# Evidence for a phonemic glottal stop in Hittite: a reassessment

Kloekhorst, A.

# Evidence for a phonemic glottal stop in Hittite as the outcome of PIE *$h_1$: a reassessment*

Alwin Kloekhorst

**Abstract**: My postulation of a phonemic glottal stop in Hittite as the outcome of PIE *$h_1$ (Kloekhorst 2006, 2008, 2014) has been criticized by several colleagues. In the present paper I will reassess the evidence and argue that most of the points of criticism cannot withstand scrutiny, and that Hittite did indeed contain a phonemic glottal stop in the environments /°V?V°/ and /?V°/. Moreover, it will be argued that the spelling practices employed by the Hittite scribes to note down the glottal stop in these environments perfectly match the Old Babylonian scribal practice for indicating an *'aleph* (= [ʔ]) in these positions.

## 1. Introduction

On several occasions I have argued that Hittite knows a phonemic glottal stop reflecting PIE *$h_1$, which can be found in the following three environments:[1]

- word-medially in intervocalic position: /°V?V°/
- word-medially between a resonant and a vowel: /°R?V°/
- word-initially before a vowel: /?V°/

This postulation of a phonemic glottal stop in Hittite has been criticized by several colleagues, cf. Rieken 2010: 128–9; Weeden 2011; Kimball 2015: 23; Yates 2016: 247–9; Melchert 2018; Melchert 2020: 264–5. As a consequence, in the most recent treatments of Hittite phonology (Rieken 2011: 38–40; Van den Hout 2011: 13–4; Kimball 2017; Francia & Pi-

* This research was conducted within the project "Splitting the mother tongue: The position of Anatolian in the dispersal of the Indo-European language family", as funded by the Netherlands Organisation for Scientific Research (NWO, grant nr. 276-70-026). I would like to thank Sasha Lubotsky for useful comments on an earlier draft of this article.

[1] Kloekhorst 2006: 77–81; Kloekhorst 2008: 25–6; Kloekhorst 2014a: 161–70, 325–30, 330–41, 374–7. Note that initially I also postulated the presence of a glottal stop in word-initial preconsonantal position, e. g. *a-ša-an-zi* 'they are' = /?sántsi/, *a-ra-an-zi* 'they arrive' = /?rántsi/, *ap-pa-an-zi* 'they seize' = /?pːántsi/ (Kloekhorst 2006: 79–81; Kloekhorst 2008: 75–6, 121). Later on, I retracted this view, however (Kloekhorst 2014a: 337–41, 382), and I now interpret these forms as /əsántsi/, /ərántsi/ and /əpːántsi/, respectively. Although not made explicit in my 2014 book, my retraction of the interpretation of *aC*- spellings as /?C-/ was partly induced by criticism by Zsolt Simon, both through personal communication and in print (Simon 2010: 256).

Historische Sprachforschung 133 (2020), 111–143, ISSN 0935-3518 (print), 2196-8071 (online)

saniello 2019: 19–21) a glottal stop is not included in the Hittite phoneme inventory.

In the following article I want to reassess the evidence in favor of a phonemic glottal stop in Hittite in the positions /°VʔV°/ and /ʔVC°/, respectively, and discuss the criticism of my earlier treatments. I intend to discuss the environment /°RʔV°/ on another occasion.

## 2. /°VʔV°/

In Kloekhorst 2008: 25, I claimed that the Old Hittite forms *ne-e-a* 'he turns' and *ḫé-e-a-u-e-eš* 'rains' must be interpreted as /nḗʔa/ and /χḗʔaues/, respectively, both containing an intervocalic glottal stop that is the outcome of a PIE laryngeal: **néh₁-o* and **h₂éih₃-eu-*.[2] To these can now be added *zé-e-a-ri* 'it is cooking', which I interpret as /tsḗʔari/ < **tiéh₁-o*.[3] In all three cases, the presence of the glottal stop is, to my mind, spelled by the sign A. Moreover, I stated that the fact that younger attestations of these words are spelled with the sign I̯A (*ne-e-i̯a(-ri)*, *ḫé-e-i̯a-u-e-eš*, *zé-e-i̯a-ri*) indicates that over time this glottal stop was lost (/nḗa(ri)/, /χḗaues/, /tsḗari/), since the *i̯* in these forms represents the presence of a phonetic glide between /ē/ and /a/, [ˈneːʲari], etc.

This claim was challenged by Rieken (2010: 128), however, who states that "[d]ie Tatsache, dass der Gleitlaut *-y-* im Hethitischen in alter Zeit in *nea* ‚wendet' und *ḫeaweš* nicht geschrieben wird, bedeutet zudem nicht, dass ein glottaler Verschlusslaut zwischen den beiden Vokalen gestanden hat. Vielmehr handelt es sich um eine wohlbekannte [...] generelle Tendenz, die sich z. B. auch in altheth. *ki-an-ta* neben jüngerem *ki-i-ya-an-ta-ti* findet, wo von einem Laryngalreflex keine Rede sein kann". As I explained in Kloekhorst 2014a: 376–7, Rieken is correct in stating that Hittite shows a general spelling alternation between *(-)Ci-aC(-)* and *(-)Ci-i̯a-aC(-)*, and that the spelling *(-)Ci-aC(-)* therefore does not necessarily imply the presence of a glottal stop. However, such

---

[2] In Kloekhorst 2008: 25, I reconstructed *nē-$^{a(ri)}$* as **néiH-*, following the then communis opinio. On the basis of Kloekhorst & Lubotsky 2014 (see also Kloekhorst 2014a: 180, 375), this reconstruction should be adapted to **néh₁-*. The main principle remains the same, however: the glottal stop in *ne-e-a* /nḗʔa/ reflects the laryngeal of PIE **néh₁-o*. Note that in *ḫēau̯ēš* < **h₂éih₃-eu-* it is in fact a PIE **h₃* that yielded Hitt. /ʔ/. See Kloekhorst 2006 for the concept that in all positions in which PIE **h₂* and **h₃* did not yield a uvular consonant in Proto-Anatolian (in that paper noted down as *h*) they in fact merged with PIE **h₁* and yielded a glottal stop. In the prehistory of Hittite, this PAnat. glottal stop was in most positions lost, except in the environments */ʔV-/ and */VʔV/, where it was preserved as /ʔ/.

[3] Kloekhorst 2014a: 375–6.

a spelling alternation does not exist when the *a* stands in an open syllable: the spelling *(-)Ci-i̯a(-CV)* never alternates with *(-)Ci-a(-CV)*.[4] This is the reason that the spellings of *ne-e-a*, *ḫé-e-a-u-e-eš* and *zé-e-a-ri*, with the sign A in an open syllable, are orthographically remarkable, and to my mind require an explanation.

The Hittite ductus is generally assumed to go back to the Old Babylonian version of the cuneiform script,[5] and it therefore is instructive to look at Old Babylonian scribal practices. It is commonly assumed that in Old Babylonian texts, spellings of the type °$V_1$-$V_2$(-) are used to represent the presence of an intervocalic *'aleph* (which phonetically is a glottal stop, [ʔ]),[6] e. g. *da-i-ku* 'murderer' = /dā'iku/, *le-a-ni* 'writing boards' = /lē'ani/,

---

[4] The only examples of a spelling *(-)Ci-a(-CV)* that I have been able to find are $^{GIŠ}$*ši-ši-a-mi* (KBo 6.10 ii 3 (OH/NS)) 'a tree', and ŠÀ-*ni-a* (KBo 35.2 r.col. 2 (MS)), which stands for ŠÀ-*ni*=*i̯a* 'and within'. The form URU-*ri-a-še-eš-šar* (KBo 4.4 iv 6 (NH)) 'town-settlement' is non-probative, since this word also occurs with a word space between URU-*ri* and *ašeššar* (e. g. URU-*ri a-še-eš-ni* (VSNF 12.57 i 21 (MH/NS))), cf. Kloekhorst 2014a: 373–4. The form *ni-a-ti* (KUB 23.28, 10 (OH/LNS)) 'he turned' is also non-probative, as this stands for *né-a-ti*. So, as far as I am aware, there are only two real examples of a spelling *(-)Ci-a(-CV)* in the entire Hittite corpus, which cannot be given any linguistic weight vis-à-vis the thousands of words in which the sequence /°Cia(CV)/ is spelled *(-)Ci-i̯a(-CV)*, with the sign I̯A.

[5] E. g. HZL: 14.

[6] Explicitly so Weeden 2011: 63: "It is common in Assyriology to accept that these writings [°$V_1$-$V_2$(-) and *(-)VC-V(-)*] indicate in some fashion the presence of an alef". See Kouwenberg 2003–2004: 93 for the fact that Old Babylonian possessed a phonemic *'aleph* in certain environments. Note that Durham (1976: 374–8) explains the fact that in the orthographic sequence °$V_1$-$V_2$(-) the *V*-sign marks the presence of an *'aleph*, /°V'V°/ (likewise in the sequence *(-)VC-V(-)*, which, too, marks the presence of an *'aleph*: /°VC'V°/), by assuming that the *V*-signs could have the value *'V*, i. e. A = *'a*$_x$, I = *'i*$_x$, and Ú = *'u*$_x$, a view that I have taken over in Kloekhorst 2008: 25. This is criticized by Weeden (2011). Although he recognizes the fact that the writing °$V_1$-$V_2$(-) and *(-)VC-V(-)* are used to indicate the presence of an *'aleph*, he objects to "extrapolat[ing] from this habit of writing to the conclusion that V-signs could equally well render phonetic 'V", since this would be "only valid if the practice of writing 'V- with V- is also observed in initial position" (Weeden 2011: 63). He therefore rather interprets these two spelling phenomena as "alert[ing] the reader to the presence of something not otherwise expressed in the script through perpetrating a break in the usual spelling convention" (*o.c.*: 63–4, note 11). To my mind, this is only a terminological issue. The generally acknowledged fact that the orthographic sequences °$V_1$-$V_2$(-) and *(-)VC-V(-)* mark the presence of an *'aleph* means that the *V*-signs behave as if they render a value *'V*, whether one assigns to them this value or not. Moreover, it should be noted that Weeden's argument that a value *'V* is not found in word-initial position and thus is "positionally determined" (2011: 63) is nullified by the fact that Old Babylonian did not have a phonemic *'aleph* in word-initial position anyway (see section 3). All in all, I maintain that it is valid to say that in the Old Babylonian orthographic sequences °$V_1$-$V_2$(-) = /°V'V°/ and *(-)VC-V(-)* = /°VC'V°/, the *V*-signs were used in the value *'V*, and it thus remains a valid hypothesis that in the Hittite ductus these signs could have been used in the value *'V* = [ʔV], as well.

*re-e-ú-tim* ‘shepherdship’ = /rē’ûtim/.[7] From an Indo-European point of view, *ne-e-a*, *ḫé-e-a-u-e-eš* and *zé-e-a-ri* all go back to a preform with a laryngeal: **néh₁-o*, **h₂éih₃-eu-*, **tiéh₁-o*. Since in all three words the location of the reconstructed laryngeal exactly coincides with the position of the sign A, which according to Old Babylonian spelling practices marks the presence of a [ʔ], these two facts impeccably combine into a synchronic analysis of the Hittite forms *ne-e-a*, *ḫé-e-a-u-e-eš* and *zé-e-a-ri* as phonologically representing /nḗʔa/, /χḗʔaues/ and /tsḗʔari/, respectively, with an intervocalic glottal stop that is the direct outcome of the PIE laryngeal.

According to an anonymous reviewer, this argumentation is flawed, however. Although they must admit that the spellings with the sign A in these forms is indeed “striking”, the reviewer thinks that “there simply is *no* way to tell whether they represent a sequence with a glottal stop or merely a hiatus that was only later filled by a yod” (emphasis theirs). This implies that the reviewer would rather interpret e. g. *ne-e-a* as /nḗ.a/, with a hiatus, and not as /nḗʔa/, with a glottal stop. Luckily, however, there is in fact a way that we can prove that the latter interpretation, with the glottal stop, is the correct one.

The verbs to which the 3sg.pres. forms *ne-e-a* ‘turns’ and *zé-e-a-ri* ‘is cooking’ belong show participle forms that in older texts are spelled *ne-e-an-t°* and *ze-e-an-t°* as well as *ne-e-a-an-t°* and *zé-e-a-an-t°* (whereas the spellings *ne-e-i̯a-an-t°* and *zé-e-i̯a-an-t°* are found in younger texts).[8] Especially the attestations that show plene spelling with the sign A, *ne-e-a-an-t°* and *zé-e-a-an-t°*, are remarkable. Normally, plene spelling is interpreted as indicating vowel length that arises due to accentuation (see also sections 3a and 3b), e. g. *ap-pa-a-an-t°* ‘seized’ /əpːā́nt-/ < **h₁p-ónt-*. However, in the forms *ne-e-a-an-t°* and *zé-e-a-an-t°* the suffix syllable can hardly have been accented: the plene spelling of the *e* of the verbal root, which is also found in the spellings *ne-e-an-t°*, *ze-e-an-t°* and *ne-e-i̯a-an-t°*, *zé-e-i̯a-an-t°*, clearly shows that in these participles these verbal roots were accented: /nḗ°/ and /tsḗ°/. This means that we expect the vowel *a* of the participle suffix *-ant-* to have been unaccented, and it therefore cannot have been long in these forms. This raises the question: if not marking vowel length, then what is the function of the

---

[7] See Kouwenberg 2003–2004: 92 for *da-i-ku*; CAD L: 157 for *le-a-ni*; and CAD R: 312 for *re-e-ú-tim*. Note that Weeden’s example *bal-ṭù-a* (KUB 1.16 i 15) ‘in my life’ = /balṭu’’a/ (Weeden 2011: 63) is somewhat ill-chosen, since this form is in fact an addition, and therefore not securely attested as such, cf. Sommer & Falkenstein 1938: 4, 43.

[8] Cf. Kloekhorst 2014a: 327–30 for the attestations of all these forms.

sign A in *ne-e-a-an-t*° and *zé-e-a-an-t*°? In Kloekhorst 2014a: 327–30, I have argued that in these forms the sign A indicates the presence of a glottal stop that reflects PIE *$h_1$: *ne-e-a-an-t*° = /nḗʔant-/ < **néh$_1$-ont-* and *zé-e-a-an-t*° = /tsḗʔant-/ < **tiéh$_1$-ont-*. In the present paper I want to make explicit that this interpretation is in fact fully in line with Old Babylonian spelling practices, where a sequence °*V$_1$-V$_2$C(-)* denotes the presence of an *'aleph* (= [ʔ]), e. g. *i-ri-a-ab* 'he replaces' = /iri''ab/.[9] Moreover, just as in Old Babylonian *i-ri-a-ab* = /iri''ab/ the vowel /a/ is, despite its plene spelling, phonologically *short*, we can assume that in Hittite *ne-e-a-an-t*° and *zé-e-a-an-t*° the /a/ is short as well: the sign A is only used to indicate the presence of /ʔ/, not to mark vowel length.[10] This is in fact a crucial point: there simply is no other way in which the presence of the sign A in *ne-e-a-an-t*° and *zé-e-a-an-t*° can be reconciled with the length and therefore accentuation of the vowel of the verbal roots *nē-* and *zē-*, which predicts that the suffix should contain a short unaccented vowel: /-ant-/, not **/-ā́nt-/.

It should be noted that in Old Babylonian spelling practices the use of the sign A in sequences of the type /V'aC/ containing an *'aleph* is not obligatory: next to *i-ri-a-ab* we also come across the spelling *i-ri-ab*, without the sign A.[11] Therefore, the Old Hittite spellings *ne-e-an-t*° and *ze-e-an-t*°, without plene spelling of A, can still be interpreted as representing /nḗʔant-/ and /tsḗʔant-/, with a glottal stop, and are thus in line with the attestations *ne-e-a-an-t*° and *zé-e-a-an-t*°, where the presence of the glottal stop is specifically indicated in spelling. The fact that in younger texts these participles are spelled *ne-e-i̯a-an-t*° and *zé-e-i̯a-an-t*°, with the sign I̯A, indicates that over time the glottal stop in these forms was lost, however: like in the cases of NH *ne-e-i̯a(-ri)*, *ḫé-e-i̯a-u-e-eš* and *zé-e-i̯a-ri*, the *i̯* in *ne-e-i̯a-an-t*° and *zé-e-i̯a-an-t*° can be interpreted as representing a phonetic glide between /ē/ and /a/, [ˈneːʲant-], [ˈtseːʲant-], which implies that *ne-e-i̯a-an-t*° and *zé-e-i̯a-an-t*° spell the phonological forms /nḗant-/ and /tsḗant-/, respectively, without a glottal stop.

The importance of the forms *ne-e-a-an-t*° and *zé-e-a-an-t*° lies in the fact that these forms cannot be explained as showing a hiatus, **/nḗ.ant-/ and **/tsḗ.ant-/, as is suggested by an anonymous reviewer (see above), since in such an interpretation the plene spelling with the sign A would

---

[9] See Weeden 2011: 63–4, with note 11.

[10] This is much better understandable if we assign to the sign A a value *'a$_x$* = [ʔa], i. e. "*ne-e-ʔa-an-t*°" and *"zé-e-ʔa-an-t*°", cf. the discussion in footnote 6.

[11] Cf. CAD R: 53–4.

remain fully unaccounted for. Instead, only an interpretation with a glottal stop, /nḗʔant-/ and /tsḗʔant-/, can explain the presence of the plene spelling with the sign A. As a consequence, in 3sg.pres. *ne-e-a* and *zé-e-a-ri*, too, the plene spelling of the A must represent the presence of a glottal stop, /nḗʔa/ and /tsḗʔari/, and not the presence of a hiatus (**/nḗ.a/ and **/tsḗ.a/), as was suggested by the anonymous reviewer.

We can conclude the following. The older Hittite spellings °*e-a(-CV)* and °*e-a-aC(-)*, which occur in words that etymologically go back to preforms with an intervocalic laryngeal, can synchronically be interpreted as denoting a sequence /-eʔa-/, with an intervocalic glottal stop that is the direct continuant of the PIE laryngeal.

older Hittite

| | | |
|---|---|---|
| *ne-e-a* 'he turns' | = /nḗʔa/ | < **néh₁-o* |
| *ne-e-a-an-t*° 'turned' | = /nḗʔant-/ | < **néh₁-ont-* |
| *zé-e-a-ri* 'it is cooking' | = /tsḗʔari/ | < **tiéh₁-o-ri* |
| *zé-e-a-an-t*° 'cooked' | = /tsḗʔant-/ | < **tiéh₁-ont-* |
| *ḫé-e-a-u-e-eš* 'rains' | = /χḗʔaues/ | < **h₂éih₃-eu-* |

This synchronic phonological interpretation is fully in line with the Old Babylonian scribal practice, where the same spelling strategies are applied to write an intervocalic *'aleph* (= [ʔ]). Especially the spelling °*e-a-aC(-)* is telling since it cannot be explained in any other way than representing the sequence /-eʔaC-/. As a consequence, we must accept the presence of a glottal stop in these words.

Note that all these forms belong to the older layer of Hittite, and that in all of them the specific plene spelling with A is no longer used at the end of the Old Hittite / beginning of the Middle Hittite period, and that we find in younger texts a spelling with the sign i̯A, instead, °*e-i̯a(-CV)* and °*e-i̯a-aC(-)*. The latter spelling probably represent the presence of a phonetic glide [j] that has appeared between the vowels *e* and *a*, which implies that by this time the glottal stop had been lost in this position.

younger Hittite

| | | |
|---|---|---|
| *ne-e-i̯a(-ri)* | = /nḗa(ri)/ | = [ˈneːʲa(ri)] |
| *ne-e-i̯a-an-t*° | = /nḗant-/ | = [ˈneːʲand-] |
| *zé-e-i̯a-ri* | = /tsḗari/ | = [ˈtseːʲari] |
| *zé-e-i̯a-an-t*° | = /tsḗant-/ | = [ˈtseːʲand-] |
| *ḫé-e-i̯a-u-e-eš* | = /χḗaues/ | = [ˈχeːʲawes] |

We can therefore conclude that in intervocalic position the glottal stop /ʔ/ is only found in the older stage of Hittite, and was regularly lost at a later stage.

## 3. /ʔV-/

My claim that Hittite knew a phonemic glottal stop in word-initial position, continuing the PIE laryngeal *$h_1$,[12] has proven to be very controversial. Especially Weeden (2011: 61–8) has extensively discussed my proposals from the point of view of spelling practices in Old Babylonian, and concluded that my model "involves doing significant violence to our usual conception of the way in which the cuneiform script works, and for this reason it is difficult to accept" (o.c.: 68). Other scholars agree with Weeden's assessment and likewise reject my postulation of an initial /ʔ/: Melchert 2020: 264 ("There is no evidence for word-initial *$h_1$ preserved as [ʔ] in Hittite"); Kimball 2015: 23; Yates 2016: 247–9 ("the glottal stop hypothesis cannot be maintained").[13]

Weeden's article indeed contains some fair criticism. For instance, he criticizes my idea that initial spellings of the shape *aC-CV(-)* could spell the presence of a word-initial preconsonantal /ʔ/, like in *ak-ka-an-zi* 'they die', which in Kloekhorst 2008: 168 was interpreted as /ʔkːántsi/. According to Weeden, this amounts to "saying that #VC- = ʾVC (i. e. $C_1VC_2$) and that the middle vowel can be silent", which is "very difficult to accommodate within any theory of cuneiform spelling" (o.c.: 68). Although I disagree with the latter point of this criticism,[14] I do now concede that these cases should not be interpreted as having an initial glottal stop. In Kloekhorst 2014a: 339–40 I argued that since the weak stem *akk-* 'to die' can be secondarily accented, it probably was not /ʔkː-/, but rather had a vocalic anlaut, /əkː-/. I therefore retracted the analysis of a form like *ak-ka-an-zi* 'they die' as /ʔkːántsi/, and instead interpret it now as /əkːántsi/. By analogy, I now interpret a form like *a-ša-an-zi* 'they are', which I initially interpreted as /ʔsántsi/, as /əsántsi/ (2014a: 379–84).[15] As a consequence, I no longer assume the presence in Hittite of word-initial /ʔ/ in pre-consonantal position.

---

[12] But also sometimes *$h_2$ or *$h_3$, depending on the exact environment.

[13] A notable exception is Simon 2010, who accepts my interpretation and applies it to Cuneiform Luwian.

[14] In forms like *li-in-kat-ta* 'he swore' /línktːa/ (also spelled *li-in-ik-ta*) and *ḫar-ták-ka-* 'bear' /χərtkːa-/ we do find spellings with CVC-signs the vowel of which is silent.

[15] Albeit that /əsántsi/ does go back to an earlier, pre-Hittite */ʔsántsi/ < PIE *$h_1$*sénti*.

Weeden also criticizes the postulation of a word-initial /ʔ/ in prevocalic position, which in my view can be spelled *V₁-V₁C(-)* (if the vowel following /ʔ/ stands in a closed syllables) or *V₁-C°* (if the vowel following /ʔ/ stands in an open syllable). Especially my interpretation of word-initial plene spelling *V₁-V₁C(-)* as representing /ʔVC°/ (e. g. *e-eš-zi* 'he is' = /ʔéstsi/, *a-aš-zi* 'he remains' = /ʔás:tsi/) is according to Weeden (with reference to Kouwenberg 2003–2004) falsified by the fact that in Old Babylonian word-initial plene spelling is in principle used to indicate the presence of long vowels, not of a word-initial *'aleph* (= [ʔ]).

And indeed, Kouwenberg (2003–2004) has convincingly argued that Old Babylonian spellings of the type *a-al-la-ak* 'I go' and *i-il-la-ak* 'he goes' represent *âllak* and *îllak*, respectively, with initial long contracted vowels (resulting from **a'allak* and **i'allak*, according to the structures *aC₁aC₂C₂aC₃* and *iC₁aC₂C₂aC₃*), and not something like ***'allak* and ***'illak*, with an initial *'aleph*. In fact, Kouwenberg convincingly argues that Old Babylonian did not have word-initial *'aleph* at all (2003–2004: 91). He points to sandhi spellings of the type *a-na-lim-ma* for *ana ālim=ma* 'to the city', which contrast with Old Assyrian sandhi spellings of the type *a-am-tí-šu* for *ana amtīšu* 'for his slave-girl'. In the latter case, *a-am-tí-šu* must be interpreted as /a''amtīšu/, in which geminate /'' / is the realization of underlying /n'/, i. e. */an'amtīšu/ (with the regular development of **nC* > *CC* in Old Assyrian), implying that Old Assyrian *amtīšu* contains an initial *'aleph*, /'amtīšu/. In the case of Old Babylonian *a-na-lim-ma*, however, we must analyze this form as /anālimma/, in which no /'/ seems to be present. This implies that Old Babylonian *ālum* 'city' did not contain an initial *'aleph*. This is an extra confirmation that in Old Babylonian word-initial plene spelling of the type *V₁-V₁C(-)* does not normally indicate the presence of a word-initial *'aleph*, because word-initial *'aleph* simply did not exist in Old Babylonian.

On the basis of Kouwenberg's arguments I concede that the examples I invoked in earlier publications[16] in favor of the interpretation of Old Babylonian word-initial *V₁-V₁C(-)* as /ʔVC°/, which were based on examples cited by Aro 1953: 4 (e. g. *i-in-šu* = /ʔīnšu/ 'his eye', *a-aḫ-šu* = /ʔaḫšu/ 'his side', etc.), can no longer be upheld.

Does all this now mean that the concept of the existence of a word-initial phonemic /ʔ/ in Hittite is decisively disproven? To my mind, the answer to this question is no. The absence of a word-initial phonemic *'aleph* = /ʔ/ in Old Babylonian does not automatically mean that Hittite

[16] E. g. Kloekhorst 2014a: 169.

cannot have had such a phoneme either. However, it does raise the question: if Hittite indeed had such a phoneme, what could have been the way in which it would have been written by scribes that had the Old Babylonian cuneiform script at their disposal?

We have seen above that Old Babylonian did possess a phonemic *'aleph* = /ʔ/ in word-medial position, where it is in principle spelled with the sequence °$V_1$-$V_2$-$V_2$C(-) if the vowel following stands in a closed syllable (e. g. *i-ri-a-ab* 'he replaces' = /iri"ab/, *iš-ta-na-a-al* 'he keeps asking' = /ištana"al/)[17], or °$V_1$-$V_2$(-) if the vowel following stands in an open syllable (e. g. *da-i-ku* 'murderer' = /dā'iku/, *le-a-ni* 'writing boards' = /lē'ani/, *re-e-ú-tim* 'shepherdship' = /rē'ûtim/)[18]. It may therefore stand to reason to assume that in order to write a word-initial phonemic /ʔ/ the Hittite scribes would copy this word-medial spelling convention, and use the sequences $V_1$-$V_1$C(-) and $V_1$-CV(-). In fact, this is what is being done by Old Babylonian scribes when they write down the phoneme *'aleph* (= [ʔ]) as present in foreign language words. As Streck (2000: 232) states, the syllable initial *'aleph* of Amorite lexemes (mostly personal names) is by Old Babylonian scribes indicated by spelling *ḫ*, *zero*, or plene spelling of the type (-)$V_1$-$V_1$C(-). As Weeden (2011: 67[29]) notes, Streck only provides examples of word-medial *'aleph* spelled -$V_1$-$V_1$C(-), but not of word-intial *'aleph* spelled $V_1$-$V_1$C(-), which makes it uncertain whether this spelling practice was used in this position as well. However, Weeden points out that the other post-uvular consonant of Amorite, *'ayin* (= [ʕ]), which in word-medial position is spelled in the exact same way as *'aleph* (i. e. with *ḫ*, *zero*, and -$V_1$-$V_1$C(-)), is securely attested in word-initial position with the spelling $V_1$-$V_1$C(-): *i-iz-zi* = *'izzī*; *a-ab-du-e-mi(-im)* = *'abdu-yimmi(m)*, cf. Streck 2000: 252. Since in word-medial position the Old Babylonian scribes treated Amorite *'aleph* and *'ayin* in the exact same way, it stands to reason to assume that also in word-initial position this would be the case, and that thus Amorite *'aleph*, too, could in this position be spelled $V_1$-$V_1$C(-). Note that in the examples *i-iz-zi* = *'izzī* and *a-ab-du-e-mi(-im)* = *'abdu-yimmi(m)* the vowel of the initial syllable is short: the plene spelling is only used to indicate the presence of the word-initial consonant.[19] This need not imply, however, that the vowel following such a consonant was always short: on the basis of examples

---

[17] See Weeden 2011: 63–4, with footnote 11 for *i-ri-a-ab* and Kouwenberg 2003–2004: 92 for *iš-ta-na-a-al*.

[18] See footnote 7 for references.

[19] I. e., as if the *V*-signs are used in the values *'V* and *'V*, cf. the discussion in footnotes 6 and 10.

like *si-im-a-al* = Amorite *śim'āl* (Streck 2000: 234), it is clear that in word-medial position the sequence *-$V_1$-$V_1$C(-)* could spell the presence of *'aleph* (and of *'ayin*) + long vowel as well.

According to Weeden, the fact that Amorite *'aleph* and *'ayin* are in Old Babylonian spelled with *ḫ*, *zero* and *(-)$V_1$-$V_1$C(-)* means that if Hittite indeed possessed a word-initial /ʔ/, we should not only expect to find the spelling *$V_1$-$V_1$C(-)*, but "we would expect there to be at least some writings with the Ḫ-series to indicate that there was some kind of meaningful sound there" (2011: 67). He therefore concludes that "[t]he alleged Hittite practice [of writing /ʔ/ with *$V_1$-$V_1$C(-)*] is thus not comparable to O[ld] B[abylonian] cuneiform's attempts to represent similar Amorite phonemes" (*ibid.*: 67–8). I disagree with him on this point. In the case of writing Amorite word-initial *'aleph* (and *'ayin*) in Old Babylonian we are dealing with a sound that is not found in the language of the scribes as such. They therefore can either ignore it (= the zero-spellings), substitute it with a phonetically similar phoneme that is present in Old Babylonian in this position (= the *ḫ*-spellings), or they can adopt a spelling with which *'aleph* is in indigenous Old Babylonian words indicated in word-medial position (= the *$V_1$-$V_1$C*-spelling). In the case of Hittite, however, the situation would be quite different. If Hittite indeed possessed a phonemic /ʔ/ in word-initial pre-vocalic position, it would be distinct both from the phoneme /χ/ (spelled with *ḫ*) and from *zero* (see below for the postulation of word-initial vowels without a preceding /ʔ/ in Hittite). It would therefore make no sense for a Hittite scribe to write this sound with *ḫ-* or with *zero*: these spellings had other functions. The only expected spelling for a hypothetical phonemic /ʔ/ is therefore *$V_1$-$V_1$C(-)*. Moreover, we would expect that if /ʔ/ is indeed phonemic in Hittite, the spelling *$V_1$-$V_1$C(-)* would in principle be employed consistently.

All in all, we can conclude that in Old Babylonian word-initial plene spelling of the type *$V_1$-$V_1$C(-)* is in principle used for indicating the presence of long vowels, e. g. *a-al-la-ak* 'I go' = *âllak*, *i-il-la-ak* 'he goes' = *îllak*. However, the spelling *$V_1$-$V_1$C(-)* can also be used for noting down foreign post-uvular phonemes (assuredly Amorite *'ayin*, very likely Amorite *'aleph*), thus adopting the value of this sequence in word-medial position, where in Old Babylonian it denoted the presence of *'aleph*. This means that from the point of view of Old Babylonian spelling practices the Hittite sequence *$V_1$-$V_1$C(-)* could theoretically be used both for spelling an initial long vowel, /V̄C°/, as well as for spelling a word-initial glottal stop that was followed by either a short vowel, /ʔV̆C°/, or a long vowel, /ʔV̄C°/. In other words, from the point of view of the Old Babylo-

nian scribal practice, a form like Hitt. *e-eš-zi* 'he is' can in theory represent either /ēstsi/, /ʔestsi/ or /ʔēstsi/. Likewise, Hitt. *a-an-ši* 'he wipes' can in principle be interpreted as either /ānsi/, /ʔansi/ or /ʔānsi/. The choice between all these theoretically possible interpretations can only be made on the basis of internal Hittite arguments. In the remainder of this section I will argue that forms like *e-eš-zi* and *a-an-ši* (at least in the post-OH period) cannot have contained a long vowel, which eliminates the interpretations /ēstsi/, /ʔēstsi/ and /ānsi/, /ʔānsi/. The only possibility that is left is an interpretation with a short vowel, which automatically implies the presence of a glottal stop: /ʔestsi/ and /ʔansi/.

### *3a. The spelling* a-aC(-)

Let us first look more closely at the Hittite verbal form *a-an-ši* 'he wipes'. This form shows consistent word-initial plene spelling.[20] In view of the normal Old Babylonian value of *$V_1$-$V_1$C(-)* we would at first sight be inclined to interpret this form as /ānsi/, with a long vowel. Also etymologically this would fit: *ānš-* is a *ḫi*-verb, and *ḫi*-verbs in principle always show an etymological accented **o*-grade in their strong stem, which in Hittite regularly yields a vowel that interconsonantally is spelled *(-)Ca-a-aC(-)*, and which is therefore generally interpreted as a long /ā/, e. g. *išpānti / šippānti* 'he libates' /ɪspːánti, sipːánti/ < **(se-)spónd-ei*, *ka-a-an-ki* /kánki/ 'he hangs' < **ǵónk-ei*, *da-a-aḫ-ḫi* 'I take' /t'áχːi/ < **dóh₃-h₂ei*, etc. This long /ā/ < **ó* contrasts with the outcome of PIE accented **é* that is colored to *a*, for instance by an adjacent **h₂*: this yields a vowel that is in principle always spelled non-plene and therefore is generally regarded to have been a short /a/, e. g. *pa-aḫ-ḫu-ur* /páχːor/ 'fire' < **péh₂ur*, *ḫant-* /χánt-/ 'forehead' < **h₂ént-*, etc.

It should be noted, however, that many forms containing an etymological **ó* do not always show plene spelling: next to *iš-pa-a-an-ti / ši-pa-a-an-ti* there are also the spellings *iš-pa-an-ti / ši(-ip)-pa-an-ti*; besides *ka-a-an-k°* we also find the spelling *ka-an-k°*; and *da-a-aḫ-ḫi* has the graphic variant *da-aḫ-ḫi*. It is well known that the forms with and without plene spelling are distributed chronologically. As Kimball (1999: 55) states, "[a]s a general rule, plene writing is more frequent in early texts (texts in OH ductus and many MH texts) than it is in original compositions of the NH period". It is usually assumed that this "lower frequency of plene writing in chronologically later texts reflects only a de-

---

[20] Attested more than 35 times as *a-an-ši*, never as ***an-ši*, cf. Kloekhorst 2008: 182, Puhvel HED 1/2: 74–5 and HW² A: 95–6 for attestations. The one attestation *a-a-an-ši* (KUB 30.41 i 14 (OH/NS)) will be treated in footnote 39.

crease in the use of an orthographic practice that was, already at the earliest stage, optional" (Yates 2016: 241). As I have argued before,[21] this view is too simplistic, however, for two reasons.

First, in many of the words that show a decrease of their plene spelling over time, this decrease is virtually total. For instance, in the case of 'he libates', in OS texts we find 12 plene spelled forms (*iš-pa-a-an-ti*, *ši-pa-a-an-ti*) vs. 22 non-plene spelled forms (*iš-pa-an-ti*, *ši-pa-an-ti*) [a ratio of plene to non-plene spelling of 35%], whereas in MS and NS texts, we do not find plene spelled forms anymore, but more than 740 attestations with non-plene spelling (*iš-pa-an-ti*, *ši(-ip)-pa-an-ti*) [a ratio of 0%].[22] The strong stem of 'to hang' is in OS texts spelled 4 times with plene spelling (*ka-a-an-k°*, *ga-a-an-k°*), but not with non-plene spelling [a ratio of 100%], whereas in NS texts we find no plene spelled forms anymore, but 12 non-plene spelled forms (*ka-an-k°*, *ga-an-k°*) [a ratio of 0%].[23] For 'I take', we find in OS texts 9 plene spelled forms (*da-a-aḫ-ḫi/ḫé*), but no non-plene spelled forms [a ratio of 100%]; in MH/MS texts we find 3 plene spellings (*da-a-aḫ-ḫi*) vs. 4 non-plene spellings (*da-aḫ-ḫi*) [a ratio of 43%], and in NH/(L)NS texts only 1 plene spelled form (*da-a-aḫ-ḫi*) vs. 22 non-plene spelled ones (*da-aḫ-ḫi*) [a ratio of 4%].[24] Plene spelling in these words in NH texts therefore does not seem to be "optional" anymore. Instead, the vowels of these words in NH texts are virtually consistently spelled non-plene,[25] which makes them graphically indistinguishable from short /a/, which is virtually consistently spelled non-plene as well (cf. also the discussion below in section 3b).

Second, next to many words in which plene spelling of *a* decreases over time, there are also words in which no decrease in their use of plene spelling can be found at all. For instance, *dāš* 'he took' is virtually always attested with plene spelling, not only in OS texts (3 times *da-a-aš*, never ***da-aš*), but also in MH/MS texts (7 times *da-a-aš*, never ***da-aš*), as well as in NH/(L)NS texts (52 times *da-a-aš*, never ***da-aš*).[26] The same

---

[21] Kloekhorst 2014a.

[22] Kloekhorst 2014a: 264.

[23] Kloekhorst 2014a: 265.

[24] Kloekhorst 2014a: 239.

[25] In not all cases the drop-off point is exactly the same: in *išpānti / šipānti* the decrease seems to start within the OH period already, whereas in the case of *dāḫḫi* it happens in the MH period. Yet, the outcome is in all cases the same: by the time of the NH period virtually no plene spelling is left anymore.

[26] Kloekhorst 2014a: 240, 252. The only non-plene spelled attestations of this word, *ta-aš*, are found on KBo 18.151, which is a tablet that shows many aberrant spellings anyway, cf. Kloekhorst 2014a: 252[894].

goes for *tān* 'second(ly)', which is attested with plene spelling in OS texts (2 times *ta-a-an*, never ***ta-an*), as well as in MS and NS texts (ca. 60 times *ta-a-an*, never ***ta-an*).[27] Also *mān* 'if, when, like' shows this pattern: it is in OS texts always attested with plene spelling (70+ times *ma-a-an*, never ***ma-an*), which is also the overwhelmingly preferred spelling in MS and NS texts (ca. 550 times *ma-a-an* vs. 4 times *ma-an*).[28] The same goes for *kāš* 'this (one)': in OS texts it always shows plene spelling (6 times *ka-a-aš*, never ***ka-aš*), which is also the case in MS and NS texts (ca. 150 times *ka-a-aš*, never ***ka-aš*).[29] The numbers for these forms are very clear: they show virtually consistent plene spelling throughout the history of Hittite, i. e. in OS, MS as well as NS texts. This means that neither for these words plene spelling was "optional". Moreover, their ratios of plene to non-plene spelled forms in NS texts (100% for *dāš*, 100% for *tān*, 99.3% for *mān*, 100% for *kāš*) are diametrically opposed to the ratios of the words treated in the preceding paragraph (0% for *išpānti / šipānti*, 0% for *kānk°*, 4% for *dāḫḫi*).

Any scholar who wishes to see "the lower frequency of plene writing in chronologically later texts" as reflecting "only a decrease in the use of an orthographic practice" (thus Yates 2016: 241, but likewise Kimball 2015: 23–4, Melchert 2018), has to come up with an explanation why a full decrease of plene spelling is found in *išpānti / šipānti*, *kānk°* and *dāḫḫi*, whereas no decrease at all is found in the case of *dāš*, *tān*, *mān*, and *kāš*. A general decrease cannot explain these facts.

There is one possible correlation that immediately presents itself: *dāš*, *tān*, *mān* and *kāš* are all monosyllabic words and thus contrast with polysyllabic *išpānti / šipānti*, *kānk°* and *dāḫḫi*.[30] From an orthographic point

---

[27] Kloekhorst 2014a: 252.

[28] Kloekhorst 2014a: 251–2.

[29] Kloekhorst 2014a: 251.

[30] Melchert (2018: 594) complains that in Kloekhorst 2014a I have not subjected the figures of plene vs. non-plene spelled examples to any formal statistical analysis, and that "[w]ithout such an analysis, we cannot even be sure that some of the alleged patterns are statistically significant", a critique that is shared by Yates (2016: 240[13]). I really do not see how a formal statistical analysis could help in judging whether the relative numbers of plene spellings for *dāš*, *tān*, *mān* and *kāš* are significant vis-à-vis the relative numbers for NH *išpānti / šipānti*, *kānk°* and *dāḫḫi* and whether we are dealing with a real linguistic distribution or not. The numbers are as clear as one could wish for. Nevertheless, for the sake of the argument, I did perform a chi-square test of independence to examine the relation between mono- vs. polysyllabicity of these words and the presence or absence of plene spelling in their NH attestations. The relation between these variables was highly significant, $X^2$ (1, $N$ = 1611) = 1591.1, $p$ = .00001 (with significance at $p < .05$). The conclusion is that the presence or absence of plene spelling of *a* in the NH attestations of *dāš*, *tān*, *mān*, *kāš*, *išpānti / šipānti*, *kānk°* and *dāḫḫi* correlates in a statistically highly signifi-

of view, one may therefore suggest that the Hittite scribes apparently felt the need to use plene spelling in monosyllabic forms, and that this need overruled the orthographic tendency according to which the use of plene spelling decreased over time, which is therefore only visible in polysyllabic words. However, this cannot be correct: on the basis of monosyllabic forms like *naš* 'and he' (attested in my files more than 350 times as *na-aš*, including in OS, MS and NS texts, never as ***na-a-aš*), *nat* 'and it' (over 450 times *na-at*, never ***na-a-at*), and *tuk* '(to) you' (over 130 times *tu-uk*, never ***tu-u-uk* or ***tu-ú-uk*), it is clear that there is no orthographic rule according to which monosyllabic forms need to be written with plene spelling.

There is thus simply no way that the distributional asymmetry between the NH attestations of *išpanti / šipanti*, *kank*° and *daḫḫi*, on the one hand, and *dāš*, *tān*, *mān* and *kāš*, on the other, can be explained by assuming orthographic tendencies.[31] I have therefore argued that the correlation is a phonological one: the retention over time of plene spelling in monosyllabic forms reflects the retention of phonological length of their /ā/, whereas the loss over time of plene spelling in polysyllabic words reflects the loss of phonological length of their /ā/. In other words, I assume a shortening of OH /ā/ to NH /a/ in the sequence /°āCCV°/, whereas OH /ā/ in monosyllables of the shape /CāC/ retained its length, and remains a long /ā/ in NH times.[32] This means that OH *iš-pa-a-an-ti* /ɪspːā́nti/ 'he libates', *ka-a-an-k*° /kā́nk-/ 'to hang' and *da-a-aḫ-ḫi* /t'ā́χːi/ 'I take' underwent shortening of their /ā/ to NH *iš-pa-an-ti* /ɪspːánti/, *ka-an-k*° /kánk-/ and *da-aḫ-ḫi* /t'áχːi/, respectively, whereas OH *da-a-aš* /t'ā́s/ 'he took', *ta-a-an* /tā́n/ 'second(ly)', *ma-a-an* /mān/ 'if, when' and *ka-a-aš* /kā́s/ 'this (one)' retained their long /ā/ through time.

---

cant way with whether these words are monosyllabic (with plene spelling) or polysyllabic (without plene spelling).

[31] Likewise Yates (2016: 251[28]), who states: "A distributional assymetry that I cannot address here is why plene spelling is so (diachronically) consistent in stressed monosyllabic words". He "note[s] only" that he disagrees with my interpretation. Yates does refer to a "possible alternative explanation" by Kimball (2015: 24), but this suggestion is non-probative, cf. my treatment in footnote 32.

[32] According to Kimball (2015: 24), in Kloekhorst 2014a I "never really provide[d] evidence that the factor accounting for the persistence of plene writing in monosyllables is retained length". According to her, "[i]t is possible, for example, that the scribe tried to avoid short spellings for monosyllabic words with long vowels; compare, for example, the Early Modern English spellings like *shee* and *bee* for *she* and *be* with doubled vowels in monosyllables with long vowels". I am not sure if I understand what Kimball means. In my interpretation, monosyllabic words with plene spelling indeed represent "monosyllables with long vowels", and this is indeed the reason why they are spelled with an extra vowel sign. So, the examples *shee* and *bee* in fact support my analysis.

It must be admitted that not all polysyllabic words containing a sequence *(-)Ca-a-aC(-)* show a decrease of plene spelling over time. For instance, *pānzi* 'they go' is attested as *pa-a-an-zi*, with plene spelling, not only in OS texts (29 times *pa-a-an-zi*, never **pa-an-zi*), but also virtually consistently so in MS and NS texts (a combined number of over 150 times *pa-a-an-zi*, vs. only 4 times *pa-an-zi* in NS texts).[33] At first sight, this word thus seems to be a counter-example to my proposed shortening rule of OH /°āCCV°/ > NH /°aCCV°/. However, as argued in Kloekhorst 2014a: 278–9, the OH form *pa-a-an-zi* probably does not represent /pā́ntsi/, but rather /pā́antsi/, the outcome of pre-Hittite */pái̯-antsi/.[34] Therefore, the retention over time of plene spelling in *pa-a-an-zi* does not contradict my shortening rule: we may assume that the disyllabic sequence /āa/ was retained as such over time, and thus kept on being spelled *pa-a-an-zi*.[35]

Another polysyllabic word in which no decrease of plene spelling over time is found is *a-an-ši* 'he wipes', with which we started our discussion. Although unattested in OS texts, in MS texts it is attested 4 times with plene spelling (*a-an-ši*) but never with non-plene spelling (**an-ši*), and in (L)NS texts it is attested 30 times with plene spelling (*a-an-ši*), but never with non-plene spelling (**an-ši*). Especially the consistent plene spelling in NS texts (a ratio of 100%) contrasts with the virtual consistent absence of plene spelling in NS attestations of other polysyllabic words like *išpanti / ši(p)panti* 'he libates' (0%), *kank°* 'to hang' (0%) and *daḫḫi* 'I take' (4%). In order to explain this remarkable distribution, we could assume that *ānši*, like *pānzi* 'they go', did not contain an original long /ā/, but rather a disyllabic sequence that did not undergo shortening over time. This is etymologically unattractive, however: although there is some debate about the exact shape of the etymological root of *ānši*, all scholars agree that it reflects a preform **Hóm(H)s-ei*,[36] with a PIE **ó* that should in principle have developed into an Old Hittite long /ā/. We would therefore by all means expect that in Old Hittite times *ānši* contained a long /ā/. But why did it not undergo a decrease of its plene spelling over time?

---

[33] Kloekhorst 2014a: 278.

[34] With the stem *pai̯-* as attested in 3sg. *paizzi* /pai̯-tsi/, cf. also 1sg.pret. *pa-a-un* /pā́un/ < */pái̯-un/ and 3pl.pret. *pa-a-er* /pā́er/ < */pái̯-er/.

[35] Alternatively, it is possible that after OH long /ā/ had been shortened to /a/ in the sequence /°āCCV°/, the disyllabic sequence /āa/ of /pā́antsi/ was contracted to /ā/, yielding a new long /ā/ in New Hittite times, spelled as *pa-a-an-zi* /pā́ntsi/ (cf. Kloekhorst 2014a: 279).

[36] Cf. the discussion in Kloekhorst 2008: 182–3.

A key to answering this question is the fact that a retention of plene spelling is also found in other polysyllabic words with word-initial plene spelling of the type *a-aC(-)*, e. g. *a-aš-zi* 'he remains', *a-aš-šu-* 'good', etc. These words, too, show in NH texts a virtual consistent plene spelling,[37] which contrasts with the virtual absence of plene spelling in NH *išpanti / ši(p)panti*, *kank°* and *daḫḫi*. According to Yates (2016: 241), who recognizes the reality of this distribution, the loss of plene spelling in word-medial position vs. its retention in word-initial position may be explained "due to the higher "cost" (in terms of scribal effort and physical tablet shape) of using plene writing [in interconsonantal position], where it requires three signs (<*CV-V-VC*>)", whereas word-initial plene spelling "requires just two signs (<*V-VC*>), and is therefore relatively "cheap"". [38] This line of reasoning is wholly unconvincing, however. The difference between word-initial plene spelling, $V_1$-$V_1$*C(-)*, and its corresponding non-plene spelling, $V_1$*C(-)*, is the presence or absence of a single sign, *V*, and therefore just as "costly" or "cheap" as expressing the difference between interconsonantal plene spelling, *(-)*$CV_1$-$V_1$-$V_1$*C(-)*, and its corresponding non-plene spelling, *(-)*$CV_1$-$V_1$*C(-)*, which, too, involves the presence or absence of a single sign, *V*. In terms of relative "cost", there is therefore no difference between the two types of plene spelling. Moreover, Yates' idea does not explain why the relatively "costly" plene spelling in monosyllables of the shape $CV_1$-$V_1$-$V_1$*C* like *da-a-aš*, *ta-a-an*, *ma-a-an* and *ka-a-aš* (but also *ke-e-el*, *ke-e-ez*, which we will see in section 3b, below) is so omnipresent in NH texts. This suggestion is therefore best forgotten.

To my mind, the presence of plene spelling in the NH attestations *a-an-ši*, *a-aš-zi*, *a-aš-šu(-)*, etc., can only be explained as follows. We have seen that according to Old Babylonian spelling practices word-initial plene spelling of the type $V_1$-$V_1$*C(-)* in principle denotes a long vowel, /V̄C°/, but can also be used for spelling a word-initial glottal stop followed by a vowel that can be either short, /ʔV̆C°/, or long, /ʔV̄C°/. The two possible interpretations that include the presence of a long vowel, /V̄C°/ (/ānsi/, /āstsi/, /āsːu-/) and /ʔV̄C°/ (/ʔānsi/, /ʔāstsi/, /ʔāsːu-/), are incompatible, however, with the fact that all other language material points to a shortening of OH /°āCCV°/ to NH /°aCCV°/: we would not expect NH polysyllabic words to contain a long /ā/ in a closed syllable. This problem does not occur if we apply the one possible interpretation that

[37] Cf. Kloekhorst 2014a: 333 and 338–9, respectively.

[38] Note that he formulates this idea for the vowel *e*, but the principle remains the same.

contains a short vowel, /ʔV̆C°/: /ʔansi/, /ʔasːtsi/ and /ʔasːu-/. The short /a/ in these NH forms would now be fully compatible with the presence of a short /a/ in the NH forms *iš-pa-an-ti / ši(-ip)-pa-an-ti* 'he libates', *ka-an-k*° 'to hang' and *da-aḫ-ḫi* 'I take', which are the result of a regular shortening of OH /°āCCV°/ to NH /°aCCV°/. The consequence of this interpretation is, however, that a glottal stop was present in *a-an-ši* = /ʔansi/, *a-aš-zi* = /ʔasːtsi/, and *a-aš-šu(-)* = /ʔasːu-/, and that the presence of this glottal stop was specifically, and virtually consistently, indicated by the plene spelling with the sign A.[39]

All in all, we can conclude that NH attestations with initial plene spelling of the type *a-aC(-)* (like *a-an-ši* 'he wipes') can only be meaningfully interpreted as representing /ʔaC-/ (/ʔansi/), i. e. with a short /a/ preceded by a glottal stop (a phonological interpretation that is one of the several possible readings of this sequence in Old Babylonian). The fact that the /ʔ/ was specifically indicated in writing by the plene spelling, to my mind implies that it was a meaningful, i. e. phonemic, sound. More on the phonemic status of word-initial /ʔ/ in section 3c, below.

### *3b. The spelling* e-eC(-)

A similar scenario can explain word-initial plene spellings of the type *e-eC(-)*. As is well known, often attested Hittite words like *ēpzi* 'he seizes', *ēšḫar* 'blood', *ēšzi* 'he is', etc., contain an *e* that goes back to a PIE short accented **é* (**h*$_1$*épti*, **h*$_1$*ésh*$_2$*r* and **h*$_1$*ésti*, respectively), and which in these words is consistently spelled plene (in my files, including OS, MS and NS texts, I have found 500+ attestations of *e-ep-zi*, never ***ep-zi*; 60+ attestations of *e-eš-ḫar*, never ***eš-ḫar*; and 160+ attestations of *e-eš-zi*, never ***eš-zi*). It is therefore often assumed that the regular outcome of PIE short accented **é* in a closed syllable is a Hittite long /ḗ/, and that these forms represent /ḗptsi/, /ḗsχːər/, and /ḗstsi/, respectively.

---

[39] Note that for Old Hittite words containing initial plene spelling of the type *a-aC(-)*, an interpretation with a long /ā/ is possible, since in this time period this /ā/ was still extant. This means that an OS form like *a-ar-ki* 'he divides' can be interpreted with a long /ā/, theoretically either as /ārki/ or as /ʔārki/ (both are licensed by Old Babylonian spelling practices). Since we now have to postulate the presence of word-initial /ʔ/ for New Hittite, it stands to reason that this phoneme was present in Old Hittite as well, and I therefore interpret OH *a-ar-ki* as /ʔārki/. In Kloekhorst 2014a: 336–7, I have cautiously suggested that the hyperplene spelled form *a-a-an-ši* (KUB 30.41 i 14 (OH/NS)) may represent an attempt to spell the presence of both the /ʔ/ and the long /ā/, *'a-a-an-ši* = /ʔā́nsi/ (which means that it must have been taken over as such from the OH original, since in NH times we expect the original /ā/ to have undergone shortening).

It is problematic, however, that in some other lexemes an etymological short accented **é* in a closed syllable never shows plene spelling. For instance, the 3sg.pres.act. form of the imperfective suffix *-šḫke/a-*, *-škezzi*, is commonly thought to reflect **-ské-ti*, but never shows plene spelling of its *e* (in my files, I have counted a total of 580+ attestations of °*š-ke-ez-zi* or °*š-ke-zi*, but never **°*š-ke-e-ez-zi* or **°*š-ke-e-zi*).[40] Likewise *šep-pitt-* 'a kind of grain' < **sépit-*, which is attested in my files 35+ times as *še-ep-pí(-it)-t*° (including OS, MS and NS examples), but never as ***še-e-ep-pí(-it)-t*°.[41]

There are also some lexemes in which we find PIE short accented **e* yielding an *e* that is spelled plene in only a few attestations. For instance, the verb *šeš-$^{zi}$ / šaš-* 'to sleep', the strong stem of which reflects **sés-*, occurs in my files 62 times with non-plene spelling, *še-eš-C*°, and twice with plene spelling, *še-e-eš-zi* and *še-e-eš-ta*. The verb *mer-$^{zi}$ / mar-* 'to die', the strong stem of which reflects PIE **mér-*, is attested 21 times with non-plene spelling, *me-er-C*°, and twice with plene spelling, [*me-*]*e*$^{?}$*-er-du* and *me-e-er-tu*$_4$. The word *genzu-* 'lap', which reflects **ǵénh*$_1$*su-*, is attested in my files 24 times with non-plene spelling, *ge-en-zu(-)*, and once with plene spelling, *ke-e-en-zu*. The verb *ša/emen-$^{zi}$ / ša/emn-* 'to pass by', the strong stem of which reflects **smén-*, is attested 15 times with non-plene spelling, *ša/še-me-en-C*°, and once with plene spelling, *ša-me-e-ez-zi*.

According to Yates (2016), who gives the most recent treatment of the outcome of PIE **é* in Hittite, all plene spelled forms (i. e. *e-eš-zi*, *e-ep-zi*, *e-eš-ḫar*, *še-e-eš-C*°, *me-e-er-du/tu*$_4$, *ke-e-en-zu*, *ša-me-e-ez-zi*, etc.)[42] in-

---

[40] Cf. Kloekhorst 2014a: 107–16 for attestations. Of these, 20 attestations stem from OS texts, 110+ attestations from MS texts, and 350+ attestations of NS texts.

[41] Cf. Kloekhorst 2014a: 102 for attestations.

[42] Yates (2016: 246) also cites forms like *ku-e-en-zi* 'he kills' < **g*$^{wh}$*én-ti* and *ḫu-e-ek-ta* 'he slaughtered' < **h*$_2$*uég*$^{(h)}$*-to* as evidence for the idea that PIE **é* > Hitt. /ē̆/, assuming that the plene spelling with the sign E in these forms indicates the presence of a long vowel. I have argued extensively in Kloekhorst 2014a: 134–61, however, that plene spelling of the type °*u-e-eC(-)* cannot be used in determining the length of the *e*-vowel, since in this sequence the sign E is used as a way to represent the phonetic glide between *u* and *e* (i. e. as if representing "°*u-u̯e-eC(-)*", comparable to spellings of the type °*u-u̯a-aC(-)*), a view that has been taken over by Yates himself (2017: 76), and also by Melchert (2017: *ad* § 1.46). Yates (2016: 246[23]; 2017: 77) does not believe, however, that this spelling practice was used for a combination of labialized consonants + *e*, a view that he has taken over from Melchert 2017: *ad* §1.46 (Yates also refers to Kimball 2015: 24–5, who is sceptical, however, about the entire concept that °*u-e-eC(-)* spellings are non-probative for determining vowel length of *e*, which contradicts Yates' own views). According to Melchert (*loc.cit.*), my statement that the spellings *ku-e-en-zi* and *ḫu-e-ek-zi* contain synchronic short /e/, /k$^{w}$éntsi/ and /χ$^{w}$éktsi/, and that the plene spelling of *e* is used

dicate that the regular outcome of PIE *é in closed syllables is a long /ē/. He must admit, however, that in many cases this vowel does not show plene spelling. In order to explain this fact, he refers to "two well-established distributional features of plene spelling, its OPTIONALITY and its ASYMMETRIC FREQUENCY" (2016: 238). With the term "asymmetry frequency" Yates refers to the phenonenon that we already saw in our treatment of the spelling *a-aC(-)* (section 3a), namely that "plene spelling decreases over time, occurring most frequently in OH compositions, less frequently in post-OH compositions (and copies of OH texts)" (2016: 240). In the case of plene spelling with the sign E, it is indeed true that it is attested more often in OH texts than in younger texts (as it was in the case of the vowel *a*), and we do indeed witness in some lexemes a decrease of plene spelling over time (e. g. OS *pé-e-eḫ-ḫi* 'I give' vs. MS and NS *pé-eḫ-ḫi*; OS *te-e-ez-zi* 'he says' vs. MS and NS *te-ez-zi*),[43] like we did in the case of the vowel *a*. However, Yates' statement that this distribution is caused by "a decrease in the use of an orthographic practice" (*o.c.*: 241) cannot be correct. As we have already seen, in the words *e-ep-zi* 'he seizes', *e-eš-ḫar* 'blood' and *e-eš-zi* 'he is', there is no decrease in plene spelling at all: these words are consistently spelled *e-eC(-)*, in OS, MS, as well as (L)NS texts. The same goes for monosyllabic words like *ke-e-el* 'of his' and *ke-e-et / ke-e-ez* 'from/by this' which do not show any decrease in their plene spelling over time either: they keep on being spelled plene in the vast majority of their attestations in OS, MS and NS texts.[44] As we have seen above, Yates' attempt to explain

---

to write a phonetic glide cannot be correct because "the labiovelars are unitary consonants, and there is no glide /w/ present, so there is no motivation for a spelling for /we/". He therefore asserts that "[i]n these sequences the plene spelling surely does mark vowel length" (with reference to Kimball 2015: 24–5, who, as we have seen, in fact says something different). Melchert's argument is demonstrably wrong, however. Whenever labiovelars are followed by the vowel *a*, Hittite regularly uses the sign U̯A, e. g. *ku-u̯a-at* /kʷat/, *ku-u̯a-a-pí* /kʷāpi/, *ḫu-u̯a-a-ar-t°* /χʷārt-/, etc. So here a spelling mechanism is used in which the labiality of the labiovelar is marked by the sign U̯A which in other cases denotes the presence of a phonetic glide. My interpretation of the spellings *ku-e-en-zi* and *ḫu-e-ek-zi* as "*ku-u̯e-en-zi*" and "*ḫu-u̯e-ek-zi*", respectively, is therefore fully parallel to these cases. I therefore maintain that the plene spelling with the sign E in *ku-e-en-zi* and *ḫu-e-ek-zi* (but also in *tu-e-ek-ki*, which is cited by Yates 2016: 246 as well) cannot be used to argue that these lexemes must have contained a long /ē/. These words are therefore non-probative for arguing that the regular outcome of PIE *é in closed syllables was /é/.

[43] Kloekhorst 2014a: 27, 49–50. Note that in these lexemes the plene spelled *e* reflects **ói* and **éh₁*, respectively (**h₁pói-h₂ei* and **dʰéh₁ti*), and these words therefore do not say anything on the outcome of PIE *é in Hittite.

[44] The ratio of plene spelled *ke-e-el* vs. non-plene spelled *ke-el* is in OS texts 100%, in MS texts 100%, and in NS texts 88%; the ratio of plene spelled *ke-e-et / ke-e-ez* vs. non-

the retention of word-initial plene spelling by claiming that plene spelling of the type *V₁-V₁C(-)* was less "costly" than plene spelling of the type *CV₁-V₁-V₁C*, and that therefore the spelling *e-eC(-)* was retained over time whereas plene spelling in *(-)Ce-e-eC(-)* was given up, is meaningless. Moreover, this claim is flatly contradicted by the forms *ke-e-el* and *ke-e-et / ke-e-ez*, which do retain their plene spelling over time.

The other feature that Yates refers to, termed "optionality", describes the fact that "(virtually) all well-attested words show intra- and/or inter-text inconsistency with respect to the plene spelling of long vowels in compositions of all historical periods", and that therefore "in any given instance, a long vowel might or might not be represented with plene spelling" (Yates 2016: 238–9). I fully agree with this statement: long vowels do not necessarily show 100% consistency in their plene spelling. For instance, the ablative *kēz* 'from this (one)' is in NS texts attested more than 160 times with plene spelling, *ke-e-ez*, but also 16 times with non-plene spelling, *ke-ez*, which means that in some 10% of its attestations plene spelling is absent (the ratio of plene spelling is thus 90%). The fact that similar numbers are found for this lexeme in OS texts (94%) and MS texts (90%),[45] implies that this principle is valid for texts of all periods.[46] The opposite is also true, however: short vowels do not necessarily show 100% consistency in their non-plene spelling, either. For instance, the word *paḫḫur* 'fire', which generally is phonologically interpreted as /páχːor/, with a short accented /á/ (< PIE **péh₂ur*), shows non-plene spelling, *pa-aḫ-ḫur*, in 23 attestations, but also two attestations with plene spelling, *pa-a-aḫ-ḫur* (KBo 17.10 iii 2 (2x)). Most scholars assume that these two plene spelled forms are untrustworthy: Melchert (1994: 147) calls them "hardly probative", I myself have suggested that these forms may be "falsely archaizing" (Kloekhorst 2014a: 289), and Yates (2016: 239[12]) views them as "a scribal error". A similar case is the suffix *-u̯ant-*, which is generally interpreted as /-uánt-/ with a short accented /á/ (< PIE **-u̯ént-*). Although this morpheme is spelled hundreds of times *-u̯a-an-t°*, without plene spelling (Melchert 1994: 135 mentions "340+ examples"), one plene spelled form has been reported: *kị̄-iš-du̯-u̯ạ-ạ-ạn*[*-du-*]*u̯š*, read

---

plene spelled *ke-et / ke-ez* is in OS texts 94%, in MS texts 90%, and in NS texts 91%. Cf. Kloekhorst 2014a: 28–30.

[45] Cf. Kloekhorst 2014a: 28–30 for figures and attestation places.

[46] Although in some cases the absence of plene spelling seems to be due to scribal practicalities (for instance at the end of line when there was not enough space, cf. Rosenkranz 1964: 168), often no clear reason for the absence of plene spelling can be detected (cf. Yates 2016: 239).

as such by Goetze (1928: 2) for KUB 14.1 obv. 9. According to Melchert (1994: 135), the phonetic reality of this latter form is "highly unlikely" (*ibid.*), and I myself have argued that it may have been read incorrectly and in fact did not contain plene spelling at all (Kloekhorst 2014a: 285–6). The noun *ḫant-* 'forehead', which is generally interpreted as /χánt-/, with a short /a/ (< PIE *$h_2$ént-*), occurs with non-plene spelling dozens of times,[47] but also twice with plene spelling, *ḫa-a-an-za* (KUB 9.28 ii 12) and *ḫa-a-an-da* (KBo 3.4 ii 17). I have cautiously suggested that these forms may have undergone monosyllabic lengthening (Kloekhorst 2014a: 256). So, whatever be the reason for these plene spellings of the short vowels of /páχːor/, /-uánt-/ and /χánt-/ —whether they are mistakenly written as such by the Hittite scribes, mistakenly read as such by modern scholars, or in fact represent a long vowel that is determined by a specific phonological environment—, it is important to realize that also in words that are generally regarded to contain a phonemically short vowel sporadic plene spellings are attested in Hittite texts.

All in all, the "optionality" feature of plene spelling means that one should be careful with using individual attestations for determining whether a lexeme contains a long or a short vowel: not only can underlying **long** vowels show sporadic **non-plene** spelling, we also know cases in which an underlying **short** vowel shows sporadic **plene** spelling.

This insight is crucial for determining the regular outcome of PIE short accented **é* in Hittite. As we have seen above, Yates (2016), for instance, assumes that the plene spelled forms *še-e-eš-C°* (attested 2x, vs. 62x non-plene *še-eš-C°*), *me-e-er-C°* (attested 2x, vs. 21x non-plene *me-er-C°*), *ke-e-en-zu* (attested 1x, vs. 24x non-plene *ge-en-zu(-)*) and *ša-me-e-ez-zi* (attested 1x, vs. 15x non-plene *ša/še-me-en-C°*) indicate that these lexemes contained a long vowel, /sḗsC°/, /mḗrC°/, /kḗntsu-/, /smḗnC°/, and that all their dozens of non-plene spelled attestations are the result of the "optionality" feature, and therefore non-probative. To my mind, however, we should take the non-plene spelled forms of these stems as the standard way of spelling, and regard the plene spelled forms as due to "optionality", in the sense that they are the result of scribal errors, archaizing hypercorrections, etc.[48] I therefore arrive at an analysis oppo-

[47] Cf. Kloekhorst 2008: 287–9 for attestations.

[48] For *se-e-eš-zi* and *še-e-eš-ta* I have argued that they are the result of archaizing hypercorrections (Kloekhorst 2014a: 72). For [*me-*]*e*$^{?}$*-er-du* and *me-e-er-tu*$_4$ I have argued that their plene spelling may reflect "emphatic lengthening" in imperatival forms (Kloekhorst 2014a: 94–5). The form *ke-e-en-zu* is probably a mistake (Kloekhorst 2014a: 68), cf. also the fact that it is the only form of this word spelled with the sign KE, vs.

site to the one by Yates: I interpret these lexemes as containing a short vowel, i. e. as /sés-/, /mér-/, /kéntsu-/, and /sménC°/, respectively, which means that in these words PIE accented short **é* has developed into a Hittite short accented /é/. Note that I contrast the outcome of PIE **é* in these polysyllabic words with the outcome of PIE **é* in monosyllables, which to my mind was a long /ḗ/, since we find consistent plene spelling in e. g. *ke-e-el* /kḗl/ 'this (gen.sg.)' < **ḱél* and *ke-e-et / ke-e-ez* /kḗt(s)/ 'this (abl.)' < **ḱét(i)*.[49]

My interpretation has the following advantages vis-à-vis Yates' analysis:

1. We can now understand why the outcome of the etymological short accented **é* in e. g. *°š-ke-ez-zi* < **-ské-ti* and *še-ep-pí-it-t°* < **sép-it-* is *never* attested with plene spelling: it synchronically was a short /é/: /°skétsi/ and /sépːitː-/. [The alternative assumption that these lexemes show an underlying long /ḗ/, which by "optionality" just happens to never have been spelled plene, not even in Old Hittite originals, is unsatisfactory].

2. The spelling of the short /é/ in /sés-/, /mér-/, /kéntsu-/, and /sménC°/, with a sporadic plene spelling (in 4.6%, 4.8%, 4.1% and 6.7% of their attestations, respectively) can now be viewed as equivalent to the spelling of short accented /á/, which in some lexemes shows sporadic plene spelling as well, like in the case of *paḫḫur* /páχːor/ 'fire' (2 of in total 25 attestations, i. e. 8%).

3. We can now explain why the percentages of plene spelled attestations of *šeš-* (4.6%), *mer-* (4.8%), *genzu-* (4.1%) and *ša/emen-* (6.7%) are so different from the numbers for *kēl* (90,5%) and *kēt/ kēz* (91.3%):[50] the latter two forms contain a long accented /ḗ/ (the outcome of PIE **é* in monosyllables), whereas the former four lexemes contain a short accented /é/ (the outcome of PIE **é* in polysyllables). [The alternative

---

normal GE. In the case of *ša-me-e-ez-zi*, I have suggested that it may have undergone emphatic lengthening in a prohibitive construction (Kloekhorst 2014a: 94[348]). Even if one does not accept these explanations for the presence of plene spelling in these forms (cf. Yates 2016: 246–7, with footnote 24, for criticism on the concept of emphatic lengthening in imperatival and prohibitive constructions), the fact remains that these plene spellings are all sporadic when compared to the vast majority of non-plene spelled forms.

[49] Kloekhorst 2014a: 37.

[50] For the sake of the argument (cf. footnote 30), I performed a chi-square test of indepedence on these words to examine the relation between the numbers of syllables of a word (monosyllables vs. polysyllables) and the presence of plene spelling. The relation between these variables was highly significant, $X^2$ (1, $N$ = 407) = 293.3, $p$ = .00001 (with significance at $p$ < .05). In this data-set, plene spelling is found significantly far more often in monosyllables than in polysyllabic words.

solution that all forms contain a long accented /ḗ/, and that the difference in relative number of plene spelled attestations is just a matter of coincidence, is unsatisfactory].

I conclude that the distribution of plene vs. non-plene spelled attestations of all the forms mentioned in the preceding paragraph is much better accounted for by assuming that *šeš-*, *mer-*, *genzu-* and *ša/emen-* contain a short accented /é/ than by assigning to them a long accented /ḗ/.

We can now return to the words with which we started our discussion, namely *ēpzi* 'he seizes' < *$h_1$épti, *ēšḫar* 'blood' < *$h_1$ésh$_2$r and *ēšzi* 'he is' < *$h_1$ésti*. These show a consistently plene spelled *e* as the outcome of a PIE short accented **é* in a closed syllable in a polysyllabic word, and e. g. Yates therefore cites them as evidence in favor of the view that PIE **é* yielded a long /ḗ/ in Hittite. This view is incompatible, however, with the fact that the outcome of PIE **é* is only sporadically spelled plene in words like *šeš-*, *mer-*, *genzu-* and *ša/emen-* and shows no plene spelling at all in e. g. *-škezzi* and *šeppitt-*, pointing to the presence of a short accented /é/ (which shows a spelling equivalent to short accented /á/). Moreover, the spelling of *ēpzi*, *ēšḫar* and *ēšzi* is also aberrant when compared to the spelling of words like *kēl* and *kēt/kēz*, which do contain a long accented /ḗ/ (the outcome of PIE **é* in monosyllabic words): whereas these latter words occasionally show non-plene spelling (in ca. 10% of their attestations in all historical periods of Hittite), the plene spelling in *ēpzi*, *ēšḫar* and *ēšzi* is consistently present in *all* attestations (500+ times *e-ep-zi*, never ***ep-zi*; 63 times *e-eš-ḫar*, never ***eš-ḫar*; 160+ *e-eš-zi*, never ***eš-zi*). It cannot be coincidental that these consistent plene spellings are only found in words that start in *e-*.[51]

As we have seen above, from the point of view of Old Babylonian spelling practices, word-initial plene spelling of the type *$V_1$-$V_1$C(-)* normally spells the presence of a long vowel, /V̄C°/, but can in principle also be used to spell the presence of an initial glottal stop followed by either a short vowel, /ʔV̆C°/, or a long vowel, /ʔV̄C°/. This gives way to interpreting *e-ep-zi*, *e-eš-ḫar* and *e-eš-zi* as /ʔéptsi/, /ʔésχːər/ and /ʔéstsi/, respectively, all with a short accented /é/. In this way, the outcome of PIE **é* in these forms would be the same as its outcome in *šeš-*, *mer-*, *genzu-*,

[51] I performed a chi-square test of independence on these words to examine the relation between whether a word (graphically) starts with a consonant or with *e-* and the presence of plene spelling. The relation between these variables was highly significant, $X^2$ (1, $N$ = 852) = 787.6, $p$ = .00001 (with significance at $p < .05$). In this data-set, plene spelling is found significantly far more often in words that graphically start in *e-* than those that start in a consonant.

*ša/emen-*, *-škezzi* and *šeppitt-*, which can be argued to contain a short /é/ as well (and which contrast with the long /ḗ/ found in e. g. *kēl* and *kēt* / *kēz*). The consequence is, however, that *e-ep-zi* = /ʔéptsi/, *e-eš-ḫar* = /ʔésχːər/ and *e-eš-zi* = /ʔéstsi/ contain a word-initial glottal stop that is specifically expressed as such in writing. Moreover, this glottal stop was apparently so important that it was virtually never left unexpressed in spelling (comparable to the situation of *a-aC(-)* = /ʔaC°/).

### *3c. The phonemicity of word-initial* /ʔ/

In his treatment of my glottal stop hypothesis, Weeden rhetorically asks "[i]f any initial vowel has a glottalic onset, how can a glottal stop be phonemically contrastive word-initially?" (Weeden 2011: 62; likewise Kimball 2015: 23). At first sight, this seems to be a fair point. It is usually assumed that in Proto-Indo-European no word could start with a vowel, and that whenever we find in the daughter languages lexemes that at first sight seem to have an initial vowel (e. g. Gr. ἐστί ~ Skt. *ásti* 'he is', or Gr. ἀντί ~ Skt. *ánti* 'facing'), we should in fact reconstruct word-initial laryngeals (**h₁ésti* and **h₂énti*). This means that Hittite stems from a language that had no contrast between, e. g., **h₁e-* (= *[ʔe-]) and **e-*, anyway. So even if, for instance, *e-eš-zi* 'he is' (< PIE **h₁ésti*) indeed synchronically represents [ʔéstsi], with an initial [ʔ], this word would not contrast with any inherited Hittite word starting in [e-], and we may just as well regard the initial glottal stop as automatic, i. e. non-phonemic. To my mind, this view cannot be upheld, however. I know of at least two arguments in favor of the phonemicity of word-initial glottal stop.

First, we should consider the words *u̯ātar* 'water' and *uu̯ātar* 'inspection', which form a minimal pair: the former of these is consistently spelled *u̯a-a-tar* (more than 210 attestations in my files, from OS, MS and NS texts),[52] whereas the latter shows a consistent spelling *ú-u̯a-(a-)tar* (14x in my files),[53] with an extra sign Ú. Etymologically, the two words have a different origin as well: *u̯ātar* 'water' goes back to PIE **uódr*, whereas *uu̯ātar* 'inspection', which is an abstract noun in *-ātar* derived from the verbal stem *au-$^{i}$ / u-* 'to see', can be transposed to a preform **Huótr*.[54] Since the spelling with the extra sign Ú in *uu̯ātar* 'inspection' correlates with the presence of a word-initial laryngeal, I have proposed that synchronically the spelling *ú-u̯a-a-tar* represents /ʔuā́tər/, with an in-

[52] Cf. Kloekhorst 2014a: 406–7 for attestations.

[53] Cf. Kloekhorst 2014a: 407[1581] for attestations.

[54] There is debate on the exact shape of the laryngeal of the PIE root **Heu-* 'to see', cf. Kloekhorst 2008: 229, but this is irrelevant for now.

itial glottal stop. In this way, this word contrasts with the spelling *u̯a-a-tar* that represents /uā́tər/ without a glottal stop (Kloekhorst 2008: 25, 38).

My interpretation has been criticized by Weeden (2011: 62–3), who argues that in Old Babylonian a spelling *ú-wa-* is in principle used to represent an initial sequence /uwa-/, e. g. *ú-wa-tar* /uwattar/ 'will be more' (3sg. D-stem of *watārum* 'to increase', containing the prefix *u-*), which contrasts with the spelling *wa-*, which represents /wa-/, e. g. *wa-ta-ar* /watar/ 'to be more' (the stative of *watārum* 'to increase'). He therefore concludes that "all evidence points against *ú-wa-* being the writing of a glottal stop" (*ibid.*: 63). Although Weeden is right that in Old Babylonian the spelling *ú-wa-* represents /uwa-/, such an interpretation will not work for Hittite. It is well known that in Hittite any sequence of the shape *-*uw-* developed into *-um-*, e. g. **tepnu-wanzi* > *tepnumanzi* 'to diminish (inf.I)'. This rule is synchronically still operative in Hittite, as can be seen from e. g. the NH 1pl. form *aumeni* 'we see', which reflects a virtual **au-weni*, a morphological renewal of OH *umēni* < **Hu-wéni* (cf. Kloekhorst 2008: 29[46]). It therefore is impossible to interpret Hitt. *ú-u̯a-a-tar* as /uwā́tər/: such a form would have surfaced as ***umātar*. This means that the Old Babylonian value of word-initial *ú-wa-*, /uwa-/, cannot have been meant by the Hittite scribes anyway: such a sequence simply did not exist in Hittite phonology. They must have therefore used this spelling practice for noting down something else. Weeden's considerations therefore cannot be used as an argument against my interpretation of *ú-u̯a-a-tar* as /ʔuā́tər/.

Rieken, too, is critical of my interpretation, and states that if there is indeed a phonetic difference between *u̯a-a-tar* 'water' and *ú-u̯a-a-tar* 'inspection', this is "am ehesten im analogisch bewahrten silbischen Charakter von anlautendem *u-* im zweiten Wort zu suchen, das eine Ableitung zu *au(š)-/u-* darstellt" (2010: 128). This implies that she assumes that *uu̯ātar* 'inspection' represents /uā́tər/,[55] with vocalic /u-/, which contrasts with *u̯ātar* 'water' = /wā́tər/, with consonantal /w-/. Fundamental to this interpretation is the question whether Hittite knew a phonemic distinction between /u/ and /w/. As I have argued in Kloekhorst 2008: 29–31, such a distinction cannot be demonstrated for any other position in the word: there is no synchronic phonemic distinction between /u/ and /w/ in interconsonantal position (no contrast between /CuC/ and /CwC/), in intervocalic position (no contrast between /VuV/ and /VwV/), in the position

[55] As we have seen in the preceding paragraph, a phonological form **/uwā́tər/ would be impossible. Phonetically, a pronunciation [u$^{w}$ā́tər], with an intermediate glide, is possible, however.

*C_V* (no contrast between /CuV/ and /CwV/), in the position *C_R* (no contrast between /CuR/ and /CwR/), or in the position *V_(C)* (no contrast between /Vu(C)/ and /Vw(C)/). In all these positions we can thus assume the presence of a single phoneme, /u/, which was either consonantal or syllabic depending on its environment.[56] This means that if one would follow Rieken's interpretation of *uu̯ātar* as /uáter/ vs. *u̯ātar* as /wáter/, one has to assume the presence of an extra phoneme, /w/, which would only be found in absolute word-initial position before a vowel.

It may be clear that Rieken's alternative interpretation for explaining the difference between *u̯ātar* 'water' and *uu̯ātar* 'inspection' certainly is not *a priori* impossible, but it comes with a cost: the assumption of an extra phoneme, /w/, that otherwise is absent from the Hittite phoneme inventory. It is therefore less economical than my interpretation, which requires the use of a phoneme, /ʔ/, that, at least for the older stage of Hittite, has to be postulated for the word-medial position anyway (cf. section 2). According to Occam's Razor, my interpretation should therefore be preferred. The consequence of this interpretation is that we now have a minimal pair in which the word-initial, prevocalic glottal stop of /ʔuátər/ 'inspection' contrasts with *zero* in /uátər/ 'water', and thus is clearly phonemically contrastive.

The second argument revolves around the verb *ārš-$^{zi}$ / arš-* 'to flow'. As argued in Kloekhorst 2008: 208–10, the original strong stem of this verb, spelled *a-ar-aš-*, cannot contain a long /ā/, since etymologically this stem is expected to reflect **h₁érs-* (*e*-grade because of the *mi*-conjugation), and the vowel **e* in the sequence **eRC* in all other relevant words yielded a short vowel, spelled *Ca-aC* or *CaC*, but never ***Ca-a-aC*. The only way to explain the plene spelling with the sign A in *a-ar-aš-* is therefore to assume that it marks the presence of an initial glottal stop that is the outcome of PIE **h₁-*. Although in my 2008 book I noted down the phonological interpretation of the stem *a-ar-aš-* as /ʔársː-/, with the vowel /a/, it has in the meantime become clear that the sequence **eRC* in fact yields Hitt. /əRC/, with an /ə/,[57] which means that *a-ar-aš-* should be analysed as /ʔársː-/. However, the principle remains the same: the plene spelling in *a-ar-aš-* writes the combination of a word-initial glottal stop + a short vowel. The original weak stem of this verb, spelled *ar-š- / ar-aš-*, shows consistent non-plene spelling, and in Kloekhorst 2014a: 337–

[56] All cases which may phonetically have [w] can be phonologically interpreted as containing the consonantal allophone of /u/, e. g. *tēpau̯ēš* 'little, few (nom.pl.c.)', which phonetically probably was [ˈteˑpawes], but which can be phonologically interpreted as /tépaues/.

[57] Kloekhorst & Mens 2021.

41 this form was therefore interpreted as /ərsː-/, without a glottal stop.[58] This means that the original alternation in this verb consisted of strong stem /ʔársː-/ < *$h_1$*érs-* vs. weak stem /ərsː-/ < *$h_1$*rs-*, e. g. 3sg.pres. *a-ar-aš-zi* /ʔársːtsi/ < *$h_1$*érs-ti* vs. 3pl.pres. *ar-ša-an-zi* /ərsːántsi/ < *$h_1$*rs-énti*. The two stems therefore form a minimal pair, /ʔársː-/ vs. /ərsː-/, in which the former contains a word-initial glottal stop before the /ə/, and the latter does not, thus implying that the glottal stop was phonemic.

One could argue against this conclusion, however, that the strong stem, /ʔársː-/, was always accented, and the weak stem, /ərsː-/, was not, and that one could assume that a glottal stop was automatically present before every word-initial accented vowel, but not before unaccented vowels, and thus was non-phonemic. However, the example of *uu̯ātar* /ʔuá̯tər/ 'inspection', treated above, shows that a word-initial glottal stop can also appear before an unaccented vowel. Moreover, within the paradigm of *ārš-$^{zi}$ / arš-* itself there are indications that this view cannot be correct. As noted in Kloekhorst 2014a: 338, in MS and NS texts we find that in some forms of this verb that on etymological grounds are expected to originally have contained the strong stem we find non-plene spelling of the *a*: 1sg.pres. *ar-aš-mi*, 3sg.pres. *ar-aš-zi*, etc. This absence of plene spelling cannot be explained as the result of some graphic or phonological development, however: in most other words starting in *a-aC-*, we never find loss of the plene spelling through time, e. g. *a-an-ši* 'he wipes', *a-aš-zi* 'it remains' and *a-aš-šu(-)* 'good' are consistently spelled *a-aC(-)* throughout Hittite, also in MS and NS texts (see section 3a, above). This implies that forms like 1sg.pres. *ar-aš-mi* instead of (unattested but expected) original **a-ar-aš-mi* /ʔársːmi/ and 3sg.pres. *ar-aš-zi* instead of original *a-ar-aš-zi* /ʔársːtsi/ can only be explained as the result of a morphological replacement, i. e. as forms in which the strong stem *a-ar-aš-* /ʔərsː-/ has been replaced by the weak stem *ar-š° / ar-aš-* /ərsː-/ through paradigmatic levelling. Moreover, since in sg.pres. forms the accent always falls on the stem (the endings *-mi*, *-ši / -tti*, and *-zi* are never accented), the weak stem in these newly made forms must have been accented: /ərsːmi/ and /ərsːtsi/. They thus contain a word-initial accented /ə́/, which was not preceded by the glottal stop /ʔ/. This implies that there was no such rule that every word-initial accented vowel automatically needed to be preceded by a glottal stop. We can therefore conclude that the glottal stop in the original forms /ʔársːmi/ and /ʔársːtsi/ was not automatic either, and therefore must have had a phonemic status.

---

[58] Thus retracting my 2008 analysis as /ʔrsː-/ (Kloekhorst 2008: 210), see also footnote 1.

All in all, Weeden's concern about whether the glottal stop that I assume for words like *e-ep-zi* = /ʔéptsi/ and *a-an-ši* = /ʔánsi/ could be phonemically contrastive "[i]f any initial vowel has a glottalic onset" has turned out to be unnecessary: minimal pairs like /ʔuā́tər/ 'inspection' vs. /uā́tər/ 'water' and /ʔə́rsː-/ 'to flow (strong stem)' vs. /ə́rsː-/ 'to flow (secondarily accented weak stem)' point out that also in word-initial position the glottal stop was contrastive and thus must be regarded as phonemic.

*3d. Alleged counterarguments against the existence of word-initial /ʔ/*

Yates (2016: 248) cites three Hittite words where, to his mind, my glottal stop theory would predict the presence of a glottal stop and thus word-initial plene writing, but where no plene spelling can be found. According to him, these cases constitute "strong counter-evidence to the validity of the [glottal stop] hypothesis" (*o. c.*: 249). Let us therefore treat these words one by one:

1. "PIE **h₁esh₂-ó-* > Hitt. <*iš-ḫa-a-aš*> [isχáːs] 'master'", but not "*(<*i-iš-ḫa-a-aš*>)".

Yates is right that if this word indeed reflects **h₁esh₂-ó-* one may wonder why its initial **h₁* is not reflected as a glottal stop in Hittite, spelled *i-iš-ḫa-a-*, and that this example thus seems to contradict my glottal stop theory.[59]

Although in Kloekhorst 2008: 390 I indeed reconstructed *išḫā-* as **h₁esh₂-ó-*,[60] based on a comparison with Lat. *erus* 'master', I have in the meantime changed my mind. Within Hittite, *išḫā-* stands out because it is one of the few *a*-stem nouns that shows oxytone accentuation in its direct case forms (nom.sg. *išḫāš*, acc.sg. *išḫān*, nom.pl. *išḫēš*); virtually all other *a*-stem nouns show in these cases barytone accentuation.[61] The only other *a*-stem noun that shows oxytone direct case forms

[59] Note, however, that on the basis of the OS spelling *ú-uš-ke/a-* vs. MS and NS *uš-ke/a-* 'to see (imperf.)' < **Hu-ské/ó-*, I have in Kloekhorst 2014a: 504–5 hesitatingly suggested that an initial pretonic sequence /ʔuC-/ may in Old Hittite originally have been spelled *ú-uC-*, but that after the Old Hittite period this spelling changed to *uC-*. If we extend this to other pretonic vowels preceded by a glottal stop, we cannot fully exclude that *iš-ḫa-a-* could in principle have represented a form /ʔisχá-/, after all. However, since I now think that the etymology of *išḫā-* should be adapted, this possibility does not need to be invoked here.

[60] See now also Nussbaum 2014: 244–5 for this reconstruction.

[61] Cf. e. g. *ḫāššа- / ḫaššā-* 'hearth' which, like *išḫā-*, has oxytone oblique case forms (e. g. dat.-loc.sg. *ḫaššī*), but in its direct case forms shows barytone accentuation (nom.sg. *ḫāššа(š)*, acc.sg. *ḫāššan*, nom.pl. *ḫāššeš*).

is *ḫuḫḫa-* ‘grandfather’, which has a nom.pl. form *ḫuḫḫēš* /χoχːéš/.[62] Since this oxytone stem, which reflects *$h_2uh_2$-$V́$°, must in Proto-Anatolian have existed next to a barytone stem *$h_2éuh_2$-$V$° that is necessary to explain the lenition that is found in CLuw. *ḫūḫa-* and Lyc. *χuga-*, it is clear that ‘grandfather’ originally cannot have been an *$o$-stem, but was rather a root noun with mobile accentuation, *$h_2éuh_2$*(-s)*, *$h_2éuh_2$-*m*, *$h_2uh_2$-*és*, etc. On the basis of this example, I am now inclined to assume that the word for ‘master’ originally was an accentually mobile root noun, too, which inflected *$h_1ésh_2$*(-s)*, *$h_1ésh_2$-*m*, *$h_1sh_2$-*és*, etc. In a prestage of Latin, the barytone stem *$h_1esh_2$- was thematicized as *$h_1ésh_2$-*o*- > *erus*, whereas in a prestage of Hittite the oblique, oxytone stem *$h_1sh_2$-$V́$° spread throughout the paradigm, yielding *$h_1sh_2$-*ó*- > *išḫā*-. In this way, we may assume that in *$h_1sh_2$-*ó*- first the initial laryngeal was regularly lost, yielding *$sh_2$-*ó*-, after which a prothetic vowel arose, yielding *išḫā*- /ɪsχá́-/,[63] comparable to the development of, e. g., *$h_1sh_2$-*én*- > *$sh_2$-*én*- > *išḫan*- /ɪsχːán-/ ‘blood’. In this way, this word no longer forms a counter-argument to my glottal stop hypothesis.

2. “PIE *$h_1eh_1$-*s*-ʹ > Hitt. <*iš*-*ši*-*i*> [isːíːˑ] ‘mouth’” (dat.-loc.sg.), but not “*(<*i*-*iš*-*ši*-*i*>)”.

It is generally acknowledged that the morphological interpretation of the word for ‘mouth’ is difficult, see Melchert 1994: 115, Kloekhorst 2008: 166–7. The main problem is the reconstruction of the oblique case forms, which synchronically show the shape *išš$V$*°. The reconstructed oblique stem that is cited by Yates, *$h_1eh_1$-*s*-ʹ, is based on Melchert (2010), who argues that ‘mouth’ originally was an acrostatic neuter *s*-stem *$h_1óh_1$-*s*, *$h_1éh_1$-*s*-. According to Melchert, “[t]he accent in the weak stem was shifted to the ending already in PIE, hence *$(h_1)eh_1$*(-)s-é/ós*” (2010: 59), and this is the reconstruction taken over by Yates. To my mind, Melchert’s etymological interpretation of ‘mouth’ is flawed in several ways. First, the reconstruction of a nom.-acc.sg. form *$h_1óh_1$-*s* is contradicted by the clear presence of a

[62] Kloekhorst 2014a: 80.

[63] In Kloekhorst 2008: 390 I argued that the initial *i*- of *išḫā*- cannot have been a prothetic *i* because such a vowel “does not participate in the lowering of OH /i/ to NH /e/ before -*š*- as we see happening in *išḫā*- > *ešḫa*-”. However, the only attestation of ‘master’ that would show such a lowering is dat.-loc.sg. *eš-ḫé* (KBo 3.34 i 25), a form of which it has in the meantime become clear that it is aberrant in several other respects as well (Kloekhorst 2014a: 449[1761]). Therefore, I no longer take this form as probative, which means that now the possibility is open to assume that the initial *i*- of *išḫā*- is indeed a prothetic vowel, which makes it possible to reconstruct *$h_1sh_2$-*ó*-.

suffix vowel in Hitt. *ă̄(i̯)iš*. Melchert's suggestion that the vowel *i* of *ă̄(i̯)iš* is the result of anaptyxis in the cluster *-Vh₁s* is not supported by any evidence: in no other case of an etymological sequence **-VHs* do we witness the rise of an anaptyctic vowel at any point in the prehistory of Hittite.[64] Second, Melchert simply postulates that the original acrostatic weak stem **h₁éh₁-s-s* would undergo an accent shift to **h₁eh₁-s-é/ós* without giving any model for it.[65] I therefore reject Melchert's acrostatic interpretation of 'mouth'.

This does not mean that I have a better alternative to offer.[66] For this moment it is only relevant to indicate that the reconstruction of the oblique stem of 'mouth' is beset with too many problems to use it as an argument against my glottal stop theory.

3. "PIE **h₁ŗs-énti* > Hitt. *<ar-ša-an-zi>* [arsán͡tsi] 'flow'" (3pl.pres.), but not "*(*<a-ar-ša-an-zi>*)".

According to Yates (2016: 248[26]), my "hesitant phonetic interpretation of the word-initial syllable in [this example] as "/(ʔ)ərs/" [Kloekhorst 2014a: 338] suggests [my] awareness that Hittite [#ʔVrs-] is incorrectly predicted to show initial plene spelling". As we saw above as well (section 3c), it is true that I changed my opinion on the interpretation of this form (and forms like *appanzi*, *akkanzi*, etc.), as I have made explicit in Kloekhorst 2014a: 340–1: I now phonologically interpret these words as /əC-/, the regular outcome of **h₁C-* through vocalization of the laryngeal.[67] These words therefore have no bearing anymore on the remainder of my glottal stop theory.

As we see, the three cases adduced by Yates as "strong counter-evidence" to my glottal stop theory do not form any good arguments against it.

---

[64] Cf. Kloekhorst 2008: 74. Only in the case of **-Vh₂s* we see that its initial Old Hittite outcome /-Vχːs/, spelled *-Vḫ-ḫa-aš*, does within the historical period of Hittite undergo anaptyxis, resulting in the New Hittite outcome /Vχːis/, spelled *-Vḫ-ḫi-iš*.

[65] His reference to other alleged cases where original acrostatic oblique stems underwent an accent shift, including the word for 'foot', cannot be upheld anymore, cf. Kloekhorst 2014b.

[66] As indicated in Kloekhorst 2008: 166–7, if we take the oblique case forms like dat.-loc.sg. *iššī*, all.sg. *iššā*, abl. *iššāz* at face value, they show accentuation of their ending, and therefore follow the hysterodynamic pattern. The original pattern of such cases was **CC-C-Ý°*, i. e. with zero-grade of the root and the suffix. For 'mouth', this would mean a preform **HH-s-Ý°* (the exact order of the two laryngeals in the root of this word is not clear, either **h₁eh₃-* or **h₃eh₁-*). Since no other words are known that show a word-initial sequence **HHs-*, it cannot be verified whether the Hittite outcome *iśś°* is to be expected or not.

[67] See also footnotes 1 and 58.

## 4. Conclusions

I conclude that my so-called glottal stop theory as formulated in earlier publications,[68] according to which Hittite contained a phonemic glottal stop in the environments /ʔV°/ and /°VʔV°/ (albeit in the latter only in the older stage of Hittite), can be maintained as such. Most of the points of criticism against this theory as formulated by Rieken (2010), Weeden (2011), Kimball (2015), Yates (2016), and Melchert (2018; 2020) can be shown to be non-probative. Moreover, I have demonstrated that my proposal that the orthographic sequences *$V_1$-$V_1$C(-)* and *°$V_1$-$V_2$(-)* are in Hittite used to spell the presence of a glottal stop (/ʔVC°/ and /°VʔV°/, respectively) is supported by the fact that according to Old Babylonian spelling practices these sequences could be used to write the presence of an *'aleph* (/'VC°/ and /°V'V°/, respectively), which phonetically was a glottal stop, [ʔ]. From an Indo-European point of view this means that not only PIE *$h_2$ and *$h_3$ were in Hittite in some environments retained as the consonant *ḫ(ḫ)* /χ(ː)/, but that also PIE *$h_1$ was sometimes retained as a consonant, i. e. as /ʔ/.

### *References*


CAD = M. T Roth et al. (edd.), *The Assyrian Dictionary of the Oriental Institute of the University of Chicago*, Chicago, 1964–2010.

CHD = H. G. Güterbock, H. A. Hoffner, Th. P. J. van den Hout (edd.), *The Hittite Dictionary of the Oriental Institute of the University of Chicago*, Chicago, 1983 ff.

HED = J. Puhvel, *Hittite Etymological Dictionary*, Berlin/New York, 1984 ff.

Hetkonk = S. Košak, *Konkordanz der hethitischen Keilschrifttafeln, Online-Datenbank*, www.hethport.uni-wuerzburg.de/hetkonk/.

HW² = J. Friedrich & A. Kammenhuber, *Hethitisches Wörterbuch, 2. völlig neu bearbeitete Auflage*, Heidelberg, 1975 ff.

HZL = C. Rüster & E. Neu, *Hethitisches Zeichenlexikon. Inventar und Interpretation der Keilschriftzeichen aus den Boğazköy-Texten* (= Studien zu den Boğazköy-Texten, Beiheft 2), Wiesbaden, 1989.

Aro, J. (1953). Abnormal plene writings in Akkadian texts, *Studia Orientalia* 19, part 11, Helsinki.

Durham, J. W. (1976). *Studies in Boğazköy Akkadian* (Harvard dissertation).

Francia, R. & Pisaniello, V. (2019). *La Lingua degli Ittiti*, Milano: Hoepli.

Goetze, A. (1928). *Madduwattaš* (= Mitteilungen der Vorderasiatisch-Aegyptischen Gesellschaft (E.V.) 32/1), Leipzig.

Kimball, S. E. (1999). *Hittite Historical Phonology*, Innsbruck.


---

[68] Kloekhorst 2006: 77–81; Kloekhorst 2008: 25–6; Kloekhorst 2014a: 161–70, 325–30, 330–41, 374–7.

Kimball, S. E. (2015). Review of: A. Kloekhorst, *Accent in Hittite* (2014), *Kratylos* 60, 18–42.

Kimball, S. E. (2017). The phonology of Hittite, *Handbook of Comparative and Historical Indo-European Linguistics* (edd. Jared Klein e. a.), Berlin/Boston: De Gruyter Mouton, 249–256.

Kloekhorst, A. (2005). Review of: *Anatolisch und Indogermanisch, Akten des Kolloquiums der Indogermanischen Gesellschaft Pavia, 22./25. September 1998* (edd. O. Carruba & W. Meid), Innsbruck 2001, *Bibliotheca Orientalis* 62, 90–94.

Kloekhorst, A. (2006). Initial Laryngeals in Anatolian, *Historische Sprachforschung* 119, 77–108.

Kloekhorst, A. (2008). *Etymological Dictionary of the Hittite Inherited Lexicon*, Leiden/Boston.

Kloekhorst, A. (2014). *Accent in Hittite. A Study in Plene Spelling, Consonant Gradation, Clitics, and Metrics*, Wiesbaden: Harrassowitz.

Kloekhorst, A. & Lubotsky, A. M. (2014). Hittite *nai-*, *nē-*, Sanskrit *nī-*, and the PIE verbal root **(s)neh₁-*, *Munus amicitiae. Norbert Oettinger a collegis et amicis dicatum* (edd. H. C. Melchert, E. Rieken, T. Steer), Ann Arbor/New York, 126–137.

Kloekhorst, A., & Mens, E. (2021). *CaR* vs. *Ca-aR* spellings in Hittite: evidence for a phonemic distinction between /ə/ and /a/, *Hungarian Assyriological Review* 2/2, 241–262.

Kouwenberg, N. J. C. (2003–2004). Initial plene writing and the conjugation of the first weak verbs in Akkadian, *Jaarbericht Ex Oriente Lux* 38, 83–103.

Melchert, H. C. (1984). *Studies in Hittite Historical Phonology*, Göttingen.

Melchert, H. C. (1994). *Anatolian Historical Phonology* (= Leiden Studies in Indo-European 3), Amsterdam/Atlanta.

Melchert, H. C. (2010). The word for 'mouth' in Hittite and Proto-Indo-European, *International Journal of Diachronic Linguistics and Linguistic Reconstruction* 7, 55–63.

Melchert, H. C. (2017). Addenda and Corrigenda to Harry A. Hoffner Jr. and H. Craig Melchert, *Grammar of the Hittite Language. Reference Grammar.* Available at: http://www.eisenbrauns.com/assets/errata/HOFGRAMMA-AddendaCorrigenda.pdf.

Melchert, H. C. (2018). Review of: A. Kloekhorst, *Accent in Hittite* (2014), *Journal of the American Oriental Society* 138, 539–595.

Melchert, H. C. (2020). Hittite Historical Phonology after 100 Years (and after 20 years), *Hrozný and Hittite: The First Hundred Years. Proceedings of the International Conference Held at Charles University, Prague, 11–14 November 2015* (edd. R. I. Kim, J. Mynářová & P. Pavúk), Leiden/Boston: Brill, 258–276.

Nussbaum, A. J. (2014). The PIE proprietor and his goods, *Munus Amicitiae. Norbert Oettinger a collegis et amicis dicatum* (edd. H. C. Melchert, E. Rieken, T. Steer), Ann Arbor/New York: Beech Stave, 228–254.

Oettinger, N. (1979). *Die Stammbildung des hethitischen Verbums* (= Erlanger Beiträge zur Sprach- und Kunstwissenschaft 64), Nürnberg.

Rieken, E. (2010). Review of: A. Kloekhorst, *Etymological Dictionary of the Hittite Inherited Lexicon*, Leiden/Boston 2008, *Kratylos* 55, 125–133.

Rieken, E. (2011). *Einführung in die hethitische Sprache und Schrift*, Münster: Ugarit.

Rosenkranz, B. (1964). Review of: Kronasser, H., *Etymologie der hethitischen Sprache. I. Zur Schreibung und Lautung des Hethitischen. II. Wortbildung des Hethitischen. Lieferung I* (1962), *Lieferung 2* (1963), *Lieferung 3* (1963), Wiesbaden, *Indogermanische Forschungen* 69, 165–173.

Simon, Z. (2010). Das Problem der phonetischen Interpretation der anlautenden scriptio plena im Keilschriftluwischen, *Babel und Bibel* 4 (= L. Kogan et al. (edd.), *Language in the Ancient Near East. Proceedings of the 53e Rencontre Assyriologique Internationale* I.1.), 249–265.

Sommer, F. & Falkenstein, A. (1938). *Die hethitisch-akkadische Bilingue des Ḫattušili I. (Labarna II.)*, München.

Streck, M. P. (2000). *Das amurritische Onomastikon der altbabylonischen Zeit. Band 1. Die Amurriter. Die onomastische Forschung. Orthographie und Phonologie. Nominalmorphologie* (= AOAT 271/1.), Münster.

Van den Hout, T. P. J. (2011). *The Elements of Hittite*, Cambridge: Cambridge University Press.

Weeden, M. (2011). Spelling, phonology and etymology in Hittite historical linguistics, *Bulletin of SOAS* 74, 59–76.

Yates, A. D. (2016). Hittite stressed vowel lengthening and the phonology-orthography interface, *Preceedings of the 27th Annual UCLA Indo-European Conference* (edd. D. M. Goldstein et al.), Bremen: Hempen, 235–257.

Yates, A. D. (2017). *Lexical Accent in Cupeño, Hittite, and Indo-European* (UCLA dissertation).

Alwin Kloekhorst

Leiden University
PO Box 9515
2300 RA Leiden
THE NETHERLANDS
*a.kloekhorst@hum.leidenuniv.nl*