Hittite ‘fire’ and “proterokinesis” as epiphenomenon

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§1 Introduction

§1.1 Hittite ‘fire’ and “proterokinesis”: PIE word for ‘fire’ traditionally cited as an example of a “proterokinetic” (PK) nominal paradigm, with alternations between stressed/full-grade root and zero-grade ending in the strong cases vs. zero-grade root and stressed/full-grade suffix in the weak cases.

- Hittite forms in (1) would continue reconstructed paradigm essentially intact, providing direct evidence for synchronic PK MOBILITY — i.e., alternating **stress** between root/strong cases and suffix/weak.

(1)

	PIE		HITTITE		
NOM/ACC.SG	**péh$_2$-wr̥*	>	*paḫḫur*	[páχːʷor]	‘fire’
GEN.SG	**p(e)h$_2$-wén-(e/o)s*	>	*paḫḫwenaš*	[paχːʷénːas]	‘of the fire’
LOC.SG	**p(e)h$_2$-wén-i*	>	*paḫḫweni*	[paχːʷéːni]	‘in the fire’

· This reconstruction has been all but universally accepted since Kuiper (1942:18) and Schindler (1975a:9–10); see Rieken (1999:331–3), Fortson (2010:120), Meier-Brügger (2010:344–5), and Beekes and de Vaan (2011:206), *i.a.*. Hittite ‘water’ shows same stress alternation synchronically, but per Schindler (1975a:4–5) due to analogical influence of ‘fire’ (contra Kloekhorst to appear); see further §3.3 below.

§1.2 PK mobility & PIE stress assignment: PK mobility difficult to reconcile with general principles of stress assignment reconstructible for PIE on the basis of other nominal and verbal evidence — in particular, Kiparsky and Halle’s (1977)’s BASIC ACCENTUATION PRINCIPLE (see §2 below).

- Some proposed solutions to this problem:
  - · PIE accentual system had a more complex set of properties — e.g., accentually “dominant” inflectional endings (Frazier 2006; Kim 2013).
  - · Accentual grammar refers directly to [proterokinetic] — e.g., as a morphophonological template (Fellner and Grestenberger 2016).
  - · PK mobility did not exist in PIE (Kiparsky 2010, Keydana 2013).

§1.3 The status of “proterokinetic” in PIE: Primary question for today is thus:

- ◦ What are the implications of Hittite evidence in (1) for the reconstruction of PIE word prosody and the status of PK (mobility) in the grammar?

- Major claims advanced here — in broad outline:
  - (i) (1) supports the reconstruction of descriptively PK stress alternations for PIE.
  - (ii) However, alternations in (1) confined to certain “heteroclite” stems, a consequence of their irregular allomorphy and how they interact with regular principles of PIE stress assignment.
  - (iii) (1) does **not** require reconstructing accentually “dominant” inflectional endings for PIE.
  - (iv) (1) does **not** require the PIE grammar to reference “proterokinetic” (or any other templatic entity).

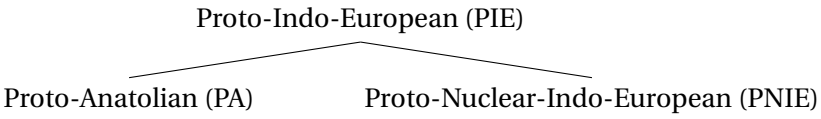
§1.4 Roadmap: Outline of the talk:

§2 – PIE word prosody & "proterokinetic" stress mobility
§3 – Analyzing 'fire' in Hittite and PIE
§4 – Conclusions & discussion

§2 PIE word prosody & "proterokinetic" stress mobility

§2.1 On PIE word prosody: Recent comparative-historical research on ancient IE word prosody has converged on reconstruction for (2) "high-node" PIE of Kiparsky and Halle's (1977) BASIC ACCENTUATION PRINCIPLE in (3), which is synchronically operative in Vedic and Hittite; relevant terms defined in (4):

(2)



(3) BASIC ACCENTUATION PRINCIPLE (BAP):
If a word has more than one ACCENTED vowel, the leftmost of these receives word STRESS. If a word has no accented vowel, the leftmost syllable receives word stress.

(4) a. STRESS ≡ **surface** (primary) prosodic prominence
b. ACCENT ≡ **underlying** specification for prominence (i.e., stress-preferring)

· See especially Kiparsky (1973, 1982, 2010, to appear b) and Yates (2016, 2017); further, Melvold (1990), Halle (1997), Kim (2002, 2013), Lundquist (2015, 2017), Sandell (2015), Keydana (2016), and Lundquist and Yates (to appear).

§2.2 BAP in PIE inflection: Most reconstructed patterns of nominal/verbal intraparadigmatic stress (im)mobility predicted by interaction between BAP, [±accented] stems, and [±accented] inflectional endings.

- BAP generates (e.g.) stress patterns in PIE MOBILE root presents (formed to unaccented roots) — predicts default leftmost stress in 3SG in (5a), and attraction of stress to accented 3PL ending in (5b).

(5)

	PIE				VEDIC		HITTITE	
a.	*/ses - ti/	→	***sés-ti***	'sleeps'	>	***sás-ti***	=	***šēšzi***	[sé:s-t͡si]
b.	*/ses - énti/	→	****sə́sénti***	'sleep'	>	***sas-ánti***	=	***šašanzi***	[sas-ánt͡si]

- BAP captures contrast in 3PL between MOBILE root presents and those with FIXED root stress (formed to accented roots), which are attested in both Vedic and Hittite (where BAP remains operative).

· Predicts that (e.g.) accented 3PL ending in (6) does not attract stress; rather, root (= leftmost accented) wins via BAP.

(6) a. Ved. /tákṣ - ánti/ → ***tákṣ-ati*** 'fashion'
b. Hitt. /wék - ánt͡si/ → ***wekanzi*** [wé:kant͡si] 'demand'

· Stress contrast between (5) and (6) emerges from minimal contrast in root accentedness and BAP.

· Accented verbal roots in daughter languages arise via reanalysis of derived stems — e.g., "Narten formations" in (6); see Yates (2017:186–8).

- Interaction of BAP and strong/unaccented and weak/accented case endings also predicts most standardly reconstructed patterns of intraparadigmatic stress mobility in primary athematic nominals.

  · Analysis straightforwardly handles root-ending stress alternations — if root (+ suffix) is unaccented, predicts default leftmost stress in strong cases, but accented ending attracts stress in weak, e.g. (7–8):

(7) UNACCENTED root ⇒ MOBILE stress

a. */√pod - es/ → **pód-es* 'feet' (NOM.PL) > Ved. *pā́d-aḥ**, Gk. *pód-es*

b. */√ped - éh$_1$/ → **ped-éh$_1$* 'with the foot' > Ved. *pad-ā́*

(8) UNCCENTED root + UNACCENTED suffix ⇒ "amphikinetic" stress mobility

a. PIE */√dʰegʰ - om - s/ → **dʰégʰ-ōm* 'earth' (NOM.SG) > Hitt. *tēkan* [té:kan]

b. PIE */√dʰegʰ - om - é/ós/ → **dʰəgʰ-m-é/ós* 'of the earth' > Hitt. *taknāš* [takn-á:s]

  · BAP predicts fixed root stress when root is ACCENTED, e.g. (9):

(9) ACCENTED root ⇒ FIXED ROOT stress ("acrostatic"):

a. PIE */√gʷów - es/ → **gʷów-es* 'cows' (NOM.PL) > Ved. *gā́v-aḥ*

b. PIE */√gʷéw - éh$_1$/ → **gʷéw-eh$_1$* 'with the cow' > Ved. *gáv-ā*

  · BAP also predicts fixed root stress when suffix is PREACCENTING — i.e., prefers stress to fall on immediately preceding syllable — thus generating nominal paradigms like (10) that are directly reconstructible for PIE (per Schindler 1975b:259):

(10) ACCENTED root + PREACCENTING suffix ⇒ FIXED ROOT stress:

a. PIE */√men - ´os - ∅/ → **mén-os* 'mind' (NOM/ACC.SG) > Ved. *mán-aḥ*, Gk. *mén-os*

b. PIE */√men - ´es - éh$_1$/ → **mén-es-eh$_1$* 'with the mind' > Ved. *mán-as-ā*

  · "Hysterokinetic" mobility similarly unproblematic — see further §3.4 below.

· Attested ACC.SG Ved. *pā́d-am* confirms root stress in (7a). For ending stress in (7b), cf. Hitt. *padān* [pat-á:n] 'of the feet', Gk. *pod-ós* 'of the foot'; and for (8b), cf. Gk. *kʰtʰon-ós*. For (10b), cf. Hom.Gk. *mén-e-os*. The analysis of (10) presented above does not exclude the possibility that stress in this noun alternated between root and suffix in pre-PIE (as proposed by Schindler 1975b:261; cf. Hale 2010).

§2.3 Reconstructing the BAP: Thus robust evidence across morphological categories for reconstructing the BAP for PIE.

✓ Generates standardly reconstructed stress patterns outside of athematic nominal inflectional paradigms.

✓ Generates most standardly reconstructed stress patterns in athematic inflectional nominal paradigms.

- ◦ Are the paradigmatic stress patterns purely epiphenomenal — i.e., the output of the interaction of the accentual properties of morphemes and the BAP?
- ◦ Or are there reconstructible inflectional stress patterns that are not consistent with the BAP?
  - · Such patterns would provide evidence for positing additional complexity in PIE inflectional stress assignment.

§2.4 The BAP and PK mobility: Of standard paradigmatic stress patterns, only the root-suffix alternation posited for "proterokinetic" nominals — i.e., PK MOBILITY — is BAP non-compliant.

- For instance, PIE **–ti*-stems typically held to continue a paradigm like (11a) (Kuiper 1942:221; cf. Rix 1992:146, Meier-Brügger 2010:342–3, *i.a*), whose stress pattern is unexpected under BAP.
  - · The suffix must be accented in order to attract non-default (i.e., non-initial) stress in weak cases.
  - · But if so, the BAP generates only paradigm in (11b) with fixed root stress or in (11c) with fixed suffix stress depending on whether the root is accented; predictions of BAP illustrated in (12–13):

(11)

	a. "PROTEROKINETIC"	b. FIXED ROOT	c. FIXED SUFFIX	
NOM.SG	***mén-ti-s*	**mén-ti-s*	**mn̥-tí-s*	'thought'
DAT.SG	***mn̥-téy-ey*	**mén-t(e)y-ey*	**mn̥-téy-ey*	'for thought'
GEN.SG	***mn̥-téy-s*	**mén-t(e)y-s*	**mn̥-téy-s*	'of thought'
NOM.PL	***mén-ti-es*[?]	**mén-t(e)y-es*	**n̥-téy-es*	'thoughts'

(12) ACCENTED root + ACCENTED suffix ⇒ FIXED ROOT stress

a. */√mén - tí - s/ → **mén-ti-s* 'thought' (⇒ LEFTMOST ACCENTED WINS)

b. */√mén - téy - éi/ → **mén-t(e)y-ey* 'for thought' (⇒ LEFTMOST ACCENTED WINS)

(13) UNACCENTED root + ACCENTED suffix ⇒ FIXED SUFFIXAL stress

a. */√men - tí - s/ → **mn̥-tí-s* 'thought' (⇒ ONLY ACCENTED WINS)

b. */√men - téy - éi/ → **mn̥-téy-ey* 'for thought' (⇒ LEFTMOST ACCENTED WINS)

§2.5 Analyzing PK mobility? Some possible solutions to account for the stress pattern in (11a):

- Enrich the accentual system — e.g., by positing that inflectional endings may be accentually DOMINANT (Keydana 2005; Frazier 2006; Kim 2013).
  - · But cross-linguistically dominance in lexical accent systems is a property of derivational — not inflectional — suffixes (see esp. Revithiadou 1999; cf. Sandell 2015 on Greek, Vedic).
  - · And dominant inflectional endings are otherwise have no explanatory power in the system.
- PIE grammar refers directly to [proterokinetic] — e.g., as a morphophonological template imposed by a marked suffix (or root?) comparable to Semitic or Yokutsan (Yowlumni, Chukchansi) languages (Fellner and Grestenberger 2016).
  - ◦ Templatic morphology is remarkably stable diachronically in Semitic (e.g., Simpson 2009) — what happened in **all** of the IE daughter languages?
- More recently, evidential basis for stress mobility in PIE **–ti*-stems of type in (11a) has been disputed.
  - · Evidence of IE daughter languages in fact provides compelling support only for the FIXED SUFFIX paradigm in (11c) as derived via BAP in (13) (per Keydana 2013; Kümmel 2014; Lundquist 2015).

· Inherited *–ti*-stems are robustly oxytone in early Vedic, i.e. (14).

(14) a. PIE **mn̥-tí-s* > Ved. *matíḥ* cf. *pītíḥ* 'drinking', *ūtíḥ* 'help'

b. PIE **mn̥-téy-ey* > Ved. *matáye** *pītáye* 'for drinking', *ūtáye* 'for help'

· Strongest accentual evidence cited in support of erstwhile synchronic PK mobility in PIE **–ti*-stems is inner-Vedic fluctuation, e.g. *matí–* vs. *máti–* (Schaffner 2001:436–40, Grestenberger 2014:88, Kim 2013:82–3, *i.a.*).

· But now demonstrated by Lundquist (2015) that oxytone *–ti*-stems consistently older than barytone — i.e., early Ved. *matí–* > late Ved. *máti–*

· Vedic *–ti*-stems thus show only a **diachronic** change whereby individual words adopt the language's default stress pattern — in PIE/Vedic, leftmost in accordance with BAP — just as in Greek thematic nominals, which often become "recessive" (Probert 2006b).

· This pattern of change has significant broader implications (further §4 below).

⇒ Accentual evidence supports reconstructing PIE **–ti*-stems with FIXED suffixal stress, not PK mobility.

· On this pattern of accentual change in IE, see further Sandell (2015) and Yates (2015). Germanic **–ti*-stem evidence cited in support of a mobile paradigm may be explained along similar lines (see Garrett 2011 for problems with traditional analogical leveling account), as can Vedic oxytone vs. barytone *–tu*-stems.

§2.6 Toward a non-analysis? Given the dearth of evidence for synchronic PK mobility in **–ti*-stems (or elsewhere?), more plausible to assume (with Kiparsky 2010; Keydana 2013) that PK mobility did not exist at directly reconstructible stage of PIE?

- Reconstructing the BAP correctly **predicts** the non-existence of this inflectional stress pattern.
  - ◦ But if so, how is the Hittite word for 'fire' to be explained?

§3 Analyzing 'fire' in Hittite and PIE

§3.1 The reality of PK mobility: While root vocalism of 'fire' in Hittite is ambiguous (< */e/ or **∅*), PK stress alternation in Hittite 'fire' must be real (contra Keydana 2013).

- Within Hittite, clear synchronic contrast between 'fire' and inherited **–wr̥/–wen–* stems with fixed root stress ("acrostatic"), e.g. (15):

(15)

	'fire'			'time'		'urine'	
NOM/ACC.SG	*paḫḫur*	[páχːʷor]	cf.	*mēḫur*	[méːχʷor]	*šēḫur*	[séːχʷor]
GEN.SG	*paḫḫwenas*	[paχːʷéːnas]		*mēḫunas*	[méːχʷonas]	*šēḫunas*	[séːχʷonas]
LOC.SG	*paḫḫweni*	[paχːʷéːni]		*mēḫuni*	[méːχʷoni]	*šēḫuni*	[séːχʷoni]

· Analogical explanation (Keydana 2013; cf. Kimball 1999:149) for suffixal *e*-vowel is unlikely — in particular, since it is subject to reduction when root stress is generalized in paradigm of 'fire' in post-OH, i.e. (16) (see *CHD*, P: 12):

(16) Hitt. *paḫḫwenas* [paχːʷéːnas] (MH/NS) > *paḫḫunaš* [páχːʷonas]) (NH)

§3.2 Toward an analysis of 'fire': Two components of the proposal:

(i) PIE 'fire' is built from an unaccented root */peh_2/.

(ii) Derivational suffix PIE *–*wr̥*/–*wen*– had two allomorphs with different accentual properties, */-wer-/ and */-wén-/.

- Like their segmental properties, the prosodic properties of these allomorphs cannot be derived from one another by regular phonological processes — they are suppletive.

- Derivation then falls out straightforwardly as in (17):

(17)

	PIE			HITTITE	
a.	*/peh_2 - wer - ∅/	→	***páh$_2$-wr̥***	>	***paḫḫur*** [páχ:^{w}-or] (⇒ DEFAULT LEFTMOST STRESS)
b.	/*peh_2 - wén - í/	→	***p(a)h$_2$-wén-i***	>	***paḫḫweni*** [paχ:^{w}-é:n-i] (⇒ LEFTMOST ACCENTED WINS)

§3.3 The important of being *–wer/wn̥–: Analysis laid out in (17) crucially depends on two facts:

(i) That 'fire' is is a heteroclite.

- Suffixes with non-suppletive allomorphy (e.g., PIE */-tí-/) do not show PK mobility, because the suffix has same accentual properties in strong and weak stem.

(ii) The phonological shape of the weak stem allomorph PIE */-wén-/ (further §3.4 below).

§3.4 Pseudo-mobility & "hysterokinesis": Under this view, */-wén-/ has same accentual representation (i.e., accented) as "hysterokinetic" suffixes — e.g. agentive PIE /-tér-/, */-én-/ — which show suffix/ending stress alternations in strong/prevocalic weak cases

- Accented suffix (i.e., only accented morpheme) attracts non-default stress in strong cases, e.g. (18):

(18) a. PIE */$\sqrt{\text{d}^{\text{h}}\text{eh}_1}$ - tér - m/ → ***d^{h}əh$_1$-tér-m̥*** 'installer' (ACC.SG) >> Ved. *dhā-tā́r-am*

b. PIE */$\sqrt{\text{pes}}$ - én - ms/ → ***p(e)s-én-m̥s*** 'men' (ACC.PL) > Hitt. ***pisēnus*** [pisé:n-us]

- Stress surfaces on ending **only** when accented syllable nucleus of suffix is eliminated by ablaut (cf. Kiparsky 2010) — still leftmost wins via BAP, e.g. (19).

(19) a. PIE */$\sqrt{\text{d}^{\text{h}}\text{eh}_1}$ - tér - éh$_1$/ → ***d^{h}əh$_1$-tr-éh$_1$*** 'by the installer' >> Ved. *dhā-tr-ā́*

b. PIE */$\sqrt{\text{pes}}$ - én - é/ós/ → ***p(e)s-n-é/ós*** 'of the man' > Hitt. ***[p]išnāš*** [pisn-á:s]

- Vedic shows clearly that accented suffix (predictably) retains stress in preconsonantal weak cases, where its syllabic nucleus is preserved on surface, i.e. (20):

(20) Ved. /$\sqrt{\text{dhā}}$ - tár - bhís/ → ***dhātŕ̥bhiḥ*** 'by the installers' (^{x}***dhātr̥bhíḥ***)

· Unattested surface form like ^{x}***dhātr̥bhíḥ*** impossible under BAP!

- Stress assignment in Hitt. /-wén-/ is explained in the same way — accented suffix would remain syllabic even with application of ablaut, so predictably attracts stress via BAP, i.e. (21):

(21) Hitt. /$\sqrt{\text{paχ}}$ - wén - í/ → ***paḫḫwen-i*** [paχ:^{w}é:n-i] 'in the fire' (^{x}[paχ:$^{(w)}$oní:])

· Unattested surface form like ^{x}***paḫḫunī*** (^{x}[paχ:$^{(w)}$oní:]) impossible under BAP!

⇒ Hittite differs from Vedic only in **ablaut** — i.e., full vs. zero-grade of accented suffix (cf. §4.4).

· No such principled explanation available for failure of ablaut to apply in Hittite 'water' (NOM/ACC.SG ***wātar*** [wá:t-ar] : ***witēni*** [wit-é:n-i]), which shows similar PK mobility; this analysis thus supports Schindler's (1975a:4–5) account of mobility in Hittite 'water' as analogical to 'fire' (contra Kloekhorst to appear).

§3.5 Implications of Hittite 'fire': Direct implications of the proposal advanced here:

- Synchronic PK mobility in PIE 'fire' — directly observed in Hittite — derives straightforwardly from interaction of phonological properties of suppletive PIE */-wer-/ ~ /-wén-/ and regular principles of PIE(/Hittite) stress assignment.
  - · Explaining stress in 'fire' does not require positing (typologically aberrant) accentually dominant inflectional endings.
  - · Explaining stress in 'fire' does not require assuming PIE stress assignment made reference to a [proterokinetic] morphophonological template.

§4 Conclusions & discussion

§4.1 PK mobility — the IE evidence redux: The evidentiary basis for PK stress alternations in the ancient IE languages:

(i) Inherited PK mobility only (?) attested synchronically in Hittite heteroclite stem 'fire'.

(ii) Outside of heteroclites, evidence that individual stems (e.g. **mn̥-tí–*) showed synchronic PK mobility in any single daughter language or its shallow prehistory is wholly (?) lacking.

(iii) Differing stress patterns (fixed root vs. fixed suffix) and ablaut patterns (full-grade vs. zero-grade root) are attested in words formed historically with the same suffix.

- Can PK mobility be reconstructed for PIE on the strength of (iii) alone?

§4.2 Some PK pitfalls: Several facts problematize reconstructing on these grounds:

- Uncontroversial that in directly reconstructible PIE stress and full-grade are imperfectly correlated.
  - · PIE had stressed zero-grades, e.g. PIE **septḿ* '7', **wl̥kʷos* 'wolf'.
  - · PIE had consistently unstressed full-grades, e.g. athematic NOM.PL *–es*.
- (Root) full-grades in zero-grade categories with immobile stress well-attested in IE languages.
  - · Some of these full-grades likely due to root phonotactics — see esp. Vine (2000) on PIE **–to–*.
- Two attested stress patterns associated with one morphological category **do not strictly require** that the category was **synchronically mobile at any historical stage**.
  - · This point has been conclusively demonstrated by Probert (2006b,a) studies of thematic adjective and **–eh₂–* event/result nouns in Greek — both categories immobile in PIE, but diachronically exhibit change to default "recessive" stress.
    - · Same pattern observed in PIE **–ti–* stems in Vedic (cf. §2.5 above).

§4.3 Against PK mobility: In view of issues in §4.2, I contend:

(i) Synchronic PK mobility did not exist in PIE except in certain heteroclites (like 'fire') as a consequence of their suppletive allomorphy (cf. Kiparsky 2010; Keydana 2013).

⇒ No need to posit additional machinery for PIE — e.g., [proterokinetic] template, [+dominant] inflectional endings — to explain the pattern.

(ii) Reconstructing the BAP for PIE provides a principled explanation for this gap.

- BAP governs stress assignment within PIE inflectional paradigms.
- BAP correctly rules out synchronic mobility, which is BAP non-compliant.

§4.4 Toward an analysis of IE ablaut: More secure reconstruction of stress (assignment) at directly reconstructible stage of PIE makes it possible to more seriously assess the conditions under which PIE ablaut applied (cf. Kiparsky to appear b).

- Did PIE have the Vedic-like grammar in (22a) with */e/-deletion before underlyingly accented morphemes (thus Kiparsky 2010, to appear a)?
- Or did PIE have the Hittite-like grammar in (22b) with */e/-deletion only before surface stress?

(22) a. PIE */peh$_2$ - wén - í/ → **p(a)h$_2$-ún-i*? cf. Ved. *dhāt̥́rbhiḥ* (x*dhātárbhiḥ*)

b. PIE */peh$_2$ - wén - í/ → **p(a)h$_2$-wén-i*? > Hitt. *paḫḫ̯weni* [paχːʷwéːni]

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