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Class 2: Anatolian phonology

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Hittite phonology

The polyvalence of cuneiform signs

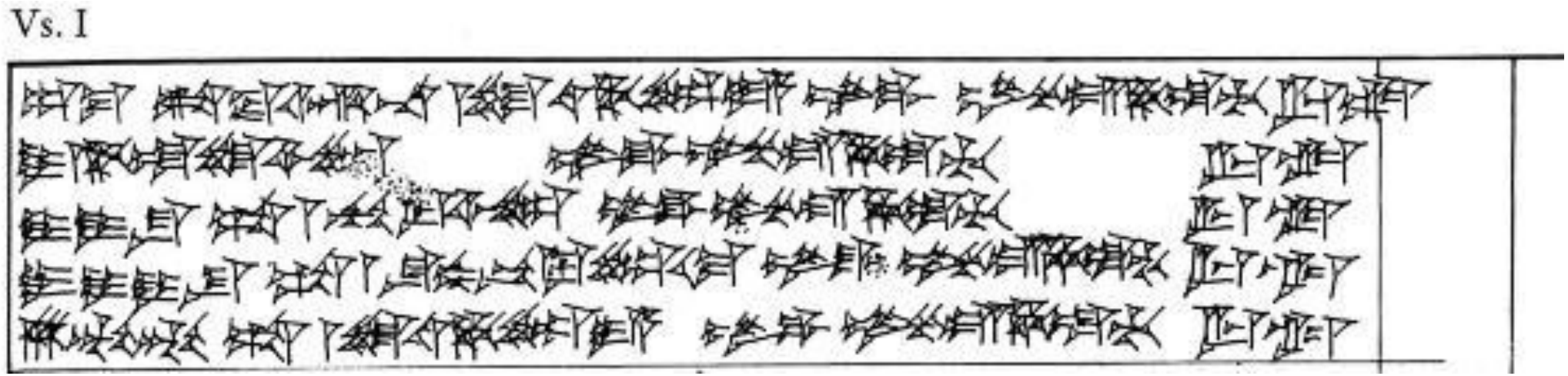
 may be read as:

- the syllable *an* as in *an-da* 'into'
- the Sumerogram for sky AN or god DINGIR: *šiunaš* or DINGIR-*aš* 'god(GEN)'
- a determiner that precedes names of divinities: ^{d}*Teššub* 'the god Tessub'

 may be read as:

- the syllable *ka* as in *ka-a-aš* 'this'
- the Sumerogram INIM 'thing', 'word'
- the Akkadogram -*KA* 'your' as in ZI-*KA* 'your soul'

Word division



1 *UM-MA ta-ba-ar-na* ^{m}*Tu-ut-ḫa-a-li-ya* LUGAL.GAL LUGAL KUR ^{URU}*Ḫa-at-ti* UR.SAG

2 DUMU ^{m}*Ḫa-at-tu-ši-li* LUGAL.GAL LUGAL KUR ^{URU}*Ḫa-at-ti* UR.SAG

3 DUMU.DUMU=*ŠU ŠA* ^{m}*Mu-ur-ši-li* LUGAL.GAL LUGAL KUR ^{URU}*Ḫa-at-ti* UR.SAG

4 DUMU.DUMU.DUMU=*ŠU ŠA* ^{m}*Šu-up-pí-lu-li-u-ma* LUGAL.GAL LUGAL KUR ^{URU}*Ḫa-at-ti* UR.SA

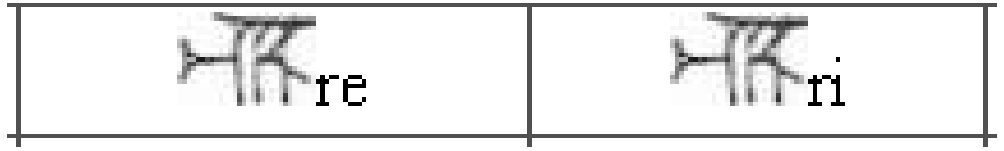
5 ŠÀ.BAL.BAL *ŠA* ^{m}*Tu-ut- ḫa-li-ya* LUGAL.GAL LUGAL KUR ^{URU}*Ḫa-at-ti* UR.SAG

The cuneiform sillabary

Sign = syllable

- V *a* 
- VC *an* 
- CV *ni* 
- CVC *pat* 

Homophony: different ways to spell the same V or CV syllables



sometimes vowels *e/i* are not distinguished

Consonant clusters

- **Two-consonant clusters** can be represented only if word internal ([C]VC-CV[C]) but not if word initial or word final (*CCV[C], *[C]VCC)

VCCV	*ar-ta*
CCV	*iš-pa-an-ta-aḫ-ḫi / ši-pa-an-ta-aḫ-ḫi* /spantahhi/
VCC	*ap-pa-an-za* /appants/

- **Three-consonant clusters** cannot be represented

Voiced/voiceless stops, geminates

CV signs mostly have different forms for voiced and voiceless stops (in Akkadian)

ta  / *da* 

VC signs have a single form which is not distinctive of voice

ap = *ab* 

Geminate consonants are spelled double

ap-pa, *šar-ra*

Vowels

Signs for *Ci*, *Ce* are not always distinct:

 = *ki*, *ke*

BUT:

 *me* vs.  *mi*

Vowels may be spelled **plene**:

pa-an-zi / *pa-**a**-an-zi* 'they go'

The phonology of Hittite

Methodological assumption: systematic ortographic contrast > phonological contrast

	LABIAL		CORONAL		PALATAL		VELAR		UVULAR	
STOP	p	p:	t	t:			k k^w	k: k^w:		
AFFRICATE				t͡s						
FRICATIVE			s	s:					χ $χ^w$	χ: $χ^w$:
NASAL	m	m:	n	n:						
LIQUID			l r	l: r:						
GLIDE	w				j					

Table 1: Hittite consonant inventory

Luraghi et al. forthc.

Consonants: phonological contrast

Systematic intervocalic geminate vs. singleton spelling:

	Fortis		***Lenis***	
a.	⟨*ha-at-ta-an-za*⟩	pierce.PTCP.NOM.SG.C	⟨*ha-ta-an-za*⟩	dry.PTCP.NOM.SG.C
b.	⟨*še-ek-kán*⟩	know.PTCP.N/A.SG	⟨*še-kán*⟩	cubit(N).N/A.SG
c.	⟨*a-ar-ri*⟩	wash.PRS.3SG	⟨*a-ri*⟩	arrive.PRS.3SG
d.	⟨*e-eš-ša-an-zi*⟩	do.IPFV.PRS.3PL	⟨*e-ša-an-zi*⟩	sit.PRS.3PL

Sturtevant's Law: ***-tt-/-dd-*** < PIE **t*

-t-/-d- < PIE **d*

Consonants: phonological contrast

	*še-e**k-k**án*	*še-**k**án*
Voicing	voiceless /k/	voiced /g/
Voice+asp	voicl. asp. /k^{h}/	voiced /g/
Length	long /kk/	short /k/

Most plausible interpretation (Kloekhorst 2016, Yates 2019):

1) long cons. pattern with clusters in syllabification;
2) explains why voicing contrast in the Babylonian syllabary is not adopted, e.g. ⟨ka-an-ki⟩ ~ ⟨ga-an-ki⟩ 'hangs';
3) voicing contrast unlikely for liquids and nasals.

Consonants: controversial points

Possible **three-way** contrast? (Kloekhorst 2013)

- fortis /t:/ → <tt>
- lenis /t/ → <t>, <d>
- ejective /t:ˀ/ → *pád-da-* 'dig' = /pat:ˀa/ < *$bod^{h}h_2$-

The phonetics of fricatives

- Only one alveolar fricative [s], despite the spelling <*š̌*> (and not expected <*s*>)
- 'Laryngeals' → <*ḫ*> and <*ḫḫ*> (< PIE **h*$_2$ and **h*$_3$) phonetically likely uvular fricatives [χ]
  - *ḫarki* 'white' (Lat. *argentum*)
  - *ḫastai* 'bone' (Gr. *ósteon*)
  - *newaḫḫ-* 'renew' (Lat. *nouāre*) < **neweh*$_2$-
- Labialized uvular fricative <*ḫu*> and <*ḫḫu*> →[χ^w]
  - *tarḫu-/taruḫ-* 'overcome' = /Tarh^w/

The vowel system

Several details concerning the interplay between vowel **length** and word **stress** are still disputed!

	FRONT		CENTRAL		BACK	
HIGH	i	i:			u	u:
MID	e	e:			o	o:
LOW			a	a:		

- Spelling variation -*e/i-*: ***e****kuna*/***i****kuna* ‘cold’
- Secondary /o/ spelled as <u> vs. /u/ spelled as <ú>?

⟨*ku-ú-ša-an*⟩ = [‘kusan] ‘daughter/son-in-law(C).ACC.SG’
⟨*ku-u-š*⟩ = [‘kos] ‘this:C.ACC.PL’

- **Vowel length**: plene spelling, *te-e-kán* = *tēkan*

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Why plene spelling?

Plene spelling (e.g. *pa-a-…*) has various functions:

1. Stress: *t**e-e**-kán* 'earth.N/A' vs. *ták-n**a-a-aš*** 'earth.GEN'
2. Vowel length: *ut-t**a-a-a**r* 'words.N/A.PL'
3. Distinguish graphic vs. real vowels: *pa-r**a-a*** /pra/
4. Show *e*-coloring of ambiguous C*e/i* signs: ***pí-i-e-e**t-ta* 'allotment'
5. Avoid one-sign spellings (except e.g. *nu*): ***d**a-a*** 'take!'
6. Interrogative intonation: *nu me-ma-aḫ-ḫ**i-i*** 'Shall I tell (you)?'

Stress and vowel length

	Morph	Stressed/long		Unstressed/short	
a.	*šăkk–*	*šākk-i*	[ˈsa:k.ki]	*šak-tēni*	[sak.ˈt:e:.ni]
	‘know’	know-PRS.3SG		know-PRS.2PL	
b.	*–ănt–*	*app-ānt-eš*	[ap.ˈpa:n.tes]	*ānš-ant-eš*	[ˈa:n.san.tes]
	PTCP	take-PTCP-NOM.PL.C		wash-PTCP-NOM.PL.C	
c.	*–ĕš*	*išḫ-ēš*	[isχ.ˈe:s]	*lāl-eš*	[ˈla:.les]
	NOM.PL.C	master(C)-NOM.PL		tongue(C)-NOM.PL	

shortening

/V:/ → [V]

	Morph	Stressed/full		Unstressed/reduced	
a.	*šeš-*	*šēš-zi*	[ˈse:s.t͡si]	*saš-anzi*	[sa.ˈsan.t͡si]
	‘sleep’	sleep-PRS.3SG		sleep-PRS.3PL	
b.	*epp-*	*ēpp-un*	[ˈe:p.pon]	*ap-tēni*	[ap.ˈt:e:.ni]
	‘take’	take-PST.1SG		take- PRS.2PL	
c.	*tekan-*	*tēkan*	[ˈte:.kan]	*takn-āš*	[tak.ˈna:s]
	‘earth’	earth(N)-N/A.SG		earth-GEN.SG	

pretonic vowel reduction

Stress

- What is the nature of word stress in Hittite?

(i) increased vowel duration
(ii) fuller realization of vowel quality
(iii) trigger of consonant lenition

} canonical '**stress accent**' = increased intensity, higher pitch

Lexical stress

1ST σ	2ND σ	3RD σ	4TH σ+
ēšḫar 'blood'	*išḫāš* 'master'	*alwanzātar* 'sorcery'	*kukupalātar* 'deception'
[éːsχːar]	[isχːáːs]	[alwant͡sáːtar]	[kukupaláːtar]

Kloekhorst 2014, Yates 2017

Luwian phonology

Stops:	/p/	/t/		/k/	/k^w/
	/b/	/d/		/g/	/g^w/
Affricate:		/t^s/			
Fricatives:		/s/		/x/	/x^w/
				/ɣ/	/$ɣ^w$/
Nasals:	/m/	/n/			
Liquids:		/r/, /l/			
Glides:	/w/		/j/		

Graphic contrast between **geminate** vs. **singleton**:

a-at-ta /a=ta/ vs. *a-a-ta/da* /ada/ ‘he made’

Contrast not visible in HLuw., but visible in **rhotacism**

CLuw. *a-a-da* = HLuw. *á-tà* /*á-ra+a* [r]

Melchert 2003, 2020

Luwian phonology

Vowels: /i/, /i:/ /u/, /u:/

/o/, /o:/

/a/, /a:/

- Dictinction between /o/ and /u/ based on the graphic distinction between <u> and <ú> in CLuw (Rieken 2016)
- Contexts for phonemic distinction between short vs. long vowels are limited

*a-ad-du-wa-**a**l-za* 'evil.N.N/A' vs. *a-ad-du-wa-**a-a**l* 'evil.N.N/A.PL'

Melchert 2003, 2020

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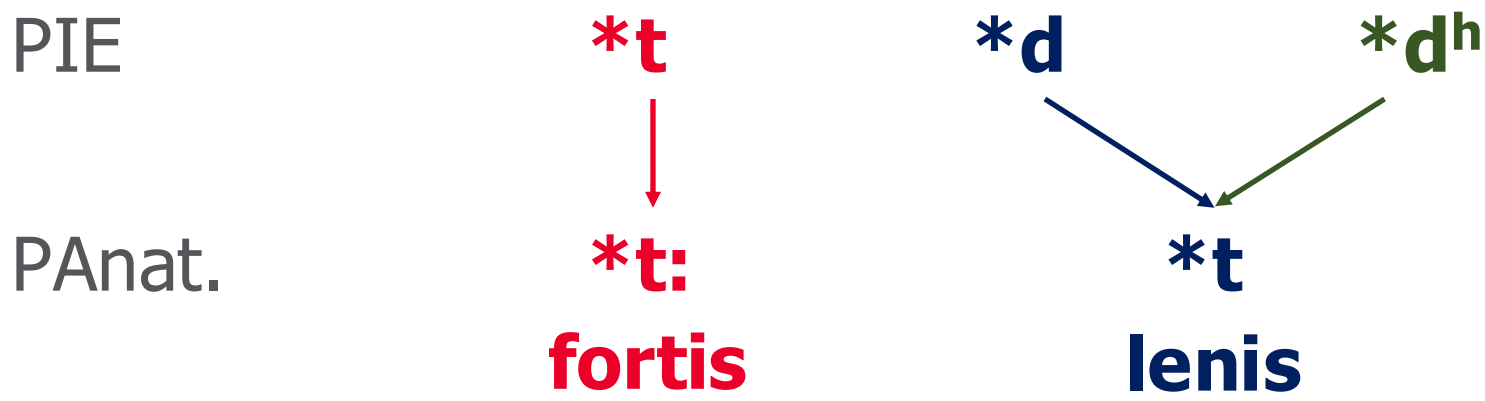
From PIE to Anatolian

Melchert 1994, Kloekhorst 2008, Kimball 2017

Stops: merger



PIE **melit-* > Hitt. *mi-li-i**t-t**** = Gk. *mélitos* ‘honey

PIE **uódr* > Hitt. *wa-a-**t**ar* = Gk. *húdōr* ‘water’

PIE **nébʰ-os* > Hitt. *ne-e-**p**í-iš* ‘sky’ = Gr. *néphos* ‘cloud’

What happens in initial position?

- Possible contrast in **initial** and **final** position (Kloekhorst 2016), involving voicing as well!

- Consistent HLuw. spelling <ta> seems to suggest merger (Rieken 2010: 303):

tama- 'build' (< **demh$_3$-*) = *ta(nu)-* 'stand' (<*steh$_2$-)

PIE **k^{w}i-* > Luw. ***k**ui-*

PIE **g^{w}on-eh$_2$-* > CLuw. ***w**ānā-*

voicing distinction in onset preserved in PAnat.!

The Hittite stops: labial and dental

- PIE /p/ *h_1e**p**- > Hitt. a**p**-**p**a-an-zi ‘they take’
- PIE /b/ *g^hró**b**h_1- > Hitt. ka-ra-a-**p**ì ‘he devours’
- PIE /b^h/ *né**b^h**es > Hitt. ne-e-**p**í-iš ‘sky, heaven’

- PIE /t/ *meli**t** > Hitt. me-li-i**t**-**t**a-aš ‘of the honey’
- PIE /d/ *uó**d**r > Hitt. wa-a-**t**ar ‘water’
- PIE /d^h/ *mól**d^h**- > ma-a-al-**d**i ‘he recites’

The Hittite stops: velars

- PIE /ḱ/ *$h_2$rt**ḱ**o- > *ḫar-ta-a**g-g**a-** ‘bear-(man)’
- PIE /ǵ/ *h_2r**ǵ**-i- > *ḫar-**k**i* ‘white’
- PIE /ǵʰ/ *d^he**ǵʰ**om > *te-e-**k**án* ‘earth’

- PIE /k/ *tué**k**o- > *tu-e-e**k-k**a-* ‘body’
- PIE /g/ *iu**g**om > *i-ú-**k**án* ‘yoke’
- PIE /gʰ/ *ló**gʰ**- > *la-a-**k**i* ‘he knocks down’

- PIE /kʷ/ *ne**kʷ**e > *ne-e**k-k**u* ‘not?’
- PIE /gʷ/ *ne**gʷ**- > *ne-**k**u-ma-an-t** ‘naked’
- PIE /gʷʰ/ *ne**gʷʰ**-ti > *ne-**k**u-zi* ‘it becomes evening’

Stops: lenition

"Lenition" of voiceless stops and -h_2- (Adiego 2001)

1) PIE *$\acute{V}C{:}V$ > PAnat. *$\acute{V}CV$

PIE *$sók^{w}o$ > Hitt. /sák^{w}a/ *ša-a-**k**u-wa-* 'eye' (*/sák:^{w}a/)

2) PIE *$VC{:}V$ > PAnat. *VCV

PIE *$sépitos$ > OH /sépitas/ *še-ep-pí-**d**a-aš* (*/sépit:as/)

The dental stops in Luwian

Short dental postconsonantal stop [t/d] = <ta> or <tá>

PIE *-*nto* > -*ta/-tá* PST.3PL

Intervocalic long stop [t:] = <ta>

PIE **h$_2$et-* > *hatali-* 'smash' = Hitt. *ḫa-a**t-t**a-* =

Intervocalic fricative [ð] < PIE **d$^{(h)}$* or lenited **t* = <tà>

PIE **dem-* > *ta-ma-**tà*** '(s)he built' /tamada/ vs. *ta-ma-**ta*** /tamanta/ PST.3PL

Rieken 2008, 2010, Vertegaal 2020

Lenition in Luwian

- Ablative CLuw. -*Ca-**t**i* = HLuw. *-a-**r**i/-a-**t**i* < PIE *-*óti* (generalized wrt *-*ti* = Hitt. *-az/za*)

- CLuw. *ma-al-li-**t**a-a-ti* 'honey.ABL' VS. Hitt. *mili**tt**-*

	Hitt.		
STAGE 1	NOM *mi-li-i**t***	['milit:]	GEN **mi-li-i**t**-aš* ['militas]
STAGE 2	NOM *mi-li-i**t***	['milit:]	GEN *mi-li-i**t-t**a-aš* ['milit:as]

Analogical spread of the unlenited consonat from the **nominative**

Velars

	Hittite	Luwian
**kʷi-* 'who?'	*kui-*	*kui-*
**ker-* 'cut'	*karš-*	*kars-*
**ḱey-* 'lie down'	*kī-tta*	*zī-*

?

- **Unconditioned** (Melchert 1987): PAnat. (and PIE) with a three-way contrast
- **Conditioned**: PAnat. is *kentum* with secondary palatalization

Melchert 2012

Conditioned palatalization

- **ḱéy-o* > CLuw. ***z**iyari*, Lyc. ***s**ijẽni* vs. Hitt. ***k**ī-* 'lies'
- **ḱērd-* > CLuw. ***z**art-* vs. Hitt. ***k**ard(i)-* 'heart'
- **ékʷo-* > HLuw. *a**z**u(wa)-*, Lyc. *e**s**be-* 'horse'
- **ḱr̥ng-id-* > HLuw. ***z**urnid-* 'horn' vs. Hitt. ***k**arkid-ant-*
- **weḱ-ye-* > HLuw. *wa**z**i-* 'request'
- **ḱm̥to* > CLuw. ***za**nta*, Hitt. ***k**atta* = Gk. *kátō*

VS.

- **ḱot-* > CLuw. ***k**attawanalli-* 'spiteful' , Hitt. ***k**adduwā(i)-* vs. Skt. ***ś**atru-* 'enemy'
- **ḱr̥u-nt-* 'horned' > ***K**(u)runtiya* > *Runtiya*
- **ḱunmo-* > C/HLuw. ***k**umma-* 'sacralized' vs. Av. ***s**pənta-* 'holy'

"Before the merger of the front and non-front velars, the voiceless front velar, but not the non-front velar, underwent conditioned palatalization." (Melchert 2012: 11)

Anatolian phonological innovations

- **Lenghtening:** PIE *ó > PAnat. ***ṓ*** *> **á́*** (before lenition!)

  PIE **sókʷo* > Hitt. /sá́gʷa/ ***ša-a-**ku-wa-* ‘eye’

- **Shortening:** PIE V̄ > PAnat. V

  PIE **h₃érōns* > Hitt. /Há́ras/ *ḫa-a-r**a-aš*‘eagle’

- **PIE *** *h₂w* > voiceless fricative [xʷ]

  *tar-**uḫ-*** vs. *tar-**ḫu-*** ‘overcome’ /tarxʷ-/

Laryngeals: word-initial

PIE		PAnat.	
*h_2e-	>	*Ha-	*$h_2$ent- > *ḫa-an-t*- ‘front’
*h_3e-	>	*Ho-	*$h_3$érōns > *ḫa-a-ra-aš* ‘eagle’
*h_1e-	>	*ʔe-	*$h_3$érōns > *ḫa-a-ra-aš* ‘eagle’
*h_2o-	}	*ʔo-	*$h_2$óro > *a-a-ra* ‘properly’
*h_3o-	}	*ʔo-	*$h_3$orǵʰei > *a-ar-ki* ‘he mounts’
*h_1o-	}	*ʔo-	*$h_1$órei > *a-a-ri* ‘he arrives’

PIE		PAnat.	
*h_2R-	>	*HR-	*h_2rǵ-i- > *ḫar-ki* ‘white’
*h_3R-	}	*ʔR-	
*h_1R-	}	*ʔR-	
*$h_2$stḗr - > *ḫa-aš-te-er** ‘star’			
*h_2T-	>	*HT-	
*h_3T-	}	*T-	
*h_1T-	}	*T-	

Kloekhorst 2008: 75

Laryngeals: word-internal

- (Amost) only -h_2- is preserved word-internally (in various clusters)

PIE	PAnat.	early OH
*Vh_2V	> */VHV/	> /VHV/

*$péh_2ur$- > *pa-aḫ-ḫu-ur* 'fire'

PIE	PAnat.	Hitt.
*Vh_2R	> */VHR/ ?	> /VHR/ ?

*$móh_2lo$- > *ma-a-aḫ-la-* 'branch of grapevine'

PIE	PAnat.	Hitt.
*sh_2V	> */sHV/	> /sHV/

*$h_1ésh_2r$- > *e-eš-ḫar* 'blood'

PIE	PAnat.	Hitt.
*Vh_2s	> */VHs/	> /VHs/

*$péh_2so$- > *pa-aḫ-ša* 'he protects'

Laryngeals: word-internal

PIE		PAnat.		Hitt.	
*CRh_2V	}	*/CRHV/	>	/CRHV/	*plh_2-*i*- > *pal-ḫi* 'broad'
*CRh_3V	}	*/CRHV/	>	/CRHV/	*ulh_3énti > *wa-al-ḫa-an-zi* 'they hit'

All larygeals are **lost** inter-consonantally and word finally!

Controversial point: glottal stop?

Kloekhorst (2006: 77-81, 2008: 75-76)

word-initial ⟨*V-VC-*⟩ = [ʔV-] sequences < **h*$_1$*V-e-eš-zi* [ʔestsi] and not [ēstsi] < **h*$_1$*esti*

- this spelling practice was not imported from Akkadian (Weeden 2011: 62–68);
- fails to explain some cases, e.g. PIE **h*$_1$*esh*$_2$*ós* > Hitt. *iš-ḫa-a-aš* 'master'; never spelled ˣ*i-iš-ḫa-a-aš* (Yates 2016: 248).

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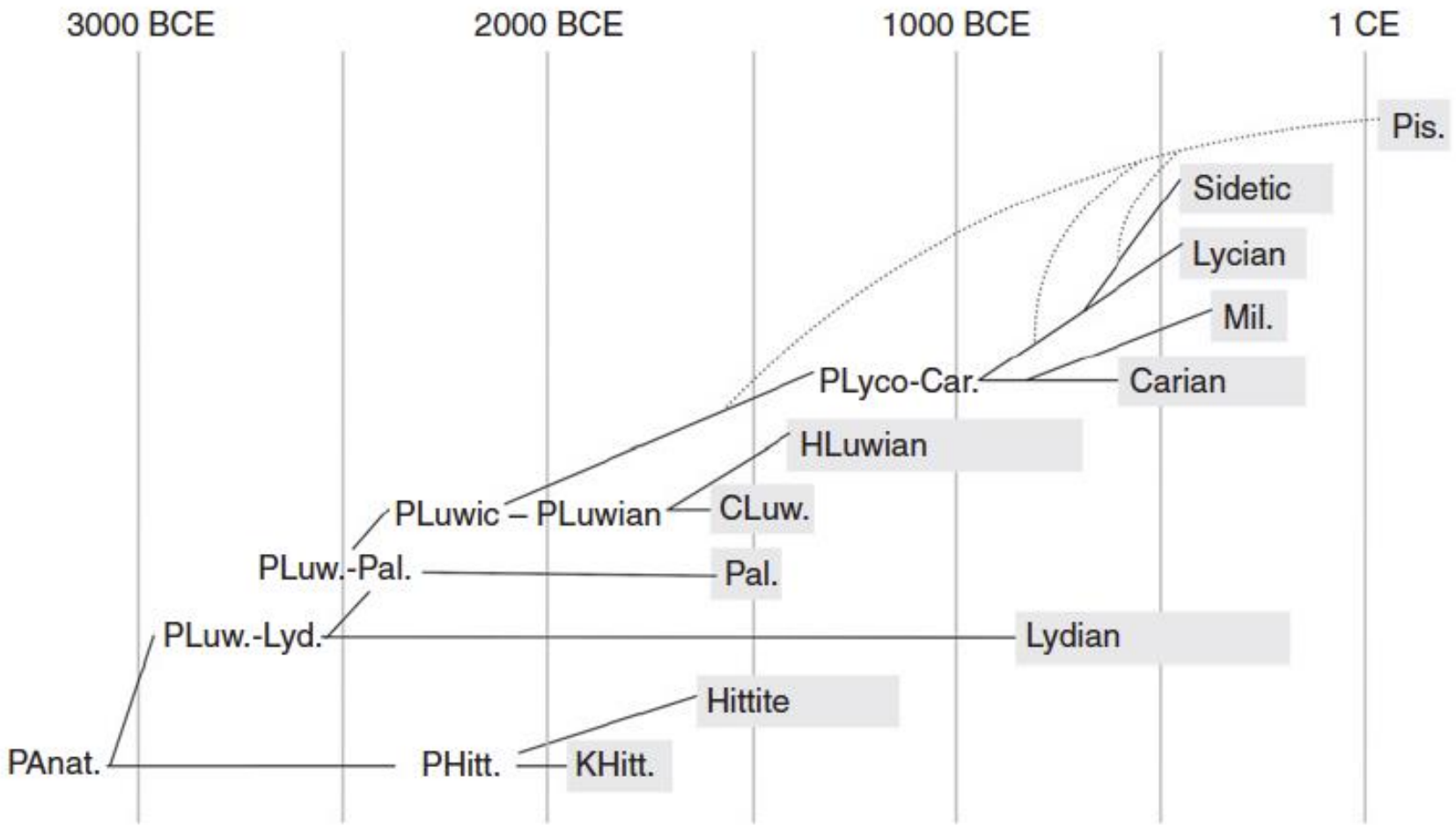
From PAnat. to Antolian languages

Melchert 1994, Kloekhorst 2008, Kimball 2017

The Anatolian family tree: phnological evidence



Hittite sound change(s)

- **Assibilation**: *-D*i*- > -*ts*-

PIE **tiéh$_1$-o* > ***z**é-e-a-ri* 'it cooks'

PIE *-*óti/-ti* ABL > *ne-e-pí-ša-a**z*** = *ne-e-pí-ša-**za*** /ts/ vs. CLuw. -*āti*, HLuw. *-adi*, Lyc. *-edi*

PIE *$h_1$ésti* > **?** *e-eš-**zi***

→ analogical reintegration of *-i* in vb. endings from *-mi/-si*

The Luwic branch

CLuw., HLuw., Lycian (+ Lydian, Carian, Sidetic, Pisidian)

- **Assibilation** of PAnat. *ḱ:> PLuw. *ts

CLuw. *z* /ts/, HLuw. *z* /ts/, Lyc. *s*, Mil. *s*, Car. *s*, Sid. *ś* (vs. Hitt., Pal., Lyd. = k)

CLuw. ***z**art-* vs. Hitt. ***k**ard(i)-* 'heart'

- **Weakening** of PAnat. *ḱ > PLuwic *i̯

PAnat. **ḱésr-* 'hand' > CLuw. ***īš(ša)ri-***, Lyc. ***izri-*** vs. Hitt. ***k**eššar*

- **Weakening** of PAnat. lenis */kʷ/ > PLuwic *u̯

PAnat. **kʷṓu-* 'cow' > HLuw. ***w**awa/i-*, Lyc. ***w**awa-* (Hitt. **k**uwāu-***)

The Luwic branch

- **Merger** of PAnat. **e* and **o͡e̯* into PLuwic */ə̯/*

h₁o-bʰó-* 'that' > CLuw. ***apā-*, Lyc. ***e**be-*, Hitt. ***a**pā-*
h₁es-* 'be' > CLuw. ***āš-/aš*, HLuw. ***ás-/s-***, vs. Hitt. ***eš-***

- **Cop's Law** (fortition): PAnat. **V́CV* > PLuwic **V́C:V*

(Kloekhorst 2014: 567-585)

pérom* > CLuw. *parr**an* vs. Hitt. *pe**r**an* 'in front'

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