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## **Voices in stone: Studies in Luwian historical phonology**

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## CHAPTER 5

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### **Luwic Lengths** Syllable weight gradation in the Luwic languages

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# Luwic Lengths

## Syllable Weight Gradation in the Luwic Languages

# 5

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**Abstract:** This chapter offers a new perspective on Čop's Law and Open Syllable Lengthening, two commonly accepted sound laws that lengthened both consonants and vowels in the Luwic languages. It is proposed that both developments take similar inputs and ultimately yield the same effect: neutralisation of the syllable weight opposition in accented (stressed) syllables. This development is in line with a tendency already observable in Proto-Anatolian, according to which unstressed syllables were made light, while stressed syllables were made heavy. Thus, it is argued, in the prehistory of the Luwic languages, vocalic length, consonantal length and syllable weight in general became increasingly dependent on the position of the stress and therefore became phonologically neutralised to a certain extent.

### 5.1 Introduction

The Luwic languages, of which Luwian and Lycian are best known, show a phonological opposition between two series of consonants: traditionally, these are referred to as 'fortis' and 'lenis'. In addition, Luwian seems to have distinguished long and short vowels. Each of the three attested writing systems applied to these languages (cuneiform, hieroglyphic, alphabetic) has a different way of expressing these distinctions.<sup>1</sup>

The cuneiform scribes used geminate and singleton spelling (<VC-CV> vs. <V-CV>) to mark the differences between fortis and lenis consonants,

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<sup>1</sup> In this chapter, I will make frequent use of the labels 'Hieroglyphic Luwian' and 'Cuneiform Luwian' to refer to two "[corpora] of linguistic data recorded using a particular writing system" (as per Yakubovich 2010: 70), without implying that the distinction in writing system marks an important dialectal divide. The phonetic changes that are at the heart of this chapter seem to have been completed in Proto-Luwian times already.

respectively. In the hieroglyphic script, fortis dental stops followed by *a* are indicated using the signs <ta> and <tá>, while the sign <tà> expresses the lenis stop (Rieken 2008). As far as we know, fortis/lenis distinctions for other consonants are not expressed in hieroglyphic writing. Lastly, the alphabetic script of Lycian employs different signs to indicate the contrast between fortis and lenis obstruents (<p> vs. <b>, <t> vs. <d> etc.).

The phonetic realisation of fortis (< PIE *\*p*, *\*t*, *\*k*, *\*kʷ*) and lenis (< PIE *\*bʰ*, *\*dʰ*, *\*ǵʰ*, *\*ǵʰ*, *\*ǵʷʰ*) consonants has been the subject of debate for over a century, and no real consensus has been reached on all details. With regard to the cuneiform languages, most scholars agree that fortis consonants were at least phonetically longer than their lenis counterparts: [t:/d:] vs. [t/d] (Melchert 1994a: 20f.; Kloekhorst 2008: 21–25).<sup>2</sup> In Lycian, on the other hand, there are indications that the distinctive factor between fortis and lenis consonants was frication (Van den Hout 1995: 131–133), and the same has been claimed for Hieroglyphic Luwian (Hajnal 1995: 32<sup>n</sup>; Rieken 2010b: 306).<sup>3</sup> In both languages, it is commonly assumed that the fricatives represent an innovation, since it is typologically much more common for occlusives to become fricatives than the other way around (Melchert 1994a: 301; Kümmel 2007: 55, 147).

Vowel length is also marked in different ways. In cuneiform writing, long vowels are marked using *plene writing*: <Ca-a>/<a-aC> = [a:]; <Ca>/<aC> =

<sup>2</sup> For this reason, I will use geminates (/tt/) and singletons (/t/) contrastively in my phonological representation of Hittite, Cuneiform Luwian and Palaic forms, e.g. Hitt. *mi-li-it-ta-aš* /milittas/ ‘honey’ (gen.sg.) vs. CLuw. *ma-al-li-ta-a-ti* /mallitāti/ ‘id.’ (abl-ins.).

<sup>3</sup> Rieken (2010b) arrived at this interpretation in her analysis of the HLuw. sign <tá>, arguing that it represents [da], with a voiced stop. Therefore, she proposes that <ta> = [t(t)a] or [d(d)a], <tà> = [ða] and <tá> = [d(d)a], identifying the synchronic distinction between HLuw. fortis and lenis consonants with the one we find in Lycian (where <t> = [t], <d> = [ð], <ñt> = [d]). However, in an earlier paper (Rieken 2008), she attributed the same phonetic value [da] to the sign <tà>, as it appears to merge with /r/ in texts after ca. 800 BCE (‘rhotacism’, cf. Morpurgo Davies 1982/1983: 246–250, Melchert 2003: 179–182, Goedegebuure 2010: 76–78). These analyses are irreconcilable, but both have been suggested on good grounds. A new analysis of Luwian dental stop phonology as apparent from the hieroglyphic corpus is provided in Chapter 3, where it is argued that <tá> writes a short stop [t/d]. In my phonological representations of these languages, I will use the symbols /t/ and /θ/ to distinguish fortis from lenis, respectively.

[a].<sup>4</sup> Moreover, the hieroglyphic scribes may have occasionally marked the presence of a long vowel using plene writing (Chapter 2). In Lycian, lastly, vocalic length seems to have been lost.

For the most part, the distribution between long and short vowels and consonants is governed by their etymological origins. Fortis (long) stops generally represent the reflexes of the Proto-Indo-European tenues (*\*p*, *\*t*, *\*k*, *\*k<sup>w</sup>*), cf. CLuw. *-tta* /-tta/ ~ Lyc. *-te* /-te/ (3sg.pret.act.) < PIE *\*-to*. Lenis (short) stops, on the other hand, normally continue Proto-Indo-European mediae (aspiratae), cf. CLuw. *pa-a-ta-* /pāta-/ ~ Lyc. *pedi-* /peði-/ ‘foot’ < PIE *\*pod*/*ped-*.

Inherited long vowels in Luwian are generally the direct continuants of PIE/PAnat. diphthongs (e.g. CLuw. *hu-u-ha-ti* /hóhati/ ‘grandfather’ [abl.ins.] < PIE *\*h<sub>2</sub>éuh<sub>2</sub>-*),<sup>5</sup> accented long vowels (e.g. CLuw. *za-a-ar-za* /tsártsa/ ‘heart’ < virtual PIE *\*kér<sup>h</sup>d-*), or combinations of accented vowels and tautosyllabic laryngeals (e.g. CLuw. *ša-a-at-ta* /sātta/ ‘he released’ < PIE *\*sóh<sub>1</sub>-to*).<sup>6</sup>

These general observations do not explain the phonological shape of *all* words in the Luwic languages, however. For instance, we often find that lenis consonants continue PIE tenues (e.g. PIE *\*h<sub>1</sub>éi-ti* > CLuw. *i-ti* /ṽiti/ ‘he goes’, never *\*\*i-it-ti* /ṽitti/).<sup>7</sup> In addition, plene spellings are often conspicuously absent in vowels that on etymological grounds can be assumed to con-

<sup>4</sup> This interpretation of plene writing seems to be supported by the majority of scholars nowadays (Melchert 1994a: 27; Kimball 1999: 59; Kloekhorst 2014: 13–18, q.v. for a succinct overview of previous scholarship). For Cuneiform Luwian, Rieken (2017) has recently confirmed the long-standing hypothesis that plene writing of *i* marks vocalic length as it does in Hittite. Plene writing in Palaic awaits a separate treatment, but it is unlikely that its basic principles will be any different from Hittite and Luwian.

<sup>5</sup> Note that the plene spelling in *hu-u* is ambiguous: we often find plene spelling after the sign *hu* where we do not expect to find a long vowel, and it has been proposed that the sign U in <hu-u> serves to disambiguate H<sub>1</sub>U<sup>h</sup> from the sign RI<sup>h</sup>, which closely resembles it in form (Kimball 1999: 67). In the case of CLuw. *hu-u-ha-ti*, however, the length of the vowel in the initial syllable can be inferred from the shortening effect it had on the following consonant, due to Proto-Anatolian lenition, see Section 5.5.1.

<sup>6</sup> The fortis stop in CLuw. *ša-a-at-ta* must be analogical. Note that the lengthening effects mentioned here make it very likely that the Proto-Anatolian accent had at least a very strong stress component (Melchert 1994a: 47).

<sup>7</sup> For the word-initial glottal stop in Hittite (< PIE *\*H*), cf. Kloekhorst 2006: 95; Kloekhorst in prep. Its presence or absence is not important for the argument made here.

tinue a long vowel, monophthongised diphthong or combination of vowel + laryngeal, e.g. CLuw. *-a* (*a*-stem nom.sg.c. ending < PIE *\*-eh<sub>2</sub>*). As is commonly accepted, most of these discrepancies are caused by various prehistoric lengthenings and shortenings which are specific to the Anatolian sub-branch of Indo-European.

In this chapter I will focus on two separately proposed sound laws with clear lengthening/fortition effects in Luwian and, to some extent, also in Lycian. Presumably, therefore, these laws had run their course already in Proto-Luwic:

1. **Čop's Law** (e.g. Čop 1970; Melchert 1994a: 252f.; Kloekhorst 2014: 571–585.)
2. **Lengthening of accented short vowels in open syllables** (e.g. Hrozný 1917: 186<sup>1</sup>; Melchert 1994a: 131–133, 215–218, 261–264).

This chapter will not provide a new interpretation of the attested linguistic material in our Luwian and Lycian corpora, nor will it propose any substantial changes to the scope and formulations of these sound laws beyond those advanced in other studies. Rather, it will offer a new way of viewing these well-known sound laws by showing their underlying coherence. I will argue that these are not two random, independent rules, as they are often presented in the scholarly literature. Rather, they demonstrate a high degree of functional similarity on a more abstract, phonological level, by taking complementary inputs while yielding identical results. Together, these two developments constitute a general Luwic fortition under influence of the accent. In the second half of this chapter it will be shown that a motivation for the eventual phonologisation of these two changes in the Luwic languages can be found in the Proto-Anatolian phonological system. The resulting picture, as we will see in Section 5.6, is an extension of ideas already proposed in Kloekhorst 2006/2008 and Hajnal 1995: 50f.<sup>48</sup>. Without taking over these authors' ultimate conclusions, it combines their approaches to lay bare the complimentary structural relations between four distinct phonetic developments in the history of the Luwic languages.

## 5.2 Čop's Law

In 1970, Bojan Čop observed that on numerous occasions, fortis consonants in Luwian correspond to lenis consonants in their Hittite counterparts, e.g. CLuw. *ma-al-li* /malli/ ~ Hitt. *mi-li-it* /milit/ 'honey', CLuw. *ta-ap-pa-aš* (=ša) /tappas=sa/ ~ Hitt. *ne-(e-)pí-iš* /nēpis/ 'heaven'. He explained this variation as the result of a historical development: "Die indogermanischen Konsonanten *l, r, n, m, \*bh, \*dh, \*gh* wurden im Luwischen nach einem betonten kurzen indogermanischen \**é* in doppelte Konsonanten verwandelt (...). In der Orthographie des Keilschrift-Luwischen werden diese Konsonanten *ll, rr, nn, mm, šš, pp, tt, kk* geschrieben." (1970: 96). In the following years, this sound law received general acceptance and was termed "Čop's Law" as more instances were found in Luwian.<sup>8</sup> Some strong examples are Cuneiform Luwian *ma-ad-du* /máttu/ 'wine' (< PIE \**méd<sup>h</sup>-u*; Morpurgo Davies and Hawkins 1987: 283) and *pár-ra-an* /párran/ 'before, in front' (< PIE \**pér-om*; Čop 1970: 86). Only in the last decade did it become clear that Čop's Law also affected Hieroglyphic Luwian and Lycian, cf. HLuw. *zati* /tsáti/ 'this' (dat.-loc.sg.), HLuw. *ápati* 'that' (dat.-loc.sg.) (both < PIE \**éd<sup>h</sup>i*; in these words, Čop's Law manifests itself as the absence of rhotacism; Goedegebuure 2010: 87) and Lycian *ebette* 'that' /eφete/ (dat.-loc.pl.; < \**éd<sup>h</sup>os*; Kloekhorst 2012a: 261f.). We find a (fortis) stop phoneme /t/ in both languages. If the fortition due to Čop's Law had not affected these words, we would have expected to find a fricative /θ/: HLuw. \*\**za-ti* /tsáθi/ (alternating with rhotacised \*\**za+ra/i*) and Lyc. \*\**ebede* /eφeθe/.

Despite the wide adoption of Čop's Law in some form or another in historical accounts of Luwian phonology, no absolute consensus has been reached on its precise conditioning and effects. In particular, it is unclear which consonants are affected by Čop's Law and whether only consonants after certain vowels are geminated by this rule. These features will be discussed in the sections below.

<sup>8</sup> Melchert 1994b has also argued for a 'limited version of Čop's Law' affecting word-initial syllables in Proto-Anatolian already, citing examples from Hittite and Lydian. Recently, however, he has retracted this view (Melchert 2015a).



### 5.2.1 Vocalism

In his 1970 article, Čop only mentioned  $*éCV$  as a potential input for his newly found law, and this view is held until this day by several scholars who believe that consonants preceded by the other Proto-Anatolian short vowels ( $*áCV$ ,  $*óCV$ ,  $*íCV$ ,  $*úCV$ ) were not liable to gemination, e.g. Melchert 2015a: 4; Rieken 2010b: 305; Goedegebuure 2010: 87. The reason to assume this restriction to  $*é$  is that almost all of the examples we have for Čop's Law continue PANat.  $*é$ . This should not surprise us for two reasons. First, other short accented vowels  $*á$ ,  $*ó$ ,  $*í$  and  $*ú$  must have been quite rare: PANat.  $*á$  and (short)  $*ó$  in open syllables can only continue PIE  $*h_2é$  and  $*h_3é$ , respectively, while  $*i$  and  $*u$  were regularly unaccented in PIE unless they attracted the accent analogically (cf. CLuw.  $p̄āa-$  in Section 5.3 for an example).

Secondly, I assume with Kloekhorst 2008: 120 that PIE  $*ó$  was lengthened to  $*ó̄$  in pre-PANat. already, as it causes Proto-Anatolian lenition (cf. Section 5.5.1) in forms such as Hitt.  $ša-a-ku-ua-$  / $sáḡ^w a-$ / 'eye' <  $*sók^w o-$  and Hitt.  $ša-a-ḫi$  / $sáhi$ / 'he stuffs' <  $*sóh_2-ei$ .<sup>9</sup> Thus, words like PIE  $*dóru-$  > CLuw.  $ta-a-ru-$

<sup>9</sup> This early lengthening of PIE  $*ó$  is not commonly accepted, cf. Melchert 2015a: 9f. Melchert (2012b: 175) cites Hittite  $da-a-ak-ki$  / $tákki$ / 'resembles' < PIE  $dókei$  and  $ḫu-ua-ap-pí$  / $h^w áppi$ / 'throws' < PIE  $*h_2wópei$  as counterexamples, and indeed, these forms show an unlenited (geminate) stop after an original PIE  $*ó$ . At the same time, however, unlenited stops are regularly expected in the plural forms of this paradigm (Hitt.  $ták-ka-an-zi$  / $takkánzi$ / and  $ḫu-up-pa-an-zi$  / $huppánzi$ / from which these stops could have been analogically introduced into the strong stem. In addition, Melchert *does* allow for a special lenition of just PIE  $*h_2$  after  $*ó$  (following Kimball 1999: 397), marking "the well-known "stronger" or "longer" quality of what we call phonological "short"  $*o$  in PIE" (Melchert 2012b: 179). The geminate/singleton alternation we see in Hitt.  $náḫi$  / $nahánzi$  'to fear' would be regular, and was extended from there to stems ending in  $s$  ( $ḫáši$  / $ḫaššánzi$  'to beget') and subsequently spread from there to other verbs as well (e.g. Hitt.  $ištápi$  / $ištappánzi$  'to clog up'). I prefer to interpret the 'stronger'/'longer' quality of  $*o$  as something which caused it to be lengthened early, so that we can take the leniting effects of  $*h_2$  as an instance of the independently established Proto-Anatolian lenition laws (see Section 5.5 and Kloekhorst 2014: 551<sup>2017</sup>). In this way, the ablaut we see in  $ḫáši$ ,  $ḫaššánzi$  and other verbs belonging to this class is phonetically regular. I readily concede that an early lengthening of  $*ó$  is not without problems and requires alternative solutions for etymologies proposed in the past, e.g. the Luwian suffix  $-att(a)-$  (if it truly continues  $*-ó-tV-$ , as one reviewer suggests). I would argue, however, that these inconveniences do not outweigh the problems associated with the massive analogical spread of the Hittite  $ḫi$ -conjugation stem pattern from a relatively small group of

/táru/- (never \*tarru- /tárru-/) are no good counterexamples to a more general application of Čop's Law to all short accented vowels. I assume that PIE \*dóru- had developed into \*dóru- in Proto-Anatolian already, meaning that it was unaffected by Čop's Law, which required a short vowel.

Nevertheless, after the lengthening of pre-PAnat. \*ó > PAnat. \*ó̄, a new short PAnat. \*ó developed from PIE \*h<sub>3</sub>e. This new short \*ó did undergo Čop's Law, as can be seen from CLuw. *ḫarrani(a/i)-* /*hárrani(a/i)-* / (< PAnat. \*Hóron- < PIE \*h<sub>3</sub>ér-on-), which provides a good example of a geminated stop after another vowel than \*é. Since so much hinges on this etymology, it is worth treating it in more detail.

*HW<sup>2</sup>* (Vol. *H*, p. 271f.) lists 14 attestations in NH texts (not counting duplicates). We come across the following forms: *ḫar-ra-ni-eš*, *ḫar-ra-ni-iš*, *ḫar-ra-ni-i-iš* (nom.sg.c.); *ḫar-ra-ni-in*, *ḫar-ra-ni-i-in* (acc.sg.c.), [*ḫar-r*]a-ni-i-uš<sup>1</sup> (acc.pl.c.). There is also one attestation of *ḫarrani(a/i)-* in a CLuw. text (KUB 35.97, 2'; cf. Starke 1985: 247), but the text is too fragmentary to determine the meaning of the word. The New Hittite contexts clearly show that the word must refer to an oracle bird, e.g.

**KUB 5.22 obv. 28:**

*nu=kan ḫar-ra-ni-i-iš* <sup>d</sup>UTU-un EGIR UGU SIG<sub>5</sub>-uḫ-[az ú-et]

“Der *ḫ*-Vogel [kam] in Richtung auf die Sonne zu hinten nach oben von der günsti[gen (Seite)]” (transl. *HW<sup>2</sup>* Vol. *H*, p. 271f.).

A direct identification of *ḫarrani(a/i)-* as a mere variant of Hittite *ḫāran-* ‘eagle’ is impossible, as per *HED* (Vol. 3, p. 139) and Melchert 1993: s.v., because of the *-rr-* and *-r-*. Nevertheless, the close similarity between *ḫarrani(a/i)-* on the one hand and Hittite *ḫa-a-ra-n<sup>o</sup>* /*háran-* ‘eagle’ and Palaic [*ḫa-*]a-ra-na-aš /*háran-* ‘id.’ (gen.sg.; cf. Melchert 1994a: 196; both < PAnat. \*Hóron- < PIE \*h<sub>3</sub>éron-) on the other is clear. For this reason, Starke 1987: 265<sup>80</sup> has proposed that *ḫarrani(a/i)-* represents the direct cognate of the Hittite and Palaic forms.<sup>10</sup> A good indication of the Luwian character of this word is the spelling of its ending, which frequently shows plene *i*, e.g. *ḫar-ra-ni-i-iš* (nom.sg.c., KUB 5.22 obv. 28) and *ḫar-ra-ni-i-in* (acc.sg.c. KUB 18.5

<sup>80</sup> *h*<sub>2</sub>-final verbal stems, as proposed by Melchert.

<sup>10</sup> This argument is repeated in Starke 1990: 76 and Kloekhorst 2014: 584f.

+ 49.13 i 28). While final *-iš/-in* is hardly ever seen on Hittite nouns and adjectives (the only notable exception being Hitt. *nakkī-* ‘important’), it has a clear parallel in Luwian, where we find formations such as CLuw. *ta-a-ti-i-iš* ‘paternal’ (nom.sg.c.) and GÉME-*i-iš* ‘of a female servant’ (nom.sg.c.). As per Melchert 1990: 200f. and Rieken 2017: 24f., these are best interpreted as denominal adjectives built on PANat. *\*-io-* (< PIE *\*-io-*), which were transferred to the highly productive *i*-stem (‘i-mutated’) class. Its plene spellings *-Ci-i-iš* (nom.sg.c.) and *-Ci-i-in* (acc.sg.c.) would then represent the resulting [-ijis] (nom.sg.c.) and [-ijin] (acc.sg.c.), respectively. The stem *ḫarrani(ia)-* can be interpreted in the same way, as a derivative in *\*-ia-* from an unattested stem *\*ḫarran-* or *\*ḫarrani-*.

It is highly unlikely that CLuw. *ḫarrani(ia)-* straightforwardly has the meaning ‘eagle’ for two reasons. First, it co-occurs with Hittite *ḫāran-* (represented Sumerographically as TI<sub>8</sub>) in several contexts, suggesting that it cannot refer to the same type of bird as the Hittite word.<sup>11</sup> Secondly, we have just seen that this word is a derivative from the ‘eagle’-root, means that it is unlikely to mean ‘eagle’ itself. Nevertheless, exactly this latter point opens up the possibility anew that the derivational basis *\*ḫarran-* itself, on which *ḫarrani(a/i)-* seems to have been built, is in fact the Luwian cognate of Hittite *ḫāran-*. While the derivative *ḫarrani(a/i)-* cannot mean ‘eagle’, its root may still have had that semantic value. Instead, *ḫarrani(a/i)-* may have referred to an eagle subspecies, as suggested by Haas (2008: 35), or a bird with eagle-like properties.<sup>12</sup>

In any case, given the strong formal and semantic similarity existing between Luw. *ḫarrani(a/i)-* and Hittite *ḫāran-*, Starke’s identification of *ḫarrani(a/i)-* as etymologically related to Hittite *ḫāran-* is likely to be correct. It follows that the geminate *-rr-* alternating with the singleton *-r-* in Hittite and Palaic is only explicable through Čop’s Law. The analysis CLuw. *ḫarrani(a/i)-* ~ Hitt. *ḫāran-* < PANat. *\*Hóron-* (for the PANat. reconstruction, cf.

<sup>11</sup> Cf. KUB 18.5 + 49.13 ii 36f.: *na-aš-ta* <sup>TI<sub>8</sub></sup> <sup>MUŠEN</sup> *ḫar-ra-ni-i-iš-ša* <sup>ÍD<sup>1</sup></sup> *-az ša-ra-a pé-ra-an aš-šu-ua-az ú-e-er* ‘Ein Adler und ein *ḫarrani*-Vogel kamen vom Fluß nach oben, vorne vom günstigen (Bereich), geflogen.’ (Sakuma 2009: 575).

<sup>12</sup> It is not uncommon to find animal names containing names of similar but unrelated animals. In the case of English bird names, compare the lark sparrow (*Chondestes grammacus*), which is not a lark, and the turkey vulture (*Cathartes aura*), which is not a turkey.

Kimball 1999: 141 and Melchert 1994a: 98) shows that Čop's Law is not restricted to PANat. \**éCV*, but also takes PANat. \**óCV* (< \**h<sub>3</sub>éCV*) as its input, suggesting that the consonant gemination is not dependent on just the vowel \**é*, and may well have applied to \**á/í/úCV* as well (becoming \**á/í/úCCV*; thus Kloekhorst 2006/2008: 132). Since evidence for the input of this change is expected to be quite rare (see the beginning of this section), the absence of positive evidence for this generalisation is not very surprising. Furthermore, this claim is not vitiated by any counterevidence: there are no cases of Proto-Anatolian \**á/í/úCV* which did not yield \**á/í/úCCV*. Personally, I am therefore inclined to believe that vocalic quality does not affect Čop's Law. Nevertheless, this point is not of crucial importance for the rest of this chapter. Even if PANat. \**áCV*, \**íCV* and \**úCV* did not undergo Čop's Law, these sequences would still undergo vowel lengthening as per OSL (see Section 5.3).

In addition, it is often claimed that apart from gemination, Čop's Law entails a change from \**é* to \**á* (Melchert 1994a: 305; Rieken 2010b: 305). In part, this idea is prompted by CLuw. *ti-ja-am-mi-* /*tiámmi-*/ 'earth', which is cognate to HLuw. *ta-ka-mi<sup>i</sup>* /*t(a)kmi-*/ and Hitt. *te-e-kán* /*tékan*/.<sup>13</sup> All forms continue PIE \**d<sup>h</sup>ǵ<sup>(h)</sup>om-* in some way or another. Kimball (1983: 427<sup>20</sup>) takes the endlingless locative form PIE \**d<sup>h</sup>ǵ<sup>(h)</sup>ém* as the starting point for CLuw. *tijammi-*, which would yield \**dǵém* in Proto-Anatolian. In principle, this form is expected to show raising through regular sound change: PANat. \**ǵe* > PLuw. \*(*ǵ*)*i*. Accordingly, \**dǵém-* should have developed into \*\**dǵim-*(?).<sup>14</sup> The attested form (CLuw. *tijammi-*) betrays no such effect, however. For this reason, Melchert (1994a: 254) argues that the "raising is blocked by the prior effect of "Čop's Law": \**dyém(V)-* > *t(i)yamm-*", implying that Čop's Law changed PANat. \**é* to \**á* before PANat. \**ǵe-* could develop into \**ǵi-*.

Although suggestive, this analysis of CLuw. *tijammi-* is not the only possible solution, and its formal features have been explained in various alternative ways. Čop (1970: 91) and Hajnal (1995: 102f.<sup>72</sup>) argue for a second-

<sup>13</sup> For the superscript <sup>*i*</sup> in *ta-ka-mi<sup>i</sup>* as a potential space-filler, cf. Chapter 1.

<sup>14</sup> This development is also found in CLuw. *i-iš-ša-ri-* (probably [jis:ri-] or contracted [i:s:ri-]) = Lyc. *izri-* [izri-] 'hand' < PANat. \**ǵés-r-* and CLuw. *im-ma-r<sup>o</sup>* /*immr-*/ 'open country' = HLuw. *i-mara/i-* /*immri-* < PANat. \**ǵem-ro-* (Melchert 1994a: 262).

ary accent shift from inherited PANat. *\*d<sup>h</sup>éǵ<sup>h</sup>om-* to pre-PLuw. *\*d<sup>h</sup>éǵ<sup>h</sup>óm-*. Kloekhorst (2008: s.v. “*tēkan*”) proposes that the change (*\*ǵe >*) *\*ǵe > \*ǵi* was blocked in *tijammi-* because of the preceding dental *\*d-*.

Incontrovertible evidence showing that there was no change in vocalic quality associated with Čop’s Law is hard to find. In Luwian, both PANat. *\*é* and *\*á* merge anyway, making any prehistoric difference impossible to spot. In Lycian, inherited *\*é* and *\*á* are usually kept apart, but the effects of umlaut and proportional analogy make the evidence difficult to interpret. Such is the case of Lyc. *ebette* /eφete/ ‘this’ (8x; dat.-loc.pl.) < PANat. *\*Hobéd<sup>h</sup>os*, which can only be equated with Hitt. *a-pé-(e-)da-aš* /ʔapētas/ ‘that’ if we explain the former’s fortis stop /t/ through Čop’s Law (Kloekhorst 2014: 572f.). The fact that we do not find Lyc. *\*\*ebatte* would indicate that no separate change from *\*é* to *\*á* has taken place here, and that the gemination caused by Čop’s Law should be detached completely from the change PIE *\*é >* Luwian *á*. However, we cannot exclude that a stem *\*eba-* would have been analogically replaced by its more common stem variant *\*ebe-*.

In the end, the evidence in favour of the claim that Čop’s Law came with a change in phonetic quality is meagre. The only example that could provide evidence in this direction is CLuw. *tijammi-*, but the history of this form is open to multiple interpretations. In absence of better evidence in favour of any change beyond the fortition of the intervocalic stop, I will adopt the most conservative definition of Čop’s Law as a merely consonantal change that did not alter the quality of the vowel.<sup>15</sup>

### 5.2.2 Consonantism

It is clear that Čop’s Law affected inherited PIE resonants (e.g. CLuw. *ma-al-li* /mállli/ < PIE *\*mélit*) as well as aspiratae (e.g. CLuw. *ma-ad-du* /máttu/

<sup>15</sup> Personally, I share the sentiment expressed in Melchert 1994b: 305: “One aspect of the phonetics of “Čop’s Law” remain puzzling: why are the changes in coloring of the vowel and the gemination of the following consonant (both unremarkable per se) inextricably bound together in this case?” My suggestion would be to say that the change from *\*e* to *\*a* and Čop’s Law (the gemination proper) are unrelated changes and that vowel quality itself is not linked to Čop’s Law in any way. I do not see how the two could be connected on a phonetic level.

'wine' < PIE *\*méd<sup>h</sup>u*). It is also clear that Čop's Law did not affect the Proto-Anatolian fortis stops *\*p*, *\*t*, *\*k*, *\*k<sup>w</sup>* or the phoneme *\*H* (< PIE *\*h<sub>2/3</sub>*), since these were phonetically long anyway. Also unaffected are the semivowels *\*i* [j] and *\*u* [w], as shown by CLuw. *ḫa-a-ú-i-* /ḫáui-/ 'sheep', see Section 5.3.

It is still debated whether the PIE mediae (*\*b*, *\*d*, *\*ǵ*, *\*g*, *\*g<sup>w</sup>*) were geminated by Čop's Law, and this depends on the etymologies to which one adheres. In Čop's original article, it was claimed that the mediae remained unaffected, based on CLuw. forms belonging to the paradigm 'to eat' (< PIE *\*h<sub>1</sub>ed-*), such as CLuw. *a-du-na* /ʔatuna/ 'to eat' (inf.), which does not show a fortited stop (written *\*\*a-ad-du-na*). All of Čop's examples could in principle, however, have reintroduced a lenis stem consonant from the weak stem (PIE *\*h<sub>1</sub>d-*), where fortition did not take place anyway, for instance the 3pl.imp.act. form *a-da-an-du* < PIE *\*h<sub>1</sub>d-éntu*. Other scholars, such as Melchert (1994a: 231), Kimball (1999: 261) and Yakubovich (2016: 294), do assume gemination of the PIE mediae, based on cases such as CLuw. *a-ad-du-ḡa-l<sup>o</sup>* /ʔáttuul-/ 'evil' (~ Hitt. *i-da-a-lu-* /ʔitálu-/ < PIE *\*h<sub>1</sub>éd-u-* *\*<sup>h</sup>biting*, CLuw. *pa-ad-du-na-aš* /páttunas/ 'carrying' (?) < *\*pédV-* and *ḡa-at-ta-an-ti-* /uáttanti-/ 'having a spring as source' (?) < *\*uédV-*. Kloekhorst (2014: 574–580), however, has put forward different explanations for all these examples.<sup>16</sup> The matter is still undecided, and because the discussion is less relevant for the remainder of this chapter, I will leave the question open.

Likewise, opinions differ on whether the Proto-Anatolian lenis velars were affected by Čop's Law. It is commonly accepted that these phonemes (*\*ǵ*, *\*g*, *\*g<sup>w</sup>*) were lost or developed into semivowels under certain conditions before Proto-Luwic (for details and treatment of cases where they appear to have been retained, cf. Melchert 1994a: 253–256 and Kimball 1994).<sup>17</sup>

<sup>16</sup> Kloekhorst (2014: 230–235, 405–414, 580–583) argues that any short accented vowel would have been lengthened by immediately following PIE mediae through what he calls "Winter's Law in Anatolian": PIE *\*V̇D* > PAnat. *\*V̇D*, while PIE *\*V̇D<sup>h</sup>* > PAnat. *\*V̇D*. It follows from this that inherited PIE *\*V̇DV* > PAnat. *\*V̇DV* and thus remains untouched by Čop's Law.

<sup>17</sup> Specifically, we find the following developments: *\*ǵ* > *\*i* >  $\emptyset$  (e.g. PAnat. *\*ǵés-r* > *\*ísr-* [with colouring of *\*ie-* > *\*i-*] > CLuw. *i-iš-ša-ri-* 'hand'); *\*g* >  $\emptyset$  (cf. PIE *\*d<sup>h</sup>uég<sub>h</sub>tr-* (Kloekhorst 2011) > Lyc. *kbatra* /c̣p̣atra-/ , HLuw. *tú-wa/i-tara/i-* /tuatra/i-/); *\*g<sup>w</sup>* > *\*u* [w] (cf. PAnat. *\*g<sup>w</sup>óu-* > Lyc. *wawa-/uwa-* /wawa-/ , /uwa-/ , HLuw. *wa/i-wa/i-* 'cow' /uau(i)-/).

We can date the weakening of the word-internal lenis velars relative to Čop's Law in two different ways.

The chronology by which the loss of lenis velars *precedes* Čop's Law is sometimes used to derive CLuw. *pár-ra-(i)ia-* /parrai(a/i)-/ 'high' from PIE *\*b<sup>h</sup>érǵ<sup>h</sup>-V-*. Thus, PIE *\*b<sup>h</sup>érǵ<sup>h</sup>-V-* > PAnat. *\*bérg-V-* > pre-PLuw. *\*bár-V-* > PLuw. *\*bárr-V-* > CLuw. *pár-ra-* (Melchert 1994a: 254).<sup>18</sup> However, this scenario is vitiated by Luw. *\*nān(i)-* 'brother'.<sup>19</sup> Based on comparison with Hittite *ne-ek-na-* /nekna-/ and Lycian *nēni-* /nēn(i)-/ 'brother', Luw. *\*nān(i)-* must continue PAnat. *\*négno-*. After the loss of the lenis velar (*\*nágno-* > *\*nóno-*) and Čop's Law (*\*nánno-*) in pre-Proto-Luwic, the expected result in Luwian is *\*\*nán(n)(i)-*, not *\*nān(i)-*.<sup>20</sup>

For this reason, the alternative chronology, by which the loss of lenis velars *follows* Čop's Law is more attractive. It implies that intervocalic lenis velars were fortified and retained. Čop (1970: 90f.) applied this chronology in order to derive the HLuw. hapax ("TERRA") *ta-ka-mi<sup>i</sup>* (SULTANHAN § 39) 'land' (dat.-loc.sg.) from PIE *\*d<sup>h</sup>érǵ<sup>(h)</sup>om-* via PLuw. *\*takkam-*, with a geminate/fortis velar (thus also Melchert 1994a: 256). On the other hand, Oettinger

<sup>18</sup> For the shwa in Proto-Luwic, cf. Section 2.3.1, Table 2.2.

<sup>19</sup> The form itself is unattested, but we do have several derivations from this stem: CLuw. *na-a-ni-ia-* /náni(a/i)-/ 'of a brother', HLuw. *na-na-sa<sub>5</sub>+ra/i-* /nanasr(i)-/ 'sister', CLuw. *na-a-na-aš-ri-* /nānasri(a/i)-/ 'of a sister', ensuring its existence. It is unclear whether the broken form CLuw. *na-a-na-ḫi-*[...] (KBo 29.24, 6), analysed as *nānaḫit-* 'brotherhood' by Melchert 1993: s.v. belongs here.

<sup>20</sup> Starting from PAnat. *\*négno-* and *\*bérg-*, what seems to have happened is that the loss of the lenis velars coincided with a compensatory lengthening of the preceding phoneme (*\*é* and *\*r*, respectively). Thus, *\*négnV-* > *\*nánV-* > *nánV-* and *\*bérgV-* > *\*bárrV-* > *párrV-*. (My thanks go to Stefan Norbruis for this suggestion.) For the development PIE *\*é* (> PLuw. *\*ǵ*) > *ǵ*, cf. Hajnal 1995: 61–65, *pace* the traditional analysis of PIE *\*é* > PLuw. *\*í* found in, e.g., Melchert 1994a: 241 and Rieken 2005: 69.) Thus, Čop's Law need not be invoked in this case: since loss of the lenis velar and compensatory lengthening happened simultaneously, there was never a point in time at which *\*nénV-* existed to serve as the input for Čop's Law. Inevitably, this explanation renders *\*nān(i)-* and *parrai(a/i)-* useless for determining the relative chronology of Čop's Law and the loss of the lenis velars. They are, however, two potential examples of compensatory lengthening in Luwian, and another one potential example will be discussed in the following section. These examples fit well with the idea developed in Section 5.4, according to which accented syllables were exceptionlessly made heavy.

2002: 101 and Kloekhorst 2014: 583 prefer to take  $*d^h g^{(h)}-m-éi$  (which also yielded Hittite *taknī* ‘id.’) as the proto-form and assume that the lenis velar was not lost in this (interconsonantal) position: CLuw. /tkmī/. If this is true, Čop’s Law simply did not operate in this word.

In conclusion, we can formulate Čop’s Law as follows: all pre-PLuw. intervocalic short consonants—except for [j], [w]—were lengthened when they are immediately preceded by a short accented vowel: PANat.  $*\acute{V}CV >$  PLuw.  $*\acute{V}CCV$ .<sup>21</sup> Thus, Čop’s Law constitutes a case of post-tonic gemination.

### 5.3 Open Syllable Lengthening (OSL)

Almost a quarter-century after the discovery of Čop’s Law, Melchert 1994a: 261, 263 described another sound law whose effects are visible in Luwian: a lengthening of accented short vowels in open syllables:  $*\acute{V}(CV) > *\acute{V}^{\prime}(CV)$ . Apart from several Luwian examples, Melchert notes that similar vocalic lengthening effects are found in Hittite (1994a: 131) and Palaic (1994a: 215ff.). In addition, recent insights have refined the picture for Hittite (Kloekhorst 2014: 218, 385, 483, 519) and added new HLuw. evidence to the dossier (cf. Chapter 2). I will treat these cases in the Excursus at the end of this chapter. In the remainder of this section, the most important Luwian cases of open syllable lengthening, abbreviated henceforth as *OSL*, will be treated.

First, there is CLuw. *na-a-(ú-)ua* /náua/ ‘not’. Even though the final element *-ua* is unclear, its base has clear correspondences in other IE languages (Lat. *ne*, OCS *ne*, Go. *ni*) and continues PIE  $*ne$ .<sup>22</sup> The presence of a long

<sup>21</sup> This development has many parallels among the world’s languages, such as Italian (*legittimo* ‘legitimate’, *ábbaco* ‘abacus’, *máccina* ‘machine’ (Borrelli 2000: 26ff.) and various Austronesian languages (Blevins 2004: 173ff.).

<sup>22</sup> Eight attestations of *na-(a-)ú-ua-ti*, *na-ú-ua-te* /náuati/ have previously been interpreted as ablative-instrumental case forms of an adjective *nāu(a/i)*- ‘new’ (Melchert 1993: s.v.; Melchert 1994a: 244), connected to Hitt. *něua-*, Lat. *novus*, Skt. *náva-*, Gr. *νέος*, Go. *ni-ujis*, ToB *ñuwe-* etc., all from PIE  $*néu-o-$ . Recently, however, Marcuson (2016: 293<sup>304</sup>) has convincingly argued (following Yakubovich 2013ff.) that these forms are better interpreted as *nāua* ‘not’ + *-ti* (reflexive particle). Although some difficulties remain, Hittite parallels to the Luwian clauses in which *na-(a-)ú-ua-ti* and *na-ú-ua-te* are found suggest that they correspond to  $\acute{U}$ -*UL* ‘not’ in the Hittite text. In both interpretations (‘not’ and ‘new’), the



vowel is independently suggested by HLuw. NEG<sub>2</sub>-a /nā/, whose word-final <a> cannot be interpreted as a space-filler and is most likely to be a marker of vocalic length, cf. Section 2.4.2.

In addition, I take CLuw. *ḥa-a-ú-i-* /hāu(i)-/ ‘sheep’ to show the reflex of PANat. \**Hóui-* < PIE \**h<sub>3</sub>eu-i-*, following Kloekhorst 2006: 92f.<sup>23</sup>

Next, there is a class of Cuneiform Luwian *ḥi-*verbs with plene writings in their root syllable, suggesting the presence of a long vowel.<sup>24</sup> These are the following.<sup>25</sup>

1. *pīja-* ‘to give’, e.g. CLuw. *pī-i-ja-at-ta* /pīatta/ (3sg.pret.act.)
2. *lūya-* ‘pour’, e.g. CLuw. *lu-u-ya-an-da* /lūanta/ (3pl.pret.act.)
3. *tūya-* ‘put’, e.g. CLuw. *du-ú-ya-an-du* /tūantu/ (3pl.imp.act.)
4. *šūya-* ‘fill’, e.g. CLuw. *šu-u-ya-at-ta* /sūatta/ (3sg.pret.act.)

long vowel in the forms can only be explained through OSL.

<sup>23</sup> This reconstruction, also found in, e.g., Martirosyan 2009: s.v. “*hoviw*”, is not accepted by everyone, mainly on account of Tocharian B *ā<sub>i</sub>w-* ‘ewe’, which seems to require a preform with \**h<sub>2</sub>* (cf. Adams 2013: s.v. “*ā<sub>(u)</sub>w*”, Pinault 1997: 190–193). The reconstruction with \**h<sub>2</sub>* forces one to put both an *o*-grade (to account for Gr. *θίς*) and *e*-grade (to account for the absence of Brugmann’s Law in Skt. *ávi-*) in the PIE *i*-stem paradigm: PIE \**h<sub>2</sub>ou-i-*/\**h<sub>2</sub>eu-i-*. Apart from the curious homophony with the ‘bird’-root \**h<sub>2</sub>eu-*, this alternating *o/e*-ablaut would be morphologically unexpected for a common gender PIE *i*-stem. I therefore prefer to view ToB *ā<sub>i</sub>w-* as an inner-Tocharian innovation, and reconstruct PIE \**h<sub>3</sub>eu-i-*.

<sup>24</sup> The *ḥi*-character of *pīja-* and *tūya-* is indicated by the typical 3sg.pres. *ḥi*-ending *-i*: HLuw. *pī-ia-i* and PONERE-*wa/i-i* (3sg.pres.act.). Unfortunately, such diagnostic forms are not present for *lūya-* and *šūya-* (the alleged 3sg.pres.act. *šu-u-ya-i* is found in a broken context). For *lūya-*, an original *ḥi*-conjugation paradigm is inferred on the basis of its Hittite reduplicated cognate *lilḥuuya<sup>-i</sup>* (– CLuw. *lilūya-*). I have tentatively added *šūya-* here based on structural grounds: like *lūya-* (< \**lh<sub>3</sub>-u-V*) and *tūya-* (< \**d<sup>h</sup>h<sub>1</sub>-u-V*), *šūya-* may well continue \**CH-u-V*: \**sh<sub>1/3</sub>-u-V* (cf. Kloekhorst 2008: s.v. “*šume/a<sup>-zi</sup>*”), and it shows plene spelling in its first syllable: 3sg.pret.act. *šu-u-ya-at-ta*.

<sup>25</sup> For Hittite, Kloekhorst 2008: 55–57 has argued that the spelling pattern *Cu-ú-ya* is not contrastive with *Cu-u-ya*, given the rarity of the former in this language. The Cuneiform Luwian data show that both spellings occur, but a cursory search in Melchert 1993 reveals that they alternate in some lemmata. This would suggest that also in Luwian, the signs <U> and <Ú> are interchangeable in the position /C\_a, and I tentatively mark both spellings with /Cūa/ in my phonological transcriptions, acknowledging that more research is needed to confirm this. For the present discussion, however, the length of the vowel is most important.

We know that incidentally, plene spellings of *i* and *u* are found before homorganic glides (<I-IA>, <U-ŪA>) in places where it is unlikely that they mark vocalic length, e.g. CLuw. *ta-a-ti-i-ja-an* ‘fatherly’ (nom.-acc.sg.n.; KUB 35.43 ii 5), occurring next to expected *ta-a-ti-ja-an* (KUB 35.45 ii 2; KBo XXIX 9\*, 11) ‘id.’<sup>26</sup> Nevertheless, these graphic(?) plene spellings are only attested a few times in the entire corpus, which makes their relative prevalence in the verbal stems here quite salient. I am therefore more inclined to follow Melchert (1994a: 240f.) in interpreting these plene spellings as markers of vocalic length. Melchert argues that in *pī̄a-*, *lū̄a-* and *tū̄a-*, a secondary shift of the accent to the verbal root has taken place, after which the vowel was lengthened: *\*pī̄iV̄- > \*pī̄iV- > \*pī̄iV-*. While the motive of the accent shift is unclear, we find effects of a similar accent retraction (and accent-based lengthening) in the Hittite cognate to CLuw. *pī̄a-*: the verb *pai-<sup>i</sup>/pi-* ‘to give’ shows occasional plene spelling of its root syllable in the forms *pī-i-ú-e-ni* /pīueni/ (6x, 1pl.pres.) and *pī-i-ú-en* /pīuen/ (1x, 1pl.pret.), cf. Kloekhorst 2014: 478f. The lengthening in these Luwian forms following this accent retraction can only be explained through OSL.

Another possible case of OSL is HLuw. *tīwad-* ‘Sun-god’, attested with plene spelling of the *i* in KÜRTÜL (DEUS)*ti-i-wa/i-ti-x* /tīuaθ-/ and as the second element of the compound name KARATEPE 1 § 1 Hu. <sup>1</sup>(LITUUS)*á-za-ti-i-wa/i-tà-sá*. The plene spellings in this word are unlikely to serve an aesthetic purpose, and it has been argued that they mark vocalic length instead (Section 2.5.8). An accent-based lengthening has also been suggested independently for its Hittite cognate *ši-(i)ua-at-t<sup>o</sup>* /šīuatt-/ ‘day’ (< PAnat. *\*dūot-*, cf. Melchert 1994a: 131). Alternatively, the long vowel in the Luwian form can also be explained from a full-grade form (*\*diéu-ot-*), cf. Rieken 1999: 105. In that case, OSL need not have applied.

In addition, OSL could explain the long vowel attested in CLuw. *ku-ú-rV-* /kūr-/ ‘to cut’, attested in *kūramman-* ‘cutting’, *kūri-/kurāi-* ‘cut into slices’ and the form *ku-ú-ru-na* /kūruna/ ‘to cut’ (inf.) (Melchert 1993). The contexts in which these verbal forms are found do not straightforwardly corroborate their identification as cognates of Hittite *kuer-<sup>zi</sup>* ‘to cut’ (< PIE *\*k<sup>w</sup>er-*), which presumably rests on formal considerations. If this connection is cor-

<sup>26</sup> These cases are not treated in Rieken’s (2017) study of plene *i* (and *e*) in CLuw.

rect, however, the plene spellings of *ku-ú-rV-* may well represent the results of OSL, following a retraction of the accent to the weak stem: *\*k<sup>w</sup>rV-* > *\*kurV-* > *\*kúrV-* > *\*kúrV-*, as per Melchert 1994a: 241. Alternatively, the long vowel may be due to contraction of [uwa] to [u:], mentioned in, e.g., Melchert 2004: 474 and Rieken 2017: 24, although the details of this development are very unclear.<sup>27</sup>

HLuw. *tu-u* /tū/ ‘you’ (orthot.dat.sg.) < PIE *\*tú* (Melchert 1994a: 262; Section 2.5.4) could very well show the effects of open syllable lengthening, although we may also be looking at the results of a separate lengthening of accented monosyllables.<sup>28</sup>

Lastly, another possible case of OSL is found in verbal stems ending in *-ī-/-āi-*.<sup>29</sup> These are: CLuw. *ḥapi-/ḥapāi-* ‘bind’, *gangati-/gangatāi-* ‘treat with the g.-plant’, *mali-/malāi-* ‘think’, *šannī-/šannāi-* ‘overturn’, *šarlī-/šarlāi-* ‘offer’, and *dūpi-/dupāi-* (~ *dūpai-*) ‘strike’.<sup>30</sup> The weak stem of verbs belonging to this verbal class is spelled with either *-Ca-a-iC-* or *-Ca-i-iC-*, cf. CLuw. *ša-<an>-na-a-en-ta* (3pl.pret.act.) vs. *ša-an-na-i-in-du* (3pl.imp.act.) < *šannī-/šannāi-* ‘overturn’. The plene *-i-* in *-Ca-i-iC-* may well be interpreted as [ji], as per Rieken 2017: 26. The occasional spellings with *-Ca-a-iC-*, however, seem to suggest that the *-a-* was long: */-CāiC-/*. If Melchert’s (2018) etymology of this verbal class in terms of PIE *\*-éie-/éio-* is correct, then the accen-

<sup>27</sup> There are a few cases in Luwian where [uwa] seems to alternate with [u:], e.g. *du-ú-un-du* /tūntu/ ~ *du-ú-ua-an-du* /tūantu/ ‘they must put’. Despite this, there are still many counterexamples to this change, such as CLuw. *pūya* ‘formerly’ and *pūyatil-* ‘past’, never *\*\*pū* or *\*\*pūtil-*. The matter still awaits a dedicated treatment.

<sup>28</sup> This is impossible to decide on the basis of this form alone. Monosyllabic lengthening has been proposed for Hittite by Kloekhorst 2012b: 251f. although it has been noted before that accented words, as a rule, are never spelled with just one sign (Sturtevant and Hahn 1951: 24, Otten and Souček 1969: 49, Hoffner and Melchert 2008: 25). As far as I know, the validity of monosyllabic lengthening for other Anatolian languages has not been investigated in full detail, but I am not aware of any counterexamples.

<sup>29</sup> Plene writing of the *-i-* is quite rare and not attested for any of the *-ī-/-āi-* verbs listed here. It is found in other verbs of this class, such as *taršita* (3sg.pres.act.) vs. *taršāintu* (3pl.imp.act.) ‘?’. In addition, HLuw. (SA<sub>4</sub>)*sa-ni-i-ti* (3sg.pres.act.) and (LIBARE)*sa<sub>5</sub>+ra/i-li-i-tú* (3sg.imp.act.), which are cognate to CLuw. *šannī-* and *šarlī-*, both show non-space-filling plene writing. As argued in Section 2.4.1, these may well be interpreted as indications of vocalic length.

<sup>30</sup> Cf. *du-ú-pa-im-mi-in* (ptc.acc.sg.c.) /tūpaimmin/ vs. *du-pa-a-im-mi-in* /tupāimmin/.

ted vowel in the weak stem could only have yielded long  $-\acute{a}-$  through OSL:  $*[-\acute{e}jo-] > *[-\acute{a}ja-]$ , after which syncope would have yielded  $[-\acute{a}j-]$ . This development is quite uncertain, however.

In summary, even though there are often multiple interpretations for the examples presented here, their combined force makes a compelling case for the presence of Open Syllable Lengthening in the prehistory of Luwian. Not only PANat.  $*\acute{e}$ , but presumably also  $*\acute{o}$  (< PIE  $*h_3\acute{e}$ ) and secondarily accented  $*\acute{u}$  and  $*\acute{i}$  seem to have yielded long vowels in open syllables in Luwian, cf. CLuw.  $n\bar{a}ya$  ‘not’ (< PIE  $*n\acute{e}$ ) and  $p\bar{u}a-$  ‘give’. The absence of good examples for  $*\acute{a}$  (< PIE  $*h_2\acute{e}$ ) is likely to be coincidental, so that we may generalise the scope of OSL to include vowels of all qualities: PANat.  $*\acute{a}$ ,  $*\acute{e}$ ,  $*\acute{i}$ ,  $*\acute{o}$ ,  $*\acute{u}$ . It is important to note that this development in principle only affected short accented vowels which either 1.) stood in word-final position or 2.) were followed by a glide (PANat.  $*[w]$  or  $*[j]$ ).

## 5.4 Synthesis: Proto-Luwic fortition

So far, we have looked at two distinct sound changes: Čop’s Law was responsible for the lengthening of short consonants in pre-Proto-Luwic ( $*\acute{V}CV > *\acute{V}CCV$ ). In addition, we have seen evidence for a lengthening of short vowels in open syllables that took place in Luwian, but possibly even as early as Proto-Luwic ( $*\acute{V}CV > *\acute{V}\acute{C}V$ ).<sup>31</sup> Apart from the fact that both sound laws describe a phonological lengthening, they have more aspects in common, regarding both their input and their output, cf. Table 5.1.

Input	Output
$\acute{V}CV$ ( $C \neq [w]/[j]$ )	$\acute{V}CCV$ (Čop’s Law)
$\acute{V}(CV)$ ( $C = [w]/[j]$ or word-end)	$\acute{V}\acute{C}V$ (OSL)

Table 5.1: Input and output of Čop’s Law and OSL

<sup>31</sup> On a phonetic level, OSL may have even operated in Proto-Anatolian, cf. the Excursus.

Both changes probably affected all accented short vowels (\**á*, \**é*, \**í*, \**ó*, \**ú*). The only difference here is that open syllable lengthening (OSL) only affected vowels preceding [w], [j] or the end of a word, while Čop's Law applied to short accented vowels that did *not* precede [w], [j] or the end of a word. In this respect, Čop's Law and OSL are complementary developments.

While the respective outputs of Čop's Law (\**ǂCCV*) and OSL (\**ǂCV*) look quite different from a phonetic and phonological point of view, they are equivalent under a 'moraic' analysis: both sound laws take light syllables as their input and yield a heavy syllable, cf. Figure 5.1.<sup>32</sup>

On the basis of this analysis, one could ask whether the similarities (input vowel quality, quality and accentuation, and output syllable weight) and complementarities (combinations with consonants) of these phonological changes are simply due to chance. Is it a coincidence that two sound laws with such similar conditionings and outcomes affected the same language (Luwian or possibly even Proto-Luwic)? I believe this is not the case. Rather than taking Čop's Law and OSL as two unrelated and distinct sound laws, we would do more justice to their similarities by interpreting these sound changes as two complementary parts of one general Proto-Luwic fortition.<sup>33</sup> Together, they affected all inherited light accented syllables and added one mora to make them heavy: Čop's Law by adding a syllable coda (\**ǂ.CV* >

<sup>32</sup> Cf. Hyman 1985 for a general introduction to moraic phonology. *Morae* are weight units assigned to syllables: 'light' syllables are said to consist of one mora, while 'heavy' syllables contain two. The classification of syllable structures as 'heavy' or 'light' is language-specific, although there appear to be two main types, exemplified here by Latin and Lardil (Hayes 1989: 255f.). In languages such as Latin, *CVC* and *CVV* syllables are heavy, while *CV* is light. Languages like Lardil, however, only take *CVV* as heavy, whereas both *CV* and *CVC* are light. Luwian would follow the pattern of Latin, by which syllables with a coda (*CVC*) or a long vowel (*Cǂ = CVV*) count as heavy. For another application of moraic theory to the historical phonology of the Anatolian languages, cf. Section 5.4.1.

<sup>33</sup> This observation bears resemblance to what is commonly called a phonological 'conspiracy' (Kisseberth 1970). This term describes how multiple different phonological rules appear to work together to satisfy a certain synchronic constraint. While I believe Kisseberth's attention to the functional unity of disparate developments is very appropriate, I do not share his synchronic, constraint-based analysis. Rather, I believe the synchronic situation in Luwian is better explained as the result of two *diachronic* developments (i.e. Čop's Law and OSL), and that these changes were not actuated in order to avoid a particular phonological system in Luwian.

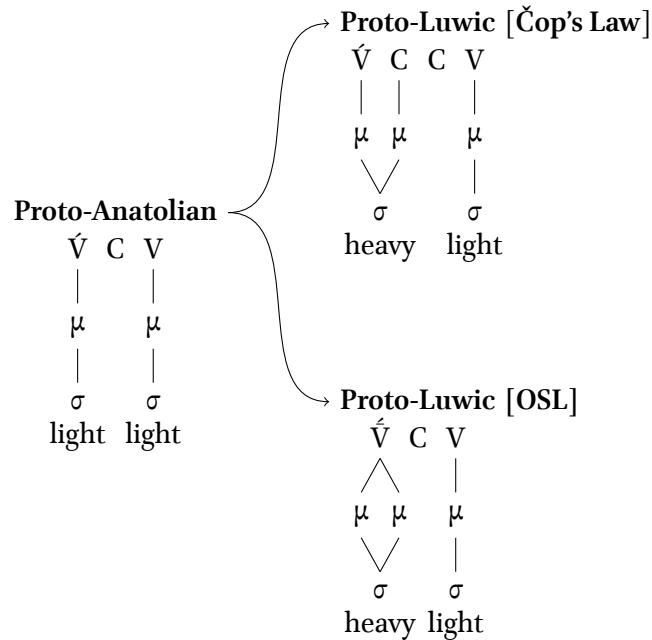


Figure 5.1: Luwic fortition

$^*V̇C.CV$ ) and OSL by lengthening the vowel ( $^*V̇.CV > ^*V̇.CV$ ). Thus, they eliminated all light accented syllables from the language and made sure that all accented syllables became heavy.<sup>34</sup> The result was that the phonological opposition between heavy and light syllables was neutralised in accented position.

#### 5.4.1 Interrelatedness of Čop's Law and OSL

One remaining question is why light accented syllables in the Luwic languages underwent two fortiting developments instead of one. Why did Čop's Law not affect both PIE  $^*mélit-$  'honey' and PIE  $h_3éui-$  'sheep', creating not

<sup>34</sup> In this interpretation of Čop's Law as a reinforcement of the connection between the accent and heavy syllable weight, it is no less than expected that consonant clusters are exempt from gemination. We would also not expect any concomitant change in vowel quality associated with Čop's Law, cf. Section 5.2.1.

only attested CLuw. *malli-* but also Luw. *\*\*hauu(i)-?* For this, we need to take a closer look at features that set glides apart from other consonant classes.

Synchronically, the Luwian phonological system shows an clearly maintained opposition between singleton and geminates, except for the glides. This is very much in line with the typological observation that [jj] and [ww] are among the consonants most likely to be missing from a language's geminate inventory. This is the case for Classical Nahuatl (Andrews 2003: 35), Modern Icelandic (Garnes 1974: 38), Kurdish and Yatee Zapotec, which have length oppositions for all segments except glides, (cf. Hansen and Myers 2017: 184 and Maddieson 2008: 1928f. for references and more examples). Phonetically, this relative rarity of geminate glides among the world's languages seems to be related to difficulties in the perception of length contrasts in glides. Experimental research suggests that this is due to blurrier boundaries between glides and their surrounding vowels, as well as smaller differences in amplitude between glides and neighbouring vowels, cf. Kawahara and Pangilinan 2017. In my opinion, there are two ways in which the perceptual difficulties for a length contrast in glides can account for the absence of geminate glides in Luwian (and its relative rarity among the languages of the world in general):

1. Length oppositions in glides hardly ever arise.
2. Once a length opposition between long and short glides develops, it is very easily lost again.

These two explanations account in different ways for the absence of a glide length contrast in Luwian. On one hand, we could argue that Čop's Law was constrained in some way, so that it only affected obstruents, liquids and nasals (i.e. all consonants except for glides). However, if Čop's Law is truly a rhythmic post-tonic gemination rule operating on the level of the syllable, as proposed in this analysis, we would not expect it to select only particular types of consonants, especially seeing that a fair number of the world's languages *do* have a long vs. short opposition in glides, despite their overall relative rarity.<sup>35</sup>

<sup>35</sup> For instance: Hungarian (*fejje* 'milk'.3sg.subj. vs. *fejje* 'head'.poss.3sg. [dr. Anikó Lipták,

Therefore, I want to propose an alternative scenario, without insisting that it is superior to the one presented above: perhaps Čop's Law *did* in fact affect all consonants (including glides), yielding pre-PLuw. \* $\check{V}\check{u}V$  and \* $\check{V}\check{u}V$ . Due to the instability or imperceptibility of such a length contrast, however, these geminated glides were soon degeminated again, leaving behind traces in the shape of compensatory lengthening.<sup>36</sup> Thus; PIE \* $h_3\acute{e}ui-$  > PAnat. \* $Hóui-$  > pre-PLuw. \* $h\acute{á}\check{u}ə/i-$  (Čop's Law) > \* $h\acute{á}\check{u}ə/i-$  (degemination + compensatory lengthening) > CLuw.  $h\acute{á}\check{u}(i)-$ . At first sight, the second scenario is much more convoluted than the first, giving the impression of a needlessly complicated *Duke of York gambit* (\*A > \*B > A; Pullum 1976). Nevertheless, there are several points which add credibility to this scenario.

First, the assumed extra steps (degemination and compensatory lengthening) are not unmotivated. The perceptual difficulties in distinguishing long from short glides have already been noted before; for this reason, length contrasts for glides are presumably more prone to neutralisation, explaining the relative rarity of length opposition for glides in the world's languages. In addition, Proto-Luwic had a concrete impetus for degemination of [jj]: it is commonly assumed that at some point in pre-Luwian, intervocalic \*[j] was lost without a trace in between identical vowels (Rieken 2005: 67–71; Norbruis fthc.). With the loss of \*[j], the opposition between singleton and geminate glides likewise vanished, allowing the phonetic duration of the glides to shorten. Unfortunately, since there is no similar general loss of intervocalic \*[w], this scenario will not explain the degemination of \*[w]. For another possible instance of compensatory lengthening in Luwian, cf. footnote 20 above.

By expanding the scope of Čop's Law to account for all consonants, we can also explain the long vowels in verbs where the accent has been secondarily retracted to the root syllable, such as  $p\bar{u}a-$  'to give', if the accent retraction took place before Čop's Law took effect. This leaves OSL to account only

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p.c.] and Arabic ([ $\{aw\}ædʒæ$ ] 'crookedness of' [acc.sg.] vs. [ $\{aw\}ædʒæ$ ] 'he made it crooked' [dr. Marijn van Putten, p.c.]). Cf. Maddieson 2008: 1929 for a typological survey and more examples.

<sup>36</sup> I am grateful to professor Adiego for suggesting this option to me. Needless to say, the responsibility for the opinion expressed here is mine.



for word-final light accented syllables such as HLuw. *tū* ‘you’ and *nā* ‘not’.<sup>37</sup>

Lastly, the Luwian situation finds a parallel in Tiberian Hebrew. In this language, consonant gemination is found at clitic junctures or required in the form of a morphologically distinctive feature. All consonants are liable to be geminated except for a class of guttural consonants (*h, ḥ, ʔ, ʕ*). Instead of lengthening, these consonants instead show lengthening of the preceding vowel (Joüion and Muraoka 2009: 77).<sup>38</sup> It is commonly accepted that at some point in time, these guttural consonants *were* in fact capable of gemination, but were subsequently degeminated with lengthening of the preceding vowel (Blau 1993: 38).<sup>39</sup>

The two scenarios presented here are given here simply for consideration. They do not change the linguistic facts we see in our texts. Also, a choice for one or the other does not alter our main conclusion for the first part of this chapter: OSL and Čop’s Law are two complementary developments, which together made all light accented syllables heavy.

## 5.5 Systemic pressure

The Luwian state of affairs, in which all accented syllables are heavy, has a great number of parallels among the world’s languages (Gordon 1999: 23–31), and seems to be a stable point of convergence of stress-based phonological systems. Apart from universal tendencies, however, there are also strong language-internal indications that Proto-Luwic was especially prone to remodelling along the lines of a strengthening of accented syllables. Several (pre-)Proto-Luwic sound changes had rendered accented light syllables

<sup>37</sup> In addition, it is notable that all of these cases involve monosyllabic words. If these cases are due to monosyllabic lengthening, and if CLuw. *ku-ú-r<sup>o</sup>* is the result of contraction from *\*ku-ya-ar-* as an anonymous reviewer suggests to me, then we might not even need to assume OSL in the prehistory of Luwian at all.

<sup>38</sup> Especially the following description of the Hebrew data is also valid for Luwic: “[V]owels lengthen, exactly where consonants cannot geminate.” (Lowenstamm and Kaye 1986: 109).

<sup>39</sup> Naturally, the Hebrew situation differs from Luwic in the sense that 1.) gemination serves a grammatical function in Hebrew; 2.) geminated gutturals are attested languages closely related to Hebrew, such as Arabic, where degemination did not take place.

increasingly rare and thus attenuated the functional load of the contrast between light and heavy accented syllables to a considerable degree. In what follows, I will argue that Čop's Law and OSL simply represent the final neutralisation of this contrast, creating a situation in which all light accented syllables were made heavy. To understand this, we need to treat several developments which profoundly reshaped the pre-Proto-Luwic phonological system. I will treat these in order below.

### 5.5.1 Phonetic changes from pre-PAnat. to pre-PLuw.

1. PIE  $*\acute{o}$  > PAnat.  $*\acute{o}$ . Kloekhorst (2014: 549–559) has argued in detail that this lengthening of PIE short accented  $*\acute{o}$  must precede the Proto-Anatolian consonantal lenition effects treated below, cf. footnote 9. Even if one does not follow this chronology, however, it is generally agreed that PIE  $*\acute{o}$  > Luw.  $\bar{a}$  in both open and closed syllables, e.g. CLuw.  $^{GIS}ta-a-ru-$  / $t\acute{a}ru$ / 'wood' < PIE  $*d\acute{o}ru-$  and CLuw.  $-(a-)a\check{s}-\check{s}a/\check{s}i-$  / $\bar{a}ssa/i-$  < PIE  $-\acute{o}sio$  (Melchert 2012a: 282). This change increased the syllable weight of many accented syllables, making them heavy if they were originally light:  $*\acute{o}(CV) > *\acute{o}(\bar{C}V)$ .
2. Eichner-Adiego's consonantal lenition laws. These two laws describe a phonetic change affecting inherited PIE tenues ( $*p, *t, *k, *k^w$ ) as well as PIE  $*h_2$  and  $*h_3$ . As mentioned in Section 5.1, these normally show up as fortis consonants in the various Anatolian languages. Preceded by a long accented vowel or in between two accented vowels, we find lenis reflexes instead, indicating that a lenition has taken place in these environments (Eichner 1973: 79–83, 100<sup>86</sup>; Morpurgo Davies 1982/1983).

At the turn of the century, Adiego (2001) proposed that these two lenition rules can be regarded as one and the same sound change. Reanalysing the long accented vowel of the 'first lenition law' as a combination of an accented mora + an unaccented one ( $\acute{V} = \acute{V}V = \acute{\mu}\mu$ ), he was able to subsume both conditioning environments under the same law: pre-Proto-Anatolian fortis consonants between two unaccented morae are lenited: pre-PAnat.  $*\acute{V}(\dots)VCCV > \text{PAnat. } *\acute{V}(\dots)VCV$

(henceforth: “Eichner-Adiego’s Law”). The main effect of this sound law was that originally heavy unaccented syllables saw a decrease in syllable weight. Thus: *\*VCCV* (heavy + unaccented) > *\*VCV* (light + unaccented).

3. **Unaccented vowel shortening (*\*V̄* > *\*V*).** The applicability of this sound change for the Anatolian languages has been defended on several occasions by Eichner (1973: 79, 86<sup>15</sup>; 1986: 206–7<sup>10</sup>; 1988: 136<sup>45</sup>), who has argued that it must have been completed in Proto-Anatolian, although he does not treat all of the material in full detail. A Proto-Anatolian date is also maintained by Hajnal (1995: 43, 81). Melchert, on the other hand, has a more careful formulation: “[O]riginal unaccented long vowels are shortened in PA: (...) However, this does **not** apply across the board to secondary long vowels from loss of tautosyllabic laryngeal or contraction of diphthongs” (Melchert 1994a: 76, emphasis in original).

With regard to the Luwic languages, it is difficult to assess the validity of Eichner’s unconditional shortening of all unaccented long vowels.<sup>40</sup> Lycian is mostly uninformative in this respect, as it does not show any sign of a vocalic quantity opposition. By contrast, the Hieroglyphic Luwian material may show plene spellings in the function of marking vocalic length, but does so only inconsistently (Section 2.2). The Cuneiform Luwian material, lastly, is most often too badly attested to allow us to judge whether absence of plene writing testifies to a short vowel or is simply due to chance. Nevertheless, Cuneiform Luwian does have a few interesting forms which suggest that

<sup>40</sup> Similar shortening effects are found in Hittite (e.g. *te-e-kán* /*tēkan*/ ‘earth’ < *\*d<sup>h</sup> éǵ-ōm*, never *\*\*te-e-ka-a-an* *\*\*/tēkān/*) and Palaic (e.g. *-a* [nom.-acc.n.pl.] < PIE *\*-eh<sub>2</sub>*), supporting Eichner’s idea of an early (PANat.) shortening. On the other hand, Kloekhorst (2008: 98) has shown that the result of PANat. unaccented *\*ē* > pre-Hitt. *\*e* does not undergo the weakening of PANat. *\*e* into Hitt. *i* and *a* (e.g. PIE *\*néb<sup>h</sup>ēs* > Hitt. *ne-(e-)pí-iš* /*népis*/ ‘heaven’, but PIE *\*h<sub>2</sub>és-ēr* > Hitt. *e-še-er* /*éser*/ ‘they were’, cf. Melchert 1994a: 143). This suggests that the shortening of PANat. *\*ē* post-dates the weakening rules we find in Hittite, and that it cannot be of Proto-Anatolian date. A general Proto-Anatolian shortening of long unaccented vowels can only be accepted if it can be demonstrated that the weakening of original PIE *\*e* is of Proto-Anatolian date as well. It is clear that the matter deserves a full dedicated treatment.

indeed some prehistoric shortening of unaccented long vowels has taken place:

- **Combinations of vowels + tautosyllabic laryngeals** yield a long vowel if they are accented: CLuw. *ma-na-a-ti* /mnáti/ ‘he sees’ (3sg.pres.) < \*mnéh<sub>2</sub>-ti. In unaccented position, however, they are spelled consistently non-plene, as in the *a*-stem nouns and adjectives such as *ku-um-ma-aš* ‘holy’ (nom.sg.c.) < \*-eh<sub>2</sub>-s (cf. Norbruis fthc.), and the nom.-acc.pl.n. ending *-a* in general (e.g. in CLuw. *da-a-u-a* /tāuā/ ‘eyes’), which is traced back to PIE \*-eh<sub>2</sub>. Also worth considering are CLuw. *la-a-la-ad-du* /lálattu/ ‘let him take’ (3sg.imp.act.), if this truly continues virtual \*dV̄-doh<sub>3</sub>-tu, and CLuw. *pa-ap-pa-ša-i* /páppasai/(?) ‘he swallows’, if this single attestation truly continues the reflex of PIE \*-peh<sub>3</sub>-s- (Kloekhorst 2008: s.v.). These suggest that the original length developing from a combination of vowel + tautosyllabic laryngeal was not retained in unaccented syllables.<sup>41</sup>
- **Inherited diphthongs** likewise result in long vowels in Luwian when they bear the accent, as seen in CLuw. *zi-i-in-zi* /tsintsi/ ‘these’ (nom.pl.c.) < PIE \*kói- (Melchert 2009: 114), and CLuw. *hu-u-ḫa-ti* /hóhati/ ‘grandfather’ (abl.ins.) < PIE \*h<sub>2</sub>éuh<sub>2</sub>-.<sup>42</sup> On the other hand, there is a derivative from the same stem: CLuw. *hu-ḫa-<ad>-da-al-l[a]* /hohattalla/ ‘grandfatherly’, whose *o* was presumably unaccented and short. Note however, that this is word is a hapax, so that its not being spelled with plene writing may be coincidental.
- **Inherited long vowels** are long when accented, cf. CLuw. *za-a-ar-za* ‘heart’ /tsárt=sa/ < PIE \*kér̥d (following Hajnal 1995: 65, pace Melchert 1994a: 243) and *ādduūāl* ‘evil’ (nom.-acc.sg.n.) <

<sup>41</sup> The attestations *la-la-a-at-ti* /lalátti/ (2sg.pres.act.) and *la-la-a-i* /lalái/ (3sg.pres.act.) rather seem to show the accentuation of the simplex verb *lā-i* ‘id.’

<sup>42</sup> In this respect, also Lycian *χyga-* /kuxa/ ‘grandfather’ is telling: the lenis /x/ <g> continues a lenited laryngeal (PAnat. \*/h/), which can only be the result of Eichner-Adiego’s consonantal lenition. This indicates that the vowel preceding Lycian *-g-* must have been long and accented.

\*-*ól*.<sup>43</sup> All cases which may show the reflex of an unaccented long vowel have alternative explanations. For instance, Cuneiform Luwian *harrani(a/i)-* (oracle bird; see Section 5.2.1) may continue the inherited nom.sg. *\*h<sub>3</sub>ér-ōn*, but since it is probably a derivation, it is more likely that it continues the oblique stem *\*h<sub>3</sub>ér-on-*, which did not contain a long vowel.

The result of this shortening can be compared to that of Eichner-Adiego's Proto-Anatolian lenition laws: both laws describe how heavy unaccented syllables are stripped of one mora, so that they become light and unaccented.

**4. Proto-Luwic loss of word-final stops (\*-*T* > \*-*∅*).** All word-final stops in both Luwian and Lycian have been lost (Melchert 1994a: 278, 323). There are only a few clear examples and each of them involves the loss of a final dental stop, e.g. CLuw. *ma-al-li* /málli/ 'honey' (nom.-acc.sg.n.) < PIE *\*mélit*; HLuw. *za-a* /tsá/ 'this' < PIE *\*kód*, HLuw. *-Cahi(=sa)* /-ahi/ (nom.-acc.sg.n.; abstr. suffix. < *\*-ahid*), Lyc. *ti* 'what' < PIE *\*k<sup>w</sup>íd*. The dearth of examples makes it difficult to determine how this rule should be dated with respect to OSL.<sup>44</sup> Nevertheless, it is clear that this change decreased the weight of word-final unaccented heavy syllables, turning them into unaccented light syllables.

These four independently motivated sound laws, which are phonetically easily understandable and typologically common, had a profound effect

<sup>43</sup> The initial syllable *ādd-*, which I interpret as /ʔatt-/ with a glottal stop following Simon 2010, must have been analogically introduced from related forms where the accent was word-initial. This is necessary to account for the geminate, which is normally explained through Čop's Law.

<sup>44</sup> In theory, PAnat. *\*k<sup>w</sup>íd* 'what?' could provide us with an answer. If PIE *\*k<sup>w</sup>íd* > *\*k<sup>w</sup>í* > *\*k<sup>w</sup>í*, then that would prove that OSL was still operative after the PLuw. loss of word-final stops. Unfortunately, CLuw. *ku-i* /k<sup>w</sup>i/ 'what' (nom.acc.sg.n.), its regular reflex, is inconclusive regarding the length of its final vowel. On the one hand, its *-i* could represent /ui/, as in CLuw. *da-a-u-i-iš* 'eye' /tāuis/, suggesting a short vowel (Rieken 2017: 26). On the other hand, it is unclear whether long accented word-final sequence of /-uī-/ would have been written differently, since we have no attestations of *\*\*\*-Cu-i-i* to contrast it with. Therefore, CLuw. *ku-i* may also represent /k<sup>w</sup>í/.

on the Proto-Anatolian and pre-Proto-Luwic distribution of syllable weight with regard to the accent. Heavy unaccented syllables were only found in pretonic position and in front of consonant clusters; in all other positions, they had been made light. Accented syllables, on the other hand, were almost always heavy. The only remaining light accented syllables in Proto-Anatolian were those continuing PIE  $*éCV$  and  $*-é\#$  (including cases where  $*é$  is coloured by an adjacent laryngeal:  $*h_{2/3}éCV$  and  $*h_{2/3}é\#$ ).

Thus, we arrive at a system in which almost all inherited unaccented syllables had been made light. This indicates that the weight of a syllable had almost become predictable in accented and, to a certain degree, also in unaccented (not pretonic) syllables. The combination of Čop's Law and the phonologisation of OSL in Proto-Luwic can be seen as a logical extension and the final chapter of these developments. In two different ways, they increased the weight of these accented light syllables ( $*\acute{V}CV > *\acute{V}CCV$ ;  $*\acute{V}CV > *\acute{V}\acute{C}V$ ) and neutralised the already marginalised weight opposition between heavy and light syllables, which carried little functional load, in accented syllables. In this way, syllable weight was tied to accentuation even more strongly and became completely predictable/allophonic in accented positions.

## 5.6 Neutralisation of contrastive syllable weight in Proto-Luwic?

A few years after Adiego's (2001) combination of Eichner's two lenition laws into one single Proto-Anatolian consonant lenition law (cf. Section 5.5.1, above), Kloekhorst (2006/2008) discovered that this consonant lenition law is complementary to Čop's Law. While intervocalic consonants which are immediately preceded by an *unaccented* mora were subject to lenition in Proto-Anatolian, intervocalic consonants immediately preceded by an *accented* mora were lengthened in accordance with Čop's Law. The complementary effects of Eichner-Adiego and Čop's Law on intervocalic consonants are summarised as follows, cf. Figure 5.2.

PAnat.		Luw.
* $\acute{V}CV$	>	$\acute{V}CCV$
* $\acute{V}CCV$	=	$\acute{V}CCV$
* $\acute{V}CV$	=	$\acute{V}CV$
* $\acute{V}CCV$	>	$\acute{V}CV$
* $VCV$	=	$VCV$
* $VCCV$	>	$VCV$

**Table 5.2:** Effects of Eichner-Adiego and Čop's Law on Proto-Anatolian and Proto-Luwic (taken from Kloekhorst 2006/2008: 133).

Kloekhorst (2006/2008: 133) concludes as follows: “Effectively, we see that the length of a consonant has become automatic in Luwian: after an accented short vowel all consonants become long; after an accented long vowel and in between two unaccented vowels all consonants become short. (...) [A]t a certain point in the (pre)history of Luwian the quantity of intervocalic consonants was fully governed by the place of the accent in the word and the quantity of the accented vowel”.<sup>45</sup>

We can now extend Kloekhorst's unification of Čop's Law and Eichner-Adiego to include even more developments. More specifically, these two accent-dependent sound laws, governing the length of intervocalic consonants, are symmetrically complemented by two accent-dependent developments governing vowel length, cf. Figure 5.3.

Together, these four phonological developments seem to neutralise not only the Luwic contrast between long and short intervocalic consonants, but also between long and short vowels. Unaccented syllables would see the shortening of both vowels and long consonants, while either short consonants or short vowels would be lengthened in accented syllables. Purely theoretically, therefore, it seems that syllable weight itself was well on its way

<sup>45</sup> By way of parallel, Kloekhorst (2006/2008: 134<sup>8</sup>) refers to Saami, where a similar development is thought to have taken place: in one particular dialect, consonants were weakened in certain positions but additionally strengthened in all other positions.

	Proto-Anatolian (lenition/shortening)	Proto-Luwic (fortition/lengthening)
<b>Consonantism</b>	Eichner-Adiego *VCCV > *VCV	Čop's Law *V̇CV > *V̇CCV
<b>Vocalism</b>	Unaccented vowel shortening *V̄ > *V	OSL *V̇(CV) > *V̇(CV)

Table 5.3: Anatolian syllable weight gradation

to becoming allophonic and predictable at some point in the (pre)history of the Luwic languages. All accented syllables were made heavy, while many unaccented syllables had been made light.

However, even theoretically, this system does not bring about a full de-phonologisation of (pre-)Luwic syllable weight. Apart from cases where the inherited length of consonants and vowels has been analogically reintroduced, there are three environments which violate the accented-heavy vs. unaccented-light pattern by maintaining heavy syllables in unaccented position.<sup>46</sup>

**Consonant clusters** such as \*VC<sub>2</sub>V were unaffected by the PAnat. consonantal lenition law, so syllables ending in a cluster remained heavy, even if they were unaccented, e.g. -š(ša)r- /s:r/ in CLuw. *iš-ša-ri-i* /isr̄i/ 'hand' (dat.-loc.sg.c.).

<sup>46</sup> An example of the analogical introduction of long vowels in unaccented syllables is CLuw. *da-a-i-na-a-ti* 'oil' (abl.-ins.). The dative-locative of the same paradigm, *ī-i* /-ī/ and its Hittite cognate nom.-acc.sg.n. *ša-a-kán* /sákan/, gen. *ša-ak-na-a-aš* /s(ə)knás/ show that the paradigm was originally mobile. In CLuw. *da-a-i-na-a-ti* the direct case stem /tāin-/ (with a full vowel) was apparently taken over into the oblique stem. As is well known, long (syllable-closing) consonants are frequently reintroduced in the Luwian verbal endings: \*-tti (3sg.pres.act.), \*-tta (3sg.pret.act.) and \*-ttu (3sg.imp.act.). Clear examples are CLuw. *ša-a-at-ta* /sätta/ 'he released' (cf. Section 5.1) and CLuw. *la-a-ad-du* /lāttu/ 'he must take' (cf. Section 4.8. In both cases, the unlenited stop after a long accented vowel must be analogous.



**Word-final consonants** (not including stops, which were lost, cf. Section 5.5.1) ensured that unaccented syllables remained heavy by providing them a coda, e.g. /-is#/ in CLuw. *ma-a-aš-ša-ni-iš* /māssanis/ ‘god’ (nom.sg.c.).

**Pretonic consonants** presumably also retained their inherited length and kept pretonic syllables long, although good examples where the geminate cannot have been restored analogically are very difficult to find. An example is CLuw. *pár-ra-a-an* /parrān/ ‘before’ (preverb), whose geminate may have been reintroduced on the basis of *pár-ra-an* /par-ran/ ‘id.’ (preposition).<sup>47</sup>

The environments described here involve a lot of data, ensuring that the point of full dephonologisation of consonant/vowel length and syllable weight was probably never reached.<sup>48</sup> Regardless, a clear tendency towards neutralisation of these contrasts cannot be denied. After Eichner-Adiego, unaccented vowel shortening and the lengthening of PIE \**ó* in pre-Proto-Anatolian, there was an imbalance in the system: speakers had become used to making accented syllables almost always heavy while most unaccented syllables happened to be light. In this situation, it is easy to see why Čop’s Law and OSL, which started off as simple fortiting developments under influence of the accent, eventually became phonologised. They happened to bring the weight of \**éCV* and word-final \**-V̄* closer to that of the other accented syllables in the language and therefore had a greater chance of being phonologised. Thus, I hope to have shown that Čop’s Law and OSL merely represent regularisations of a pattern that was already starting to materialise in pre-Proto-Anatolian, and that the pre-Proto-Luwic system of available syllable structures provides a possible motivation for the phonologisation of Čop’s Law and OSL, revealing a greater unity behind all these sound laws on a more abstract level.

<sup>47</sup> Cf. also Kloekhorst 2014: 595f. for a treatment of the behaviour of pretonic consonants in Hittite.

<sup>48</sup> For this reason, I do not follow Hajnal 1995: 50f.<sup>48</sup> and Kloekhorst 2006/2008: 133 who conclude (too strongly in my opinion) that vocalic (Hajnal) and consonantal (Kloekhorst) length had ceased to be phonologically distinctive in the prehistory of Luwian.

## 5.7 Conclusion

In the prehistory of Luwian (and Lycian), four sound laws recast the distribution of long and short consonants and vowels as it was inherited from Proto-Indo-European. After a wave of lenitions/shortenings in Proto-Anatolian—Eichner-Adiego’s consonantal lenition laws and the shortening of unaccented long vowels—Proto-Luwic saw two complementary fortiting developments: Čop’s Law and the lengthening of all remaining accented short vowels in open syllables.

We have seen that the two pre-Proto-Anatolian leniting developments, along with other phonetic changes, resulted in the situation in which almost all accented syllables became (super)heavy, while many unaccented syllables were rendered light. This tendency towards an ever closer connection between the accent on the one hand and segmental length and syllable weight on the other provided a motivation, or catalyst, for Čop’s Law and open syllable lengthening. The latter two simply represent generalisations of this inherited pattern and eliminated the last remaining light accented syllables from the language by making them heavy.

Together, these four sound laws ensured that not only syllable weight but also vowel and consonant length became increasingly bound to—and therefore predictable by—the presence or absence of the accent. Despite this tendency, the Proto-Luwic phonological system probably never reached full phonological neutralisation of these three factors, as consonant clusters, word-final consonants and pretonic consonants remained unaffected by the changes investigated here.

More broadly, I have claimed that sound laws are not always isolated and in general do not happen randomly (although the precise cause is often not retrievable). Wherever possible, we should try to consider sound laws not as a disjointed set of transformations, but rather as parts of a system. This enables us to understand how they follow from synchronic phonological patterns and how they induce or block further phonetic developments. In this respect, phonetic and phonological changes, like languages in general, are very much a child of their own place and time.

## Excursus: OSL in Proto-Anatolian

In Section 5.3, we only looked at the results of Open Syllable Lengthening in Luwian, while actually, Melchert (1994a: 131, 215ff., 261) reports similar effects in Hittite and Palaic. Nevertheless, Melchert (1994a: 132) argued at the same time that OSL cannot have taken place in Proto-Anatolian, but must have taken place in each of these daughter languages independently, for reasons we will see below.

Recent research has now brought to light even more evidence for an accent-based lengthening of short vowels in open syllables, following new studies of plene writing in Hittite (Kloekhorst 2014: 218, 385, 483, 519) and Hieroglyphic Luwian (Chapter 2). This puts some strain on Melchert's analysis of OSL in terms of independent lengthening developments, and makes it more attractive to think about one pre-Proto-Anatolian lengthening after all. This possibility will be explored in this excursus. I will briefly go over the most important evidence for all languages, paying attention to the scope and conditioning of OSL in Hittite, Palaic and Luwian, before returning to the question whether we can actually reconstruct (some form of) OSL in Proto-Anatolian.

### Hittite

The idea that accented short vowels were lengthened at some point in the (pre)history of Hittite is far from new, going back to the earliest days of Hittitology (cf. Hrozný 1917: 186<sup>1</sup>: “Tondehnung”, who based himself on Hitt. *antuḫšātar* < \*ó). The scope and dating of this phenomenon, however, has been a matter of considerable debate.<sup>49</sup>

According to Melchert (1994a: 107), lengthening in open syllables was a synchronically active rule in Hittite, as is visible from, e.g., *ku-it-ma-a-na-aš* /k<sup>w</sup>itmān=as/ ‘while’, where the addition of the enclitic nom.sg.c. pronoun

<sup>49</sup> In the cuneiform languages under scrutiny here (Hittite, Cuneiform Luwian, Palaic), a long vowel is indicated by the use of an extra vowel sign (*plene writing*), e.g. <CV-V> or <V-VC> instead of <CV> or <VC>. Although the function of plene writing has been debated for many decades, the current communis opinio seems to favour the idea that its main function was to mark vocalic length, cf. Melchert 1994a: 27, Kimball 1986: 84.

=*aš* seems to have triggered an accent shift to the syllable *-ma-*, followed by lengthening of the vowel in an open syllable. Because the lengthening was still synchronically active in Hittite, Melchert (1994a: 131) has argued that the result of this lengthening was only phonetic. Phonologically, accented vowels in open syllables remained short. Also Kloekhorst (2012b, 2014) believes that the lengthening of vowels due to OSL was subphonemic, although his approach is very different from that of Melchert. Kloekhorst (2012b) argues that the phonetic lengthening due to OSL can be observed directly in the spelling: etymologically short accent vowels in open syllables are spelled with plene writing approximately half of the time, e.g. Hitt. *pé-e-ra-an* (53x OS) ~ *pé-ra-an* (52x OS) ‘before’ < PIE *\*\*pérom*. In this sense, they are different from etymologically long accented vowels (near-consistent plene writing, e.g. *pé-e-da-* (54x OS) ~ *pé-da-* (4x OS) ‘to carry’ < PIE *\*(h<sub>1</sub>)poi-*) and etymologically unaccented vowels (usually never plene spelled, e.g. the *i* in *ne-e-pí-iš* ‘heaven’). The systematic contrast in spelling between especially the first two groups, Kloekhorst argues, indicates that accented short vowels in open syllables (group 1) were phonetically half-long ([peːran]), not quite as long as the fully long vowels in group 2: [peːta-]. In other words, short accented vowels in open syllables were lengthened due to OSL, but not to the extent that they merged with the inherited long accented vowels.

We find examples of OSL nearly all Hittite vowels: /á/ (*pa-ad-da-(a-)ni* [patːaːni]<sup>50</sup> ‘basket’ [dat.-loc.sg.] < PIE *\*peth<sub>2</sub>-én-i*; Kloekhorst 2014: 348f.), /é/ (*ge-(e-)nu* [keːnu] ‘knee’ < PIE *\*génu-*; Kimball 1983: 333), as well as /í/ (*ši-(i-)ua-at-t<sup>o</sup>* [siːwatː-] ‘day’ < PANat. *\*díuot-* [Melchert 1994a: 131] or alternatively *\*diéuot-* [Kloekhorst 2014: 477f.]) and /ú/ (Hitt. *-úV-* found in, e.g., *aš-šu-(ú-)li* /asːuːli/ ‘favour’ [dat.-loc.sg.]; Kloekhorst 2014: 516). Thus far, no examples of phonetically lengthened /ó/ have surfaced, but this vowel was quite rare in Hittite anyway. It is very likely, therefore, that in principle all Hittite vowels were affected and lengthened by OSL.

<sup>50</sup> For the idea that Hittite DA-spellings represent postglottalised or ejective stops, cf. Kloekhorst 2013: 128f.

## Luwian

The Luwian evidence has been treated in Section 5.3. The effects of OSL are found in both the Cuneiform Luwian and Hieroglyphic Luwian text corpora. We find evidence of its effects on nearly all short accented vowels: Proto-Anatolian \**é* (CLuw. *nā̄ya* ‘not’ < PIE \**né*), presumably also \**í* (HLuw. *ti-i-wa/i-t<sup>o</sup>* /*tīuaθ-* ‘Sun-god’ < \**dīuod-*, cf. Melchert 1994a: 131) and \**ú* (CLuw. *tū̄ya-* ‘to put’), as well as \**ó*, if CLuw. *hā̄yi-* does in fact continue PIE \**h<sub>3</sub>eui-*.

We have also seen, however, that OSL was significantly bled by another sound law: Čop’s Law, which closed open syllables with a short accented vowel before OSL could take effect: PANat. \**mélid-* developed into PLuw. \**mállid-* (Čop’s Law) before the *é* could be lengthened in an open syllable to \*\**mállid-* > Luw. \*\**máli-*.<sup>51</sup> For this reason, the only plausible cases of OSL in Luwian are found in front of the glides [j] and [w], and in word-final position.

## Palaic

The Palaic data is expectedly meagre but nonetheless, a few cases of OSL have been proposed for this language as well.<sup>52</sup>

Pal. *pí-i-ša* /*pīsa*/ ‘give’ (2sg.imp.act.) is interpreted as the stem *pi-* ‘give’, enlarged by an imperfective suffix *-ša-* (~ Hitt. *-šša-<sup>i</sup>*), as attested with the same root in CLuw. *pí-pí-iš-ša* /*pipissa*/ ‘give’ (2sg.imp.act.) and HLuw. *pi-pa-sa-* /*pipassa*/(?). Notably, the Palaic plene spelling could show the result of an accent retraction similar to that of CLuw. *pī̄a-* and Hitt. *pī̄uen(i)*, see above and Melchert 1994a: 200. Another example is Pal. *šu-ú-na-at* /*sūnat*/ ‘fill’ (3sg.pret.act.); *šu-ú-na* /*sūna*/ ‘id.’ (2sg.imp.act.), cf. Melchert 1994a: 202. The plene spellings in the root can be compared to that of CLuw. *šu-u-ya-* ‘id.’, perhaps with a similar accent shift from \**su-nóH-* to \**sú-noH-*, cf. Melch-

<sup>51</sup> For an alternative explanation for forms involving glides, cf. Section 5.4.1.

<sup>52</sup> As long as plene writing in Palaic has not been investigated in full detail, we cannot know for certain that it marks vocalic length, as in Hittite and Cuneiform Luwian. It is not to be expected, however, that plene writing has a dramatically different function in Palaic compared to Hittite and Luwian, as the Palaic texts we have were presumably composed by the same scribes who also wrote the Hittite and Cuneiform Luwian texts.

ert (1994a: 89). Two final examples are Pal. *tu-ú* /tū/ ‘you’ (acc.-dat.sg.), the cognate of HLuw. *tú-u* ‘id.’ < PANat. \**tú* (treated in Section 5.3), and Pal. *nu-ú* /nū/ ‘now’, meaning ‘now’ (< PIE \**nú*, cf. Melchert 1994a: 202). In both of these forms, however, we may also be dealing with lengthening of accented monosyllables.<sup>53</sup>

We have examples of OSL affecting at least the vowels /i/ and /u/ in Palaic, but I see no reason not to assume, with Melchert (1994a: 204), that in principle all vowels could be lengthened by this development.

### Proto-Anatolian OSL

With all this in mind, we turn to the dating of OSL within Anatolian. Melchert (1994a: 132) has argued that open syllable lengthening must be a post-Proto-Anatolian rule. His reason for assuming this involves Hitt. *tuk* ‘you’ (acc.-dat.sg.), which shows a short vowel and the added element *-k* with regard to its Pal./HLuw. cognate *tū* ‘id.’ < PANat. \**tú*. Melchert correctly observed that a full phonologisation of OSL cannot have taken place in Proto-Anatolian already, since its expected result \*\**tū* would have developed into Hitt. \*\**tūk* after the specifically Hittite addition of *-k*. In addition, I suggest that another argument to take the phonologisation of OSL as a post-PANat. rule comes from Luwian. If Proto-Luwic had already undergone a general lengthening of all instances of \**VCV* to \**VCV̄*, there would have been no input for Čop’s Law, which takes the same input. For instance, if the *é* in PANat. \**pérom* ‘before’ had been phonologically lengthened to \**é̄* in Proto-Anatolian, then resulting \**pérom* would never have yielded attested Luw. *parran* through Čop’s Law.

Nevertheless, the fact that we find the effects of OSL in each of the four Anatolian languages in which we can identify signs of vowel length makes it quite uneconomical to assume three independent instances of the same phonetic development: pre-Hittite, pre-Palaic and pre-Proto-Luwic. Rather, I believe we can account for the lengthening effects in all four languages

<sup>53</sup> Other potential cases of OSL in Palaic mentioned by Melchert (1994a: 200ff.), including Pal. *ḥa-šī-i-ra-* /hasīra-/ ‘dagger(?)’ < PIE \**H̥s̥íro-* and Pal. *pa-a-pa-* ‘father’ < PANat. \**bába-* are not compelling.

by assuming that pre-Proto-Anatolian *did* undergo open syllable lengthening, but only on a phonetic level. In open syllables, short vowels were pronounced slightly longer than in closed syllables: accordingly, /é/ = [e] in closed syllables, [eː] in open syllables.

This situation seems to have remained unchanged in Hittite, where OSL did not bring about any phonological change. Thus, when pre-Hittite added *-k* to inherited \*/tú/ \*[tuː] (< PANat. *tú*), the vowel was automatically shortened: [tu]. The phonetic length remained tied to the accent and the syllable structure, and did not become phonological in Hittite.

In Luwian, OSL must have remained subphonemic until after the completion of Čop's Law in Proto-Luwic (\**VCV* > \**VCCV*). Taking the same example as above, I assume that PANat. \**pérom* developed a half-long allophone in its initial open syllable: \*[peːrom], which remained phonologically short. When Čop's Law closed the syllable (pre-PLuw. \*/pérom/ > PLuw. \*/pérrom/), the half-long vowel automatically reverted to short: [əː] > [ə], leaving no trace of its original phonetic length. The remaining phonetically half-long vowels which did not undergo Čop's Law eventually merged with their long counterparts (e.g. *nāya* 'not' and HLuw. *tū* 'you'). It is difficult to say when exactly this merger took place. Lycian seems to have lost vowel length oppositions, while the Lydian script does not seem to mark it in a consistent way (cf. Gérard 2005: 37; Kloekhorst 2018). It is possible, therefore, that the phonologisation of open syllable lengthening was completed in Proto-Luwic already.

The same is—as far as we can see—true for Palaic: also in this language, the vowels which were lengthened through OSL eventually merged with their inherited long counterparts. A schematic representation of these developments is given in Figures 5.2 and 5.3.

## Conclusion

With regard to the conditioning and scope of Open Syllable Lengthening, the Hittite (and Palaic) data show very little restrictions to its application, as we find traces of OSL on all short vowels, either word-final or immediately preceding (lenis) stops and resonants—semivowels included—whenever

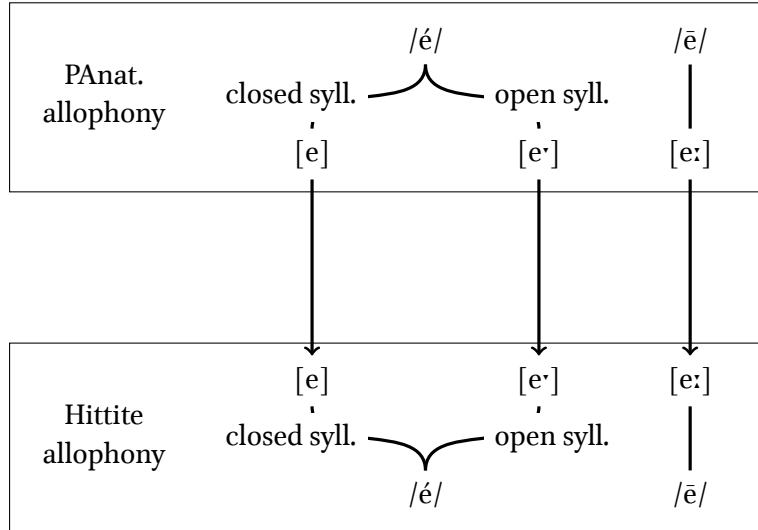


Figure 5.2: OSL in Hittite

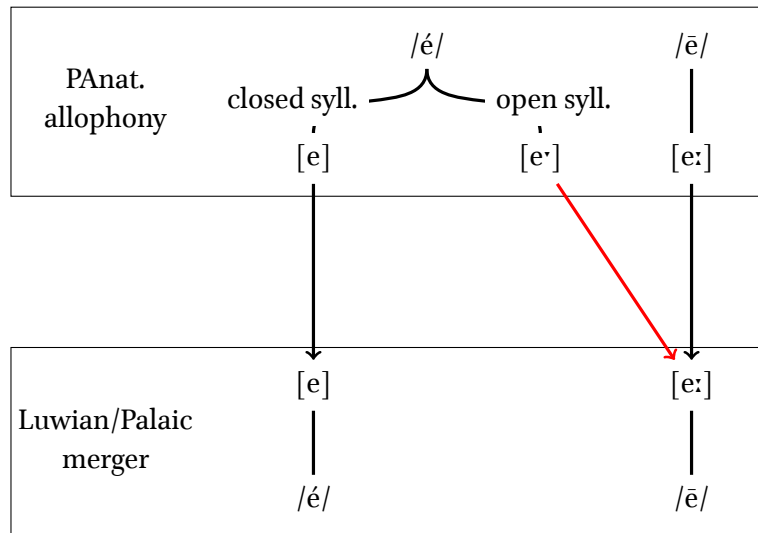


Figure 5.3: OSL in Luwian and Palaic



they stood in open syllables and were accented. In Luwian, on the other hand, the effects of OSL appear to have been decidedly more modest. We only find cases of OSL before glides ([j] and [w]) and in word-final position. These restrictions seem to be secondary, however, as they have an inner-Luwic explanation, and I therefore conclude that in Proto-Anatolian, OSL in principle affected all cases of \*- $\acute{V}$ # and \*- $\acute{V}CV$ .

I agree with Melchert that the effects of OSL cannot have been phonologised in Proto-Anatolian already. Not only his analysis of Hitt. *tuk* but also the synchronic phonetic half-length in Hittite as well as the relative chronology of OSL and Čop's Law attest to this. Nevertheless, I have argued that we can still find a common origin for the lengthening effects in Hittite, Luwian and Palaic if we assume that an accent-based lengthening of accented short vowels in open syllables existed in Proto-Anatolian on a phonetic level.

