Does Kloekhorst's *h_1 hypothesis measure up? *meh_1-[2].

Yuval Wigderson

Hieroglyphic Luvian (HL) is an Indo-European language, spoken in the second and first millennia BCE in Anatolia. HL, as its name suggests, was written in a hieroglyphic script that is not known to be related to any other writing system, though the language itself is closely related to the other Anatolian languages, most notably its sister dialect Cuneiform Luvian. The hieroglyphic script used to write HL is partly syllabic and partly logographic, with some signs representing a word, and others representing either *V*, *CV*, or *CVCV* (the latter very rarely) syllables (Fortson 185–6; Payne 1–5). Moreover, the script is plagued by allography, with several distinct signs representing sounds which, as far as anyone knows, are identical (Payne 13).

This allography has been the subject of quite a bit of recent research, primarily based on the assumption that so much redundancy is unlikely. For instance, it was observed that the signs which were thought to represent the sound [ta] are not in fact all interchangeable, with the three signs transcribed as *ta*, *tá*, and *tà* found in distinct positions from the signs transcribed as *ta₄* and *ta₅*. Annick Payne suggests that this may reflect a voicing difference,

1

with one group representing [ta] and the other [da] (16), while J. D. Hawkins proposed that ta_{4-5} actually represent the sound [la] (qtd. in Kloekhorst 27), and this hypothesis has received much support (e.g. Melchert, "Spelling of initial /a-/" 155).

However, it seems that no reanalysis of allographs has created so large a stir as that published by Alwin Kloekhorst in 2004. He focused on the two signs commonly transcribed as *a* and *á*, which were always thought to be homophonous, both representing the same *a*-like vowel. Already before Kloekhorst, it had been noted that these two signs were not wholly interchangeable—for instance, *á* appeared almost exclusively word-initially (Payne 15)— but it was assumed that this did not reflect any linguistic difference. However, Kloekhorst argued, the two signs were not at all phonologically identical: *a* did indeed represent a plain vowel [a], but *á* represented the *CV* syllable [ʔa], where [ʔ] is a glottal stop (27). Moreover, Kloekhorst went on to argue that the PIE laryngeal *h_1* was preserved word-initially as a glottal stop in HL, and the use of *á* reflects this (38). If Kloekhorst is correct, then HL would be the only known IE language to show a consonantal reflex of *h_1* (Simon 1–2).

Unsurprisingly, Kloekhorst's work was met with quite a bit of skepticism, and two important scholars of Anatolian, Jens E. Rasmussen and H. Craig Melchert, have published criticisms of Kloekhorst's theory, in 2007 and 2010, respectively. However, in 2012, Zsolt Simon came to the support of Kloekhorst, publishing a paper that both refuted many of the counterarguments given by Rasmussen and Melchert and provided additional evidence in support of Kloekhorst's hypothesis.

In what follows, I will begin by summarizing the main ideas and arguments in these

four papers. Once that is done, I will present my own arguments in response to those of

Kloekhorst, Rasmussen, Melchert, and Simon, and will end by giving my own opinion on

Kloekhorst's $*h_1$ hypothesis.

Kloekhorst's thesis

Kloekhorst's key observation is that there appears to be a complementary distribution within

the HL corpus in the use of the two signs *a* and *á*, in the sense that some words are consis-

tently spelled with one and others with the other. For instance, to use his most numerically

striking examples, the sentence particle *a-wa/i* appears in his corpus with an initial *a* 168

times but only once with an initial *á*, while the possessive *á-ma/i-* 'my' is spelled with ini-

tial *á* 109 times, but with *a* only seven times (29). Moreover, he is able to provide fairly

convincing explanations for the deviant spellings, such as untrustworthy scribes and ques-

tionable interpretations of words (30–33). Indeed, even his critics have essentially accepted

this complementary distribution, though with some caveats (Simon 2).

Kloekhorst then goes on to argue that if such a distribution exists, it must reflect some

linguistic fact, namely a phonetic difference between the two signs (35). For determining

what this phonetic difference is, Kloekhorst has essentially only one piece of evidence. This

is the spelling of the foreign (Semitic) name Ba'al(ī)-malik (formed off of the divine name

Ba'al), which is thrice spelled on HL seals as *pa-á-li-ma-li*, with a rare word-internal *á* (27–28).

Moreover, in these three instances, the name is accompanied by a cuneiform gloss reading

[I]EN-ma-lik. Kloekhorst argues that when these seals were inscribed, the 13th century BCE,

there were two distinct pronunciations of the Sumerogram EN, namely *bēlu* in Akkadian and *ba'al* in Ugarit. Since, Kloekhorst says, the vowel *ē* is incompatible with the HL spelling *pa-á*, we must read this as representing the same sound as Ugarit, meaning that *á* represents the same sound as Ugarit *'a*, namely [ʔa] (36).

Another closely related name, that of the goddess Ba'alat (or Ba'alatis), is consistently spelled *pa-ha-la-ti* (e.g. Payne 51). However, Kloekhorst preempts this potential counter-argument by pointing out that all instances of the spelling *pa-ha-la-ti* come from 9th–8th century BCE texts from the area around Hama, now in Syria. Since Phoenician was the dominant language there at that time, and since the Phoenician pronunciation of the name Ba'al had an 'ayn (phonetically [ʕ]), Kloekhorst argues that the HL spelling with *ha* is simply mimicking the 'ayn (36).

Kloekhorst gives some more synchronic evidence in support of the hypothesis that *á* represents a glottal stop, but he himself admits that much of this evidence is weak, so he moves on to his diachronic evidence, namely a collection of HL words spelled with an initial *á* that can be traced back to PIE roots beginning with *$*h_1$*. He provides fewer than ten examples, several of which were later proven to be unreliable by Rasmussen and Melchert, so I will put off the discussion of the specific etymological evidence until we arrive at Simon's paper, as he both uses a larger corpus and takes into account the problems raised by Rasmussen and Melchert. However, Kloekhorst's main argument in this section is that these examples serve two purposes: first, they strengthen the conjecture that *á* represents a glottal stop (Kloekhorst is here implicitly assuming that *$*h_1$* was itself a glottal stop or similar sound),

and second, they demonstrate that HL preserved a consonantal reflex of *h_1* (38).

Finally, Kloekhorst ends his paper with a section on aphaeresis, in an attempt to demonstrate the explanatory power of his theory. Aphaeresis is a phenomenon commonly observed in HL, whereby initial *a-* is often deleted (Payne 16). Kloekhorst argues that aphaeresis only occurs in words that begin with *á,* and not *a;* moreover, he imagines that in these words, *á* does not represent the full [ʔa] syllable, but rather the single consonant [ʔ], in analogy with the other HL *Ca* signs that can be used similarly (42–44). If we accept these propositions, then Kloekhorst contends that many instances of aphaeresis are easy to explain, as they simply represent the loss of preconsonantal glottal stop, a well-known cross-linguistic phenomenon (44).

Rasmussen and Melchert in antithesis to Kloekhorst

Both Rasmussen and Melchert provided some strong arguments against Kloekhorst, and both also attempted to propose their own explanations for the complementary distribution between *a* and *á,* and I will summarize each in turn.

Rasmussen's two main objections to Kloekhorst are that *h_1* is "plainly the weakest" of the three PIE laryngeals (161) and that in his opinion, *h_1* was phonetically [h], which is very unlikely to change into [ʔ] (162). For the first of these claims, Rasmussen uses the slightly circular reasoning that there is already evidence for the full retention of *h_2* and the partial retention of *h_3* in Anatolian, suggesting that *h_1* is weaker, while for the second, he cites a "handsome series of compelling examples" that demonstrate that *h_1* aspirated

adjacent consonants, which is consistent with it being [h], but not [ʔ] (162). As an alternative to Kloekhorst's theory, he proposes that *á* represents a different vowel sound from *a*, namely the vowel [e]. He then proceeds to demonstrate that many of Kloekhorst's etymological examples are as consistent with this hypothesis as they are with Kloekhorst's own, though he also has to struggle to provide explanations for some. In addition, he argues that with this theory, it is now possible to read *pa-á-li-ma-li* as reflecting the Akkadian pronunciation *bēlu*, rather than the Ugarit *ba'al* favored by Kloekhorst. Finally, he argues that if the vowel [e] were relatively weak in HL, then his hypothesis explains aphaeresis just as well as Kloekhorst's, as it now comes down to the loss of a weak initial vowel (165).

Melchert's paper primarily consists of a far more detailed analysis than Kloekhorst's of the various spelling practices used in writing HL words that begin with either *a* or *á*. His most important finding is that, starting in the mid-9th century BCE, different orthographic conventions begin to take hold, and *a* and *á* become interchangeable in spelling starting at this time, which he considers "ruinous for the claim of Kloekhorst" ("Spelling of initial */a-/*" 152–3). However, he does accept that there is a complementary distribution between the two before this time, and therefore also accepts that there is some phonetic difference between them in the early texts. Like Rasmussen, he proposes that the two signs represent different vowel sounds, and conjectures that the conditioning factor is the height of the following vowel; more specifically, he supposes that *a* represents a mid-high vowel such as [ə], while *á* is a lower vowel such as [a] or [ɑ], and *a* is used when preceding the high vowels *i,u*, while *á* is used when preceding the low vowel *a* (154). However, Melchert himself admits that this

hypothesis is problematic, and declares the situation a *non liquet* unless further evidence of pre-mid-9th century spellings is discovered (156).

Simon's synthesis of the evidence

Zsolt Simon's 2012 paper is primarily an update of Kloekhorst's, taking into account additional evidence both in the form of a larger corpus and in the form of Cuneiform Luvian (CL) cognates, though he also incorporates several of Rasmussen and Melchert's insights. His first step is to affirm Melchert's finding that the distinction between *a* and *á* disappears in the mid-9th century BCE, though he then argues that this actually provides further support for Kloekhorst's hypothesis, as it allows him to discard evidence from some later texts which Kloekhorst had had some difficulty in explaining (8). He also observes that in all cases where both an HL word and its CL cognate are attested, HL *á* corresponds to CL *plena*-written *a* (i.e. *a-aC-*), which he uses to refute both Rasmussen and Melchert's hypotheses that *a* and *á* represent different vowel qualities, since there is no evidence that *scriptio plena* could be used to denote a different vowel (9–11).

Next, Simon provides further synchronic evidence for identifying the phonetic value of *á* as [ʔa]. First, he returns to the observation mentioned above, that HL *á* and CL *plena a* are in correspondence, and notes that *plena* writing is one of the ways that scribes marked glottal stops in foreign names in cuneiform transcription (12). Next, he examines a collection of Hittite seals from Emar (in present-day Syria), also written in hieroglyphs, in which Semitic names are transcribed and where *á* is the only sign used to represent a glottal stop (13–14).

Finally, Simon turns to diachronic evidence, in which he examines all known pre-mid-9th century BCE words that begin with *á,* along with their proposed etymologies. The evidence is not large—he lists fifteen words, of which only ten are sufficiently well-understood to be given a PIE preform (four are given no etymologies, and one is only reconstructible up to Proto-Anatolian) (15). Of these preforms, all but two begin with $*h_1V$-, so Simon rightly points out that for these cases, we could just as well take *á* to represent the vowel itself, and assume that $*h_1$ had dropped (15). However, two of the PIE forms begin with $*h_1C$-, and it is on the basis of these that Simon argues that *á* does indeed show a consonantal reflex of $*h_1$ (16). I will return to this analysis below, when I reconsider Simon's etymological data.

My opinions and analyses

Before proceeding with detailed analysis, I would like to make a trivial but important observation, which was not made explicit by Kloekhorst, Rasmussen, Melchert, or Simon. This observation is that Kloekhorst's paper makes two distinct claims, namely:

(1) The HL sign *á* represents a glottal stop.

(2) This glottal stop is a consonantal reflex of PIE $*h_1$.

These two claims are, of course, closely related, but I think that it is important to keep them separate. Both Kloekhorst and Simon do not do so, for they use so-called "etymological evidence," which is really just Claim (2), in order to provide support for Claim (1). In addition, Rasmussen and Melchert do not distinguish the two claims, which in my opinion is one of the reasons their counterarguments are so weak—they really object to Claim (2), since they

don't believe that *h_1 has any consonantal reflexes, but this forces them to try to disprove Claim (1), because they don't treat the two independently. On account of this, I will deal each claim in turn.

First, I believe that Claim (1) is true, and *á* really does represent the syllable [ʔa], because the evidence seems pretty conclusive. Melchert's analysis shows a very clear complementary distribution before the middle of the 9th century BCE, so a phonetic difference seems assured. Moreover, the fact that the complementary distribution disappears in the mid-9th century implies that the phonetic difference vanished, suggesting a sound change that merged the sounds represented by *a* and *á*. This implies that the phonetic difference cannot have been too great, as a rapid merger between two very disparate sounds is phonetically very unlikely. Simon's arguments for a glottal stop are quite convincing, both because of the reasonably large number of foreign names that are transcribed with an *á* and because of the correlation with CL *plena* writing. In addition, Kloekhorst's elegant explanation of HL aphaeresis is a strong point in favor of his theory, and in fact relies only on Claim (1), so is yet another reason to accept that *á* represents [ʔa].

I must reject both Rasmussen and Melchert's hypotheses, and indeed any hypothesis that posits that *a* and *á* represent two distinct vowels, for two main reasons. The first is that the HL writing system was notoriously bad at indicating information about vowels, e.g. by not indicating vowel length, which is known to be phonemic in Luvian (Melchert, *Anatolian Historical Phonology* 37, 250). Secondly, CL represents only the vowels *a,i,u*; since the cuneiform script that CL borrowed from Hittite was also able to represent e-vocalism, it

seems to me very unlikely that CL had a phonemic fourth vowel (Fortson 184–7). So if we are

to believe that *a* and *á* represent different vowels, we must believe both that there is a major

phonetic difference between CL and HL, which is unlikely (Melchert, *Anatolian Historical

Phonology* 229), and that the HL scribes chose to represent a fairly minor fact about vowels

in writing, while leaving out far more important ones. As both of these are rather unlikely,

I think that Rasmussen and Melchert's positions are untenable. Therefore, based on the

solid positive evidence given by Simon, and on the weakness of the alternative explanations

offered by Rasmussen and Melchert, I conclude that *á* did indeed represent [ʔa].

As to Claim (2), however, I am more skeptical, simply because I don't believe that the

etymological evidence is sufficiently strong or conclusive. As mentioned earlier, Simon could

find only ten pre-mid-9th century BCE words beginning with *á* for which he could propose

an etymology. Here are these ten forms, along with the PIE preforms he proposes (from

Simon Table 5).

HL word	Proposed PIE preform
á-la/i$_{(2)}$-ma 'name'	*$h_{1/3}néh_3mṇ$
á-mu 'I, me'	*$h_1mé$
á-sa- 'to be'	*h_1es-
á-sa- 'to sit; seat'	*h_1es-
á-sa$_5$-za- 'to say'	*h_1eh_3-es- 'mouth'
"*350" *á-sa-ha+ra/i-mi-sa* 'blood-offering'	*$h_1ésh_2r$, gen. $h_1sh_2éns$ 'blood'
á-ta-, á-za- 'to eat'	*h_1ed-
á-tara/i- 'person, soul'	*$(h_x)eh_1t$- (Simon proposes *h_x = *h_1)
á-za- 'to love'	*h_1esu- 'good' + -$sĥe/o$-
á-za$_x$-za 'we, us'	*$ṇsmé$ (but Simon proposes $h_1ṇsmé$)

Table 1: HL *á*-initial words and their etymologies

First, it is important to note that even if all the data in this table were completely secure, the *h_1 > á* hypothesis would still be tenuous, as ten data points do not a fact make. However, much of this evidence is itself problematic, making the situation still grimmer. First, as mentioned above, Simon himself points out that since all but two of these examples have the PIE word begin with *h_1V-*, it is possible to imagine that *á* reflects the vowel, rather than the laryngeal (15). In contrast, he contends that the two first examples in the table, *á-la/i$_{(2)}$-ma < *$h_{1/3}$néh$_3$mn̥* and *á-mu < *$h_1$mé* cannot be explained in this way, and that the glottal stop represented by *á* must reflect *h_1*. More specifically, for the first of these, he suggests a problem with the "traditional explanation," namely that PIE *h_3n̥h$_3$mn̥* > PA *n̥mn̥* > *anman* after laryngeal loss and vocalization of the syllabic resonants, which then led to the HL form via dissimilation of *n* to *l* and anaptyxis. In his view, this etymology is problematic because "the anaptyxis is *ad hoc*," so he suggests instead that the HL word goes back to the PIE e-grade *$h_{1/3}$néh$_3$mn̥* (which also yields Hittite *lāman*), and then that the initial glottal stop in the HL word is precisely what one would expect as the reflex of the initial *h_1* (15). In the same way, he contends that the first sound of *á-mu,* which he reads as phonetically [ʔmu], is the reflex of the initial laryngeal in *$h_1$mé.*

Both of these derivations present some major problems. First, while it is true that the proposed anaptyxis in the etymology of *á-la/i$_{(2)}$-ma* is *ad hoc,* it is not much less *ad hoc* than his own etymology, given that he has essentially only two pieces of evidence to support *h_1 > ʔ.* Secondly, his analysis of the etymology of *á-mu* relies on the PIE pronoun being *$h_1$mé,* a position that seems to me to be untenable; in particular, Melchert has argued very con-

vincingly that the Hittite *ammug* and the Lydian *ẽm(i)-* cannot go back to *$h_1$mé*, so instead proposes that the PIE form *$mé$* was sometimes extended to *emé*, which can also explain other vowel-initial pronouns, such as Greek ἐμέ ("Čop's law" 298–9). Therefore, there are strong intra-Anatolian reasons to disbelieve the PIE form *$h_1$mé*, so Simon's derivation here is questionable. In a very similar vein, Simon proposes that the PIE 1pl. pronoun was *h_1ņsmé* (in order to explain the glottal stop at the beginning of HL *á-za$_x$-za*), but this is at least as problematic as the *$h_1$mé* proposal. The reason is that PIE 1st person pronouns had a full-grade clitic form as well as a tonic form, consisting of the zero-grade extended by the suffix *-mé* (Katz 261). Thus, if we accept the tonic *h_1ņsmé*, we must also imagine the clitic *$h_1$nos* (rather than the accepted *nos*). But then, since Indo-Iranian continued vocalized laryngeals as *i* (Fortson 212), we would expect to see forms such as Vedic *$inas$*, rather than the *nas* that we do find (143). Similarly, since Italic has *a* as a reflex of the vocalized laryngeals (278), and since Latin generalized the clitic pronouns, the form *$h_1$nos* would lead us to expect things like *anōs* in place of Latin *nōs*. Therefore, I am forced to reject Simon's conjecture of *á-za$_x$-za* < *h_1ņsmé*.

Finally, at least one other piece of evidence in Table 1 is too problematic to be seriously considered, namely the PIE form *$h_1$eh$_3$-es-*, which Simon considers the etymon of HL *á-sa$_5$-za-*. Everyone agrees that this HL word is related to CL *āšš-* 'mouth' and to Hittite *aiš* 'mouth' (Simon 15; Rasmussen 164; Melchert, "Spelling of initial /a-/" 154), but, to quote Melchert, "there are few words whose prehistory is more complicated and controversial than that of the Anatolian word for 'mouth', so no arguments can be made based on

this item" ("Spelling of initial /a-/" 154). Similarly, Watkins suggests the PIE form *$h_3\bar{o}s$-
(in contrast to Simon's *h_1eh_3-es-), but warns, "precise preform uncertain" (63), so I believe
that HL *á-sa$_5$-za-* cannot be used to argue either for or against Kloekhorst's hypothesis.

On the basis of all of the above, I find the etymological data presented by Simon dubious.
Moreover, it is also possible to find negative etymological evidence, in the form of words
that would be expected to begin with a glottal stop if Kloekhorst's hypothesis was correct,
but which do not. Kloekhorst himself considers one such example, namely PIE *$h_1ndo(n)$
> HL *a-ta(-na),* which is not written with an initial *á*. He explains this in a fairly *ad hoc*
way, based on the glottalic theory, which suggests that the PIE preform would have been
pronounced [ʔn̩ˀdon], which dissimilated to *$\mathring{n}do(n)$* [n̩ˀdon] and thence to the HL form (43).
However, there are other such examples of negative etymological evidence. For instance, we
can consider the Luvian verb *u-* 'drink' (Melchert, *Cuneiform Luvian Lexicon* 241), which goes
back to the PIE root *h_1eg^{uh}- 'drink' (*LIV* 231). In the standard theory, the root lost the
laryngeal and *g^{uh}* de-aspirated, leading to Proto-Anatolian *eg^u-, which led to Luvian *u-*
because PA *g^u* weakened to Luvian *u̯* and since Luvian seems to have monophthongized
u-diphthongs (Melchert, *Anatolian Historical Phonology* 60, 254, 265). However, if we accept
Kloekhorst's hypothesis that *h_1* was not lost at any point of this process, then we would
expect a Luvian form like *ʔeu̯-* or *ʔu-*, and probably the latter. Then, since Kloekhorst
and Simon both claim that the sign *á* could be used to represent the single consonant [ʔ]
in addition to the syllable [ʔa], we would expect to see this verb written in HL as *á-u-*, a
spelling which, to the best of my knowledge, does not appear anywhere; in particular, it is

not listed in Melchert's corpus of all HL words written with initial *á* (*Hieroglyphic Luvian Initial*

a- vs. á-). It is, of course, possible to come up with an explanation for why this might be the

case—perhaps the sign *á* could only represent plain [ʔ] before a consonant, or perhaps there

was glottalic dissimilation akin to Kloekhorst's explanation of *a-ta(-na)* above. However, it

seems to me that any such explanation will necessarily be as *ad hoc* as the explanations which

Kloekhorst and Simon decry as *ad hoc*. In addition, when the number of examples in support

of some theory is in the single digits, even one or two counterexamples must be treated as

serious problems.

However, since I do accept Kloekhorst's Claim (1) as being true, a natural question arises:

what is the etymological origin of the glottal stop at the beginnings of these words? The short

answer is that I don't know, but I think it must be a sound change of the form [a] > [ʔa] word-

initially, under some unknown conditioning factors. Such a sound change is not surprising;

many varieties of English have word-initial glottal stops before vowels (Bissiri et al.), and

though this effect is not phonemic in English, it is not hard to imagine it becoming phonemic

in Luvian, especially if we consider the influence of neighboring Semitic languages, where

word-initial glottal stops are common and phonemic. It would be very interesting to attempt

to determine what factors condition this sound change, though the paucity of examples

means that this will likely be difficult; however, maybe a good place to start is Melchert's

attempt to explain the distribution between *a* and *á* as one conditioned by the height of the

following vowel ("Spelling of initial */a-/*" 154).

Conclusion

In this paper, I have attempted to reevaluate the data and analyses surrounding Kloekhorst's hypothesis that word-initial *h_1* is reflected in Hieroglyphic Luvian as a glottal stop, represented by the sign *á*. Though the four main previous studies on this topic have each offered many important ideas, I think that all of them make the mistake of conflating two separate claims which must be assessed independently, namely that *á* represents a glottal stop and that *á* reflects *h_1*. As I have argued, the first of these claims seems to me very probably true, while I have serious doubts about the second, because the etymological evidence seems far from conclusive. Instead, I propose a simple sound change of word-initial [a] to [ʔa] under certain conditions, and hope that some of these conditions can be determined in the future.

za-	*wa/i*	SCRIBA- *la- li- za*	*i- zi- ia- sa- tara/i- sa₄-'*	*á- ma- za*	*wa/i- ra+a- li* $^{-i}$
za=wa		SCRIBA-*lali=za*	*iziya=ast(a)ri=sa*	*áma(n)za*	*warali=∅*
'this'	qpt.	'writing'	npt. 'make' abstr. n. npt.	'my' N/A n.	'own' N/A n.

REL- *za*	CAPERE- *ma- na- sà-'*	"LINGUA"- *ni-*	DOMUS- *a- si- za*	*á- sa₄- ti*
REL=*za*	CAPERE-*mana=sa*	LINGUA=*ni*=DOMUS=*asi=za*		*ásati*
'because'	'agreement' npt.	'language' cpd.	'house' poss. npt	'(there) is'

(EGO) *i- u- pa- la*	*wa/i- ka- ti+ra/i- su- na*
(EGO) *iupal*	*wiktirsun*
det. Yuval	Wigderson

'This writing (is) my own making because (there) is an agreement of the language-house. Yuval Wigderson'

Works Cited

Bissiri, Maria Paola, et al. "The Role of Word-Initial Glottal Stops in Recognizing English Words." *Language and Speech Laboratory* (). Web. <http://laslab.org/upload/the_role_of_word-initial_glottal_stops_in_recognizing_english_words.pdf>.

Fortson, Benjamin W., IV. *Indo-European Language and Culture: An Introduction*. 2nd ed. Wiley-Blackwell, 2010. Print. Blackwell Textbooks in Linguistics.

Gelb, Ignace Jay. *Hittite hieroglyphic monuments*. University of Chicago Press, 1939. Print.

Hawkins, John David, ed. *Corpus of Hieroglyphic Luwian inscriptions*. Walter de Gruyter, 2000. Print.

Katz, Joshua Timothy. "Topics in Indo-European Personal Pronouns." Diss. Harvard University, 1998. Print.

Kloekhorst, Alwin. "The Preservation of $*h_1$ in Hieroglyphic Luwian: Two Separate a-Signs." *Historische Sprachforschung / Historical Linguistics* 117.1 (2004): 26–49. Web. <http://www.jstor.org/stable/40849207>.

Melchert, H. Craig. *Anatolian Historical Phonology*. Rodopi, 1994. Print. Leiden Studies in Indo-European.

——."'Čop's law' in Common Anatolian." *In honorem Holger Pedersen: Kolloquium der Indogermanischen Gesellschaft vom 25. bis 28. März 1993 in Kopenhagen*. Dr. Ludwig Reichert Verlag, 1994. 297–306. Print.

——, ed. *Cuneiform Luvian Lexicon*. 1993. Web. <http://www.linguistics.ucla.edu/people/Melchert/LUVLEX.pdf>. Lexica Anatolica.

——, ed. *Hieroglyphic Luvian Initial a- vs. á-*. 2010. Web. <http://www.linguistics.ucla.edu/people/Melchert/Hieroglyphic%20Luvian%20Initial%20a.pdf>.

——."Spelling of initial /a-/ in Hieroglyphic Luwian." *ipamati kistamati pari tumatimis: Luwian and Hittite studies presented to J. David Hawkins on the occasion of his 70th birthday*. Ed. Itamar Singer. 2010. 147–158. Print.

Payne, Annick. *Hieroglyphic Luwian*. Harrassowitz, 2004. Print.

Rasmussen, Jens Elmegård. "A Reflex of $*h_1$ in Hieroglyphic Luvian?" *Proceedings of the 18th annual UCLA Indo-European Conference*. Ed. Karlene Jones-Bley, et al. 2007. 161–168. Print.

Rix, Helmut and Martin Kümmel, eds. *Lexikon der Indogermanischen Verben*. 2nd ed. Dr. Ludwig Reichert Verlag, 2001. Print.

Simon, Zsolt. "Once again on the Hieroglyphic Luwian sign *19 <á>." *Indogermanische Forschungen* 118 (2013): 1–21. Web.

Watkins, Calvert, ed. *The American Heritage Dictionary of Indo-European Roots*. 3rd ed. Houghton Mifflin Harcourt, 2011. Print.

Woudhuizen, Fred C. *Selected Luwian hieroglyphic texts*. Vol. 1 & 2. Institut für Sprachen und Literaturen der Universität Innsbruck, 2005. Print.