*-most element of each constituent onto line 2.
- 5) **Conflation** (optional):
In languages lacking secondary stress, conflate lines 0 and 1.

The segment (typically a syllable head) whose corresponding element is marked with an asterisk on line 2 receives primary phonetic stress. In languages lacking conflation, one or more of the elements with line 1 projections may receive secondary stress.

This model of stress computation is illustrated below with examples from the three major accentual classes of Russian *a*-stem nouns: accented (*dum*- 'thought, Duma'; unaccented *borod*- 'beard'; and postaccenting *gospož*- 'lady' (cf. Halle and Idsardi 1995:415-6, Halle 1997:276-86). Each noun is inflected with two accentually contrasting case endings, accented instrumental plural *-(ami* and unaccented accusative singular *-u*, in order to illustrate the interaction of stem and ending in the computation of Russian stress.⁹

Line 0

Project syllable heads

Project L boundary of lexically specified syllable heads

⁹Here and in the Greek grids below, divisions within words often follow morpheme boundaries rather than syllable boundaries, in order to highlight their morphological structure. The projection of syllable heads as line 0 elements, of course, remains unaffected.

Edge-Marking: RRR

Head: L

Line 1

Edge-Marking: LLL

Head: L

Conflate lines 0 and 1

Instr. pl.	accented (dum-(ami	unaccented borod-(ami	postaccenting gospož(-(ami
Acc. sg.	dum-u	borod-u	gospož(-ú
* (* *)		* (* *)	* (* *)
(dúm (a mi	bo rod	(á mi	gos pož ((á mi
* (* *)	* (* *)		* (* *)
(dúm u	bó rod u		gos pož (ú

The parameter settings given above produce the correct surface stress. A similar analysis holds for Serbo-Croatian, once one takes into account the leftward accent shift of the majority of dialects and the standard language(s) (Halle 1997:286-90). Halle's extension of this analysis to Lithuanian and Vedic Sanskrit is also fundamentally correct (ibid., 291-5).

In the following sections, I will apply the brackets-and-edges analysis to ancient Greek, another IE language with distinctive lexical accent. Despite several significant innovations, it will be shown that stress in Homeric and Attic Greek may be computed by means of the same parameter settings as for Balto-Slavic or Vedic, thus making it more likely that these settings were inherited from, and operative already in, the ancestral protolanguage.¹⁰

¹⁰Halle (1997:308-9) briefly treats the various inflectional classes of PIE ablauting nouns, but provides no supporting evidence for the underlying accentuations of roots, stems, and endings which he postulates. He also makes no attempt to trace the diachronic development from the protolanguage down to the separate daughter languages.

4 Relics of PIE Accent in the Greek Verb

4.1 Exceptions to Recessive Verbal Accent

One of the accentual peculiarities of Vedic Sanskrit is that the underlying accentuation of finite verb forms surfaces only in subordinate clauses and at the beginning of a clause or *pāda* (verse). Otherwise, a postlexical rule of de-stressing results in forms such as pres. act. 3sg. *yunakti*, 3pl. *yuñjanti* 's/he yokes, they yoke' for *yunákti*, *yuñjánti* < PIE nasal-infixed **yu-né-g-ti*, **yun-g-énti* (cf. Whitney 1924:223-6).

If we assume that the same rule was operative already in PIE—or at least in the dialect of post-PIE that gave rise to Greek—it follows that pre-Greek, like Vedic, must have contrasted unstressed finite forms in main clauses with stressed forms elsewhere. A generalization of the unstressed variants to subordinate clauses under these circumstances would not have been surprising. As a result, all finite verb forms at that stage of pre-Greek would have been unstressed, i.e. enclitic, a situation preserved in Attic and (to the extent that its evidence is independent) Homeric in most forms of the presents of *e:mi* 'be' and *p^hε:mi* 'say' (Wackernagel 1877:457-8; cf. Chantraine 1942:381, Risch 1975:475-6, Rix 1976:43, 199-200). The introduction of the Three-Syllable Rule (TSR) then assigned surface stress to the mora farthest to the left permitted by the final syllable, resulting in the familiar "recessive" accent of Attic-Ionic:¹¹

1. Forms ending in a syllable containing a short vowel (or certain short diphthongs, e.g. nom. pl. *-oi*, *-ai* or mediopassive and infinitival endings in *-ai*; cf. Lejeune 1972:296, Risch 1975:473, Rix 1976:47-8) receive antepenultimate stress—in disyllabic words, initial stress, with circumflex intonation on a long vowel:¹² Hom. aor. 3sg. *kéleuse* 's/he ordered', *lábe*

¹¹Cf. Schwyzer 1939:378-9, Lejeune 1972:295-6, Risch 1975:471-2, Rix 1976:42. In the East Aeolic dialect of Lesbos (Lesbian), all words carry recessive stress, so that stress is no longer distinctive (Schwyzer 1939:383, Lejeune 1972:298, Risch 1975:475, Rix 1976:43): cf. *Sdeús*, *t^hú:mos* 'soul, spirit', *pótamos* 'river' vs. Att.-Ion. *Zeús*, *t^hu:mós*, *potamós*.

On exceptions to the TSR, e.g. gen. sg. *póλεος:s*, pl. *póλεων* to *pólis* 'city', see §5.2, fn. 27.

¹²The so-called "*so:tē:ra*-rule" (after acc. sg. *so:tē:ra* 'savior', an example of it), which assigned circumflex intonation to long penults followed by a final short vowel, had the effect of eliminating intonational distinctions in penultimate position: the intonation of a long penult is entirely conditioned by the quantity of the vowel of the final syllable, so that ' and ^ contrast only word-finally. Not all Greek dialects appear to have undergone this innovation: cf. Doric

- 's/he took', *heûre* 's/he found'; pres. 3sg. *ágetai* 's/he takes for her/himself', inf. *ê:nai* 'to be'.
- Forms ending in a syllable containing a long vowel or diphthong (excluding the diphthongs in 1.) are stressed on the penultimate, with acute intonation on a long vowel or diphthong: pres. 1sg. *klí:nɔ:* 'I lean (tr.)', *k^háirɔ:* 'I enjoy, am happy', 3sg. *klí:nei*, *k^háírei*.
 - Long monosyllables receive circumflex intonation: Hom. aor. 3sg. *i^hê:* 's/he put', impf. 3sg. *ê:n* 's/he was'.

Thus, the previous underlyingly unaccented nature of finite verb forms is masked by the subsequent operation of the TSR. As Hoenigswald (1998:271) succinctly puts it, "recessivity is the guise taken perforce by their former enclisis, which can be reconstructed by comparative evidence".¹³

Should one conclude that PIE lexical accent in verbal inflection was lost without a trace in Greek? Almost completely: excepting a few fossilized thematic aorist active imperatives in *-é* (and the regular aorist mediopassive

ná:sos 'island', *gunáikes* 'women' (Schwyzer 1939:377, 384, Lejeune 1972:297, Rix 1976:44-5; otherwise Risch 1975:474-5).

¹³Cf. Wackernagel 1877:459, Schwyzer 1939:389-90. Subsequent to the assignment of recessive accent, loss of intervocalic *y, *h (< *s), and later *w led to the contraction of vowels across the resulting hiatuses (cf. Chantraine 1942:382-3, 384). Examples include so-called "contract verbs" (i.e. verbs with vowel-final stems, e.g. pres. 1sg. *ti:mɔ:*, 3sg. *ti:má:i* 'honor' < *ti:má-ɔ:*, *ti:má-ei*) and the subj. and opt. of athematic verbs and the stative/passive aor., e.g. pres. subj. 1sg. *tí^hɔ:*, *tí^hê:i* < **tí^hé:-ɔ:*, **tí^hé:-ei* to *tí^hε:-mi* 'I put', aor. subj. *k^harɔ:*, *k^harê:i* < **k^haré:-ɔ:*, **k^haré:-ei* to *e-k^háre:-n* 'I was happy'.

The exceptional accentuation of athematic pres. opt. mp. 3sg. *didoíto*, *tí^heíto*, *histaíto* (to *dídɔ:-mi*, *tí^hε:-mi*, *hístε:-mi* 'I give, put, stand (tr.)') probably results from contraction following the loss of laryngeals in intervocalic position: (post-)PIE **di-dh₃-ih₁-tó*, **d^hi-d^hh₁-ih₁-tó*, **s(t)i-sth₂-ih₁-tó* > pre-Gr. **didóito*, **tí^héito*, **histáito* → *didoíto*, *tí^heíto*, *histaíto* (sim. act. 1pl. *didoímen*, *tí^heímen*, *histaímen*; Risch 1975:476-8). These were further supported by the corresponding aor. opt. forms *doíto*, *tí^heíto*, *staíto*, as opposed to *práito*, *dúnaíto* (to aor. *e-príá-me:n* 'I buy', *dúna-mai* 'I am able'), which have adopted regular recessive surface stress. For other possible survivals of laryngeal contraction, cf. fn. 31.

On the implications of these contractions for the surface opacity of recessivity, cf. Noyer 1997. I leave aside the accentuation of verbal compounds such as iptv. 2sg. *apó-dos* 'give away!', *sum-pró-es* 'send forth together!', *sun-é-sk^hon* 'held together', in which the surface stress cannot retract beyond the final syllable of the last preverb (hence not "*ápodos*", "*súmproes*") or the augment (hence not "*súnesk^hon*"; Chantraine 1942:384, Risch 1975:476); on the cyclic computation of stress in such forms, cf. Noyer 1997:522-4 with refs.

imperative ending *-ou* < *-*éō*; cf. Chantraine 1942:382, Risch 1975:475-6, Rix 1976:42-3, 215 and see below, §4.2), finite verbal forms are synchronically unaccented and receive recessive surface stress.

Non-finite verbal forms such as participles and infinitives, however, would not have been subject to postlexical destressing. To be sure, one finds recessivity in a number of participles, including several in masc. *-menos*, fem. *-menē*:, neut. *-menon* (stem *-meno-*), illustrated here with forms of pres. *graph^h.e/o-*, fut. *graps-e/o-*, aor. *graps-a-* ‘write’:

pres. mp. *graph^hómenos*, *graph^homéne*:, *graph^hómenon* ‘writing for oneself, being written’;

fut. mid. *grapsómenos*, *-ménē*:, *-menon* ‘going to write for oneself, who/which will write for oneself’;

fut. pass. *graph^hh^e:sómenos*, *-ménē*:, *-menon* ‘going to be written, which will be written’;

aor. mid. *grapsámenos*, *-ménē*:, *-menon* ‘who/which writes for oneself, wrote for oneself’.

These correspond to the recessively stressed infinitives *gráph^he-st^hai*, *grápsē-st^hai*, *graph^hh^e:se-st^hai*, and *grápsa-st^hai*, respectively. In the absence of probative evidence for underlyingly accented (*graph^h-*, I adopt the default hypothesis that verbal stems, and hence the above participles, are unaccented, with recessive stress determined by the TSR.

Three others, the pres. and fut. act. ptcp. in masc. *-ō:n*, fem. *-ō:sa*, neut. *-on* (stem *-ont-*) and the “first” (i.e. productive) aor. act. ptcp. in masc. *-a:s*, fem. *-a:sa*, neut. *-an* (stem *-ant-*), appear at first glance to be recessive as well:

pres. act. *ph^hérō:n*, *ph^héro:sa*, *ph^héron* ‘bearing, carrying’, *baínō:n*, *baíno:sa*, *baínon* ‘going, stepping’;

fut. act. *oísō:n*, *oíso:sa*, *oíson* ‘going to bear, that will bear’;

aor. act. *deiksa:s*, *deiksa:sa*, *deiksan* ‘showing, that showed’.

As with *graph^h-*, there is no reason to assume accented (*ph^her-*, (*ois-*, (*deiks-* here (but cf. fn. 14). However, an examination of longer forms, e.g. those of *paideúō*: ‘instruct, teach’, reveals an irregularity in the neut. nom./acc. sg. in *-on*, *-an*:

paideúō:n, *paideúo:sa*, ***paideûon*** ‘instructing’;

paideúsō:n, *paideúso:sa*, ***paideûson*** ‘going to instruct, that will instruct’;

paideúsa:s, paideúsa:sa, paideûsan 'instructing, that instructed'

Why do we not find recessive "*paideuon*", "*paideuson*", "*paideusan*"? The answer lies in interaction of the TSR with the paradigms of these participles: the neut. nom./acc. sg. was the *only* form in which stress could retract to the penultimate syllable of the verbal stem, in this case *pai*.¹⁴ This sparsity of phonetic (surface) evidence for recessivity caused a phonological reanalysis: instead of *pai[deúɔ:n, pai[deúsɔ:n, pai[deúsa:s*, with stress determined by the TSR, speakers of Greek at some point abstracted underlyingly accented forms *pai[deúɔ:n, pai[deúsɔ:n, pai[deúsa:s*. (For a parallel case of reanalysis in the noun, cf. §5.1.)

Although the stress of pres. and fut. act. ptcps. in *-ɔ:n, -o:sa, -on* may be explained starting from a recessive origin, there remain four other participles whose non-recessive stress cannot be account for in this way (cf. Rix 1976:199-200, 215):

¹⁴Cf the following paradigm for *pai[deúɔ:n* 'instructing' (excepting the dual), with TSR limitations marked; *paideúsɔ:n* and *paideúsa:s* are entirely parallel:

	masc.	neut.	fem.
nom. sg.	<i>pai[(deúɔ:n</i>	[pai[deúon	<i>pai[(deúo:sa</i>
acc.	<i>pai[(deúonta</i>	"	<i>pai[(deúo:san</i>
gen.	<i>pai[(deúontos</i>		<i>pai[deu[ó:sɛ:s</i>
dat.	<i>pai[(deúonti</i>		<i>pai[deu[ó:sɛ:i</i>
nom. pl.	<i>pai[(deúontes</i>	<i>pai[(deúonta</i>	<i>pai[(deúo:sai</i>
acc.	<i>pai[(deúontas</i>	"	<i>pai[deu[ó:sa:s</i>
gen.	<i>pai[deu[óntɔ:n</i>		<i>pai[deu[ó:sɔ:n</i>
dat.	<i>pai[(deúo:si</i>		<i>pai[deu[ó:sais</i>

The corresponding infinitives match their participles in stress: pres. act. *pai[deú-e:n*, fut. act. *pai[deús-e:n*, aor. act. *pai[deús-ai* (*-ai* here counts as short; cf. opt. 3sg. *paideúsai* with "long" *-ai*, like 2sg. *paideúsais*). This innovative accentuation appears to be limited to *infinite* forms only: cf. iptv. mp. 2sg. *paideusai* with recessive accent, thus excluding a stem *pai[deusa-*. — On the so-called "Aiolic infinitive" ending *-men* and East Aiolic (Lesbian) *-menai* found with athematic presents in Homer, e.g. *ém-men(ai)* 'to be' < *eh-m- for Att. *ê:nai* < *eh-enai (to pres. 1sg. *e:mí* < *eh-mi), *í-men(ai)* 'to go' for Att. *i-énai* (to *é-mi*), *éd-menai* 'to eat' for Att. *éd-e:n* (to thematized pres. *éd-ɔ:*), cf. Rix 1976:238.

I leave unresolved for now whether the same reanalysis occurred in monosyllabic pres., fut., and ("first") *s*-aor. act. stems, e.g. whether *p^her-*, *ois-*, *deiks-* remain underlyingly unaccented, which leads to no problem in their participial stress, or have been reinterpreted as accented (*p^her-*, (*ois-*, (*deiks-* after polysyllabic stems.

1. active participles of the thematic or “second” aorist, ending in *-ῶ:n*, *-ῶ:sa*, *-ῶ:n*, e.g. *λίπῶ:n*, *λίπῶ:sa*, *λίπῶ:n* ‘leaving (behind)’, *εἰῶ:n*, *εἰῶ:sa*, *εἰῶ:n* ‘coming’;
2. aorist passive participles (still largely stative in Homer) in *-ῆ:s*, *-ῆ:sa*, *-ῆ:n* (stem *-ῆnt-*), e.g. Hom. *κῆarῆ:s*, *κῆarῆ:sa*, *κῆarῆ:n* ‘(being) joyous, happy’, Att. *λυῆῆ:s*, *λυῆῆ:sa*, *λυῆῆ:n* ‘released’;
3. perfect active participles in *-ῶ:s*, *-ῶ:sa*, *-ῶ:s* (stem *-ῶt-*), e.g. Hom. *γεγονῶ:s*, *γεγονῶ:sa*, *γεγονῶ:s* ‘being (X years) old’, Att. *πεπαυεῶ:s*, *πεπαυεῶ:sa*, *πεπαυεῶ:s* ‘having instructed’;
4. perfect mediopassive participles in *-μένος*, *-μένη:s*, *-μένον*, e.g. *γεγραμμένος*, *-ε:s*, *-ον* ‘having written for oneself, having been written’.

As has long been known (cf. Wackernagel 1877:459-60, Schwyzler 1939:389-90, Chantraine 1942:378ff.), these forms preserve an older accentual pattern which was lost in the corresponding finite forms when the latter generalized their destressed variants (whence recessive stress in Greek).¹⁵ In the next two sections, we shall discover that the non-recessive stress of these four participles provides evidence that the inherited underlying accentuation of at least certain PIE verbal morphemes has survived into Greek.

4.2 Survivals of Lexical Accent: The Thematic Aorist

As is well known, the Homeric and Attic “second”, i.e. thematic aorist continues PIE root aorists which have been thematized on the basis of 3pl. **-ῶ-nt* <— **-ῆ-nt*, e.g. Hom. 3sg. *λίπε* ‘s/he left (behind)’ <— **lik^w-ῆ-t* <— PIE **léyk^w-t* after 3pl. *λίπον* < post-PIE **lik^w-ῶ-nt* < PIE **lik^w-ῆ-nt*.¹⁶ The

¹⁵I wish to thank an anonymous reviewer for the *PWPL* for emphasizing the need to distinguish between finite and infinite verbal forms.

¹⁶Cardona (1960) has established that only two thematic aorists are attested in more than two branches of IE: 3sg. Hom. Gr. *ἔ:λυῆ*, OIr. *luid* ‘s/he went’, TB *lac* /lǝcǝ/ ‘s/he went out’ < (post-)PIE **é-h₁lud^h-et*, *h₁lud^h-ét*; Gr. *eide* < **éwide* ‘s/he saw’, Ved. *ávidat*, Arm. *egit* ‘s/he found’ < **é-wid-et*. As Bammesberger (1985:71ff. with refs.) notes, however, both of these may be independent creations in the individual languages: cf. Lat. *vidī* ‘I saw, have seen’ < aor. **weyd-*, implying an ablauting athematic paradigm with 3sg. **wéyd-t* (= **[wéyt^st]*), 3pl. **wid-ént*; pres. Skt. *ró(d)hati* ‘grow, ascend’, PGmc. **lewd-* (Goth. *liudan* ‘grow, rise, spring up’) < PIE aor. subj. **h₁léwd^h-e/σ-*, implying an ablauting athematic aor. with sg. **h₁lewd^h-* ~ pl. **h₁lud^h-* (cf. also R. Kim 2001, fn. 4). The thematic aorist must therefore have arisen, via thematization of the 3pl., in the late or

diachronic origin of both the “zero-grade” vocalism and the oxytonesis of Greek aor. act. ptcps. such as *lip̄ō:n*, *lip̄ō:sa*, *lip̄ón* ‘leaving (behind)’, *elth̄ō:n*, *elth̄ō:sa*, *elth̄ón* ‘coming’ is thus clear: both were generalized from the 3pl. which, along with other plural and dual forms, contrasted with the full *e*-grade and stem-stress of the singular. One may correspondingly reconstruct *lik^w-ónt-, *h₁lud^h-ónt- as the thematized aorist participial stem in post-PIE. But how should the accent of these participles be analyzed synchronically?

If the zero-grade aorist roots were underlyingly postaccenting, e.g. *elth̄(-*, *lip(-*, then the contrast in accentuation between these participles and pres. act. *ph̄érō:n* would immediately follow: since pres. *ph̄er-* is unaccented, *ph̄ér-ō:n* receives recessive accent according to the TSR (but cf. fn. 14), whereas in *lip-ō:n* it is the thematic vowel which receives the accent according to the above rules of prosodic computation. Similarly in the infinitive, pres. *ph̄ér-e:n* contrasts with aor. *lip-ê:n*.

Within the brackets-and-edges framework, the innovative TSR may be implemented by limiting Line 0 Projection to the final two or three syllable heads. I tentatively propose the following two steps:

- 0a) Insert a *left* boundary to the *left* of the *rightmost* (i.e. final) syllable head if the latter is a long vowel or diphthong (excluding nom. pl. *-oi*, *-ai*, mp. and inf. verbal endings in *-ai*; cf. above), i.e. if it “counts as long” for the purposes of accent.
- 0b) Construct a single binary foot to the *left*.

The resulting boundary, which will be indicated in the examples below with the symbol [, thus demarcates the “stressable” portion of a Greek word: only those syllables which lie to its right may project an element onto line 0.¹⁷

post-PIE period; the agreement between Gr. and Skt. in accenting the theme vowel is due to parallel development (contra Chantraine 1942:379).

¹⁷Cf. the situation in Latin, where words take penultimate stress if their final syllable contains a long vowel and antepenultimate stress if their final syllable contains a short vowel; because Latin lacks lexical accent (and hence Syllable Boundary Projection), one may simply project the left boundary of a final long syllable on line 0, then construct a single foot to the left by ICC. For a different analysis, cf. Halle and Idsardi 1995:424-5.

Note that the analysis proposed here is also required for modern Greek, in which historically long endings such as substantival *o*-stem gen. sg. *-u*, acc. pl. *-us*, gen. pl. *-on* (< ancient *-o:*, *-o:s*, *-ō:n*; cf. §5) still count as underlyingly “long” in step 0a. The contrast between e.g. nom. sg. *ánthrop-os* and gen. sg. *ánthrop-u* may thus be represented by the grids

Otherwise the rules for stress computation in ancient Greek are the same as those given above for Russian. I repeat these for convenience:

Line 0

Project syllable heads

Project L boundary of lexically specified syllable heads

Edge-Marking: RRR

Head: L

Line 1

Edge-Marking: LLL

Head: L

The metrical grids for *p^hérɔ:n* and *lipɔ:n* are thus

*				*
(*				(*
*	*)		*(*)
[p ^h ér	ɔ:n		[lip	ɔ:n.

This explanation, however, is ruled out by unaugmented finite aorist forms, i.e. “injunctives”, which survive in Mycenaean and are still quite frequent in Homer. Based on the evidence of *lípe*, etc., the aorist root cannot have been postaccenting—unless the thematic vowel *-e/o-* is a dominant cyclic affix in Greek, for which there is no evidence. These unaugmented forms suggest that the root is instead underlyingly *unaccented*, and that the initial accent of unaugmented aorist forms such as *lípe* is due to the LLL and Head-L parameter settings for line 0.

*				*	
(*				(*	
*	*	*)		*	*)
[án	θro	pos	an	[θró	pu

which correspond perfectly to ancient Greek

*				*	
(*				(*	
*	*	*)		*	*)
[án	t ^h ɔ:	pos	an	[t ^h ɔ:	po:.

But if that is the case, the oxytonesis of *lipón*, etc. presupposes that the participial endings are still underlyingly accented in Greek. It is therefore not true that ancient Greek has completely lost lexical accent in the verbal system: although the majority of both finite and infinite categories exhibit recessive accent, the decidedly non-recessive oxytonesis of the participle of the thematic aorist can only be analyzed in synchronic terms by positing an underlyingly accented ending *-(o)n*, *-(o:sa)*, *-(on)*.

Further support for this analysis comes from the imperative of the thematic aorist, which furnishes the *only* nonrecessive finite verb forms in all of Greek. The fossilized active imperatives *elthé* 'come!', *heuré* 'find!', *eipé* 'speak! tell!', *idé* 'see!', *labé* 'take!' suggest that iptv. act. 2sg. *-(e)*, like the participial ending, was also originally accented (cf. Schwyzler 1939:799); similarly pl. *elthéte*, *heuréte*, *eipéte*, *idéte*, *labéte*, with accented 2pl. *-(ete)*. These relics apparently reflect an earlier stage of the language in which all imperatives to thematic aorists were oxytone, before analogy to the recessive accentuation of the rest of the paradigm resulted in the majority pattern of Hom. *lípe* 'leave (behind)!', *pie* 'drink!', Att. *bále* 'throw!', *páthe* 'suffer!'.¹⁸ Likewise, the regular aorist middle iptv. 2sg. ending Hom. *-éo* < **-éso* (Att. contracted *-ô:*) has preserved the accentuation of the theme vowel, e.g. *genéo* 'become!', *idéo* 'see for yourself!', *labéo* 'take for yourself!' (ibid.).

To recapitulate, we may trace the accentual development of the thematized aorist from PIE to Homeric Greek as follows. In PIE, the past-tense ("temporal") augment **(e-* was underlyingly accented: cf. Ved. aor. 3sg. *vid-át*, *á-vid-at* 's/he found' (Hom. *íde*, *eíde* < **wíde*, **éwide*), where the stress of the unaugmented variant disappears after the uniform *á-*. As seen above, the thematic aorist which arose in late or post-PIE had an accented thematic vowel **(e/o-*. This vowel has lost its accent in all finite forms by Homeric times, so that post-PIE unaugmented aor. ("injunctive") 1sg. **lik^w-óm*, 3sg. **lik^w-éd* develops to Hom. *lípon*, *lípe*.

	*				*
	(*				(*
	*	(*)			* *)
post-PIE	*lik ^w	óm	—>	Homeric	[líp on

¹⁸Cf. Schwyzler 1939:389-90, 799. Synchronically, these five must almost certainly have been treated as lexical exceptions: the unusual oxytone aor. iptv. was entered as part of the underlying specification of the verb. An anonymous reviewer for the *PWPL* has argued for treating these roots as exceptionally postaccenting rather than assuming that iptv. *-e*, *-ete* are accented only when suffixed to them, but cf. above for the evidence against such an analysis.

In Homeric, the augment is also no longer accented: the placement of stress in 1sg. [*élipon*, 1pl. *e[lípomen*, or for that matter in “normal” *s*-aorists such as 1sg. *e[paídeusa*, 1pl. *epai[deúsamen* ‘instructed’ or imperfects such as 1sg. [*élegon*, 1pl. *e[légomen* ‘was saying’, is completely determined by the TSR. The correspondence between 1sg. PIE **é-lik^w-o-m* and Hom. *élipon* ‘I left (behind)’ is hence merely due to coincidence.

*		*		*		*
(*		*		(*		*
(*	*	(*)		*	*	*)
* <i>é</i>	<i>lik^w</i>	<i>om</i>	—>	[<i>é</i>	<i>lip</i>	<i>on</i>

The thematic vowel retains its original lexical accent only in the non-recessive active participle (and infinitive: *lip-ê:n*, *id-ê:n*), as well as in the mid. iptv. 2sg. in *-éo* (Att. *-ô:*) and five residual act. iptvs. in 2sg. *-é*, 2pl. *-éte*. Here alone we find complete continuity between PIE (or rather post-PIE; cf. fn. 16) and Homeric, not only in surface realization but also in underlying specification of accent:

	*				*	
	(*				(*	
*	(*	*)		*	(*	*)
* <i>lik^w</i>	<i>ónt</i>	<i>m̥</i>	>	[<i>lip</i>	<i>ónt</i>	<i>a</i>
	*				*	
	(*				(*	
*	(*	*)		*	(*	*)
* <i>wid</i>	<i>é</i>	<i>te</i>	>	[<i>id</i>	<i>é</i>	<i>te</i>
	*				*	
	(*				(*	
*	(*	*)		*	(*	*)
* <i>lik^w</i>	<i>é</i>	<i>s(w)o</i>	>	[<i>lip</i>	<i>é</i>	<i>o.</i>

Note that the underlying accentuation of the participial endings *-(o):n*, *-(o):sa*, *-(on)* does not extend to the present, where we find ordinary recessive [*p^hérɔ:n* or *pai[deúɔ:n* with stress governed by the TSR.¹⁹ Greek therefore

¹⁹As I hope to show elsewhere, simple, i.e. unsuffixed thematic presents—which are (almost) entirely a post-PIE innovation, only one or two unclear examples being attested in the archaic Anatolian languages—had unaccented theme vowel, whereas present-forming suffixes such as *-(y^c)_o-

exhibits a synchronic contrast between unaccented pres. act. $-\sigma:n$, $-o:sa$, $-on$ and accented them. aor. act. $-(\sigma:n, -(o:sa, -(on.$

4.3 Survivals of Lexical Accent: The Aorist Passive and the Perfect

In addition to the thematic aorist, the perfect active and passive participles and the aorist stative/passive participle also indirectly continue the underlying accent of their PIE ancestors. Let us begin with the latter. It is universally agreed that the classical Greek **aorist passive** in $-\varepsilon:-$, $-^h\varepsilon:-$ (in Homer still predominantly with stative meaning), e.g. Hom. *ek^hárε:* 's/he was joyous, happy', Att. *elú^hε:* 's/he, it was released', continues a stative formation inherited from PIE. The latter may be reconstructed with zero-grade of the root and stress on the suffix $*-eh_1-$, e.g. PIE $*h_1rud^h-éh_1-$ 'to be red' > Latin *rubēre*.

The underlying accentuation of the old stative suffix $*-(ē-$ has been lost in finite forms such as *ek^hárε:*, *elú^hε:*, but survives in the ptcp. and inf.: *k^har-é:s*, *k^har-ê:sa*, *k^har-én* '(being) joyous', *lut^h-é:s*, *lut^h-ê:sa*, *lut^h-én* '(being) released', with accented $-(ent < *-(ē-nt-;$ ²⁰ inf. *k^har-ê:-nai*, *lut^h-ê:-nai*. Below is the metrical grid for masc. acc. sg. *lut^hénta*:

	*	
	(*)	
*	(*)	*)
[lut ^h	ént	a.

The **perfect active** participle is regularly stressed on the suffix, e.g. Hom. *eidós:s*, *iduûa*, *eidós* 'knowing' (to *oîda* 'I know'), *gegonós:s*, *-ûa*, *-ós* 'being (X years) old' (to *gígnomai* 'I am born'), Att. *pepaideukós:s*, *-ûa*, *-ós* 'having instructed'. Since the stress of these forms is not recessive, we must assume that the suffix is underlyingly accented $-(\sigma:s, -(uia, -(os.$

How may we relate this to the accentuation of the perf. act. ptcp. in PIE? Consider the reconstructed PIE paradigm of the archaic unreduplicated ptcp. of $*woyd-$ ~ $*weyd-$ ~ $*wid-$ 'know', for which we have the most information:

*-(sk^e/o- were underlyingly accented. Greek has lost the accent of such suffixes, e.g. in *k^háiro:* 'go, step' < $*k^h ar-y^e/o-$ < $*g^h r-y^e/o-$, *báskō:* 'go, step' < $*g^w r-sk^e/o-$, so that *all* thematic presents in Greek share recessive stress.

²⁰Here $*-(ē-$ has been shortened before tautosyllabic nasal within the history of Greek, by "Osthoff's Law": $*V:RC > *VRC.$

	masc.	neut.	fem.
nom. sg.	*wéyd-wōs	*wéyd-us (*wos?)	*wid-wés-ih ₂
acc.	*wéyd-wos-m̄	”	*wid-wés-ih ₂ -m̄
gen.		*wid-us-és	*wid-us-yéh ₂ -s
dat.		*wid-us-éy	*wid-us-yéh ₂ -i
loc.		*wid-wés-∅	*wid-us-yéh ₂ -∅.

In Halle and Idsardi's terms, the masc. and neut. paradigm presupposes that the oblique case endings (gen. *-es, dat. *-ey) are accented—as usually reconstructed—whereas the ablauting root *weyd- ~ *wid- and the suffix *-wos- ~ *-us- are unaccented. The analysis of the feminine, with its proterokinetic contrast between stressed suffix *-wés- in strong cases vs. stressed feminine “motion-suffix” *-yéh₂- in weak cases, is more complicated, and not all the details are fully clear.²¹ Nevertheless, it appears that at some point in the prehistory of Greek, the suffix *-wos- ~ *-us- was reanalyzed as accented, resulting in the following paradigm reconstructible for the Mycenaean stage, i.e. the 15th to 13th cc. BC:

²¹It appears that in PIE, suffixed adjectives exhibited ablaut and accent alternation in the fem. between their suffix and the fem. “motion-suffix” *-ih₂- ~ *-yéh₂-. The paradigm of the *u*-stem adjective ‘short’, for example, was probably

	masc.	neut.	fem.
nom. sg.	*mrég ^h -u-s	*mrég ^h -u	*mrǵ ^h -éw-ih ₂
acc.	*mrég ^h -u-m	”	*mrǵ ^h -éw-ih ₂ -m̄
gen.		*mrǵ ^h -éw-s	*mrǵ ^h -u-yéh ₂ -s
dat.		*mrǵ ^h -éw-i	*mrǵ ^h -u-yéh ₂ -i.

(For *e*-grade *mrég^h-u- cf. Lat. *brevis*; the zero-grade is continued in Gr. *brak^hús*, Skt. *mṛhú-*. Fem. nom./acc. *-éw-ih₂- is supported by Gr., e.g. *bar-eía* < *bar-éw-ya < *g^wṛh₂-éw-ih₂-). Interestingly, the alternation in the fem., although traditionally described as “proterokinetic”, does not involve the first two morphemes, i.e. root and suffix, but rather the two suffixes: the root appears in zero-grade throughout the fem. paradigm. I tentatively suggest that this pattern reflects a constraint, perhaps operative already in PIE, limiting ablaut/accnt alternations to the final three syllables of the (phonological) word, and it is tempting to speculate that this restriction, evident in such fems. as *mrǵ^h-éw-ih₂(-m̄), *wid-wés-ih₂(-m̄), contributed to the eventual generalization of the TSR in Greek.

	masc.	neut.	fem.
nom. sg.	*weydwó:s	*weydwós	*wid-úh-ya
acc.	*weydwóh-a	”	*wid-úh-yan
gen.		*weydwóh-os	*wid-úh-ya:-s
dat./loc.		*weydwóh-i	*wid-úh-ya:-y.

Subsequent changes in suffix (substitution of *-wot- for *-woh- once *h had ceased to be a conditioned allophone of *s) and ablaut (spread of *e*-grade to the fem., cf. Hom. *iduía* vs. Att. *eiduía*) produced the paradigm of classical Greek.

As with *-(wos- ~ *(us-, the accented ending *-énai* of the pf. act. infinitive always carries the stress, e.g. in *eid-énai* ‘to know’, *gegon-énai* ‘to be (X years) old’, *pepaideuk-énai* ‘to have instructed’.²² The pf. mp. ptcp. and inf. are likewise characterized by penultimate stress: Att. *pepaideuménos* ‘having been instructed’, *gegramménos* (< /ge-graph^h-ménos/) ‘having been written’, *pepaideúst^hai* ‘to have been instructed’, *gegráph^hai* (< /ge-graph^h-st^hai/) ‘to have been written’ to *paideúō*: ‘I teach, instruct (children)’, *gráphō*: ‘I write’. Since PIE apparently did not have a pf. act. inf., nor any pf. mp. at all, these forms must be independent innovations—paralleled in other IE branches such as Indo-Iranian, but specific to Greek—and the underlying accentuation of their stems is almost certainly due to the model of the pf. act. ptcp.

5 PIE Nominal Accentuation in Greek

Although it has undergone several innovations, the Greek nominal system has preserved relatively more of the original PIE system of accent. Below are the case/number endings of the noun in Homeric and Attic Greek, excluding the dual and Hom. instrumental *-ph^hi*:²³

²²In Homer we find inf. *íd-men*, *íd-menai* ‘to know’, with the Aiolic endings (cf. fn. 14).

²³Originally plural and confined to non-*o*-stems, as regularly in Mycenaean; the *o*-stem instr. pl., spelled *-o* in Myc., probably stood for **-ō*is (cf. Skt. *-āiḥ*, Av. *-āiš*, Lith. *-aīš*). Cf. Morpurgo-Davies 1970 with references.

I also leave aside the vocative, which originally had initial stress no matter what the underlying accentuation of the stem, to judge from the pattern of Vedic and Balto-Slavic (cf. SC voc. *žěno /ž'eno/* to *žěna /ž'en'a/* ‘woman’; cf. Schwyzler 1939:391, 547). This pattern remains fairly productive in consonant-stems: cf. *páter*, *Sop^hókle:s* (< *Sop^hó-klewes), *eúdaímon* with recessive stress, to nom. *paté:r* ‘father’, *Sop^hoklé:s* (< *Sop^ho-kléwε:s) ‘whose fame is wisdom’, *eu-dáimō:n* ‘well-spirited, fortunate’. Virtually all *o*-stem voc. sgs. in *-e* have acquired “columnar accent” (see below), leaving only a few isolated relics such as

	<i>o</i> -stems	<i>a</i> :/ <i>ε</i> :-stems	consonant-stems
singular			
nom.	- <i>os</i>	- <i>a</i> ·, - <i>ε</i> ·	- <i>s</i> , -∅
acc.	- <i>on</i>	- <i>a</i> · <i>n</i> , - <i>ε</i> · <i>n</i>	- <i>a</i> , - <i>n</i>
gen.	Hom. - <i>oio</i> , Hom./Att. - <i>o</i> ·	- <i>a</i> · <i>s</i> , - <i>ε</i> · <i>s</i>	-(<i>os</i>)
dat.	- <i>o</i> · <i>i</i>	- <i>a</i> · <i>i</i> , - <i>ε</i> · <i>i</i>	-(<i>i</i>)
plural			
nom.	- <i>oi</i>	- <i>ai</i>	- <i>es</i>
acc.	- <i>o</i> · <i>s</i>	- <i>a</i> · <i>s</i>	- <i>as</i>
gen.	- <i>o</i> · <i>n</i>	Hom. - <i>á</i> · <i>o</i> · <i>n</i> > Att. - <i>ḥ</i> · <i>n</i>	-(<i>o</i> · <i>n</i>)
dat.	Hom. - <i>ois</i> (<i>i</i>), Att. - <i>ois</i>	Hom. - <i>ε</i> · <i>is</i> (<i>i</i>) Hom./Att. - <i>ais</i> . ²⁴	-(<i>si</i>)

Let us investigate the accentual properties of each of these classes in turn. As is well known, *o*- and *a*:/*ε*:-stems, along with the majority of consonant-stems, regularly exhibit "columnar accent": the stress of the nom. sg. is maintained throughout all other forms of the paradigm as far as allowed by the TSR, with a circumflex becoming an acute as necessary. Where columnar stress would violate the TSR, it shifts one syllable to the right: cf. [*pḗ*:*k^hus* 'arm', gen. sg. [*pḗ*:*k^heos* (Ionic); [*hḗ*:*misus* 'half', gen. sg. *hḗ*: [*míseos* (Rix 1976:43).

5.1 *o*- and *a*:/*ε*:-Stems

For *o*-stem nouns and adjectives containing at least three syllables, there are three possible patterns of surface stress:

1. X' X *os* e.g. *pátrios* 'paternal', *t^hánatos* 'death'
2. X X' *os* e.g. *olígos* 'few'
3. X X *ós* e.g. *potamós* 'river', *ouranós* 'sky'

Type 1 may be analyzed as accented on the antepenult, i.e. (X X *os*, or as underlyingly unaccented, with surface stress provided by the TSR: [X X *os*. Type 3 includes all oxytone, or ending-stressed, *o*-stem nouns; it may be

ádelph^he to *adelp^hós* 'brother'. On the voc. of masc. *a*:/*ε*:-stem nouns with nom. -*a*·*s*/-*ε*·*s*, cf. fn. 26.

²⁴On the distribution and origin of the competing dat. pl. endings in Homer, Attic, and the other dialects, cf. Schwyzler 1939:556-9, Chantraine 1942:194-6, 201-2.

analyzed as postaccenting X X(*os* or, if one posits an underlying accented thematic vowel *-o-*, as X X(*os*. In the absence of positive evidence that the theme vowel is accented in Greek *nominal* inflection, I adopt the former analysis.

Type 2, however, can only be analyzed as X (X *os*, with penultimate accent. Among other examples of this relatively limited class, one may cite *poikílos* 'pointed', *pedíon* 'plain, flat area', and the oblique/feminine stem *megálo-* to the adjective *mégas, megále:*, *méga* 'big, great'. At least for this class, therefore, one *must* assume an underlyingly accented stem, contrasting with both unaccented (type 1) and postaccenting (type 3) stems, much as in Slavic languages such as Russian or Serbo-Croatian.²⁵

One might likewise expect the same three patterns in *a:/ε:-*stem nouns—i.e., unaccented (or accented on the antepenult), accented on the penult, and postaccenting—and indeed oxytone (Type 3) *a:/ε:-*stems can be analyzed as postaccenting: X X(*a:/ε:*. Interestingly, however, Homeric and Attic lack *a:/ε:-*stem counterparts to the recessive type 1 of *o-*stem *pátrios, thánatos*.

1. *X' X a:
2. X X' a: e.g. *oikía*: 'house', *agápe*: 'love'
3. X X á: e.g. *agorá*: 'marketplace', *are:té*: 'virtue'

The absence of unaccented *a:/ε:-*stems is likely to be due to the weakness of phonetic evidence which would distinguish their paradigm from that of type 2. Note that with the exception of nom. pl. *-ai*, all the *a:/ε:-*stem case/number endings contain a long vowel, so that according to the TSR stress cannot recede beyond the penult. Thus, the paradigm of unstressed */oi ki a:-/ would be

	sg.	pl.
nom.	/oi ki a:/ > oi[kí-a:	/oi ki ai/ > "[oíki-ai]"
acc.	/oi ki a:n/ > oi[kí-a:n	/oi ki a:s/ > oi[kí-a:s
gen.	/oi ki a:s/ > oi[kí-a:s	/oi ki a:ɔ:n/ > oiki-[ɔ:n
		(Hom. <i>oiki</i> -[á:ɔ:n])
dat.	/oi ki a:i/ > oi[kí-a:i	/oi ki ais/ > oi[kí-ais

²⁵The distribution of this class has undergone certain alterations within the prehistory of Greek, e.g. Wheeler's Law ($\overset{\sim}{\text{v}} > \overset{\sim}{\text{v}}^{\text{z}}$, e.g. *agkúlos* 'crooked' < *agkulós, cf. Ved. *ankurá-*) or Vendryes's Law ($\overset{\sim}{\text{v}} > \overset{\sim}{\text{v}}^{\text{z}}$, e.g. *hetoimos* 'ready' < *hetoimos*; Att. only). Here $\overset{\sim}{\text{v}}$ and $\overset{\sim}{\text{v}}^{\text{z}}$ denote short vowels and long vowels/diphthongs, respectively. Cf. Schwyzler 1939:379, 382-3, Lejeune 1972:297-8.

Just as the neut. nom./acc. sg. of participles in $-o:n$, $-o:sa$, $-on$ did not furnish enough evidence for recessive stress (§4.1), so here the nom. pl. alone did not constitute a sufficient basis from which learners of Greek could deduce an underlyingly unaccented stem. Instead, they reanalyzed the nom. sg. and other forms with a long vowel in the final syllable as underlyingly accented, i.e. /oi (ki a:-/. As a result, the nom. pl. became *oiktai*, thus falling into line with the rest of the paradigm and bringing about columnar accent on the surface.²⁶

*				*		
(*				(*		
(*	*)		*	(*	*)	
<i>oi</i>	[kí	a	—>	[oi	kí	ai

Type 2 must therefore be analyzed as X (X $a:/\epsilon:$, with penultimate accent. Unlike type 2 o -stems, which are relatively limited in ancient Greek, this class includes *all* non-oxytone, i.e. barytone or stem-stressed $a:/\epsilon:$ -stem nouns.

5.2 Consonant- and Semivowel-Stems

As noted above, polysyllabic consonant-stem nouns regularly show columnar accent. The same applies to i - and u -stem nouns, which are generally recessive: *pólis* 'city', gen. sg. *póleō:s* < *póle:(y)os (by quantitative metathesis),²⁷ nom. pl. *póle:s* < *póleyes; *pê:k^hus* 'arm', gen. sg. *pé:k^ho:s* (Ion. *pé:k^heos*) < *pé:k^hewos, nom. pl. *pé:k^he:s* < *pé:k^hewes.

²⁶This was already seen by Kuryłowicz (1958:118-9); he further adduces the accentuation of the voc. sg. of $a:/\epsilon:$ -stem masculines in $-a:s/\epsilon:s$, e.g. *poli:ta* 'citizen', *hippóta* 'horseman', which must likewise be analogical to the nom. sg.: *po(li:t-a, hip(pot-a* after *po(li:t-ε:s, hip(pot-ε:s* <— *po[li:t-ε:s, hip[pot-ε:s*. Cf. fn. 23 on non-recessive stress in the o -stem voc. sg. The lack of recessivity in vocatives such as *Lukó-p^hron* 'wolf-minded' (for "*Lúko-p^hron*", to nom. *Lukó-p^hro:n*) is a related phenomenon, although complicated by the cyclic computation of stress in compounds (cf. fn. 13; Noyer 1997:512-5, 522-4 and passim).

²⁷Whence gen. sg. *póleō:n* < *pole:ō:n by analogy; cf. Lejeune 1972:296, Rix 1976:42. The gen. pl. forms of *pólis* and other i -stems make up the only synchronic exceptions to the TSR, since the gen. sg. may be analyzed as underlyingly /pole:(y)os/, with quantitative metathesis still a synchronic rule. Cf. the paradigm of *basileús* 'king' and other eu -stems: gen. sg. *basiléō:s*, acc. sg. *basiléa:*, gen. pl. *basiléō:n*, acc. pl. *basiléa:s* for underlying /basile:(w)-os, -a, -ō:n, -as/.

This, however, does not imply that polysyllabic consonant-stems have necessarily given up lexical accent in all cases. For example, nouns containing the feminizing suffix *-ís*, gen. *-íd-os* must carry an underlying accent on the final syllable of the stem, for otherwise we should expect, e.g., "*aléktorís*", gen. "*alekórid-os*", "*Átlantis*", gen. "*Atlántid-os*" instead of actually occurring *alektorís* 'hen', gen. *alektoríd-os*, *Atlantis* 'daughter of Atlas', gen. *Atlantid-os* (formed to *aléktɔ:r* 'cock' and *Átla:s*, gen. *Álant-os*, respectively). Similarly, the numerous masculine nouns in *-eús*, e.g. *basileús* 'chief (Mycenaean, Homeric), king (Attic, Hellenistic), emperor (Byzantine)', *hippeús* 'knight, horseman', or Homeric names in *-eus* such as *Ak^hilleús* 'Achilles', must be analyzed with accented suffix */(eu-/ ~ /ε:w-/*.²⁸ A convenient list of nominal derivational suffixes with their surface accentual properties is given in Kuryłowicz 1958:130-7.

In contrast to polysyllables, monosyllabic consonant-stems still exhibit intraparadigmatic stress alternations, e.g. nom. sg. *pó:s* 'foot', acc. *pód-a* vs. gen. *pod-ós*, dat. *pod-í*. This pattern is easily accounted for if we assume that the nom. and acc. endings are underlyingly unaccented and the gen. and dat. endings accented, as in the table above (§5). The underlying forms for */pod-/* 'foot' are thus

	sg.	pl.
nom.	<i>/pod-s/ > pó:s</i> ²⁹	<i>/pod-es/ > pódes</i>
acc.	<i>/pod-a/ > pód-a</i>	<i>/pod-as/ > pódas</i>
gen.	<i>/pod-(os/ > podós</i>	<i>/pod-(ɔ:n/ > podô:n</i>
dat.	<i>/pod-(i/ > podí</i>	<i>/pod-(sí/ > posí.</i>

Interestingly, not only have Homeric and Attic generalized a requirement restricting mobile stress to monosyllables, but *all* monosyllabic nominal stems exhibit mobile stress, i.e. are unaccented. That this pattern remains productive is proved by disyllabic stems in Homer (representative of early Attic-Ionic) which have undergone vowel contraction in Attic:

PGr. neut. *ows, *owh-at- > Hom. *oús* 'ear', nom./acc. pl. *oúata*
 ([ów.wa.ta], with Aiolian treatment of intervocalic *-wh-) for

²⁸On the prehistory of this class cf. Schindler 1976. Cf. fn. 27 on quantitative metathesis in, and the underlying forms of, the *eu*-stem paradigm.

²⁹The lengthening in this form is irregular and must be due to (imprecise) analogy with long-vowel nom. sg. forms in *-ɔ:n*, *-ɔ:s*, *-e:s*, etc. Cf. Lat. *pēs*, whose long vowel is likewise analogical to oblique forms with short *e*, e.g. acc. *pedem*, gen. *pedis*: the original PIE alternation of nom./acc. *o ~ obl. *e has been replaced by *ē ~ *e. In Greek, leveling of *o ~ *e to *o probably took place first, followed by introduction of the innovative long vowel into the nom. sg.

- * $\acute{\sigma}$:wat-a > Att. $\acute{\sigma}$:t-a, whence gen. sg. * $\acute{\sigma}$:wat-os (Hom. *ouatos*) → σ :t-*ós* (cf. Rix 1976:148);³⁰
- PGr. *i*-stem * $\acute{\omicron}$ wis (cf. Argolic *ówis*) > Hom. *óis* 'sheep' > Att. *oís*, whence gen. *ói-os* [$\acute{\omicron}$.i.yos] → *oi-ós* [oy.yós];
- PGr. * $\acute{\rho}$ áwis, * $\acute{\rho}$ áwid- > Hom. *páuis* 'child' > Att. *país*, *paid-ós*;
- PGr. neut. *s*-stem * $\acute{\rho}$ háhos > Hom. *p^háos* 'light' > Att. *p^hḗ:s*, reanalyzed as /p^hḗ:t-s/ with a new stem *p^hḗ:t-*, whence gen. *p^háo:s* (/p^háeh-os/) → *p^hḗ:t-ós*.

In each of the above cases, an underlyingly accented polysyllabic stem has become monosyllabic by contraction across an intervocalic hiatus: the new stem exhibits stress alternation between direct and oblique cases, although the original polysyllable did not. This suggests that Attic-Ionic had a synchronic constraint against accented monosyllabic stems which remained in effect at least until the above contraction had taken place.³¹

³⁰Cf. the contrast within Homer between older dat. pl. *ouasi* (for * $\acute{\sigma}$:wasi; *Iliad* 12.442) and contracted σ :*sín* (with prevocalic "movable *n*"; *Odyssey* 12.200). Hellenistic Gr. nom./acc. sg. $\acute{\sigma}$:s has adopted the stem vowel of σ :t-.

³¹In the root aor. ptcps. *dós:s*, *t^hés:s*, *stás:s*, root-accented *dónt-os*, *-i*, *-o:n*, *dó:si* (sim. *t^hént-os*, *stánt-os*, etc.) are either analogical to the pres. act. ptcps. *didós:s*, *t^hés:s*, *histás:s* or indirectly reflect the columnar accent of disyllabic **doat-*, **t^heat-*, **staat-* < * dh_3 - η t-, * $\text{d}^{\text{h}}\text{h}_1$ - η t-, * sth_2 - η t- (leveled after nom.-acc. **dont-*, **t^hent-*, **stant-*, e.g. *dós:s* < **dónts*, *dónta*, pl. *dónt-es*, *dónt-as* < * dh_3 - $\acute{\epsilon}$ nt-; Rix 1976:234). Cf. the contraction across laryngeals in the opt. of these verbs, fn. 13 above. Similarly Attic $\acute{\sigma}$:n, gen. *ónt-os* is contracted from Hom., Ionic *e $\acute{\sigma}$:n*, *eónt-os*, thematized from PGr. **ent-* ~ **ea(n)t-* < **ehent-* ~ **ehat-* < PIE * $\text{h}_1\text{s-ént-}$ ~ * $\text{h}_1\text{s-}\eta$ t-' (Rix, *ibid.*; cf. Herakleian *ént-es*, Hom. fem. *éassa* < **ehat-ya*, fn. 40 below). As far as I am aware, these participles constitute the only exceptions to this constraint.

The root accent of gen. sg. *é:r-os*, dat. *-i* to nom./acc. *éar* 'spring' (Lindeman 1972:219) poses no problem if one sets up an underlying stem /*ear-*/, with the sequence /*ea*/ subject to contraction in forms of more than two syllables (cf. *en-t^ho:-sía(z)*σ: 'be inspired by a god, inspire' vs. *t^héós* 'god' with uncontracted /*eo*/; Rix 1976:54).

The synchronically irregular root accentuation of gen. pl. *ḗ:t- σ :n*, *paid- σ :n* vs. σ :t-*ós*, *-í*, σ :*sí*, *paid-ós*, *-í*, *paísí* (cf. also Hom. *dó:r- σ :n*, *gó:n- σ :n* < **dórw- σ :n*, **gónw- σ :n* vs. *do:r-ós*, *-í*, *go:n-ós*, *-í* to *dóru* 'wood', *gónu* 'knee') is an archaism, dating from the period prior to the contraction and resulting "monosyllabization" of the stem. As observed by Lindeman (1972:218-9), forms such as *o*-stem gen. pl. *lú σ :n*, *oík σ :n* (to *lúkos* 'wolf', *oikos* 'house') would have provided more than ample support for *ḗ:t- σ :n*, *dó:r- σ :n*, so that the latter could survive as such, reinterpreted as underlying / σ :t- σ :n/, /do:r- σ :n/ with unaccented stem and unaccented (properly *o*-stem!) gen. pl. /- σ :n/.

6 Implications for the Phonological Prehistory of Greek

Is it possible to draw any inferences about the relative or absolute chronology of the changes involved in the development of the Greek accentual system? Fortunately, a handful of isolated relic forms survive from older stages of the language and allow us to trace, if only approximately, the evolution of the productive accentual rules and restrictions of Greek of the first millennium BC.

Hoenigswald (1997) has argued that Hom. *kê:ri* 'at heart', an old locative to the fossilized neuter noun *kê:r* 'heart', represents the sole survival of an earlier stage of Greek in which the dat. sg. ending *-i*—originally the PIE locative sg. ending **-i*—was unaccented. This concurs with our current understanding of PIE nominal morphology, according to which the most archaic type of PIE locative was "endingless", and **-i* was subsequently added.³²

At some point in the prehistory of Greek, loc. (—> dat.) sg. *-i* acquired underlying accent, becoming *-i*. This accent must have been analogical, not only to gen. sg. *-(os)*, but almost certainly also to the older PIE dat. sg. **(ey)* which survived into Mycenaean (e.g. dat. *e-me* /hem-éy/ 'one' vs. Hom., Att. *hen-i* with stem-final *-n-* from nom. **hens* —> *hê:s*): as **-i* and **-ey* have undergone functional syncretism already in Mycenaean, with *-e* /*-ey*/ preponderant in *s*-stems and *-i* in other consonant-stem classes, one would

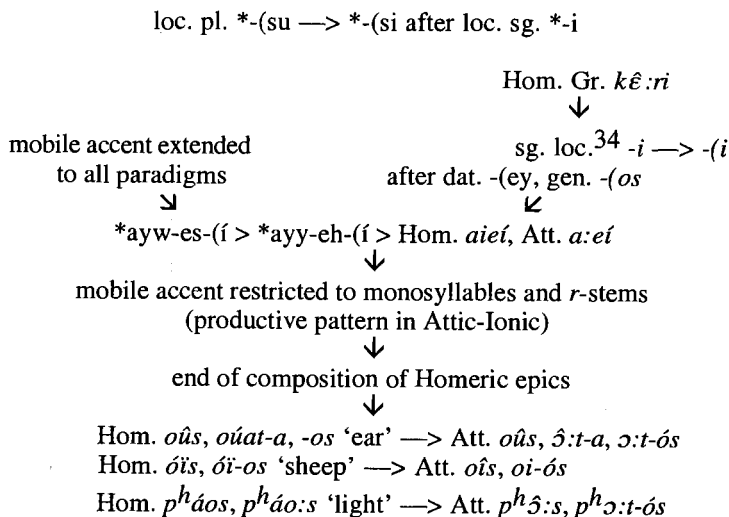
Note also *pâ:s* 'all (m.)', which stresses the ending in gen. and dat. sg. but the root in both gen. and dat. pl.: *pantôs*, *panti* vs. *pânto:n*, *pâ:si* (the circumflex of *pâ:s* < **pânts* is unexplained, as is that of *hê:s* < **héns* 'one'; Lejeune 1972:296). I tentatively propose that this adjective is a fossilized pres. ptcp. to PIE **peh₂-* 'guard, take care of' (hence **watched*, *guarded*, *kept* > **whole*, *entire* > *'all'*; cf. Hitt. *paḥ(has)s-* 'protect', OCS *pasŏ* 'watch over, tend' < **peh₂-s-*), which has otherwise been lost in Greek: nom./acc. **ph₂-ént-* (or perhaps rather **péh₂-ŋt-?*), gen./dat. **ph₂-ŋt-* > **pant-* ~ **paat-* —> *pánt-*, as in *dónt-*, etc. above. (Cf. TB, TA *pont-* 'all' < PT **pont-* < **pānt-* [Ringe 1996:23, 75], which Penney [cited in Adams 1999:402] suggests may be from **péh₂-ŋt-*.) Could the complete isolation of *pant-* have led to its partial assimilation to the regular accentual pattern, in the sg.?

³²Cf. Brugmann 1911:174-85, esp. 179; Benveniste 1935 with references. Reflexes of endingless locatives are especially common in the *n*-stems in Indo-Iranian, e.g. Ved. *mūrdhān*, *mūrdhāni* (later *mūrdhni*) 'on the head' (Whitney 1924:158-9); cf. also Hitt. *dagān* [(a)gān] 'on the ground' < **dgóm* < PIE **d^hg^h-ém* (Ved. *kṣām-i*). In his treatment of endingless locative forms in Hittite, Neu (1980:31-3) discusses and rejects the proposed occurrences of loc. *ŠĀ-ir* (presumably for /*kēr*/, parallel to *É-ir* /*pēr*/ 'in the house'); if real, this form—along with pre-Greek **kēr(+i)*—would presumably continue PIE **kēr* < ***kērd-Ø* by "Szemerényi's Law": pre-PIE ***VRC* > PIE **V:R*, where *C*=*s, *h₂, or *d (cf. R. Kim 2001, §2).

expect these two endings to have influenced each other. Unless *-i* remained unaccented until after the complete loss of **(ey* —which is highly unlikely—it is probable that the combination of gen. *-(os* and dat. **(ey* led speakers of Greek to associate underlying accent with oblique case and so bring originally unaccented loc. **-i* into line with this pattern.³³

The other probable accentual archaism, also discovered by Hoenigswald (1987), is Hom. *aiéi*, Att. *a:éi* ‘forever’. If, as Hoenigswald argues, these forms continue **ayyehí* < (post-)PIE locative **h₂eywes-i* to an *s*-stem **h₂éywos* (cf. Dor. *aiés* ‘id.’), their final accent marks them as a unique relic, a “moderately ancient locative dating from the time after oxytonesis had been generally extended to oblique cases including the locative, but before it was limited to monosyllables” (51).

These considerations lead to the following relative chronology of developments in the nominal accentuation of Greek:



³³I wish to thank an anonymous reviewer for the *PWPL* for clarifying this argument. The accentuation of **-i* in Greek is therefore independent of the parallel development in Sanskrit: cf. Ved. *mūrdhán-i* vs. *mūrdhn-í* (fn. 32), after gen./abl. *mūrdhn-ás*, dat. *-é*, instr. *-ǎ*.

Note that even in contracted monosyllabic stems with stem-stressed gen. pl. (*ô:t-o:n, paíd-o:n*) or gen. and dat. pl. (*pánt-o:n, pâ:si*; cf. fn. 31), the gen. and dat. sg. always have stressed *-ós, -í*. Thus the gen. sg. is the only oblique case form which is always ending-stressed in Greek, without exceptions or relics.

³⁴Or dat., if functional syncretism of **-i* and **-ey* had occurred by this time.

7 Epilogue: Some Innovative Patterns in Greek Nominal Accent

As demonstrated in §5, Greek nominals have retained significantly more of the inherited PIE accentual system than the verb. Nevertheless, certain nominal classes have undergone significant innovations which have not yet received a satisfactory explanation in previous scholarship. Two of these are discussed below.

Like their animate counterparts, monosyllabic neuter nouns are regularly unaccented and exhibit alternating stress: cf. nom./acc. *pûr* 'fire', gen. *pur-ós*, dat. *pur-í*, like *aíks* 'goat', acc. *aíg-a*, gen. *aig-ós*, dat. *aig-í*. As has long been noted, however, athematic neuter nouns, i.e. neuters other than *o*-stems ending in *-on*, of more than one syllable regular exhibit *recessive* stress in Greek:

r/n-stems, e.g. *húdō:r* 'water' < **udōr* <— PIE coll. nom./acc. **wédōr*, gen. *húdatos* < pre-Gr. **udŋ-t-os* <— PIE coll. obl. **ud-n-* (cf. Hitt. coll. *widār* < **wedōr* <— **wédōr*; sg. *wātar* < **wód-r*, gen. *wedenaš* <— PIE **wéd-ŋ-s*; Schindler 1975a:3-7);

u-stems, e.g. *dōru* 'wood', *gónu* 'knee' < PIE **dōru*, **gónu* (but cf. fn. 31);

s-stems, e.g. *génos* < PIE **génh₁-os* (< pre-PIE **génh₁-s*), gen. *génos* < **genes-os* 'birth, race, race, kind' < PIE **génh₁-es* (< pre-PIE *gŋh₁-és-*), *kréas* 'flesh, meat' < **krewas* < PIE **kréwh₂-s* (Schindler 1975b);

n-stems, e.g. *ónoma*, gen. *onómatos* 'name' <— *ónuma* (cf. Hom. *nó:num(n)os* 'nameless') <— *enuma** (preserved in Laconian *Enuma-kratída:s*) < **enomŋ-*³⁵ < **h₁ŋh₃m-ŋ-* (synchronously in the following class);³⁶

³⁵Cf. Vine 1999b:557-8 and passim on the precise conditioning of the rounding of **o* > *u* in this and other Greek forms ("Cowgill's Law").

³⁶Note that TB *ñem*, TA *ñom* < PT **ñemə* requires a protoform **h₁néh₃m-ŋ-*, i.e. the strong stem of an acrostatic noun, whereas OIr. *ainm*, OPr. *emmens*, PSI. **ĵimę* (OCS *imę*; cf. Cz. *jméno*), HLuv. *á-ta_{4/5}-maⁿ-za* /ad(a)man-za/ reflect a preform **h₁ŋh₃m-ŋ-*, with generalization of zero-grade of the root in a proterokinetic paradigm **h₁néh₃m-ŋ-* ~ **h₁ŋh₃m-én-*. (Skt. *nāman-*, Lat. *nōmen*, Hitt. *lāman* may continue either weak acrostatic or strong proterokinetic **h₁néh₃m-*.) Since acrostatic inflection is clearly recessive already in PIE, and 'name' could have been remodeled to a proterokinetic noun from its accidental phonetic resemblance to action nouns in *X'-mŋ* ~ *X-mén-* independently in

t-stem (< *n*-stem) *nomina actionis* ("action nouns") in *-ma*, e.g. *sō:ma*, gen. *sō:matos* 'body'.

Whereas the recessive stress of (nearly all) finite verb forms reflects the generalization of the postlexical destressing rule found in main clauses in Vedic Sanskrit (§4.1), and that of vocatives continues the initial stress of vocatives in PIE (cf. fn. 23), this pattern seems to have no historical basis: as Hoenigswald (1998:272) observes, no related phenomena are found elsewhere among the ancient IE languages.³⁷

However, an examination of the archaic accent-ablaut paradigms reconstructed for PIE reveals that the oldest stratum of neuter nouns always carries stress on the root in the nominative-accusative singular. According to the classic studies of Schindler (1975a and especially 1975b:262-4), PIE athematic neuter nouns may belong only to either the acrostatic or proterokinetic inflection, i.e. with fixed stress on the root or stress alternating between root and suffix, respectively.

"acrostatic", fixed stress on root

nom./acc.	*wód-ŕ 'water'	*h ₁ néh ₃ m-ŋ 'name'
gen.	*wéd-ŋs	*h ₁ néh ₃ m-ŋ-s

"proterokinetic", stress alternating between root and suffix

nom./acc.	*dór-u 'wood'	*X'-mŋ (> Gr. <i>-ma</i> in
gen.	*dr-éw-s	*X-mén-s "action nouns")

Now if we assume that the initial stress of the "strong", i.e. nom.-acc. variant was generalized at some early stage of pre-Greek, all neuter nouns (other than *o*-stems) would have ended up with fixed stress on their initial

Anatolian, Greek, Celtic, and Balto-Slavic, I reconstruct 'name' as acrostatic for PIE. In any case, proterokinetic inflection provides the starting point for Greek (as for Anatolian; Melchert 1994:67, 83).

³⁷Athematic neuter adjectives also appear to have generalized recessivity in prehistoric Greek, although the effects of columnar accent have largely leveled this out. Cf. *álē:tēs* 'really?', *k^hárien* 'nice!', fossilized neut. nom./acc. sg. of *alē:t^hés:s* 'true', *k^haríe:s* 'beautiful, elegant' (vs. regularized *alē:t^hés, k^haríen*; Hoenigswald 1998:272), although the second of these, like *elē:mon* 'full of pity', *béltion, kállion* 'better' (to *eleé:mō:n, beltío:n, kallío:n*), may merely reflect an underlying unaccented stem of the type which has been eliminated in pres. and fut. act. ptcps. (cf. §4.1, fn. 14). On Att. *eū* 'well' < *éū vs. Hom. *eūs, eú*, cf. Hoenigswald 1998:272-4.

syllable—just like vocatives.³⁸ Subsequent application of the TSR then resulted in the observed recessive stress.

Another class of nouns that regularly exhibits recessive stress in Greek is feminines with nom. sg. in short *-a*. In contrast, the cognate Vedic class of feminines in *-ī* with obl. forms in *-yā-* (< PIE **-ih₂-* ~ **-yeh₂-*), although preponderantly barytone, also includes oxytone stems, e.g. *devī* 'goddess', after which the inflection is named in traditional grammars.³⁹ Note, however, that Greek feminine *adjectives* in *-a* are often accented on a preceding suffix: *barēa*, f. to *u*-stem *barús* 'heavy'; *iduía*, f. to pf. act. ptcp. *eidós:s* 'knowing'; *lipô:sa*, f. to aor. act. ptcp. *lipó:n* 'leaving (behind)'.

These patterns may be explained, I believe, if we suppose that the same generalization of nom.-acc. stress to oblique case forms just proposed for athematic neuters also occurred in *ih₂*-stems. Since this class, like *eh₂*-stems (> Gr. *a:/ε:-*stems), was proterokinetic in PIE, the "strong" cases would have carried stress on the root, while the "weak" cases would have had stressed full-grade of the ending, i.e. nom. **X'-ih₂-Ø*, acc. **X'-ih₂-m̄* vs. gen. **X-yéh₂-s*, dat. **X-yéh₂-i*. If the nom. and acc. were reanalyzed in pre-Greek as having underlying accent on the root, generalization to the oblique cases would have yielded a columnar paradigm. The development of the *a*-stem *pâ:sa* 'all, every' < **pânsa* (cf. Arcadian *pânsa*) < **pântya* < **pânt-ih₂* (cf. fn. 31) would thus have been

³⁸In the case of *pûr* 'fire' <— PIE *r/n*-stem **péh₂-w_r*, **ph₂-wén-s* (Hitt. *pahhur*, gen. *pahhwenas*; cf. Schindler 1975a:7, 9-10), which has become monosyllabic within the prehistory of Greek, this initial accent has been eliminated by the constraint that monosyllabic noun stems must be underlyingly unaccented (§5).

³⁹In Vedic, a large class of about 70-80 oxytone derivatives in *-ī* are inflected like root nouns in *-ī* (e.g. *dhīh* 'thought'), i.e. with non-ablauting stems in *-ī* ~ *-iy-*: hence *vṛkīh* 'she-wolf', gen. *vṛkīy-aḥ*, *kalyāñīh* 'fair woman', *puruṣīh* 'woman', *Yamīh* (to *vṛka-*, *kalyāñā-*, *puruṣa-*, *Yamā-*, respectively), *lakṣmī* 'mark', m. *rathī* 'charioteer', m. *ahī* 'serpent' (cf. older *i*-stem *āhi-*, Gr. *óph^his* 'snake'); cf. Macdonell 1910:268-70, Whitney 1924:128 (§355b). Interestingly, Whitney (1924:132 (§362, 2d)) notes that Vedic fems. in *-ī* which show accent shift from the corresponding masc., e.g. *táviṣī* 'might', *páruṣṇī* 'reedy (name of river)', *páliknī* 'gray', *róhiṇī* 'ruddy cow', follow *devī*-inflection *only* when not oxytone, in contrast to *vṛkī*, etc. Oxytone stems of the *devī*-type are either analogical to the corresponding masc., e.g. *devī* itself to m. *devá-* 'god', or result from remodeling of the inherited stem stress, e.g. *u*-stem *ur-v-ī* 'wide', pres. ptcp. *ad-at-ī* 'eating' (m. *urú-*, *adánt-*; cf. Macdonell 1910:273 and see fns. 21, 40). By classical Skt., the *vṛkī* class was almost completely assimilated to the *devī* type; the resulting paradigm took nom./acc./voc. du. *-iy-ā(u)*, nom. pl. *-īy-aḥ* from *vṛkī* inflection (Whitney 1924:128-9, 132-3).

nom. *pánt-ih ₂		> *pánt-ya	> <i>pâ:sa</i>
acc. *pánt-ih ₂ -ṃ		> *pánt-yan	> <i>pâ:san</i>
gen. *pánt-yéh ₂ -s	→	*pánt-yeh ₂ -s > *pánt-yās	> <i>pá:sē:s</i>
dat. *pánt-yéh ₂ -i	→	*pánt-yeh ₂ -i > *pánt-yāy	> <i>pá:sē:i</i> . ⁴⁰

Evidence for this hypothesis comes from the one *a*-stem that preserves mobile accent, i.e. *mía* 'one (f.)':

nom. <i>mía</i>	< *smíya	< *sm-íh ₂	<— *sém-ih ₂
acc. <i>mían</i>	< *smíyan	< *sm-íh ₂ -ṃ	<— *sém-ih ₂ -ṃ
gen. <i>miâ:s</i>	< *smiyá:s	<	*sm(i)-yéh ₂ -s
dat. <i>miâ:i</i>	< *smiyá:y	<	*sm(i)-yéh ₂ -i.

The accentual alternation of this form, which is entirely isolated within Homeric and Attic Greek, can only be explained by assuming that—at least at an earlier stage—the oblique endings of *a*-stems were underlyingly accented, just as for the consonant-stems: gen. sg. *-(a:s)*, dat. sg. *-(a:i)*. Why the stem *mi-* remained unaccented, in contrast to all other *a*-stems, is

⁴⁰Note that according to this view, the PIE inflection of fem. *u*-stems and perf. act. ptcps. proposed in fn. 21 above explains the non-recessive accentuation of these forms in Greek, e.g.

nom. *mr̥ǵ ^h -éw-ih ₂		> *brak ^h -éw-ya	> <i>brak^heíā</i>	
acc. *mr̥ǵ ^h -éw-ih ₂ -ṃ		> *brak ^h -éw-yam	> <i>brak^heíān</i>	
gen. *mr̥ǵ ^h -u-yéh ₂ -s	→	*mr̥ǵ ^h -éw-yeh ₂ -s > *brak ^h -éw-yās	> <i>brak^heíā:s</i>	
dat. *mr̥ǵ ^h -u-yéh ₂ -i	→	*mr̥ǵ ^h -éw-yeh ₂ -i > *brak ^h -éw-yāy	> <i>brak^heíā:i</i>	
nom. *wid-wés-ih ₂	→	*wid-ús-ih ₂	> *wid-úh-ya	> <i>(w)iduā</i>
acc. *wid-wés-ih ₂ -ṃ	→	*wid-ús-ih ₂ -ṃ	> *wid-úh-yan	> <i>(w)iduān</i>
gen. *wid-us-yéh ₂ -s	→	*wid-ús-yeh ₂ -s	> *wid-úh-ya:s	> <i>(w)iduā:s</i>
dat. *wid-us-yéh ₂ -i	→	*wid-ús-yeh ₂ -i	> *wid-úh-ya:y	> <i>(w)iduā:i</i> .

The same should have occurred in the archaic pres. ptc. fem. of *h₁es- 'be': *h₁s-ént-ih₂, gen. *h₁s-ṃt-yéh₂-s > *ehént- ~ *ehat- → PGr. *ehátya > "*eás(s)a*", *eásse:s* (cf. Ved. *satī* <— *sánt- ~ *sat-). Could Hom. *eássa* (gen. *eásse:s* by the TSR) owe its accent to masc./neut. *ént- < *ént- < *ehént- < *h₁s-ént- (Herakleian *ént-es*; cf. fn. 31), subsequently thematized in Hom./Ion. masc. *eó:n*, neut. *eón* (> Att. *ῥ:n*, *ón*)? Similarly, f. *pí:era* 'fat' <— PIE *píh₂-wér-ih₂ (Ved. *pívarī*) for expected "*pi:é:ra*" has been influenced by m. *pí:c:n*, itself from amphikinetic PIE *péyh₂-wōn, gen. *píh₂-un-és (Ved. *pívan-*).

somewhat less clear. Note that unlike the development proposed above, by which the accent of the nom./acc. was generalized to the oblique cases, 'one (f.)' has apparently generalized both the stem accent and zero-grade root ablaut of the oblique cases to PIE *sém-ih₂(-ṃ); the motivation for this divergent treatment remains unclear to me.⁴¹

Although the hypotheses proposed in this section remain tentative, note that they depend crucially on the assumption that pre-Greek did inherit the accentual patterns and distributions of PIE, e.g. the apparent restriction of ablauting neuter nouns to acrostatic and proterokinetic inflection, or the proterokinetic inflection of ih₂-stems. Despite recent claims to the contrary, the evidence of ancient Greek can contribute significantly—particularly in the nominal system—to the reconstruction of PIE accent. Conversely, full consideration of the Indo-European background of Greek is necessary for understanding the many synchronic idiosyncrasies of Greek accent, and the extent to which the language has preserved and modified the system inherited from its PIE ancestor.

References

- Adams, Douglas Q. 1999. *A Dictionary of Tocharian B*. (Leiden Studies in Indo-European 10.) Amsterdam: Rodopi.
- Bammesberger, Alfred. 1985. Thematische und athematische Wurzelariste im Indogermanischen. *Grammatische Kategorien: Funktion und Geschichte. Akten der VII. Fachtagung der Indogermanischen Gesellschaft, Berlin, 20.-25. Februar 1983*, ed. by Bernfried Schlerath and Veronica Rittner, 71-8. Wiesbaden: Reichert.
- Benveniste, Émile. 1935. La question du locatif singulier. *Origines de la formation des noms en indo-européen*, Vol. I, 87-99. Paris: Maisonneuve.
- Brugmann, Karl. 1911. *Grundriß der vergleichenden Grammatik der indogermanischen Sprachen. Zweiter Band: Lehre von den Wortformen und ihrem Gebrauch*. Zweiter Teil. Straßburg: Trübner.
- Buckley, Eugene. 2000. Final extrametricality in Latin and Manam. *University of Pennsylvania Working Papers in Linguistics* 6.3.

⁴¹Monosyllabicity alone cannot explain the unaccented status of *mi-*, as other monosyllabic *a*-stems exhibit no accentual alternation, e.g. nom. sg. f. *pá:sa* 'all', gen. *pá:sē:s* above or *moīra* 'fate' (< *'that which is measured') < *mórya < *mór-ih₂ (to the verbal root *mer- 'measure'), gen. sg. *moīra:s*. Has *mi-* secondarily become unaccented by analogy to masc./neut. *hen-* 'one'? Or has this root merely preserved the inherited proterokinetic pattern despite remodeling of nom. and acc., thanks to the development of *ih₂ > *īya after the initial cluster *sm (PIE *sém-ih₂(-ṃ) → *sm-ih₂(-ṃ) > *smīya(n) > *mía*, *mían*)?

- Cardona, George. 1960. *The Indo-European Thematic Aorists*. Ph.D. dissertation, Yale University.
- Chantraine, Pierre. 1942. *Grammaire homérique (phonétique et morphologie)*. (Collection de Philologie Classique I.) Paris: Klincksieck.
- Debrunner, Albert and Jacob Wackernagel. 1930. *Altindische Grammatik von Jacob Wackernagel. Band III: Nominalflexion — Zahlwort — Pronomen*. Göttingen: Vandenhoeck und Ruprecht.
- Euler, Wolfram. 1979. *Indoiranisch-griechische Gemeinsamkeiten der Nominalbildung und deren indogermanische Grundlagen*. (Innsbrucker Beiträge zur Sprachwissenschaft, Band 30.) Innsbruck: Institut für Sprachwissenschaft.
- Garde, Paul. 1961. Réflexions sur les différences phonétiques entre les langues slaves. *Word* 17, 34-62.
- Halle, Morris. 1997. On stress and accent in Indo-European. *Language* 73:2, 275-313.
- Halle, Morris and William Idsardi. 1995. General properties of stress and metrical structure. *The Handbook of Phonological Theory*, ed. by John Goldsmith, 403-43. Oxford and Cambridge, MA: Blackwell.
- Hayes, Bruce. 1985. *A Metrical Theory of Stress Rules*. New York: Garland.
- Hayes, Bruce. 1995. *Metrical Stress Theory: Principles and Case Studies*. Chicago: U. of Chicago Press.
- Hoenigswald, Henry M. 1987. Aief and the prehistory of Greek noun accentuation. *Studies in memory of Warren Cowgill (1929-1985): Papers from the Fourth East Coast Indo-European Conference, Cornell University, June 6-9, 1985*, ed. by Calvert Watkins, 51-3. Berlin and New York: Walter de Gruyter.
- Hoenigswald, Henry M. 1997. Some archaisms in the Iliad. *Historical, Indo-European, and Lexicographical Studies: A Festschrift for Ladislav Zgusta on the Occasion of his 70th Birthday*, ed. by Hans Henrich Hock, 79-85. (Trends in Linguistics, Studies and Monographs 90.) Berlin/New York: Mouton de Gruyter.
- Hoenigswald, Henry M. 1998. Eû, eú and the accent of non-thematic neuters. *Mír Curad: Studies in Honor of Calvert Watkins*, ed. by Jay Jasanoff, H. Craig Melchert, and Lisi Olivier, 271-4. (Innsbrucker Beiträge zur Sprachwissenschaft, Band 92.) Innsbruck: Institut für Sprachwissenschaft.
- Idsardi, William. 1992. *The Computation of Prosody*. Ph.D. dissertation, MIT.
- Kim, Ronald I. 2001. Toch. B *šem* ≈ Lat. *vēnit*? Szemerényi's Law and *ē in PIE root aorists. *Münchener Studien zur Sprachwissenschaft* 61.
- Kiparsky, Paul. 1967. À propos de l'histoire de l'accentuation grecque. *Langages* 8, 73-93.
- Kiparsky, Paul. 1973. The inflectional accent in Indo-European. *Language* 49:4, 794-849.
- Kuryłowicz, Jerzy. 1958. *L'accentuation des langues indo-européennes*. 2nd ed. Wrocław: Polska Akademia Nauk.
- Kuryłowicz, Jerzy. 1968. *Indogermanische Grammatik. Band II: Akzent/Ablaut*. Heidelberg: Winter.
- Labov, William. 1994. *Principles of Linguistic Change. Vol. I: Internal Factors*. Oxford and Cambridge, MA: Blackwell.

- Lejeune, Michel. 1972. *Phonétique historique du mycénien et du grec ancien*. Paris: Klincksieck.
- Lindeman, Fredrik Otto. 1972. Zur Akzentuation in den griech. Pradigmata von dóru und gónu. *Norwegian Journal of Linguistics (NTS)* 26, 217-31.
- Lubotsky, Alexander. 1988. *The System of Nominal Accentuation in Sanskrit and Proto-Indo-European*. (Memors of the Kern Institute, No. 4.) Leiden: E.J. Brill.
- Macdonell, Arthur Anthony. 1910. *Vedic Grammar*. (Grundriß der indo-arischen Philologie und Altertumskunde, 1. Band, 4. Heft.) Straßburg: Trübner.
- Melchert, H. Craig. 1994. *Anatolian Historical Phonology*. (Leiden Studies in Indo-European 5.) Amsterdam: Rodopi.
- Morpurgo-Davies, Anna. 1970. Epigraphical -p^hi. *Glotta* 47, 46-54.
- Neu, Erich. 1980. *Studien zum endungslosen "Lokativ" des Hethitischen*. (Innsbrucker Beiträge zur Sprachwissenschaft, Vorträge und Kleinere Schriften 23.) Innsbruck: Institut für Sprachwissenschaft.
- Noyer, Rolf. 1997. Attic Greek accentuation and intermediate derivational representations. *Derivations and Constraints in Phonology*, ed. by Iggy Roca, 501-27 (Ch. 16). Oxford: Clarendon Press; New York: Oxford U. Press.
- Ringe, Donald A., Jr. 1996. *On the Chronology of Sound Changes in Tocharian. Vol. I: From Proto-Indo-European to Proto-Tocharian*. (American Oriental Series, Vol. 80.) New Haven: American Oriental Society.
- Risch, Ernst. 1975. Remarques sur l'accent du grec ancien. *Melanges linguistiques offerts à Émile Benveniste*, 471-9. (Société de Linguistique de Paris, Collection Linguistique 70.) Louvain: Peeters.
- Rix, Helmut. 1976. *Historische Grammatik des Griechischen*. Darmstadt: Wissenschaftliche Buchgesellschaft.
- Schindler, Jochem. 1975a. L'apophonie des thèmes indo-européens en -r/n. *BSL* 70, 1-10.
- Schindler, Jochem. 1975b. Zum Ablaut der neutralen s-Stämme des Indogermanischen. *Flexion und Wortbildung: Akten der V. Fachtagung der Indogermanischen Gesellschaft, Regensburg, 9.-14. September 1975*, ed. by Helmut Rix, 259-67. Wiesbaden: Dr. Ludwig Reichert Verlag.
- Schindler, Jochem. 1976. On the Greek type hippeús. *Studies in Greek, Italic, and Indo-European Linguistics Offered to Leonard R. Palmer on the Occasion of His Seventieth Birthday, June 5, 1976*, ed. by Anna Morpurgo Davies and Wolfgang Meid, 349-52. (Innsbrucker Beiträge zur Sprachwissenschaft, Band 16.) Innsbruck: Institut für Sprachwissenschaft.
- Schwyzler, Eduard. 1939. *Griechische Grammatik auf der Grundlage von Karl Brugmanns Griechischer Grammatik. Band I: Allgemeiner Teil, Lautlehre, Wortbildung, Flexion*. München: Beck.
- Steriade, Donca. 1988. Greek accent: a case for preserving structure. *Linguistic Inquiry* 19, 271-314.
- Vine, Brent. 1999a. Greek de:ró:s, Armenian erkar 'long': notes on full-grade *-ro- formations in Greek and Indo-European. Paper presented at the 18th East Coast Indo-European Conference, University of Texas, Austin, 27-30 May 1999.

- Vine, Brent. 1999b. On "Cowgill's law" in Greek. *Compositiones Indogermanicae in Honorem Jochem Schindler*, hrsg. von H. Eichner und H. C. Luschützky unter redaktioneller Mitwirkung von V. Sadovski, 555-600. Prague: Enigma.
- Wackernagel, Jacob. 1877. Der griechische Verbalakzent. *ZVS* 23, 457-70. (Reprinted in *Kleine Schriften*, Band 2, 1058-71. Hrsg. von der Akademie der Wissenschaften in Göttingen. Göttingen: Vandenhoeck und Ruprecht, 1953.)
- Whitney, William Dwight. 1924. *Sanskrit Grammar. Including Both the Classical Language and the Older Dialects of Veda and Brāhmaṇa*. 5th ed. Leipzig: Breitkopf und Härtel.

Department of Linguistics
University of Pennsylvania
Philadelphia, PA 19104-6305
rkim2@ling.upenn.edu