Initial stops in Hittite (with an excursus on the spelling of stops in Alalaḫ Akkadian)*

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In this article it is argued that in Hittite the members of the sign pairs TA vs. DA, KA vs. GA and KE/I vs. GE/I represent phonologically distinct sounds in word-initial position. The signs TA and DA represent a normal fortis and a glottalized fortis stop, respectively: TA = /ta/ vs. DA = /t'a/. The signs KA and KE/I, on the one hand, and GA and GE/I, on the other, represent a fortis and a lenis stop, respectively: KA and KE/I = /k-/ vs. GA and GE/I = /g-/. The distribution of the fortis and lenis stops in word-initial position in Hittite is then compared to the situation in the Luwic branch. Moreover, it is argued that the phonetic values of these signs directly reflect their value as attested in the Old Babylonian texts from Alalaḫ VII.

The linguistic interpretation of Hittite is seriously hampered by the fact that several details regarding its orthography are still unclear. For instance, one of the issues that has remained controversial is the interpretation of spelling conventions regarding initial stops.

It is commonly held that the Hittites have taken over the cuneiform script from the North Syrian region and that the typical Hittite ductus best resembles the ductus as found in Old Babylonian texts from Alalaḫ (Tell Açana, level VII; cf. e.g. Rüster/Neu 1989, 15). The cuneiform syllabary that was in use there possesses in its CV series separate signs to distinguish voiceless from voiced stops, e.g. KA vs. GA, TA vs. DA, PA vs. BA, KU vs. GU, TU vs. DU, etc.[1] Nevertheless, the Hittite scribes seem to have a strong preference for only one variant of some of these pairs when writing Hittite words phonetically. For instance, in order to spell a velar stop + *u*, the sign GU is practically never used,[2] instead one always finds the sign KU;

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[1] On the use of these signs for spelling the stops in Alalaḫ Akkadian, cf. the excursus.

[2] The only exceptions are [*p*]*a-an-gu-uš* 'assembly (nom.sg.)' (KBo 16.71 obv. 9, OS) and the gloss wedged, probably Hurrian word *gu-pa-ḫi-i*[*n*] '?' (KBo 13.46 obv.? r.col. 10, OH/NS, dupl. *ku-p*[*a-ḫi-in*] (KBo 22.6 iv 3, OH/NS), cf. Catsanicos 1994, 318). Note that the form *pa-an-gu-i* as cited by Ünal (1974, 171[228]) and Catsanicos (*ibid.*) in 2157/c, 10 (= KBo 41.202, 11), in fact should be read *pa-an-ga-u-i* (p.c. Theo van den Hout). Otherwise, the sign GU only occurs in Akkadograms, e.g. *I-RA-AG-GU-MA* 'he is summoning' (KUB 31.64 ii 25, OH/NS), or Sumerograms, e.g. ^{GIŠ}GU.ZA 'throne'.

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the sign BA is in its phonetic value extremely rare, instead the sign PA is used. Of other pairs, however, both signs can be found in phonetically spelled Hittite words. For instance, both TA and DA, KA and GA, KI and GI, etc., are in use.

Already in the beginning of Hittite studies it was noticed that many words are sometimes spelled with one member of the pair, and sometimes with the other: e.g. *an-da* next to *an-ta*, *ku-u̯a-at-ta* next *ku-u̯a-ad-da*, *Du-ut-ḫa-li-i̯a-* next to *Tu-ut-ḫa-li-i̯a-*. On the basis of these examples, Weidner (1917, 13f.) concludes that "der Hethiter ... einen Unterschied zwischen Lenis und Fortis in der Schrift nicht zu kennen [scheint]" (o.c. 24). Hrozný (1917, 199) reacts to this statement, however, that in some words the signs do not interchange at all. For instance, the verb *dāi, danzi* 'to take' is practically always spelled with DA, whereas the sentence connector *ta* is always spelled with TA. Moreover, since Hrozný had shown that Hittite was an Indo-European language (which Weidner did not know yet), and since for Proto-Indo-European three types of stops are reconstructed, namely a row of 'voiceless' stops, **p*, **t*, **ḱ*, **k*, **k^{w}*, a row of 'voiced' stops, **b*, **d*, **ǵ*, **g*, **g^{w}*, and a row of 'voiced aspirated' stops, **b^{h}*, **d^{h}*, **ǵ^{h}*, **g^{h}*, **g^{wh}*, one could now ask the question whether in cases where Hittite uses both members of a sign pair, their usage corresponds in any meaningful way to the etymological value of the stop they represent. According to Hrozný, this question needs a "systematische Untersuchung".

One such systematic investigation was performed by Goetze (1933, 271f.), who examined the distribution of the signs KA and GA.[3] His results are somewhat ambivalent, however: on the one hand, it seems that the usage of the signs KA and GA sometimes reflects an etymological difference between voiceless and voiced (aspirated) stops, but, on the other, it cannot be denied that some variation in use is found as well. He therefore suggests that "dem Hethitischen das Gefühl für den Unterschied zwischen Media und Tenuis verloren zu gehen begann, wenn nicht schon verloren gegangen war". His proposal to transliterate the sign GA as *kà* shows, however, that he ultimately considered the distinction between KA and GA irrelevant.

In 1932 it was discovered that in Hittite, etymological voiceless stops (**t*, etc.) are word-internally spelled with a geminate stop, *Vt-tV* or *Vd-dV*, whereas etymological voiced and voiced aspirated stops (**d$^{(h)}$*, etc.) are spelled with a single stop, *V-tV* or *V-dV* (Sturtevant 1932). This distribu-

[3] And QA, but that is less relevant here.

tion, called Sturtevant's Law,[4] indisputably shows that in word-internal position a distinction was present between two types of stops. Yet, since this distinction was not expressed by the voice opposition present in sign pairs like TA vs. DA, but rather by geminate vs. single spelling, it is likely that phonetically the distinction was not one in voice, but rather one in length, cf. Kloekhorst (2008a, 21–5). We therefore use the terms 'fortis' (= the geminate spelled stops that correspond to **t*, etc.) and 'lenis' (= the single spelled stops that correspond to **d*$^{(h)}$, etc.) to describe this distinction.

This discovery shifted the focus of the question about the interpretation of the difference between signs for voiceless stops vs. voiced stops to the word-initial position. The nature of the cuneiform script makes it impossible to use geminate writing at the beginning of words. So if the distinction between fortis and lenis stops was retained in word-initial position as well, this distinction could not be indicated by geminate vs. single spelling. So could it then be that the difference between fortis and lenis stops in word-initial position, if it existed at all, was expressed by the voice distinction present in pairs like TA vs. DA? In other words, is there any correlation between the word-initial use of e.g. TA vs. DA to the etymological presence of **t*- vs. **d*$^{(h)}$-?

For a long time this question was answered negatively. E.g. Friedrich (1940, 6) remarks: "Zwischen der Schreibung von Tenuis and Media scheint völlige Willkür zu herrschen. *d* und *t*, *b* und *p*, *g*, *k* und *q* werden, soweit man bisher sieht, völlig promiscue gebraucht"; Sturtevant/Hahn (1951, 26) state that "[t]he pairs *k*, *g*; *t*, *d*; and *p*, *b* are so frequently interchanged that no inference can be drawn as to a distinction between them"; Kronasser (1956, 55) asserts that "bei der Schreibung der Tenues und Mediae so große Unregelmäßigkeit [herrscht], daß auf weitgehende oder völlige Unfähigkeit der Unterscheidung geschlossen werden muß"; and according to Gamkrelidze (1961, 408), "Hittite cuneiform [...] fails to distinguish between the signs for corresponding voiced and voiceless plosives", to name just a few scholars.[5]

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[4] Although Sturtevant in his article credits his student C. L. Mudge for discovering this distribution.

[5] An interesting exception is Crossland, who states that "although [...] most initial stops are written sometimes with a "voiceless-stop" sign and sometimes with a "voiced-stop" sign, the orthography of a few words is exceptional in that stops in them are invariably or very frequently written with signs which would have been used in Mesopotamia [...] for writing Akk. stops of the same nature as the pIE stops which the various Hitt. stops in question represent" (1951, 127). Yet, he does not go into details regarding this statement and presents no evidence in favor of it.

Nevertheless, in 1979 Oettinger reopened the debate by looking at all relevant words, discussing their spelling and etymology. He hesitatingly concluded that "anlautende Tenuis fast immer durch Tenuiszeichen und anlautende Media meist durch Mediazeichen wiedergegeben wird" (1979, 551–6). Yet, as e.g. Hart (1983, 112) and Melchert (1984, 69[128]; 1994, 14) have pointed out, if we look objectively at the material presented by Oettinger, we can conclude that it does not support this alleged distribution. Moreover, the usage of e.g. TA vs. DA seems in certain words to change through time. Hart (1983) therefore systematically investigated the diachronic situation and shows that in the course of time e.g. DA is ousting TA, DU is ousting TU, etc. She concludes that "in the initial position the choice of signs does not correspond in any principled way with the etymologically expected character of the stop, and appears to be dominated by the fashion of the time" (o.c., 114–5) and rather assumes that in word-initial position the phonetic distinction between original fortis and lenis stops had been lost. Also Melchert (1994, 13–4) states that the choice of signs for voiceless vs. voiced stops "does not correspond in any meaningful way with the voicing quality of the sounds being indicated, based on their expected inherited values", and assumes that all initial stops have become voiceless/fortis in Hittite. Although this also seems to have happened in e.g. Lycian, where no words in *b-*, *d-*, *g-* are attested,[6] Melchert warns not to push this devoicing of initial stops back to Proto-Anatolian, since several developments in the individual daughter languages show that PAnat. must still have retained a difference between voiceless/fortis and voiced/lenis stops.[7]

Nowadays, this seems to be the *communis opinio*: in initial position, the original distinction between fortis and lenis stops was lost in Hittite, and the two merged into the fortis series. In spelling, the choice between the sign for the voiceless stop and the sign for the voiced stop does not correspond in any way to the etymological value of that stop, and is in principle random. If there seems to be any pattern, that pattern is caused by scribal convention or just by fashion (thus e.g. Kimball 1999, 89–90; Kloekhorst 2008a, 21; Patri 2009, 89).

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[6] Cf. Melchert (2004). Note that the words starting in *dd-* probably go back to older **td-*, whereas the one word starting in *g-*, *gasabala-*, is a title that could well be of foreign origin. Neumann (2007) cites a few words starting in *b-*, *d-* and *g-*, but these are either incorrectly analyzed (*da-*, *dau*, *dbijahe*, *deliñtāte*, *dem*[...], *dewē*), personal or geographical names (*dapara*, *gaXe*, *galadrē*[*m̃*]*ma*, *garāi*), or rather Milyan (Lycian B) words.

[7] E.g. the difference in outcome between **ti-* and **di-* in Hittite: the former yielded *z-*, the latter *š-*. Since this is a specific Hittite development (in Luwian both yielded *ti-*), the difference between initial **t* and **d* must still have been present in Proto-Anatolian.

Nevertheless, if of some pairs, like KU vs. GU, only one sign was chosen for the spelling of Hittite words, why did that not happen with other pairs, like TA vs. DA? Moreover, if there really would have been no single phonetic difference between e.g. TA and DA, how come that the interchangeability of these signs is limited? As we have seen above already, the conjunction *ta*, for instance, is always spelled with the sign TA, whereas forms of the verb *dā-*^{i} 'to take' are practically always spelled with the sign DA. I, for one, do not believe that such cases can be merely the result of spelling convention and that the choice of spelling these words with TA or DA is coincidental. In the following I will therefore investigate the use of the signs for voiceless vs. voiced stops in word-initial position. Of each pair I will try to establish whether there is a distribution to be found between the two signs, and if so, what phonetic reason could lie behind it.

It is commonly known that Hittite is attested over a period of some four centuries, and that within that period Hittite shows linguistic change. This change is not limited to morphological processes; we encounter phonological developments as well. It is therefore *a priori* not impossible that, if there had originally been a phonological opposition that was expressed by the sign for a voiceless vs. the sign for a voiced stop, this opposition in the course of time was subject to change or was lost altogether. It is therefore important to first focus on the oldest stage of Hittite that we know, namely the language as attested in the OS texts.[8] Of each pair I will there-

[8] For this research I have used all texts that in Hetkonk are dated as "ah.". I am aware of the fact that in recent years a discussion has arisen about the absolute and relative dating of OS vs. MS. In 2004, Miller pointed out that some texts that palaeographically are dated as OH (i.e. are written in the OH ductus = OS) in fact are MH documents (i.e. are written in the historically defined MH period). He therefore argues for a younger absolute dating of OS ("Ductus I"), namely as spanning "from the beginning of the OH period to the immediate predecessors of Tuṯḫaliya I", whereas MS ("Ductus II") covers "the period from Tuṯḫaliya I through Tuṯḫaliya II (III) or Suppiluliuma I" (2004, 463[773]). Also Popko (2005) pointed out that some MH documents show a ductus that rather looks like OS. According to him, the MH period can be divided in three stages. Documents written in the first stage, lasting up to Ḫuzziya II, are indistinguishable from OS documents; documents written in the second stage, around the time of Muṷatalli I, show MS features mixed with OS features; whereas documents written in the third stage, from Tuṯḫaliya I/II until Tuṯḫaliya III, show the traditionally defined MS features. Popko himself concludes on the basis of these observations that "the Old Hittite and early Middle Hittite scripts are very similar" and that "consequently, documents in these scripts cannot be precisely dated" (o.c., 9), but it is better, as Miller did, to extend the

fore first search for distributions within the OS texts and try to link these to possible phonetic differences, and then describe the diachronic development.

TA VS. DA

The first group of signs I will investigate are those that represent a dental stop. Of these, I will start with the pair TA vs. DA. I have therefore collected all words starting in *t/da-* in OS texts, counting how often they are spelled with the sign TA, and how often with DA.[9] This yields the following table:

period in which OS is written, namely to the time of Ḫuzziya II. Popko's second MH stage (around Muwatalli I), in which documents are written that show OS as well as MS features (cf. also Popko 2007), is then rather to be seen as a transitional period between OS and MS. Therewith, Popko's timeline would largely coincide with Miller's one. Also van den Hout (2009) has now adopted Miller's timeline, and adds credible arguments for the view that although from Ḫattušili I onwards "writing [was] going on" (o.c., 30), at first all texts were written in Akkadian and that only from Telipinu onwards also the Hittite language was started to be used in writing. A complicating factor is formed by the older *Landschenkungsurkunden*. These documents, which are sealed and therefore must be original documents (i.e. not copies from later times), are usually regarded to be written in the MH ductus, whereas Wilhelm (2005) has now shown that on the basis of their content they must be dated to the period from Ammuna or Ḫuzziya I through Ḫantili II, i.e. well into the period where according to Miller only the OH ductus was in use. It should be noted, however, that in his 2005 article Wilhelm does not treat the palaeography of the *LSU* (which will hopefully be done in the monograph that he is preparing on this subject, cf. o.c., 272[1]), and that at this point these texts can therefore not be used as arguments when it comes to the questions regarding the dating of OS vs. MS. To sum up, although there are indeed good arguments to assume that the period in which OS was written should be extended to the times of Muwatalli I, and that consequently the period in which MS texts were written should also be given a lower absolute dating, I see no reason to assume that OS and MS texts were ever contemporaneous. I therefore think it is still justified to use OS texts as representatives of the oldest language stage of Hittite, whereas MS (and of course also NS) texts can be regarded to represent a younger stage.

[9] Broken forms that could not be identified as belonging to a specific word are left out of consideration: *da-an*[?]*-nu*[?]-x[...] (KBo 13.254, 8), $^{\text{NINDA}}$*ta-ḫa-*x[...] (KBo 54.216, 3), *ta-lu-u*[*p-* ...] (StBoT 25.54 ii 23), $^{\text{TÚG}}$*ta-ma-r*[*i-* ...] (KUB 36.104 rev. 4), *da-an-ku-uz-z*[*i-* ...] (KBo 25.153, 9).

	TA	DA		TA	DA
ta (conj.):[10]	161	–	*tān* 'second':	2	–
dā-ʲ/d- 'to take':[11]	1	123	*tankui-/tankuu̯ai-* 'dark':	1	–
DUG*taḫakappi-*, a vessel:	1	–	*tandukišn-* 'mortality':	5	14
NA₄*taḫapšetai*, a stone:	1	–	*tabarna-*, title of the king:	1	–
DUG*taḫaši-*, a vessel:	1	–	*tapeššar/tapešn-* '?':	1	–
taḫātauššaš '?':	1	–	*tāpišena-*, *tapišana-*, a vessel:	5	–
taḫattumar '?':	1	–	*tapulli-*, a kind of knife:	1	–
dai-ʲ/ti- 'to put':[12]	–	37	*tapušza* 'besides':	9	–
taiazzil- 'theft':[13]	3	1	*tarḫu-zi*, *taruḫ-zi* 'to conquer':	1	–
tāie/a-zi 'to steal':[14]	26	1	*tar(k)u-zi* 'to dance':	1	–
taišzi- 'hay-barn':	1	–	GIŠ*tāru-* 'wood':	1	–
tāiuga- 'two-year-old':	5	–	*tarupp-zi* 'to collect':	–	1
tagānzepa- 'earth':	2	–	KUŠ*tarušḫa-*, part of harness:	1	–
NINDA*takarmu-*, a bread:	1	–	É*tāštuppa-*, a building:	2	–
taki- 'other, foreign':	2	–	*tašuu̯aḫḫ-* 'to make blind':	1	2
tāla-ʲ/tāli- 'to let, to leave':[15]	2	1	*dātti-* '?':	–	2
taluki-/talugai- 'long':	4	–	*tau̯al-*, a kind of beer:	1	–
talupuša- '?':	1	–	*tau̯ananna-*, title of queen:	1	–
tamai-/tame- 'other':	7	–	*tēkan/takn-* 'earth':[16]	9	–
tamāšš-zi/tame/išš- 'to (op)press':	2	2	*ter-zi/tar-* 'to speak':[17]	5	–

Especially the numbers of the conjunction *ta* and the verbs *dā-ʲ/d-* and *dai-ʲ/ti-* are telling: they show practically consistent spelling with either TA or with DA. But also the other words almost all show a clear preference for one of the two signs. This becomes even more apparent when we look more specifically at where the different forms occur. Of the words that show only one or two attestation with DA, these forms turn out to appear on two tablets only. In the case of *tāie/a-zi*, which shows 26 attestations

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[10] *ta* (78×), *t=a-pa* (2×), *t=a-aš-ta* (19×), *ta=kán* (2×), *ta-a=š-ša-an* (12×), *t=a-aš* (10×), *t=a-aš=kán* (1×), *t=a-an* (17×), *t=a-at* (4×), *ta-a=š-še* (1×), *ta-a=š-ma-aš* (2×), *ta-a=z* (12×), *t=a-az=(š)-ta* (1×).

[11] *da-a-aḫ-ḫé* (5×), *da-a-aḫ-ḫi* (3×), *da-a-at-ti* (1×), *da-a-i* (58×), *da-an-zi* (26×), *ta-an-zi* (1×), *da-a-aḫ-ḫu-un* (12×), *da-aḫ-ḫu-un* (1×), *da-a-aš* (3×), *da-a-er* (1×), *da-a* (2×), *da-a-ú* (4×), *da-a-at-te-en* (1×), *da-aš-ke/a-* (6×). Of yet another 23 attestations of *da-a-i* it could not be determined whether they belong with this verb or with *dai-ʲ/ti-* 'to put'.

[12] *da-a-i* (34×), *da-iš* (1×), *da-iš-te-en* (2×). Of yet another 23 attestations of *da-a-i* it could not be determined whether they belong with this verb or with *dā-ʲ/d-* 'to take'.

[13] [*t*]*a-ia-az-zi-il* (1×), *ta-ia-zi-la-aš* (2×), *d*[*a-ia-zi-la-aš*] (1×).

[14] *ta-a-i-ez-zi* (15×), *ta-i-ez-zi* (9×), *ta-a-ia-az-zi* (2×), *da-a-i-ez-zi* (1×). The hand copy of KUB 29.25, 6 shows a damaged form *da-a-i-ez-zi*, but the traces of the first sign as visible on the photograph of this tablet (available through Hetkonk) were too unclear to be able to distinguish between reading TA or DA.

[15] *ta-a-la-i* (1×), *da-a-la-i* (1×), *ta-a-la-aḫ-ḫu-un* (1×).

[16] *ta-ak-na-a* (2×), *ta-a-ak-na-a* (1×), *ta-ga-a-an* (3×), *ta-ga-an* (1×).

[17] *ta-ru-e-ni* (2×), *ta-ra-an-zi* (3×).

with TA, the only attestation with DA is found in KBo 6.2+ iii 23. Of *taiazzil-*, the only form with DA is attested on that very same tablet as well, namely *d[a-ia-zi-la-aš]* (KBo 6.2+ iv 41). The same goes for *tāla-i/tāli-*: the only form with DA, *da-a-la-i*, is attested in KBo 6.2+ ii 17. And also the two forms of *tašuuaḫḫ-* spelled with DA can be found here: *da-šu-ua-aḫ-ḫi* (KBo 6.2+ i 9, 11). Of the verb *tamāšš-zi/tame/išš-*, the two attestations with DA are both found in KBo 22.1: *da-me-eš-ke-ua-an* (KBo 22.1 obv. 4), *da-me-eš-ket$_9$-te-ni* (KBo 22.1 obv. 19).[18] This is the same tablet where we find the one attestation of *tarupp-zi* with DA: *da-ru-up-pé-e-e[r]* (KBo 22.1 obv. 2). This high concentration of singular spellings with DA on these two tablets is quite suspicious, and they are therefore better left out of consideration. If we remove the forms from KBo 6.2+ and KBo 22.1 from the table, and also, for the sake of convenience, remove the words that are of unknown meaning, we now get the following table:

	TA	DA		TA	DA
ta (conj.):	157	–	*tamai-/tame-* 'other':	6	–
dā-i/d- 'to take':	1	101	*tamāšš-zi/tame/išš-* 'to (op)press':	1	–
dai-i/ti- 'to put':	–	36	*tān* 'second':	2	–
taiazzil- 'theft':	1	–	*tankui-/tankuuai-* 'dark':	1	–
tāie/a-zi 'to steal':	8	–	*tandukišn-* 'mortality':	5	14
taišzi- 'hay-barn':	1	–	*tapušza* 'besides':	9	–
tāiuga- 'two-year-old':	1	–	*tar(k)u-zi* 'to dance':	1	–
tagānzepa- 'earth':	2	–	GIŠ*tāru-* 'wood':	1	–
taki- 'other, foreign':	1	–	*tēkan/takn-* 'earth':	9	–
tāla-i/tāli- 'to let, to leave':	2	–	*ter-zi/tar-* 'to speak':	4	–
taluki-/talugai- 'long':	4	–			

The distribution is perfect: the verbs *dā-i/d-* and *dai-i/ti-* are both consistently spelled with DA,[19] whereas all other words are consistently spelled with TA. This distribution can only be explained by assuming a phonetic difference between the signs TA and DA. The only true exception to the distribution is the word *t/dandukišn-* 'mortality', which shows 5 forms with TA and 14 forms with DA. Since this word may well be of foreign origin,[20] its fluctuation in spelling should not concern us too much: we are probably dealing with a phoneme from another language that was adapted to the Hittite phonemic system in different ways by different speakers.

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[18] Note that the same tablet contains *ta-me-eš-ket$_9$-te-ni* (KBo 22.1 obv. 3).

[19] The one attestation of *ta-an-zi* 'they take' with the sign TA (KBo 20.17 obv. 7) is in view of the 101 attestations of *dā-i/d-* that are spelled with DA to be seen as insignificant.

[20] All attempts to provide *t/dandukišn-* 'mortality' and its base-word *t/danduki-* 'mortal' with IE etymologies (see the references in HEG T, 110–1) are unconvincing.

Now that we have established that in OS texts a clear distribution can be found, namely that the verbs *dā-ʲ/d-* and *dai-ʲ/ti-* are consistently spelled with the sign DA whereas all other words are consistently spelled with TA, we must search for a phonetic explanation for these facts by looking at etymological evidence. Since the verbs *dā-ʲ/d-* and *dai-ʲ/ti-* are the only words that are spelled with DA, we must start our investigation with these.

It is universally accepted that *dā-ʲ/d-* 'to take' is derived from the PIE root **deh$_3$-*, which in the other IE languages has the meaning 'to give', and that *dai-ʲ/ti-* 'to put' must be derived from the root **dʰeh$_1$-* 'to put'. The first thing that strikes the eye is the fact that they reflect **d-* and **dʰ-*, respectively, the two consonants that are commonly regarded to have merged into a lenis dental stop */d/ in Proto-Anatolian, contrasting with the fortis stop */t/ < PIE **t*. Could this be the reason that they are consistently spelled with DA? Unfortunately, the answer to this question must be negative. Within the group of words that are spelled with TA, we not only find words that reflect **t-*, but several ones that reflect **d-* or **dʰ-* as well: *tar(k)u-ʦi* 'to dance' < **terkʷ-*, *ta* (conj.) < **to-*; *tāru-* 'wood' < **dóru-*, *tān* 'second' < **duoiom*; *tēkan/takn-* 'earth' < **dʰégʰ-m-/*dʰǵʰ-m-*, *tankui-/tankuu̯i-* 'dark' < **dʰ(o)ngʷ-i-*. It therefore is not possible that the presence of **d-* and **dʰ-* in the preforms of *dā-ʲ/d-* and *dai-ʲ/ti-* is the decisive factor for the spellings with DA.

Another peculiarity is the fact that *dā-ʲ/d-* goes back to an ablauting stem **doh$_3$-/*dh$_3$-*, and *dai-ʲ/ti-* goes back to an ablauting stem **dʰh$_1$-oi-/*dʰh$_1$-i-* (Kloekhorst 2006a),[21] and that therefore in both verbs the initial dental stop is (in at least a part of the inflected forms) followed by a laryngeal. The presence of this laryngeal is crucial. We know that in word-internal position, laryngeals are assimilated to preceding stops. The idea that we are dealing here with assimilation instead of mere loss of the laryngeal is based on the fact that the outcome of the assimilation of a word-internal cluster consisting of a lenis stop + laryngeal is a fortis stop: **DH> T*. For instance, the preform **meǵh$_2$-i-*, which contains a **ǵ* that normally in Hittite would yield a lenis /g/, turns up as Hitt. *mekki-* 'much, many', with a fortis /k/. Similarly, the preform **bʰodʰh$_2$-*, containing a **dʰ* which normally would yield lenis /d/, develops into Hitt. *padda-ʲ/padd-* 'to dig', with a fortis /t/. This development is well established and generally accepted (Melchert 1994, 76–7; Kimball 1999, 407–10; Kloekhorst 2008a, 79). We can date this

[21] Note that the following scenario does not crucially depend on this reconstruction, however. Also if one would favor a reconstruction **dʰeh$_1$-i-/*dʰh$_1$-i-* (with Melchert 1984, 73; 1994, 65) or **dʰoh$_1$-i-/*dʰh$_1$-i-* (with Oettinger 1979, 461), the conditions for the account that will follow are still met.

assimilation quite precisely. Unlike clusters of the shape **ti* and **d$^{(h)}$i*, which assibilated to *z* and *š*, respectively,[22] clusters of shape **tHi* and **d$^{(h)}$Hi* do not show assibilation: *tiianzi* 'they place' < **dʰh$_1$-i-énti, tiie/a-^{zi}* 'to step' < **(s)th$_2$-ie/o-*, etc. Apparently, the laryngeal in **tHi* and **d$^{(h)}$Hi* blocked the assibilation, which means that it must still have been present at the moment of the latter development, providing us with a *terminus post quem* for the assimilation of stop + laryngeal. The assibilation of **ti* and **d$^{(h)}$i* is specifically Hittite, which means that the assimilation of stop + laryngeal must have been a specific Hittite development as well.[23] Moreover, there are indications that the assibilation of **ti* and **d$^{(h)}$i* took place relatively recently within the pre-history of Hittite,[24] which means that the assimilation of stop + laryngeal must have taken place even more recently.[25]

Accordingly, in word-internal position, a cluster consisting of a stop + laryngeal assimilated into a fortis stop, but this development took place only very recently in pre-Hittite times. The question now is: how did word-initial clusters consisting of a stop + laryngeal develop, i.e., in this case, what are the outcomes of the clusters **dh$_3$-* and **dʰh$_1$-*? It is generally assumed that in Proto-Anatolian the PIE voiced and aspirated stops **d* and **dʰ* had merged into a lenis stop, */d/. Furthermore, since the words *ta* (conj.) < **to-*, *tāru-* 'wood' < **dóru-* and *tankui-/tankuuai-* 'dark' < **dʰ(o)ngʷ-i-* are in OS texts all spelled with the sign TA, it seems that by the time Hittite was first written, the fortis stop /t/ and the lenis stop /d/ had

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[22] E.g. **tieh$_1$-no-* > *zēna-* 'fall', *ti-n(e)-h$_1$-* > *zinn(i)-^{zi}* 'to finish', **tioh$_2$-* > *zāi-* 'to battle'; *diéus* > *šiuš* 'god', **diéuot-* > *šiuatt-* 'day', cf. Kloekhorst (2008a, *s.vv.*).

[23] *Pace* Melchert (1994, 76–7), who regards this development PAnatolian since in Pal. *-ttuuar* and CLuw. *-ttuuar(i)* (both 2pl.midd. endings) < **-dʰh$_2$uo(ri)* also assimilation of **-dʰh$_2$-* > /t/ must have taken place (compare Hitt. *-ttuma(ri)*). These assimilations as found in Hittite, Palaic and Luwian must now be regarded as independent, parallel developments.

[24] This can be inferred from the fact that in the oldest texts we come across a few words containing a 3sg.pres.act. ending *-z* and a 3pl.pres.act. ending *-anz*. Although these are the phonetically regular outcomes of **-ti* and **-enti*, their **-i* being lost in the process of assibilation, it is clear that in a verbal paradigm where *-i* is the main marker of the present tense, this *-i* would have been almost immediately restored, especially in view of the fact that in this period the **-i* of the *mi*-conjugation is spreading to present forms of the *ḫi*-conjugation as well. The presence of these *i*-less endings *-z* and *-anz* in the oldest texts indicates that the assibilation had taken place relatively recently before the oldest attested stage of Hittite.

[25] Elsewhere I will argue that the OS hapax nom.pl.c. *me-e-ek-e-eš* 'many, much' (KBo 25.23 rev. 5) phonologically represents /mḗg?es/, still containing the unassimilated cluster /g?/, which in the rest of the OS texts is spelled with *-kk-* (*me-e-ek-k^{e}*) and therefore must be regarded as having assimilated into a fortis stop /k/. If this is correct, the assimilation of **DH* > *T* must even be regarded a historical development.

merged in word-initial position into a single stop, which is commonly thought to have been fortis /t/. In the case of the initial clusters **dh₃-* and **dʰh₁-* we must therefore assume that, through an intermediate PAnat. */dʔ-/,[26] they yielded pre-Hittite */tʔ-/. It is likely that just as in word-internal position, also in word-initial position a laryngeal following a stop was eventually assimilated to that stop. In the case of */tʔ-/, we could imagine that this happened via a stage /tˀ-/, in which the laryngeal had lost its status as a separate phoneme, but was incorporated by the stop, which had now become glottalized. I therefore propose that the spelling of the verbs *dā-ʲ/d-* < **doh₃-/*dh₃-* and *dai-ʲ/ti-* < **dʰh₁-oi-/*dʰh₁-i-* with the sign DA designates the presence of this glottalized dental stop /tˀ/.[27] This proposal is even more attractive in view of the fact that in Alalaḫ Akkadian the sign DA was not only used to spell the syllable *da* containing the voiced stop /d/, but could also be read ṬA, i.e. as spelling the syllable *ṭa* containing the emphatic stop that is in Semitic studies traditionally rendered as *ṭ*.[28] Phonetically, the emphatic stops were realized as glottalized stops in Akkadian (Kouwenberg 2003, with especially p. 81–2 for *ṭ* = /tˀ/). In this case, the emphatic stop *ṭ* must be interpreted as /tˀ/, which is then identical to the /tˀ-/. I now propose for *dā-ʲ/d-* and *dai-ʲ/ti-*.

To sum up: in OH original texts, a complementary distribution between the signs TA and DA in word-initial position can be found: the verbs *dā-ʲ/d-* and *dai-ʲ/ti-* are always spelled with DA, all other words always with TA. This points to a phonetic difference between the two signs, and from an etymological point of view this difference can only have been that the sign TA spells a plain dental stop /t/ whereas the sign DA spells a glottalized dental stop /tˀ/ that developed from a sequence **TH-*. This matches the origins of the signs as well: in Alalaḫ Akkadian the sign TA is used for writing the syllable *ta* containing the stop /t/, whereas the sign DA, which can also be read ṬA, is used for writing the syllable *ṭa* containing the emphatic stop /tˀ/.

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[26] Although PIE possessed three laryngeal phonemes, **h₁*, **h₂*, **h₃*, for PAnatolian there is evidence for two laryngeal phonemes only, namely */ʔ/ and */H/ (which has a secondarily lenited variant */h/). This means that except in the cases where **h₂* and **h₃* yielded PAnat. */H/ or /h/ (namely in **h₂e-* > */Ha-/, **h₂C-* > */HC-/, **Vh₂s* > */VHs/, **sh₂V* > */sHV/, **CRh₂/₃V* > */CRHV/, **Vh₂V* > */VHV/ or */VhV/ and **h₃e-* > */Ho-/), **h₂* and **h₃* merged with **h₁* into PAnat. */ʔ/. Cf. Kloekhorst (2008a, 75–82).

[27] This scenario implies that in *dā-ʲ/d-* an analogical spread has taken place: the regular outcome of **dóh₃-ei*, **dh₃-énti* must have been */tấi/, */tˀántˢi/, in which the /tˀ-/ of the weak stem forms apparently spread through the paradigm. This assumption seems unproblematic to me, especially since Hittite hardly tolerates consonantal alterations within a paradigm.

[28] Cf. the excursus on Alalaḫ Akkadian.

TA vs. DA: the post-OH situation

The distribution between TA and DA as found in the OS texts is not found as such in MS and NS texts: many words that originally are spelled with TA only, show in younger texts spellings with DA as well. In MS texts, we find spellings with DA only occasionally, but in NS texts, the usage of DA has clearly increased in popularity. Let us look, for instance, at the development of the spelling of *tamai-/tame-* 'other' (numbers refer to the number of attestations with either TA or DA, the ratio represents the percentage of TA-spelled forms compared to the total amount of attested forms):

	TA	DA	ratio in %
OH/OS	7	–	100 %
MH/MS	22	3	88 %
NH/NS	55	44	56 %

We see that in MS texts the number of DA-spellings is still very low, whereas in NS texts the number of DA-spellings approaches the number of TA-spellings. This could be interpreted as an indication that in NH times the signs DA and TA come to be used interchangeably and that the functional difference between word-initial DA and TA had ceased to exist. Yet, if we look at the development in other words that are originally spelled with TA only, this seems not to be the case. For instance, if we look at the number of attestations with TA and DA of *tagān* 'on the earth' and *tagānze/i-pa-* 'earth', we see that in NS texts the number of attestations with DA is much higher than with TA:

	TA	DA	
OS	6	–	100 %
MS	17	1	94 %
NS	13	62	17 %

This means that we are not dealing with a mere loss of opposition between the signs TA and DA, but that the sign DA has become the more popular one, eventually even ousting the sign TA. This observation is supported by the fact that the verbs *dā-^{i}/d-* and *dai-^{i}/ti-* also in MS and NS texts keep on being spelled with the sign DA only.[29] Thus, in MH and es-

[29] MS and NS TA-spellings of *dā-^{i}/d-* and *dai-^{i}/ti-* are very rare. MS examples can only be found in KBo 18.151, MS, where we find *ta-a-aš* (obv. 3), *ta-aš* (obv. 6, 8, 9, 12, 13, 14) 'he took' and *ta-i-iš* (rev. 10, 11) 'he placed'. Since this tablet shows many spelling aberrancies, it had better be left out of consideration when it comes to determining normal Hittite spelling practices. A real possible MS example is *ta-at-ta* 'you (will) take' as found in HKM 102 rev. 17, MS?. All other examples of TA spellings are from NS texts:

pecially NH times we cannot speak of merger of the two signs in the sense that they come to be used interchangeably, just randomly chosen by the scribe. Instead, the sign DA is taking over the place of TA, eventually on its way to ousting it completely. This probably indicates that on a phonetic level, the opposition between word-initial /ta-/ and /t²a-/, which was still present in OH times, is disappearing from MH times onwards.[30] It follows that the spelling difference between TA and DA in MH times had become an etymological one: the spelling of a certain word either with TA or with DA had now become a convention that was not based on a synchronic phonetic difference anymore, but only on the scribe's awareness of the word's 'correct' spelling. Nevertheless, we see that the sign DA becomes the more popular one, and is more and more ousting the sign TA. This does not mean that the NS texts are worthless for etymological purposes. Since spellings with TA are the 'unproductive' ones, it is still significant if in NS texts a certain word is spelled with TA besides DA. Even when no OS attestations of it are known, we can still predict that its original spelling must have been with TA and that therefore its initial consonant must have been /t-/ and not /t²-/.

TI, *TE* and *TU*

If for dental stop + *a* an original distribution between TA = /ta/ and DA = /t²a/ can be found, we should ask ourselves whether such a spelling difference is present in the sequence dental stop + *i*, *e* and *u* as well. In the

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2sg.pres.act. *ta-at-ti* (KBo 19.44 rev. 48, NH, KUB 5.9 i 24, NH, KUB 31.26, 2, NH), 3sg.pres.act. *ta-e* (cited in Oettinger 1979, 64 as "ah+ (1×)", without attestation), 2pl.pres.act. *ta-at-te-ni* (KUB 9.34 iii 36, NS), 1sg.imp.act. *ta-li-it* (KBo 3.38 rev. 16, OH/NS, but interpretation not ascertained), 3sg.pres.midd. *ta-at-ta-ri* (KUB 20.1 ii 10, NS), 3sg.pret.midd. *ta-at-ta-at* (KBo 4.2 iv 35, NH), inf. *ta-a-an-na* (KUB 31.74 ii 15, OH/NS); 2sg.pres.act. *ta-it-ti* (KBo 3.38 obv. 24, OH/NS), 2sg.pret.act. *ta-it-ta* (KUB 33.70 ii 14, MH/NS), 2pl.imp.act. *ta-iš-tén* (Bo 4222 (KUB 21.19) iii 9, NH). The total number of TA spellings, 9× for *dā-ʲ/d-* and 3× for *dai-ʲ/ti-*, are insignificant when compared to the enormous amount of forms attested for both verbs in NS texts spelled with DA (hundreds of them).

[30] The first signs of merging may be found in OH times already, if the use of DA in the OS texts KBo 6.2 and KBo 22.1 for spelling forms that are originally spelled with TA are to be interpreted as an indication of this. Note that KBo 22.1, although dated as "ah." in Hetkonk, does contain some slanted DA's (obv. 2, 4, 12, 15, rev. 19, 22, 27, 29) and ID's (rev. 24, 25, 29) that seem rather characteristic of MS. This text could therefore well be one of the transitional texts (cf. footnote 8) that have to be dated to the time of Muwatalli I, which would fit the occurrence of spellings with DA instead of TA, which in principle seems to be a MH phenomenon.

case of dental stop + *i*, the answer is easy. Since PAnat. */ti-/ and */di-/ assibilated to Hitt. *z-* and *š-*, all cases of Hitt. *ti-* must in principle go back to */tʔi-/ or */dʔi-/. Therewith, we would *a priori* not expect that there is any opposition to be found in writing dental + *i*. And indeed, this is what we find: in word-initial position virtually always the sign TI is used.[31] The choice for the sign TI might seem surprising, since in Alalaḫ Akkadian the sign DI = ṬI is the normal sign to spell /tʔi/ with.[32] Nevertheless, in absence of a distinction to non-glottalized /t/ in this environment, the Hittite scribes may not have found it necessary to indicate the glottalic feature at all.

In the case of dental stop + *e*, we would from an etymological point of view expect a glottalic /tʔ/ to be present only in the words *te-e-eḫ-ḫi* 'I place' and *te-e-eḫ-ḫu-un* 'I placed' < **dʰh₁-ói-h₂e(i)*. As we see, these are spelled with the sign TE. Words in which we would expect to find non-glottalic /te/ are spelled with the sign TE as well, however: e.g. *te-e-ez-zi* 'he says' < **dʰéh₁-ti*, *te-e-kán* 'earth' < **dʰég-m*, *te-e-pu* 'little, few' < **dʰébʰ-u-*. It seems thus that in Hittite no distinction was made between /te-/ and /tʔe-/: both are spelled with TE. This coincides with the situation in Alalaḫ Akkadian, where the sign TE is used to spell both the syllable *te* and *ṭe* (in which function it is read as ṬE₄).[33] The absence of a spelling difference between etymologically expected /te/ and /tʔe/ does therefore not mean that these two syllables were not phonologically distinct in synchronic OH either: the writing system that the Hittites adopted just happened to write these two syllables with one sign, which then was taken over.

In the case of dental stop + *u*, we would on etymological grounds only expect the words *tumēni* 'we take' < **dh₃-uéni*[34] and *tuzzi-* 'army' < **dʰh₁-uti-*[35] to have contained initial /tʔ-/. Both words are spelled in OS texts with TU: $^{\text{NINDA}}$*tu-u*[*z-zi-* ...] (StBoT 25.12 iii 6), *tu-me(-e)-ni*. Words where we would expect /t-/, are also spelled with TU, however: *tuekk(a)-/tukk-* 'body' < **tuek-/*tuk-*, *tūriḫe/a-ᶻⁱ* 'to harness' < **dʰuh₁r-ḫe/o-*, *tuḫān* 'to this side' < **dʰueh₂m*, *tuḫarni-ᶻⁱ/tuḫarn-* 'to break' <

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[31] The only two cases where the sign DI is used in initial position within the whole Hittite corpus are [$^{\text{DUG}}$]*di-iš-šu-um-mi-n=a* (KUB 36.104 obv. 6, OS) // *di-iš-šu-me-e*[*n*] (KUB 48.77 obv.? 4, OH/NS) 'cup'.

[32] Cf. the excursus.

[33] Cf. the excursus.

[34] It seems that in **dh₃-uéni* > *tu-me(-e)-ni* /toméni/ the laryngeal was 'vocalized' to /o/ and that therefore we would perhaps not expect the laryngeal to have been present anymore at the time of assimilation of **DH* > *T*. Yet, since this form is part of the paradigm of *dā-/d-* where all forms became to contain /tʔ-/, it is likely that in the 1pl.pres. form this was the case as well: /tʔoméni/.

[35] If this etymology is correct, cf. Kloekhorst (2008a, 908).

**dʰur-n(e)-h_1-*, *tuu̯az* 'from afar' < **dʰuh$_2$-*, *zīk/tu-* 'you' < **tiH/*tu-*. This coincides with the situation in Alalaḫ Akkadian, where the sign TU is used to spell both the syllable *tu* and *ṭu* (in which function it is read ṬÚ).[36] Here the same remarks apply as the ones regarding /te/ and /tʾe/: the absence of a spelling distinction between /tu/ and /tʾu/ does not mean that they were not phonologically distinct in OH: the script just happened to spell both syllables with the same sign.[37]

KE/I VS. GE/I

The next group of signs I will focus on are those representing velar stops. Within this group I will start with the pair KE/I vs. GE/I. I have collected all words starting in *k/ge-* and *k/gi-* in OS texts, counting how often they are spelled with KE/I, and how often with GE/I. This yielded the following table:[38]

	KE/I	GE/I		KE/I	GE/I
kā-/kū-/ki-/ke- 'this (one)':[39]	54	–	^{GIŠ}*gipeššar* 'cubit, ell':	–	1
genu- 'knee':	–	6	*kiš-$^{a(ri)}$/kiš-* 'to happen, become':[40]	11	–
genzu- 'lap':	–	2			
keššar/kišše̯r-/kišr- 'hand':[41]	10	–	*kiššan* 'thus':	14	–
ketkar 'on top':	2	–	*kištanu-^{zi}* 'to extinguish':	1	–
ki-$^{tta(ri)}$ 'to lie':[42]	27	–	*kištanzi̯e/a-$^{tta(ri)}$* 'to suffer famine':	1	–
gimra- 'field':	–	4			
kinun 'now':	17	–	$^{(GIŠ)}$*kištun-* 'stand, shelf':	8	–
			^{LÚ}*kita-* 'crier':	2	–

[36] Cf. the excursus.

[37] Note that in OS texts the sign DU does not occur in word-initial position. Yet, in younger texts (MS and NS) DU does start to occur in word-initial position: *duu̯ān*, *duu̯arni-^{zi}*, *dukk-^{ari}*, *dumēni*, etc. It is interesting that *zīk/tu-* and *tūri̯e/a-^{zi}* are also in younger texts never spelled with DU. The rationale behind all this is not yet clear to me.

[38] Broken forms that could not be identified as belonging to a specific word are left out of consideration: *ki-n*[*a-*]x-*ma* (KBo 9.67, 3), *ki-i*[*š-*...] (KBo 34.1 iv 3) and *gi-iš-ta-ri*ʾ*-ja*ʾ[(–)...] (KUB 8.41 iii 2).

[39] nom.-acc.sg.n. *ki* (4×), *ki-i* (11×), gen.sg. *ke-e-el* (1), dat.-loc.sg. *ke-e-da-ni* (3×), instr. *ke-e-et* (13×), *ke-et* (1×), nom.pl.c. *ke-e* (2×), nom.-acc.pl.n. *ke-e* (18×), gen.pl. *ki-in-za-an* (1×).

[40] 3sg.pres.midd. *ki-i-ša* (6×), *ki-i-ša-ri* (3×), 2sg.pret.midd. *ki-iš-ta-at* (2×), 3sg.pret.midd. *ki-ša-at* (1×), 3pl.pret.midd. *ki-i-ša-an-ta-ti* (1×), broken *ki-ša*[-...] (1×).

[41] nom.sg.c. *ke-eš-šar* (1×), dat.-loc.sg. *ki-iš-ša-ri(-i)* (3×), all.sg. *ki-iš-ra-a* (1×), abl. *ki-iš-ša-ra-az* (2×), instr. *ki-iš-šar-ta* (3×).

[42] 3sg.pres.midd. *ki-it-ta* (25×), 3pl.pres.midd. *ki-an-da* (1×), *ki-an-ta* (1×).

We see that the distribution is perfect: all words show a consistent spelling, either with KE/I or with GE/I. This means that these two signs reflect a phonetic difference. We must now look at etymological evidence for determining what that phonetic difference could be. First I will look at the words that are spelled with GE/I: *genu-* 'knee', *genzu-* 'lap', *gimra-* 'field' and GIŠ*gipeššar* 'cubit, ell'. Apart from the latter word, which has no good etymology, it is remarkable that all these words go back to an etymon starting in **(ǵ)* or **(ǵ)ʰ*: *genu-* < **ǵénu-*, *genzu-* < **ǵénh₁-su-*, *gimra-* < **ǵʰim-ro-* (Kloekhorst 2008a, 467–8, 468–9 and 476–7, respectively). We know that PIE **(ǵ)* and **(ǵ)ʰ* in PAnatolian merged into a lenis stop */(ǵ)/*. Could the spelling with GE/I indicate the presence of this lenis stop? And would the sign KE/I then indicate the presence of a fortis stop */(ḱ)-/*? Of the words that are spelled with KE/I and have a good etymology, there are indeed many that have to be reconstructed with an initial **(ḱ)-*: *kā-/kū-/ki-/ke-* 'this (one)' < **ḱo-*, **ḱi-*, **ḱe-*, *ketkar* 'on top' < **ḱét-ḱrh₂*, *ki-ttа(ri)* 'to lie' < **ḱei-*, *kinun* 'now' < **ḱi-num*, *kiššan* 'thus' < **ḱi-som*. Yet, there are also a few that have to be reconstructed with **(ǵ)* or **(ǵ)ʰ*: *keššar/kiššer-/kišr-* 'hand' < **ǵʰes-r/*ǵʰs-er-/*ǵʰs-r-*, *kištanu-zi* 'to extinguish' < **ǵʰsd-neu-*, *kištanziie/attа(ri)* 'to suffer famine' < **ǵʰsd-ent-i̯e/o-*, *kīš-a(ri)/kīš-* 'to become' < **(ǵ)eis-*(?) (Kloekhorst 2008a, 471–2, 461–3 and 479–81, respectively). It is interesting to see, however, that in the first three of this group of words, the initial **ǵʰ* is directly followed by **s*. On the basis of other evidence, we know that **s* can cause fortition of a preceding consonant. For instance, the **ške/a-*imperfective to *eku-zi/aku-* = /ʔegʷ-, ʔgʷ-/ 'to drink', is *akkuške/a-* = /ʔkʷské/á-/, in which the /gʷ/ underwent fortition to /kʷ/. Similarly in the *-ške/a-*imperfective of *lāk-i* = /lāg-/ 'to make fall', *lakkiške/a-* = /ləkiské/á-/, in which /g/ has become fortis /k/. I therefore propose that in **ǵʰs-er-/*ǵʰs-r-*, **ǵʰsd-neu-* and **ǵʰsd-ent-i̯e/o-* a similar fortition took place, which first yielded */kSer-, kSr-/*, */kSdnū-/* and */kSdantsie/a-/*, and later, with the appearance of the epenthetic vowel /i/, /kiSer-, kiSr-/, /ki-Sdnū-/ and /kiSdantsie/a-/, spelled *kiššer-/kišr-*, *kištanu-* and *kištanziie/a-*. If this scenario is correct, we would still be able to interpret the spelling of the words *keššar*[43]*/kiššer-/kišr-*, *kištanu-zi* and *kištanziie/a-tta(ri)* with the sign KE/I as an indication of the presence of an initial fortis stop /k-/. We are now only left with the verb *kīš-a(ri)/kiš-* 'to happen, to become', which would show an irregular spelling with the sign KE/I. As is already indicated

[43] We would not expect a fortition of **ǵʰ-* to /k-/ in nom.sg.c. **ǵʰés-r* 'hand'. Yet, since in all other cases, which show zero-grade of the root, **ǵʰs-*, the fortition must have been phonetically regular, it seems unproblematic to me that fortis /k-/ was analogically introduced in the nom.sg. as well, yielding /kéSr/, spelled *ke-eš-šar*.

by the question mark following the reconstruction **ǵʰeis-*, the etymology of the verb *kīš-/kiš-* is not fully clear. The reconstruction **ǵʰeis-* is based on an etymological proposal by Eichner (1973, 78) to connect *kīš-/kiš-* with OHG *kēran*, ModHG *kehren* 'to turn', which reflect **ǵʰois-eie-*. Although formally and semantically certainly appealing, it is rather awkward that the root **ǵʰeis-* would only be attested in West-Germanic and in Hittite. Melchert (1984, 103), however, rather derives *kīš-/kiš-* from "**keis-* 'stir, be in motion' seen in Skt. *ceṣṭati* 'stirs, moves, acts'". Although his etymology is semantically certainly possible and would provide the fortis /k-/ that now seems to be required by the spelling of *kīš-/kiš-* with KE/I, the *-ṭ-* in Skt. *ceṣṭ-* < **keist-* remains unexplained, which makes the connection rather uncertain. As we see, both etymologies have their pros and cons, albeit that Eichner's reconstruction of *kīš-/kiš-* as **ǵʰeis-* at first sight seems formally and semantically more attractive. Yet, the methodological question of course is: are we willing to abandon this etymology in favor of the explanation of the distribution between KE/I and GE/I as one designating the presence of fortis /k-/ vs. lenis /g-/? Personally, I am certainly prepared to do that: the distribution between KE/I and GE/I is so clear, and the assumption that KE/I spells /k-/ whereas GE/I spells /g-/ so perfectly explains the gross majority of words involved (11 out of 12!), that having to reject the idea that *kīš-/kiš-* reflects **ǵʰeis-* is only a small sacrifice.

To sum up, the distribution between KE/I and GE/I[44] as found in OS

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[44] Riemschneider also noticed the distribution between the signs KI and GI: "Ein Wechsel zwischen GI und KI ist ziemlich selten. Damit scheint die Annahme einer lautlichen Differenzierung gerechtfertigt" (1973, 276). Since he presupposes, however, that the Hittite language "Mediae and Tenues zumindest im Anlaut nicht unterschied" (o.c., 273), he has to search for another type of phonetic differentiation. He therefore proposes that although the sign KI can spell both the syllables *ki* and *ke*, the sign GI can only spell the syllable *ge*. Riemschneider is indeed right that the sign GI is never followed by a plene spelled *-i-*. Moreover, it is never followed by signs that would prove *i*-vocalism, namely the unambiguous signs IL, IN (except in GI-*in-zu* [KUB 14.11 iii 22, NH, KUB 14.14 rev. 15, NH], which is a spelling for *genzu* 'lap, abdomen') or IŠ (except in GI-*iš-ta-ri*²-*ia*²[*(-)*...] [KUB 8.41 iii 2, OS], on which see note 48), or by IA (except in the place name URU*Za-*GI-*ia* [KUB 5.1 i 74, NH], which could stand for URU*Zageia* as well). It cannot therefore be excluded that the sign GI only stands for *ge* (this would mean that words like GI-IM-*ra-* 'field', GI-IM-*ma-an-t*° winter', GI-IM-*mi* 'in winter', GI-*ma-ni-ie/a-* 'to spend the winter' and GI-*pé-eš-šar* 'cubit, ell' should be read *gemra-*, *gemmant-*, *gemmi*, *gemaniie/a-* and *gepeššar*, respectively, of which the former ones then all should reflect PIE **ǵʰoim-*). The converse is not true, however: KI can still stand for both *ki* and *ke* (note plene spellings like KI-*i-* = *ki-i-* and KI-*e-* = *ke-e-*). So even if Riemschneider is right that the sign GI can only spell the syllable *ge*, we should still search for an explanation for the distribution between words spelled with *ge-* and words spelled with *ke-*, which could then only be that words starting in *ge-* go back to PAnat. **ǵʰ-* and words starting in *ke-* go back to PAnat. **kʰ-*.

texts fits the etymological distribution between PAnatolian fortis */(ǩ)-/ and lenis */(ǧ)-/, respectively, which means that this phonological distinction must still have been present in OH. Since in Alalaḫ Akkadian the signs KE/I and GE/I are used to spell the phonetic distinction between voiceless *k* and voiced *g*,[45] it is likely that in Hittite the phonetic distinction between word-initial fortis /k-/, spelled with KE/I, and lenis /g-/, spelled with GE/I, would then be one in voice as well.[46]

The post-OH period

The words that in OS show a spelling with the sign KE/I, namely *kā-/kū-/ki-/ke-* 'this (one)', *keššar/kiššer-/kišr-* 'hand', *ketkar* 'on top', *ki-ta(ri)* 'to lie', *kinun* 'now', *kiš-a(ri)/kiš-* 'to happen, to become', *kiššan* 'thus', *kištanu-zi* 'to extinguish', *kištanziie/a-ta(ri)* 'to suffer famine', (GIŠ)*kištun-* 'stand, shelf' and LÚ*kīta-* 'crier', are also in MS and in NS texts always spelled with KE/I. To my knowledge, for none of these words forms with initial GE/I are ever attested.[47] This also goes for a verb like *kišt-āri* 'to perish, to be existinguished': just like its cognate *kištanu-zi*, which is always spelled with KE/I, this verb, too, is always spelled with KE/I.[48] The words that in

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[45] Cf. the excursus. Note that the sign KE/I can in Alalaḫ Akkadian also spell the syllables *qe* and *qi*, for which see below at the treatment of *kĭnu-zi*, *ginu-zi* 'to open up'.

[46] Since in word-internal position the phonetic distinction between fortis and lenis stops is spelled with geminate vs. single spelling (e.g. *VkkV* vs. *VkV*), I have argued elsewhere (Kloekhorst 2008a, 21–25) that the phonetic difference between these two types of stops must be one in length and not in voice, so *VkkV* = /VkV/ = [Vk:V] vs. *VkV* = /VgV/ = [VkV]. If in word-initial position the phonetic difference between fortis /k-/ and lenis /g-/ is indeed rather one in voice, it would therewith differ from the phonetic distinction in word-internal position (cf. also footnote 57 on this matter). This is typologically not uncommon: compare e.g. Modern Icelandic where the phonetic difference between the phonemes /t/ (spelled *t*) and /d/ (spelled *d*) is in word-initial position one in aspiration, *t-* = /t-/ = [tʰ-] vs. *d-* = /d-/ = [t-], whereas in word-internal position it is one in voice and fricativization, *-t-* = /-t-/ = [-t-] vs. *-d-* = /-d-/ = [-ð-].

[47] If in KUB 42.97, 3 we would really have to read [*ǧ*]*e-eš-šar-ta* 'with the hand' (thus Oettinger 1979, 553[10]; Puhvel HED 4, 162), this form would be the only exception showing a GE/I-spelling of one of these words. The word *ker* 'heart', which goes back to **ḱēr*, is indeed, as expected, usually spelled with KE/I (cf. Puhvel HED 4, 189 f. for attestations), but a spelling with GE/I is attested twice as well, on one tablet: *ge-er* (KBo 31.77 i 6, 11, MS).

[48] The form '*gi-iš-ta-ri*' (KUB 8.4 iii 2, OS) cited by Puhvel (HED 4, 167) as a 3sg.pres.midd. form to *kišt-āri* (taken over by Kloekhorst 2008a, 482) probably does not belong here: the form in fact reads *gi-iš-ta-ri*?-*ia*?[*(-)*...] and is attested without any surrounding context, so that its meaning cannot be independently determined. Moreover, if indeed a 3sg.pres.midd. form to *kišt-āri*, we would have expected plene spelling of the ending *-āri*.

OS texts are spelled with GE/I, namely *genu-* 'knee',[49] *genzu-* 'lap', *gimra-* 'field' and *gipeššar* 'cubit, ell', are also in MS and NS texts practically always spelled with GE/I. Only rarely do we find forms spelled with KE/I, especially in NS texts: acc.sg. *ke-nu-un* 'knee' (KUB 9.34 iii 34, NS), nom.-acc.sg. *ke-e-en-zu* 'lap' (KBo 10.31 ii 17, OH/NS),[50] gen.sg. *ki-im-ra-aš* 'field' (KUB 38.3 ii 9 NS), dat.-loc.sg. *ki-im-ri* (KUB 36.49 i 10, OH/?[51]), nom.-acc.sg. *ki-pé-eš-šar* 'cubit, ell' (KUB 30.31 i 6, NS). I do not think these forms should be given any linguistic weight. Also a word like *gimmant-* 'winter' provides us with the same picture: this word and its derivative *gimmantariie/a-zi* 'to spend the winter', which are unattested in OS texts, are in MS and NS texts practically always spelled *gi-im-ma-an-t°*, with the sign GE/I.[52] Only once do we find a spelling with KE/I: acc.sg. *ki-im-ma-an-tan*$_x$ (KUB 4.4 obv. 3, undat.).[53] The generally accepted reconstruction of *gimmant-* as **ǵʰim-no-* (Kloekhorst 2008a, 475–6) supports our idea that the sign GE/I represents /g-/.

The establishment that also in MS and NS texts the spelling difference between KE/I and GE/I remains intact, makes it possible to also use the data from younger texts for etymological purposes. For instance, the verb *kiš-zi* 'to comb, to card' is unattested in OS texts. Yet, its consistent spelling with the sign KE/I points to an initial /k-/, which fits its reconstruction, namely **kes-/*ks-* (Kloekhorst 2008a, 481–2). The verb *kinae-zi* 'to (as)sort' is only attested in NS texts. Yet, its consistent spelling with the sign KE/I points to an initial /k-/, which matches its reconstruction, namely **ki-né-h*$_2$*-ti* (Kloekhorst 2008a, 477).

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[49] Its derivative *genuššariie/a-zi* 'to kneel', which is usually spelled *ge-(e-)nu-uš-* (cf. Puhvel HED 4, 150 for attestations), is twice spelled with KE/I: *ke-nu-uš-ša-ri-ia-an-za* (KUB 17.31 i 13, NS), *ke-nu-uš-ri-a[n-...]* (KUB 39.61 ii 4, NS).

[50] Note the aberrant plene spelling of *-e-* as well.

[51] In CHD (L-N, 21, 371; P, 346), this text is dated as "OS" (although in CHD P, 198, we find "OS?"), whereas Hetkonk dates this text as "ah.?". I have not been able to find any specific OS features in the hand copy of this text, however (a photograph was not available to me). Note that the absence of plene spelling in 3sg.pret.act. *ha-aš-ta* (ibid. iv 8) 'she bore' may point to a younger copy. In the same text we find the hapax *ki-im-mar-na-la-aš* (ibid. iv 2), also spelled with KI, which is taken by Laroche (1983, 131) as a derivative of *gimra-*.

[52] The same goes for the cognate forms *gimmi, giemi* 'in winter' and *gimaniie/a-zi* 'to spend the winter', which are always spelled with GE/I as well (cf. Puhvel HED 4, 143f. for attestations).

[53] Note the aberrant use of TÉN as *tan*$_x$.

The only word I know of that shows a considerate amount of spellings with KE/I as well as with GE/I is the verb *kǐnu-zi*, *ginu-zi* 'to open up'. A close look at its attestations[54] shows that the spelling *ki-(i-)nu-* is the oldest: it is attested several times in MS texts. The spelling *gi-nu-* is predominantly found in NS texts (only once in a MS text), whereas the spellings *ke-e-nu-* and *ge-e-nu-* are only found in (L)NS texts. So here we seem to be dealing with a development *ki-(i-)nu-* > *gi-nu-* > *ge-e-nu-*. How do we reconcile this with our finding that in all other words spellings with KE/I and with GE/I remain consistent throughout Hittite? Does this mean that only in this word OH /ki-/ develops into NH /gi-/? That is hardly credible as in all other words starting in /ki-/ the fortis /k-/ remains constant through Hittite. Something else must have been going on, and we can only find out what that is by looking at its etymology. Laroche (1963, 59) connected *kǐnu-zi*, *ginu-zi* 'to open up' with verbs for 'to yawn, to open up (one's mouth)' as found in other IE languages, which point to a root **ǵʰh₂ei-*.[55] Hitt. *kǐnu-zi*, *ginu-zi* seems to form a *-nu-*causative to this root,

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[54] 3sg.pres.act. *ki-i-nu-zi* (KBo 19.145 iii 35, MS, KBo 22.189 iii 5, OH/NS), *ki-nu-uz-zi* (KUB 9.22 ii 49, MS, KUB 13.9 + 40.62 iii 5, 7, 8, MH/NS, KUB 4.47 obv. 41, NS), *ki-nu-zi* (KBo 6.26 i 30, OH/NS, KUB 58.48 iii 17, OH/NS, KUB 55.58 obv. 15, 17, MH/NS, KUB 41.8 iii 13, MH/LNS), *gi-nu-uz-zi* (KBo 10.11 i 7, OH/NS, KBo 10.45 iii 2, MH/NS), *gi-nu-zi* (KBo 40.118 l.col. 7, NS), 3pl.pres.act. *ki-nu-an-zi* (KBo 24.45 rev. 11, MS?, KUB 15.31 ii 9, 10, 11, MH/NS, KUB 29.4 iv 23, NS), *ki-nu-ua-an-zi* (KUB 15.31 ii 9, MH/NS, KBo 10.20 i 39, NS, KBo 27.202, 8, NS), *gi-nu-ua-an-zi* (KUB 25.23 i 39, NH, KUB 13.32 obv. 9, NH/LNS, KUB 17.37 i 4, LNS, VSNF 12.1 rev. 11, LNS), *ke-e-nu-ua-an-zi* (KUB 25.23 iv 51, NH), *ge-e-nu-ua-an-zi* (KBo 2.7 obv. 9, 23, rev. 16, LNS), 3sg.pret.act. *ki-nu-ut* (KUB 55.58 obv. 25, MH/NS, KUB 24.7 iii 25, NS, KUB 44.56 rev. 11, NS, KUB 60.48 ii 2, NS, ABoT 56 iii 31, NH/LNS), 2sg.imp.act. *gi-nu-ut* (KBo 21.22 rev. 49, OH/MS), 3sg.imp.act. *ki-i-nu-ud-du* (KUB 30.10 obv. 24, 28, OH/MS), *ki-nu-ud-du* (KUB 30.10 obv. 25, OH/MS, KUB 13.9 + 40.62 iii 6, MH/NS), 3sg.pret.midd. *ki-nu-ut-ta-ti* (KBo 49.11 rev. 11, NS), 3sg.imp.midd. *ki-nu-ut-ta-ru* (KBo 2.3 iv 13, MH/NS), part. acc.sg.c. *gi-nu-ua-an-ta-an* (KUB 35.145 iii 8, NS), *gi-nu-ua-an-da*<*-an*> (KUB 44.4 + KBo 13.241 rev. 31, LNS,), nom.-acc.sg.n. *ki-i-nu-an* (KUB 13.1 iv 7, MH/MS), *ki-nu-ua-an* (KUB 13.2 iv 17, MH/NS, KBo 17.56 obv. 2, NS), inf. *ki-nu-ma-an-zi* (KBo 24.45 rev. 8, MS?, KBo 21.34 + IBoT 1.7 iv 41, MH/NS, KBo 23.7 i 10, NS, KUB 7.22, 8, NS, KUB 30.60+ i 32, NS), *ki-nu-ua-an-zi* (KBo 27.202, 3, NS), verb.noun gen.sg. *gi-nu-ma-a-aš* (KUB 41.34 rev. 6, LNS), *ge-e-nu-ua-aš* (KUB 17.37 i 5, LNS, KUB 42.105 iii 10, LNS). Note that 3pl.pres.act. '*gi-nu-ua-an-zi*' (IBoT 1.36 i 7, MH/MS) as cited by Puhvel (HED 4, 152) does not exist, cf. Güterbock/van den Hout (1991, 4).

[55] The presence of **h₂* is clear from Gr. *χανεῖν*, *χάσκω*, perf. *κέχηνα* 'to yawn, to open one's mouth' < **ǵʰh₂-n-*, **ǵʰeh₂-n-* and *χήμη* 'yawning' < **ǵʰeh₂-meh₂*. The root **ǵʰh₂ei-* as found in OCS *zěvati* 'to yawn' < **ǵʰh₂ei-u-*, OCS *zějǫ* 'to yawn' < **ǵʰh₂ei-+-ie/o-*, OCS *zijati*, Lith. *žióti* 'to open (one's mouth)' < **ǵʰh₂i-eh₂-*, MHG *giwen* 'to yawn' < **ǵʰh₂i-u-*, OHD *ginēn* 'to yawn' < **ǵʰh₂i-n-*, Lat. *hīscō* 'to open up, to yawn' < **ǵʰih₂-ske/o-* (with laryngeal metathesis), TochB *kāy-* 'to open wide' < ** ǵʰh₂i-*(?), probably forms an old pet-

and therefore must reflect **ǵʰh₂i-neu-*. As we have seen above in the case of TA vs. DA, an initial cluster **THV-* first yielded pre-Hittite */t?V-/, the glottalic element of which was retained into OH, and spelled with the sign DA which in Akkadian could also be read with the emphatic value ṬA, i.e. /tʔa/. Only in MH times the glottalic element in /tʔV-/ seems to have been lost. This means that in the case of a preform **ǵʰh₂i-neu-* we could also envisage that it first developed into */ǵʔi-/, the glottalic element of which was preserved into OH, yielding /gʔi-/. If that is correct, how would this /gʔi-/ be spelled? In Alalaḫ Akkadian, the syllable *qi*, i.e. /kʔi/, is spelled with the sign KI = QÍ.[56] It therefore seems quite possible to me that in this word the syllable /gʔi-/ would be spelled with KI as well. When in MH times the glottalic element eventually was dropped, the result was apparently /gi-/, which then was spelled with the sign GI.[57] To summarize, the change in spelling of the verb *kǐnu-zi*, *ginu-zi*, namely with the sign KI in the older stages of Hittite, but with the sign GI in the younger stages, does not represent the development of an original initial fortis /k-/ to /g-/ (which would be inexplicable in view of the retention of the distinction between /ke/i-/ and /ge/i-/ throughout Hittite as attested in other words), but rather as the presence vs. absence of glottalization of the initial stop: /gʔ-/ > /g-/.

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rified *i*-present of the root **ǵʰeh₂-*. The *u*-derivatives OCS *zěvati* < **ǵʰh₂ei-u-* and MHG *giwen* < **ǵʰh₂i-u-* may be directly cognate with the *nu*-formation as found in Hittite: *kinu-zi* < ** ǵʰh₂i-ne-u-*. The semantics of Hittite *kinu-zi* 'to open up' and TochB *kāy-* 'to open wide', which both do not have a connotation 'to yawn' (but cf. TochB *koyn* 'mouth', which must reflect the same root), may show that the original meaning of **ǵʰh₂(-ei)-* was 'to open up', and that the semantic development to 'to open one's mouth, to yawn' is a common innovation of the other IE languages (p.c. T.C. Pronk).

[56] Cf. the excursus.

[57] Note that the outcome of word-initial */(ǵ)?-/, which on the basis of this example can be determined as /g-/, differs from the outcome of */(ǵ)?/ in intervocalic position, which is /k/ (e.g. **méǵh₂-i-* > *mégʔi-/ < /méki-/). Whereas the development of intervocalic */V(ǵ)?V/ to /VkV/ fits in well with the phonetic interpretation of the distinction between word-internal fortis and lenis stops as one in consonantal length (cf. Kloekhorst 2008a, 21–25 and footnote 46), so *[V(k)?V] > [Vk:V], the fact that word-initial */(ǵ)?V-/ did not yield a fortis stop, but rather a lenis one, corroborates the view as expressed above that in word-initial position the phonetic distinction between fortis and lenis stops was rather one in voice.

The absence of etymological spellings of this word in later times (unlike in the case of *dā-i/d-* and *dai-i/ti-*) must be due to the fact that the verb *kǐnu-zi*, *ginu-zi* was much less common than *dā-i/d-* and *dai-i/ti-*.

KA VS. GA

I have collected all words starting in *k/ga-* in OS texts, counting how often they are spelled with KA, and how often with GA. This yielded the following table:[58]

	KA	GA		KA	GA
kā- 'this (one)':	7	–	*karaitt-/karett-* 'flood':	2	–
NINDA*kaḫari-*, a kind of bread:	1	–	*karāp^{i}/karip-* 'to devour':	2	–
NINDA*kaḫariet-*, a kind of bread:	11	–	*garāu̯ar/garaun-* 'horn':	–	3
LÚ*gaina-* 'in-law':	–	1	*karinu-^{zi}* 'to silence':	2	2
kakkapa-, a bird:	1	–	*karū* 'early':	18	–
galueššina-, a plant:	–	1	LÚ*karuḫala-*, a functionary:	1	–
kalulupa- 'finger':	14	–	*karuili-* 'former':	2	–
ganenant- 'crouching':	–	2	*kāša* 'just':	11	–
gane/išš-^{zi} 'to recognize':	–	6	*kaššaš* 'in lieu of':	1	–
kāni 'here':	1	–	*gāšt-* 'hunger':	–	1
kānk-^{i}/kank- 'to hang':	4	5	*katti* 'along with':	1	–
gāpina- 'thread, yarn':	–	7			

Apart from *kānk-^{i}/kank-* and *karinu-^{zi}*, all words show forms that are either spelled with KA or with GA. And although the distribution between KA vs. GA is less perfect than between TA vs. DA or KE/I vs. GE/I, it still seems evident to me that it must have an underlying phonetic reason. It is instructive to first look at the spelling of these words in younger texts. It namely appears that the well-attested OS words (i.e. words with more than 5 attestations) that occur with the spelling KA only, are in younger texts virtually consistently spelled with KA as well: *kā-* 'this one',[59] NINDA*kaḫariet-*, a kind of bread,[60] *kalulupa-* 'finger',[61] *karū* 'early',[62] *kāša* 'just'.[63]

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[58] Broken forms that could not assuredly be assigned to a specific word are left out of consideration: *ga*[-...] (KBo 20.8, iv 14), *ka-a*[-...] (KBo 25.110 rev. 2, 3), *ga-*x[-...] (KBo 25.97, 7), *ga-an*[-...] (FHL 117, r.col. 4).

[59] Cf. Puhvel (HED 4, 3 f.) for attestations.

[60] Cf. Puhvel (HED 4, 16) and Hoffner (1974, 166–7) for attestations. Note that the clear cognate terms NINDA*kaḫari-* and NINDA*kaggari-* do also show spellings with the sign GA, however. Yet, since these words are undoubtedly of a foreign origin (cf. Hoffner l.c.), this should not concern us too much here.

[61] Cf. Puhvel (HED 4, 31) for attestations. This word is spelled 3× with GA as well, namely nom.sg. *ga-lu-lu-pa-aš* (KUB 13.2 ii 6, MH/NS), nom.pl. *ga-lu-lu-pé-e-eš* (KBo 32.13 ii 30, 31, MH/MS, note the aberrant plene spelling of *-e-*), and once with QA, namely acc.pl. *qa-lu-lu-pu-uš* (KBo 15.10 i 6, OH/MS, which contains aberrant *qa-a-ša* as well, cf. footnote 63).

[62] Cf. Puhvel (HED 4, 112 f.) for attestations. Also its derivatives *karū(i)li-* 'former' and *kareu̯ariu̯ar* 'early in the morning' are consistently spelled with KA.

[63] Cf. Puhvel (HED 4, 118) for attestations. This word is spelled *qa-a-ša* in KBo 15.10 (i 30, 31, ii 8, 19, 32, 43, OH/MS), the same tablet where we find aberrant *qa-lu-lu-p°* 'finger'.

Well-attested OS words that are spelled with GA only, occur in younger texts spelled with the sign GA as well as KA, however: *gane/išš-zi* 'to recognize' is in younger texts spelled *kane/išš-* as well,[64] *gāpina-* 'thread, yarn' is in younger texts spelled *kāpina-* as well.[65] This reminds us of the situation of TA vs. DA, where we saw that in post-OH times DA was spreading at the cost of TA, which was caused by the loss of the OH phonetic distinction between TA = /ta/ and DA = /tˀa/. For KA vs. GA, it now seems that in post-OH times KA is spreading at the cost of GA, indicating that if there originally was a phonetic difference between these two signs, it was lost in the post-OH period. Since GA is in this scenario the unproductive sign, spellings with GA are linguistically important, even if they are found in young texts. In the following, words that are always spelled with the sign KA are rendered with initial *k-* (e.g. *kā-*, *kāša*, etc.), whereas words that are spelled with both GA and KA are rendered with *g-* (e.g. *garaitt-*, despite its OS spellings with KA, *garāp-i/garip-*, despite its OS spellings with KA, etc.).

In the case of KE/I vs. GE/I, we have seen that the distinction between these two signs represents the phonetic distinction between fortis /k/ and lenis /g/. It is therefore *a priori* likely that this would be the case for KA vs. GA as well. And indeed, several of the words starting in *ka-* etymologically reflect a fortis */(ǩ)-/: *kā-* 'this one' < *ḱó-*, *kāša* 'just' < **ḱós+*, *katti-* 'along with' < **ḱmti-* (Kloekhorst 2008a, 425–7, 460–1 and 463–4, respectively). Conversely, several of the words starting in *ga-* etymologically reflect a lenis */(ģ)-/: *gamarš-* 'to defecate' < **ǵʰodmrs-*(?), *gāšt-* 'hunger' < **ǵʰosd-* (Kloekhorst 2008a, 432 and 461–3, respectively). So far, so good. In the case of words starting in *gR-*, the situation is different, however. Here we find a few words spelled with GA that etymologically should go back to fortis */(ǩ)-/: *gališš-* 'to call' < **ḱlh*$_1$*s-*, *garāuuar* 'horn' < **ḱr-ó-u̯r*, *gariie/a-zi* 'to cover' < **kr-i̯e/o-* (Kloekhorst 2008a, 430–1, 446–7 and 449–50, respectively). Yet, it does not seem problematic to me to assume that before a resonant, */(ǩ)R-/ and */(ģ)R-/ merged into Hitt. /gR-/.[66] The fact that *karinu-zi* 'to silence' < **kr-i-neu-* (Kloekhorst 2008a, 450–1) is in OS texts spelled both with KA and with GA, could indicate that this development took place within the OH period.

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[64] Cf. Puhvel (HED 4, 42f.) for attestations.

[65] Cf. Puhvel (HED 4, 65) for attestations.

[66] If indeed the phonetic distinction between word-initial fortis and lenis stops was one in voice (cf. footnote 57), then the development of */(ǩ)R-/ to /gR-/ can be seen as due to voice assimilation.

If the difference between KA and GA indeed denotes an etymological difference between fortis /k-/ and lenis /g-/, and taking into account that a sequence */(ḱ)R-/ seems to have developed into Hitt. /gR-/, the spelling of the following words can now be accounted for:[67]

kV	gR	gV
kā- < **ḱo-*	*galank-* < **gleng^{h}-*	*gamarš-* < **ǵ^{h}odmr-s-*(?)
kāni < **ḱóni*	*galiss-* < **ḱlh$_1$s-*	*gāšt-* < **ǵ^{h}osd-*
kāša, kāšma < **ḱós+*	*ganen(iie/a)-* < **ǵ-ne-n-*?	
katti < **ḱmti-*	*gane/išš-* < **ǵnh$_3$s-*	
	ganu- < **ǵneu-*	
	garaitt- < **ǵroit-*	
	garāp- < **ǵ^{h}robh$_1$-*	
	garāt- < **ǵrh$_1$-od-*	
	garāu̯ar < **ḱr-ó-u̯r*	
	gariie/a- < **kr-ie/o-*	
	garinu-^{ri} < **kr-i-neu-*	
	garūšš- < **greus-*	

Unfortunately, there remain some words that do not immediately fit into this picture: their spelling with KA or with GA does not match the value of their initial consonant as is reconstructed on the basis of commonly accepted etymologies. This means that either our interpretation of the signs KA and GA has to be adjusted, or that the etymologies of these words are incorrect. Let us look at these words more closely.

^{LÚ}*gaina-* 'in-law, kinsman' is spelled *ga-i-na-* (also *ga-e-na-* and *ga-a-i-na-*) as well as *ka-i-na-* (also *ka-e-na-*), which in our present understanding would point to an initial /g-/. The etymology of this word is difficult. The fluctuation between spellings with *-i-* and *-e-* is highly remarkable and unexplained. When compared to a word like *pa-i-mi* = /páimi/ 'I go', which is never spelled ***pa-e-mi*, it seems that *ga-i-na-/ga-e-na-* cannot be simply interpreted as /gaina-/. Therefore Hrozný's proposal (1919, 100–1) to connect *gaina-/gaena-* to Lat. *cīvis* 'citizen', Skt. *śivá-* 'friendly', which implies a reconstruction **ḱoi-no-* and nowadays seems to be quite generally accepted,[68] cannot be correct.[69] Puhvel's connection (HED 4, 13–4) with Skt. *jā́mātar-*, Av. *zāmātar-* 'son-in-law', Gr. γαμβρός 'son-in-law; brother-in-law' and subsequent reconstruction **ǵm̥h$_2$-ino-* is formally difficult as

[67] All reconstructions taken from Kloekhorst (2008a, *s.vv.*).

[68] Taken over by Kimball (1994) and Kloekhorst (2008a: 427).

[69] Moreover, the semantic connection between *cīvis* 'citizen' and *śivá-* 'friendly', on the one hand, and 'in-law, kinsman', on the other, also leaves room for doubt.

well (the laryngeal should have been retained in this position; moreover, it does not explain the spelling with *-e-*). Unfortunately, I am unable to offer a better proposal, so we must conclude that *gaina-/gaena-* cannot be used as an argument in this discussion.

kaleliie/a- 'to tie up, to truss' is attested with the sign KA only, which would point to an initial /k-/. This does not match the fact that this verb is thought to reflect **ḱlh$_1$-el-ie/o-* (Kloekhorst 2008a, 429–30), on the basis of which we would expect initial /g-/ (since */(ḱ)R-/ > /gR-/). Yet, the number of attestations of this word is quite low (it is attested six times only, five of which are found in NS texts), and it therefore is quite possible that the absence of spellings with GA is coincidental. This makes this word non-probative.

gānk-i/gank- 'to hang (trans.)' is already in OS texts spelled with KA as well as GA: 1sg.pres.act. *ga-a-an-ga-aḫ-ḫé* (StBoT 25.4 iv 13), *ga-a-an-ga-aḫ-ḫi* (StBoT 25.3 iv 17), 3sg.pres.act. *ka-a-an-ki* (KBo 17.2 i 3 [fr.], 7), 3pl.pres.act. *ka-an-kán-zi* (KBo 17.2 i 1, 11), part.nom.pl.c. *ga-an-ga-an-te-eš* (KBo 17.6 iii 19, StBoT 25.3 iii 26, 27). Note, however, that all forms with KA are from one tablet. Etymologically, *kānk-i/kank-* clearly belongs with Goth. *hahan* 'to hang', Skt. *śáṅkate* 'to waver', Lat. *cunctor* 'to hesitate' and must reflect **ḱonk-/*ḱnk-* (Kloekhorst 2008a, 437–8). According to our findings above, we would now expect the strong stem **ḱónk-* to develop into Hitt. /kānk-/, spelled with KA, but the weak stem **ḱnk-* into Hitt. /gnk-/, spelled with GA. Since Hittite did not tolerate consonantal alternation within one paradigm, it should be no surprise that the initial consonant of one of these stems was generalized throughout the paradigm. The two attestations of *kānki* spelled with KA may still reflect the original /k-/, but the spellings *gāngaḫḫe* and *gāngaḫḫi* clearly show that already in OH times the /g-/ of the weak stem was spreading at the cost of /k-/.

kariant- 'grass' and its derivative *karikantašḫa-* 'lawn' are both hapaxes in a NS text, and their spelling with KA is therefore non-probative. Their reconstruction as **ǵʰrh$_1$ient-* (Kloekhorst 2008a, 448–9) would rather predict an initial /g-/.

kariie/a-(tti)a(ri) 'to be gracious towards' and its derivatives *kariiašḫa-* 'graciousness' and *kāri tiie/a-zi* 'to be gracious toward' are attested with the sign KA only, which would point to an initial /k-/. This would not fit the etymology of these words, which are usually connected with Skt. *háryati* 'to desire, to covet' and Gr. χαίρω 'to rejoice at, to take pleasure in' and therefore reconstructed as **ǵʰr-ie/o-* and **ǵʰór-i-* (Kloekhorst (2008a, 449). Yet, the fact that the number of attestations of these words is very low (*kariie/a-* is attested twice, *kariiašḫa-* once and *kāri tiie/a-* about ten times)

and that these forms are all from NS texts, allows us to assume that the absence of spellings with GA is coincidental, which makes the attestations of these words with KA non-probative.

karū 'already; early; up to now' is usually spelled *ka-ru-ú*. In principle, this spelling can be interpreted both as /karū/ and as /krū/. Since we now would expect an initial cluster */(ḱ)r-/ to develop into Hitt. /gr-/, the consistent spelling of this word and its derivatives *kareu̯ariu̯ar* 'early in the morning' and *karū(i)li-* 'former' with the sign KA would be problematic for the latter interpretation. It therefore seems preferable to assume that *karū* stands for /karū/. This interpretation might be supported by the attestations *ka-a-ru-ú* (KBo 31.108 iv 5) and *ka-a-re-u̯a-ri-u̯a-ar* (KUB 5.6 l.edge 5), which show plene spelling of the *-a-*. The etymology of *karū* is not easy to determine since the semantics of this word are quite broad. On the one hand, *karū* means 'in former times', but on the other it can also mean 'already'. Puhvel (HED 4, 114) states that "[t]he source-meaning is probably 'early', perhaps literally 'at dawn'" and therefore follows Čop (1961–2, 197–97, 206–9) in connecting *karū* with ON *gryiandi* 'dawn' and Swed. *dagen gryr* 'it dawns', which together with ON *grár* and OHG *grāo* 'grey' point to a *u*-stem **ǵʰreh₁-u-*. A reconstruction **ǵʰrh₁-ēu* or **ǵʰréh₁-u* (thus Kloekhorst 2008a, 458) would not fit a phonological interpretation /karū/, however. Moreover, although it is understandable that an original meaning 'grey' would develop into a meaning 'dawn', as it did in Germanic, it is harder to envisage how an original meaning 'grey' would yield 'in former times' as well as 'already', as would be the case in Hittite.[70] Also Eichner (1978, 160) apparently assumed a basic meaning 'at dawn' since he compares Lat. *crās* 'tomorrow'. This latter word has nothing to do with 'dawn', however, since it rather reflects **ḱr-éh₂-s* 'at the head, up front > tomorrow' (De Vaan 2008, 141), and therefore must be separated from *karū*. In my view, the semantics of *karū* should be interpreted as follows. When meaning 'in former times' it denotes the time span before the present (sometimes until just before the present), but when meaning 'already' it denotes the time span before the present including the present itself. So, the point of reference of *karū* is not a point of time that is situated in the past, but rather the present moment: its basic meaning is to be seen as 'up to now, up to this point', sometimes excluding and sometimes including the present. I therefore want to return to an etymological proposal suggested already by Hrozný (1917, 79[5]), namely to connect *karū* with the de-

[70] The derivative *kareu̯ariu̯ar* 'early in the morning' is sometimes translated as 'at dawn' as well, but the proper expression for 'at dawn' is (*mān*) *lukkatta* (which can also refer to the dawn of the next day).

monstrative pronoun *kā-* 'this (one)'.[71] The element *-r-* was connected by Hrozný with the **-r* found in e.g. Skt. *kár-hi* 'when' and *tár-hi* 'then', which is comparable to e.g. Lat. *cūr* 'why', Goth. *hvar* 'where' < **kʷor* and Goth. *her* 'here' < **ḱēr*. This means that Hitt. *kar-* should reflect **ḱor-* 'this point'. The element *-ū* probably goes back to **-ēu*,[72] and therefore could be a locatival formans denoting the meaning 'up to'. If this is correct, *ka-ru-ú* = /karṹ/ would reflect **ḱor-ēu*, and therewith fit our finding that KA spells initial /k-/.[73]

As we see, all the words that at first sight seem to contradict the interpretation of KA = /ka-/ vs. GA = /ga-/, are either non-probative, or have received an alternative etymology with which they do fit this interpretation. We therefore can conclude that, just as in the case of KE/I vs. GE/I, the words that begin with *k/ga-* show that in OH the original distinction between fortis */(ḱ)-/ and lenis */(ǵ)-/ was still preserved, the former being spelled with KA, the latter with GA (except before a resonant, where both */(ḱ)R-/ and */(ǵ)R-/ seem to have merged in /gR-/). Unlike in the case of KE/I vs. GE/I, however, the distinction between /ka-/ and /ga-/ seems to have been lost from the MH period onwards.

QA

The sign QA, which in Alalaḫ Akkadian is used to spell the emphatic stop, /kʾa/, is in Hittite hardly ever used word-initially. The only examples I know of are all from one tablet, *qa-a-ša* (KBo 15.10 i 30, 31, ii 8, 19, 32, 43), *qa-lu-lu-pu-uš* (ibid. i 6), where the sign QA seems to be used as a mere variant of KA, and had better be read *ka*$_4$-.[74] The fact that QA = /kʾa/ is not

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[71] For a semantic parallel, cf. Lat. *ōlim* 'formerly, once', which is derived from *olle, ollus* 'that; he, she, it'.

[72] On the basis of *kareu̯ariu̯ar*, which must be a derivative in *-u̯ar* of a verb **kareu̯ariie/a-*, itself a derivative in *-ariie/a-* of the stem **kareu̯-*.

[73] The interpretation of HLuw. *ruwan* 'formerly' is less clear. This word is a hapax (KARATEPE 1 §XXXIII), spelled *rú-wa/i-na*, i.e. with the sign *rú* = CERVUS$_2$, which is almost exclusively used to write the name of the deity Runtiya. Since the name Runtiya denotes the Stag-god (and CERVUS$_2$ = 𒄰 designates the antlers of the stag), it is often thought that it must etymologically be connected with the PIE root **ḱer-* 'horn'. It therefore has been suggested that the name Runtiya is derived from **ḱru-* (through a stage **ḫru-*?). This would mean that *rú-wa/i-na* could possibly go back to **ḱr(V)u-* as well. This would invalidate the argument that since only lenis */(ǵ)/ disappears in Luwian, *ruwan* can only reflect */(ǵ)ru-/.

[74] The form "QA-*za-u̯a-al-li-iš*" (KUB 18.2 ii 9) as cited by Riemschneider (1973, 274[10]), is rather to be read ^{d}*Za-u̯a-al-li-iš* (cf. van den Hout 1998, 136f. on the *Zau̯alli*-deity). Only rarely do we find a word-initial QA in the spelling of geographical names: ^{URU}*Qa-aš-qa-aš*

used word-initially coincides with the fact that I know of no Hittite word starting in *ka-* where we would have to reconstruct **(ḱ)H-* or **(ǵ)(h)H-*.[75]

KU VS. GU

As said above, the sign GU is practically never used in writing phonetically spelled Hittite words,[76] and in word-initial position we therefore only find the sign KU. Hittite words starting with *ku-* can on the one hand go back to words starting in labiovelars and, on the other, to words starting in (palato)velars + *-u-* or *-Vu-*. In the case of words with an initial labiovelar, we must assume on the basis of words like *kuer-zi* 'to cut' < **kʷer-*, *kuelu̯ana-* 'washbasin(?)' < **gʷelh₁-uono-* (?) and *kuen-zi* 'to kill' < **gʷʰen-*, which are spelled with initial KU, that the three labiovelars **kʷ*, **gʷ* and **gʷʰ* seem to have merged in word-initial position in Hittite, probably into /kʷ-/. In the case of words starting in (palato)velar + *-(V)u-*, the same seems to apply: *kuu̯an-* 'dog' < **ḱuōn-*, *kukuš-zi* 'to taste' < **ǵ(e)us-*[77] and *kutt-* 'wall' < **ǵʰ(e)u-t-*, which are all spelled with initial KU, indicate that the three (palato)velars **(ḱ)*, **(ǵ)* and **(ǵ)ʰ* have merged in word-initial position before an *u*, probably into /k-/.

/kʔu/?

In Alalaḫ Akkadian, the syllable *qu*, i.e. /kʔu/, is consistently spelled with the sign KU, which can then be read as QÚ. This means that even if in Hittite words would exist that would start with /kʔu-/ (but note that as far as I am aware no Hittite words exist that go back to a preform containing **KʷH-* or **KHu-*), they would in spelling probably not be differentiated from words starting in /ku-/.

(KBo 3.4 i 31, KBo 5.6 i 18), URU*Qa-aš-ga* (KUB 23.77+ rev. 63, 69, KBo 16.27 ii 5, 13, ABoT 60 rev. 5), URU*Qa-a-aš-ga* (IBoT 1.36 iii 35), URU*Qa-aš-qa* (KBo 22.54 obv. 6, KUB 31.79, 6); URU*Qa-du-du*[*-pa*(-)...] (KUB 19.21 rev.? 5).

[75] Except *kattu-* 'strife' if this really reflects **ḱh₂et-u-* (~ OIr. *cath-* 'strife', MHG *hader* 'fight', Skt. *śátru-* 'enemy'(?), cf. Kloekhorst 2008a, 466), which is always spelled with the sign KAT. Note that this sign can in Akkadian be read QÀT, i.e. /kʔat/, as well.

[76] Cf. footnote 2 for exceptions.

[77] Cf. Watkins (2003) and Kloekhorst (2008a, 491–2) for this verb, its semantics and etymology.

PA VS. BA

The last group of signs I am treating are those representing labial stops, starting with the pair PA vs. BA. The sign BA is hardly ever used in word-initial position in genuine Hittite words. The only good examples I know are the following: *ba-i-iš* 'he gave' (KBo 18.151 obv. 7, 13, MS),[78] *ba-i-it* 'he went' (ibid. rev. 19, MS),[79] GIŠ*ba-tal-ha-aš* 'sole of the foot' (KUB 17.1 ii 10, NH)[80] and *ba-aš-š[u]-uš* 'pedestal' (KUB 42.46, 3, NH)[81]. Note that the first two forms are from KBo 18.151, a tablet that is notorious for its many spelling aberrancies (cf. footnote 29) and are therefore to be taken as a peculiarity of that tablet that do not shed light on normal spelling practices. The words in which we find initial BA on a wider scale are all likely to be of foreign origin: GIŠ*bāini-* 'tamarisk'[82] is probably a loanword connected with Hurr. *paini-* and Akk. *bīnu* (Tischler HEG P, 384); NA$_4$*baraš-ḫa-*, a semi-precious stone,[83] may be derived through Hurrian from Akk. *marḫašītu*-glass, itself derived from the place name *Marḫaši*, *Barašḫi*, *Paraši* (Tischler HEG P, 444–5); ≮ *ba-ra-ti-i[š]* '?' (KBo 18.170a rev. 11) is preceded by a gloss wedge and therefore probably of non-Hittite origin; *bašta-* 'embroidery(?)'[84] is probably of Luwian origin as can be seen by the Luwian formation *baštaimi-* 'embroidered'; LÚ*bātili-*, a priest with purificatory functions,[85] is likely to be a term of Hurrian origin (CHD P, 246). So, although it cannot be excluded that BA in these foreign words denoted

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[78] The verb *pai-/pi-* 'to give' is in all other attestations consistently spelled with the sign PA.

[79] The verb *pai-zi* 'to go' is in all other attestations consistently spelled with the sign PA.

[80] The noun *patalḫa-* 'sole of the foot' is in all other attestations consistently spelled with the sign PA.

[81] The noun *paššu-* is in all other attestations consistently spelled with the sign PA. Note that Košak (1982, 182) suggests that *ba-aš-š[u]-uš* might perhaps rather be read *ba-aš-t[u]-uš*, with which he seems to imply an interpretation as acc.pl. of *bašta-* 'embroidery'.

[82] GIŠ*ba-a-i-ni-ia-az* (KUB 42.98 i 23, NH). Spellings with *pa-(a-)i-ni-* and *pa-(a-)e-ni-* occur as well, cf. CHD (P, 55).

[83] nom.sg. NA$_4$*ba-ra-aš-ḫa-aš* (KBo 11.14 i 10, MH/NS), dat.-loc.sg. NA$_4$*ba-ra-aš-ḫi* (KUB 27.67 iii 62, iv 35). Spellings with *pa-ra-aš-ḫ°* and *pa-ru-uš-ḫ°* occur as well, cf. CHD P, 139.

[84] Nom.sg. *ba-aš-ta-aš* (KBo 9.92, 5, NH), with derivatives *baštaimi-* 'embroidered(?)' [nom.sg.c. *ba-aš-ta-i-mi-iš* (HT 50 r.col. 12), nom.pl.c. *ba-aš-ta-i-me-en-zi* (KUB 12.1 iii 34), broken *ba-aš-ta-i-m[a-...]* (KBo 9.92, 4), *ba-aš-ta-i-[m°...]* (KUB 42.43 obv. 14)], and *baštant-* 'embroidered(?)' (nom.-acc.sg.n. *ba-a-aš-ta-an* [KUB 42.78 ii 20], *ba-aš-ta-a-an* [KUB 42.55 i 2]).

[85] Nom.sg. LÚ*ba-a-ti-li-iš* (KBo 17.68, 8, KUB 44.58 rev. 3, VAT 6212 rev. 4, KBo 3.62, 7), dat.-loc.sg. LÚ*ba-a-t[i-li-ia]* (KUB 44.58 rev. 4), nom.pl. LÚ.MEŠ*ba-ti-li-e-eš* (Bo 4951 rev. 18), akkadographic LÚ*ba-a-ti-[li]* (KUB 44.58 rev. 4). This word is also spelled *pa-(a-)ti-li-*, cf. CHD P: 245.

another sound than PA, that sound was not a part of the normal Hittite phonemic system.[86] We can therefore conclude that Hittite knew only one labial stop in word-initial position, which must have been the result of the merger of PAnat. */p-/ and */b-/, and which was spelled with the sign PA.

PÉ/PÍ and PU

This conclusion is supported by the situation regarding the spelling of labial stops + *e/i* and *u*. The sign PI, which in 'normal' Old Babylonian can have the values *pi*, *pe* as well as *wa*, *we*, *wi* and *wu*, is in Alalaḫ Akkadian used with the values *wa*, *we*, *wi* and *wu* only (Giacumakis 1970, 23). For writing the syllable *pi* or *pe*, the sign BI is used, which is then read PÍ and PÉ.[87] This practice is taken over in Hittite: the sign PI is only used in its value *u̯a*, whereas the sign BI is used to spell *pí* and *pé*.[88] In the case of labial stop + *u*, the cuneiform script only knows one sign to spell PU as well as BU, which in Hittite is therefore only transliterated with its *p*-value, PU. These facts support the hypothesis that in word-initial position only one phonemic labial stop existed.

/pʔ/?

In Akkadian, the sound /pʔ/ did not exist, and therefore the cuneiform script does not possess signs to indicate this sound. In Hittite, I know of no good examples of words that etymologically should be reconstructed with word-initial **PHV-*,[89] and I know of no spelling peculiarity either that could be interpreted as pointing to the presence of an initial sound /pʔ-/.

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[86] Compare e.g. the situation in Finnish. Originally, the Finnish phonemic system only knew voiceless word-initial stops, and loanwords with voiced word-initial stops were taken over with the corresponding voiceless one. Only since recently, the voiced stops of such loanwords are being retained, which now have gotten a marginal phonemic status in Finnish. Cf. Suomi/Toivanen/Ylitalo (2008, 55).

[87] The sign BI is also used to write the syllable *bi*, whereas the syllable *be* is written by the sign BE, cf. the excursus on Alalaḫ Akkadian.

[88] In Hittite, the sign BE is only used in its alternative value *pât/pét/pít*.

[89] The only possible examples are *pūu̯ae-*^{zi} 'to pound, to grind', if this is cognate with Lat. *pavīre* 'to beat' and Gr. παίω 'to strike' < **peh₂u-*, and *pūš-*^{zi} 'to be eclipsed(?)' if this is cognate with Lat. *paucus*, Gr. παῦρος 'small, little' < **peh₂u-* (Kloekhorst 2008a, *s.vv.*).

Conclusion

On the basis of the results presented above, we can draw the following conclusions regarding the initial stops in Hittite. In the case of dentals, labials and labiovelars, there is no evidence that the original distinction between fortis and lenis stops has been retained. We may therefore assume that original */t-/ and */d-/ merged into Hittite /t-/, original */p-/ and */b-/ merged into Hitt. /p-/, and original */k^w-/ and */g^w-/ merged into Hitt. /k^w-/. The case of the (palato)velars is more complicated, however. Here it seems probable that before *e* and *i* the original distinction between fortis */(ḱ)-/ and lenis */(ǵ)-/ has been retained up to NH times. Before *a*, this distinction was retained up to OH times, but was lost after the MH period, when the two stops seem to merge, probably into /k-/. Before *u*, however, the original distinction between */(ḱ)-/ and /(ǵ)-/ was already lost in pre-Hittite times, since here we find evidence for one stop only, probably /k-/. Before **s*, */(ḱ)-/ and */(ǵ)-/ merge to /k-/, whereas before resonants, */(ḱ)-/ and */(ǵ)-/ merge to /g-/. Moreover, we have found evidence that initial clusters of stop + laryngeal yielded glottalized stops which in the OH period were still phonemic (/t'a/ being spelled with DA = ṬA, /g'i/ being spelled with KI = Qí), but only at the end of the OH period started merging with their non-glottalized counterparts.

At first sight, it may seem odd that within the dental, labial and labiovelar series the original fortis and lenis stops merged unconditionally in word-initial position, whereas within the (palato)velar series the moment of merger is dependent on the following vowel: before *-u-* the merger apparently took place in pre-Hittite times; before *-a-* the merger took place in the MH period; but before *-e-* and *-i-* the merger never took place (at least not within the period of attested Hittite). Why would there be a difference between the dental, labial and labiovelar stops on the one hand, and the (palato)velar stops on the other? And why would within the (palato)velar series the moment of merger be dependent on the following vowel? In order to answer these questions, we must compare the situation as found in the Luwic branch.

The Luwic branch

Although Cuneiform Luwian, due to the ambiguities of the cuneiform script, exhibits the same problems regarding the interpretation of its initial stops as Hittite, its cognates Hieroglyphic Luwian (written in its own hieroglyphic script) and especially Lycian (written in an alphabetic script) provide us with more information regarding the development of initial stops in the Luwic branch. If we look at the development of the dental stops, we can conclude on the basis of the fact that in Lycian only word-initial *t-* occurs, and not word-initial *d-*,[90] that fortis */t-/ and lenis */d-/ merged into /t-/ in word-initial position. This coincides with the fact that in HLuwian, for which Rieken (2008) recently established that the sign <ta> denotes the fortis stop /t/ and the sign <tà> the lenis stop /d/, only the sign <ta> occurs word-initially, indicating that here, too, fortis */t-/ and lenis */d-/ merged into fortis /t-/ (Rieken 2008, 646). This makes it likely that this was a Proto-Luwic development. In the case of the labial stops, the same is true: in Lycian, only word-initial *p-* occurs, and no word-initial *b-*,[91] which indicates that fortis */p-/ and lenis */b-/ merged into /p-/. Unfortunately, the HLuwian script does not allow us to distinguish between fortis /p/ and lenis /b/ at all, so this language cannot provide additional evidence for the merger of */p-/ and */b-/. The cases of the palatovelar and velar stops are quite different, however. It is well known that the fortis palatovelar stop */ḱ-/ assibilated into Luwian *z-* = /t^{s}-/ and Lycian *s-*. The development of the corresponding fortis plain velar stop */k-/ is less clear, since good Lycian examples are lacking. The CLuwian verb *karš-* 'to cut' < **kers-* seems to show that it was retained as a velar stop, although it cannot be strictly proven that it was retained as a fortis stop, /k-/. The development of the lenis stops */ǵ-/ and */g-/ is quite different: their outcome depended on the following vowel (note that although not always good examples exist for both */ǵ-/ and */g-/, they seem to behave similarly). Before a front vowel, */(ǵ)-/ disappeared in Luwian and Lycian, probably through a stage **i̯-* (*/ǵesr-/ > Luw. *išša̯ra/i-*, Lyc. *ĩzre/i-* 'hand'), whereas before a back vowel[92] */(ǵ)-/ was retained as a velar stop

[90] Word-initial *d-* is only found in reduplicated formations starting in *dd-*, of which it is quite possible that they reflect original **td-*, in which **t-* was assimilated to *-d-* (cf. Kloekhorst 2008b, 147). Compare also footnote 6.

[91] Cf. footnote 6.

[92] The best examples are before *-u-*. Melchert (1994, 252) also gives CLuw. *katmaršiia)-* 'to defecate' < */ǵodmrsie/a-/ as an example of fortition before *-a-*, but cf. Kloekhorst (2008a, 432) for doubts regarding this etymology.

(*/ǵut-esr-/ > CLuw. *kuttaššara/i-*, HLuw. *ku-ta-sa+ra/i-* 'orthostat'). This velar stop possibly was fortis, if Lyc. *χupa-* 'tomb' /kupa-/, which Melchert (1994, 303) connected with Gr. γυπή 'hole, lair', can be used as evidence for this assumption. The development of */(ǵ)-/ before consonants is unknown since good examples are lacking. The labiovelars develop in more or less the same way. The fortis labiovelar stop */kʷ-/ was retained as a labiovelar stop in Luwian (e.g. */kʷi-/ > CLuw. *kui-*, HLuw. *kwi-* 'who'), which, since in Lycian */kʷ-/ yielded the fortis stop /t-/ when palatalized (e.g. */kʷi-/ > Lyc. *ti-* 'who'), probably was fortis as well, /kʷ-/. Unfortunately, we have no good examples of the outcome of */kʷ-/ in non-palatalizing position in Lycian. The lenis labiovelar stop */gʷ-/, however, gives *u̯-* in both Luwian and Lycian in the following examples, where it stands before a vowel: */gʷónā-/ > CLuw. *u̯ānā-* 'woman', */gʷōu-/ > HLuw. *wawa/i-* 'cow', Lyc. *wawa-* 'cow'. If Lyc. *qā-* = /kʷaⁿ-/ 'to destroy' derives from the stem **gʷʰn-* 'to kill, to slay', then we may assume that */gʷ-/ was retained as /kʷ-/ before consonants.[93]

Comparing Hittite and Luwic

If we summarize, we see that in the Luwic branch the dental fortis and lenis stops and the labial fortis and lenis stops in word-initial position have merged into their fortis variant, i.e. that the lenis stops have undergone fortition. This corresponds to the merger of */t-/ and */d-/ and of */p-/ and */b-/ as seen in Hittite. It should be noted, however, that these developments are not to be projected back to Proto-Anatolian times, as is clear from the fact that in Hittite the assibilation products of */ti-/ and */di-/ were different, namely *z-* and *š-*, respectively, which shows that the distinc-

[93] With the interpretation of the Lycian sign *q* as the labiovelar stop /kʷ/ (Rasmussen 1974; Schürr 1997, 129–30; Gusmani 1997, 152–6; Kloekhorst 2006b, 97–101), the connection between Lyc. *qā-* 'to destroy, to ruin' and Hitt. *kuen-ʷi/kun-* 'to kill, to slay, to ruin' < **gʷʰen-* (Hajnal 1995, 161[180], followed by Schürr 1997, and independently Gusmani 1997, 156) becomes more attractive. Deriving *qā-* = /kʷaⁿ-/ directly from */gʷen-/ is impossible, however, since */°en-/ should have yielded *°ē-*. Yet, since */CnC/ yields Lyc. *CāC*, we may assume that the zero-grade stem was generalized. This could then also explain the retention of the stop, which should have yielded *w-* before the vowel **e*: if we assume that before consonants */gʷ-/ was retained and eventually underwent fortition to *q-* = /kʷ-/, the original paradigm **gʷʰénmi*, **gʷʰénsi*, **gʷʰénti*, **gʷʰnu̯é*, **gʷʰnté*, **gʷʰnénti*, **gʷʰn-ské/ó-* would have regularly yielded Lyc. **wēwi*, **wēsi*, **wēti*, **qāwe*, **qāte*, **qñēti*, **qās-*, in which the stem *qā-* was generalized, yielding 3sg.pres.act. *qāti*, 3pl.pres.act. *qāñti* and imperf. *qas-* (< **qās-*).

tion between initial */t-/ and */d-/[94] must still have been present after the disintegration of Proto-Anatolian (the assibilation is specifically Hittite and did not occur in the Luwic branch, cf. e.g. */diuot-/ > CLuw. *tiu̯ad-*). The Hittite and Luwic fortition of initial dental and labial lenis stops must therefore be parallel developments. In the case of the (palato)velars, we also observe some cases in Luwic where original lenis stops underwent fortition, namely in the words where */(ǵ)-/ preceded a back-vowel: e.g. */ǵut-esr-/ > CLuw. *kuttaššara/i-* and */(ǵ)upā-/ > Lyc. *χupa-* /kupa-/. It is remarkable that, although initial */ǵ-/ in these words became a fortis stop, it did not merge with the outcome of fortis */ḱ-/, which was assibilated in Luwic to Luw. /t^{s}-/ and Lyc. /s-/. This shows that the fortition of */ǵV^{back}-/ to /kV^{back}-/ must have taken place after the assibilation of */ḱ-/.

When preceding a front vowel, */(ǵ)-/ did not undergo fortition, but yielded */i̯-/, which was subsequently lost. This means that the fortition of initial lenis (palato)velar stops took place later than the fortition of initial lenis dental and labial stops, and that the moment of fortition was dependent on the color of the following vowels: before back vowels the fortition took place earlier than before front vowels (where it never took place because it was bled by the development */(ǵ)-/ > */i̯-/ > /Ø-/). We have seen that in Hittite the merger of the fortis and lenis velar stops before *-u-* has taken place in pre-Hittite times, before *-a-* in MH times, whereas before *-e-* and *-i-* it never happened (at least, not before the end of the Hittite Empire). So here too, the merger of the two velar stops, i.e. the fortition of */(ǵ)-/, took place later than the fortition of */d-/ and */b-/, and was dependent on the color of the following vowel: before back vowels it took place earlier than before front vowels. The case of labiovelars is different in the two branches: in Hittite, */k^{w}-/ and */g^{w}-/ seem to have merged in pre-Hittite times already, whereas in the Luwic branch they were kept distinct before vowels (with */k^{w}-/ remaining and */g^{w}-/ yielding *u̯-*), and only merged before consonants (Lyc. *qã-* = /k^{w}a^{n}-/ < */g^{w}n-/). This could indicate that the fortition of */g^{w}-/ took place in time between the fortition of, on the one hand, */d-/ and */b-/ and, on the other, /(ǵ)-/.

In order to accommodate all these facts, we could set up the following relative chronologies of sound laws for the two branches. The fortition of word-initial lenis stops was an independent but parallel development in Hittite and in Luwic. The fortitions of these stops did not happen at one

[94] At least before the vowel **i*. It may well be possible that also in the case of the dentals (and in the case of the labials) the moment of fortition of the lenis stop was dependent on the following vowel: it may have taken place earlier before back vowels than before front vowels.

stage, but were temporarily graded. The fortition of */b-/ and */d-/ took place the earliest, followed by */gʷ-/ and then by */(ǵ)-/. The fortitions were in the Luwic branch sometimes bled by other developments.

	Hittite relative chronology		Luwic relative chronology
(1)	*/b-/ > /p-/	=	*/b-/ > /p-/
	*/d-/ > /t-/	=	*/d-/ > /t-/
			*/k̲-/ > */tˢ-/
			*/gʷ-/ > u̯- /_V
	must precede		must precede
(2)	*/gʷ-/ > /kʷ-/	=	*/gʷ-/ > /kʷ-/
	must precede		must precede
(3)	*/(ǵ)u-/ > /ku-/	=	*/(ǵ)u-/ > /ku-/
			must precede
			(3a) */(ǵ)-/ > */i̯-*[95]
	must precede		must precede
(4)	*/(ǵ)a-/ > /ka-/	=	*/(ǵ)a-/ > /ka-/

Development (4) can be dated to around 1400 BC. The expected development (5), namely */(ǵ)e/i-/ > /ke/i-/, is attested in neither of the branches. In Hittite, it may have taken place after the collapse of the Empire, and therewith after our historical records, whereas in the Luwic branch it was completely bled by the development */(ǵ)-/ > /i̯-/.

Excursus: The spelling of stops in Alalaḫ Akkadian

As we have seen, it is commonly held that the typical Hittite ductus best resembles the ductus as found in Old Babylonian texts from Alalaḫ (Tell Açana), level VII (18–17th century BC), cf. e.g. Rüster/Neu (1989, 15). In an investigation dealing with the spelling of initial stops in Hittite, it is therefore instructive to also discuss the spelling of stops in the variety of Akkadian as attested on these Alalaḫ tablets.

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[95] The place of the development */(ǵ)-/ > */i̯-/ within the relative chronology of sound laws of the Luwic branch depends on the interpretation of CLuw. *katmarš-*. If really from **ǵodmrs-*, this would show that the development */(ǵ)-/ > */i̯-/ must have taken place after stage (4). If, however, the stages (1), (2), (3) and (4) are not only parallel developments in these two branches, but really took place at the same time and therewith are areal features spreading over the boundaries of linguistic communities, it must be dated before stage (4), since stage (4) is attested in historical records (namely in MH texts, around 1400 BC), by which time the development */(ǵ)-/ > */i̯-/ had already taken place (as it can be found in the oldest attested CLuwian texts already, which date to the 15th century BC).

In his book in which a large part of the corpus of tablets found in Alalaḫ is for the first time published, Wiseman remarks that in Alalaḫ Akkadian "there is constant graphic confusion between voiced and voiceless stops" and that "[e]mphatic sounds (*q, ṭ, ṣ*) are not separately indicated" (1953, 19). In his grammatical sketch of Alalaḫ Akkadian, Giacumakis puts it more mildly. He states about the dental stops *t/d/ṭ* that they "are distinguished phonetically" but "are not always distinguished in the script" (1970, 26). This seems to indicate that he assumes that the dental stops *t*, *d* and *ṭ* were phonologically distinct, but that they were not always spelled accordingly. Yet, he does not indicate how often this lack of distinction in the script occurs. The velar stops *k/g/q* are, according to Giacumakis, "frequently not distinguished in the script", whereas the labial stops *p/b* "are often confused in the script" (l.c.). He does not indicate to what extent he thinks that *k/g/q* and *p/b* are separate phonemes in Alalaḫ Akkadian. Moreover, both authors do not, in this respect, distinguish between the scribal practices as found on the Old Babylonian tablets from Alalaḫ VII and the Middle Babylonian tablets that were found in level IV (15–14th century BC).

Because of the unclear situation regarding the spelling of stops in Alalaḫ Akkadian, I have looked closely at these consonants in the Alalaḫ texts, trying to determine whether or not the voiced, voiceless and emphatic stops of each series were phonemically distinct, and if so, how exactly they are spelled and to what extent this coincides with the Hittite spelling practices. Since only the script as used on the tablets from Alalaḫ VII can be regarded as the precursors of the Old Hittite script (Alalaḫ IV postdates the introduction of the cuneiform script in Ḫattuša), I will limit myself to these.[96]

I will first treat the dental series, starting with the question whether voiceless *t* and voiced *d* are phonemically distinct. Wiseman (l.c.) states that "*d* and *t* freely interchange" on the basis of the observations that in some words an expected *t* is spelled with a sign of the D-series and that in others an expected *d* is spelled with a sign of the T-series. He gives as examples the forms *i-mi-id-da-šu* for *imitta-šu* 'his right hand', *a-ti* for *adi* 'until, as far as' and *ta-am-gu* for *damqu* 'good', to which Giacumakis (l.c.)

[96] I have investigated the corpus of Alalaḫ VII texts as published by Zeeb (2001) and Dietrich/Loretz (2004a, 2004b, 2005, 2006). The numbers given here follow the numbering of these editions. Numbers starting in "AIT" refer to Alalaḫ IV texts published by Wiseman (1953). I have excluded from this research personal and geographical names as well as words of unknown meaning.

adds ^{ITU}*Ḫu-ti-iz-zi* for ^{ITU}*Ḫudizzi*, name of a month, and *ma-di-me-e* for *matimê* 'whenever'. It must be noted, however, that most of these examples stem from texts from Alalaḫ IV, namely *a-ti* (AlT 16, 4), *ta-am-gu* (AlT 361, 7) and *ma-di-me-e* (AlT 2, 50), and are therefore irrelevant for the present investigation. Within the Alalaḫ VII corpus, however, the number of examples is low. So low even, that we can hardly speak of the "free interchange" that Wiseman was talking about. For instance, the noun *imittu* 'right hand' is indeed spelled *i-mi-id-da-šu* once (23.05, 14),[97] but occurs six times spelled with the correct stop, namely *i-mi-it-ta-šu* (20.07, 40, 20.08, 46, 20.18, 6, 22.05, 37, 41, 22.18, 10 [fr.]). The month name *Ḫudizzi* is indeed incorrectly spelled as ^{ITU}*Ḫu-ti-iz-zi* once (41.17, 30),[98] but occurs eight times spelled with the correct stop, namely ^{ITU}*Ḫu-di-iz-zi* (30.09, 12, 21.04, 30, 41.6, 33, 41.18, 18, 41.52, 3 [fr.], 6 [fr.], 41.71 rev. 11) and ^{ITU}*Ḫu-di-zi* (20.05, 36). The same goes for one form of the verb *nadānu* 'to give' which is spelled with an incorrect stop, namely *it-ti*[*-na-ak-ki*] (20.05A, 11) for *iddinakki* 'he gave you', which contrasts with the 63 forms of this verb that are spelled with the correct stop.[99] Also of the verb *nadû* 'to throw' we find one incorrectly spelled form, namely *it-tu-ú* (20.03, 12) for *iddû* 'they threw', which contrasts with the six forms of this verb that are spelled with the correct stop.[100] Likewise *mâtu* 'to die', of which we find one incorrectly spelled form, namely *im-du-ut* (40.05, 6)[101] for *imtūt* 'has died', contrasting with two forms of this verb that are spelled with the correct stop,[102] and

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[97] In this text we find the aberrant spelling *ip-pa-la-ak-ka-tu* (23.05, 12) for *ibbalakkatu* 'acts against an agreement' as well, cf. below.

[98] The reading "[ITI *Ḫ*]*u-di*[*-iz-zi*]" of 41.83, 4 as given by Zeeb (2001, 609), which would form another aberrant spelling of ^{ITU}*Ḫudizzi*, is very uncertain.

[99] G.pres.3sg. *i-na-ad-di-in* (10.02, 61, 62, 22.19, 12 [fr.], 22.21, 6 [fr.], 23.03, 9, 11, 19, 21, 24), *i-na-ad-di-na-ak-kum* (10.03, 27), *i-na-ad-di-šu-nu* (22.05, 23), [*i-na-*]*ad-di-nu* (10.02, 59), 1sg. *a-na-ad-di-in* (10.02, 32), G.pret.3sg. *id-di-in* (20.01, 31, 20.01A, 33, 20.07, 32, 20.08, 7, 20.10, 6 [fr.], 21.02, 6, 22.23, 6, 23.01, 11, 23.02, 11, 23.03, 6, 23.04, 7, 23.05, 11, 30.11, 3, 7, 13, 31.01A, 6 [fr.], 44.01, 26, 51.04, 6, 60.02, 7 [fr.], *i-di-in-ma* (51.03, 3), [*i*]*d-di-na-am* (10.01, 6), *id-di-nam* (10.01, 8), *id-di-in-ši-im-ma* (20.02, 27), [*i*]*d-di-na-ak-ki* (20.05, 11), *li-id-di-in* (11.01, 7, 31.17, 2 [fr.]), *li-id-di-nam-ma* (20.02, 25), 1sg. *ad-di-nu-ku-um-mi* (10.02, 42), 3pl. *id-di-nu* (40.05, 16, 44.01, 3, 50.07, 3 [fr.]), *i-di-nu* (43.07, 9), *id-di-nu-ma* (21.03, 5, 20.09, 4 [fr.]), *i-di-nu-ma* (20.04, 8), *id-di-nu-šu* (10.01, 13), *id-di-nu-šum* (22.05, 27), G.inf. *na-da-nim* (20.02, 8, 24), G.stative *na-di-in* (30.14, 4, 41.50, 8, 41.54, 15, 43.09, 2, 17, 28, 44.04, 39, 50.07, 6, 51.08, 12 [fr.]), Gtn.pret.3sg. *it-ta-ad-di-nu* (20.02, 16), Gtn.pres.3sg. *it-ta-na-ad-di-in* (22.05, 34).

[100] G.pret.3sg. *id-du-ú* (20.03, 16), G.stative *na-du-ú* (22.10, 11, 20.08, 27), *na-a-di* (43.08, 9), *na-di-ma* (20.08, 20), Š.pret.3sg. *ú-ši-id-di* (21.04, 6) (erroneously transliterated as *ú-ši-iṭ-ṭi* by Dietrich/Loretz 2004, 94).

[101] On the same tablet we find aberrant *i-ir-du* for *irtu* 'breast' as well, cf. below.

[102] G.pret.3pl. *i-mu-tu* (20.08, 11, 13).

(w)uddû 'to appoint, to make known', which is attested once with an incorrect spelling, *ú-we-ṭ[i]* (21.07, 5)[103] for *uweddi* 'has appointed', contrasting with three correctly spelled forms.[104] Besides these six forms, only six other forms spelled with an incorrect stop can be found within the entire corpus of Alalaḫ VII texts.[105] All other forms containing *t* or *d* are always spelled with the correct stop. As examples for *t*, consider *ištu*[106] 'from, out of', *qātu*[107] 'hand', *târu*[108] 'to turn, to return', and words containing the 2sg. and 2pl. prefix *ta-*[109]. As examples for *d*, consider *adi*[110] 'until, as far

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[103] On the same tablet we find the aberrant spellings *i-qa-<ša->du-šu* (14) for *ikaššadū-šu* 'they will conquer it', *ib-ba-ga-du* (23) for *ippaqqadū* 'they will put someone in charge' and *ba-aq-du* (23) for *paqdu* 'person in charge' as well, cf. below.

[104] D.pres. *ú-wa-ad-di-a-am* (20.05, 7), D.pret.3sg. *ú-we-ed-di* (21.01, 14), 3pl. *ú-we-ed-du-šu* (21.01, 10).

[105] These six are: *ba-al-la-di* (20.01, 8) for *ballāti* 'you (fsg.) are entiteld to a share' (cf. the spelling *ba-al-la-ti* in 20.01, 5); *[i-]ta-ti-i-ni* (51.01, 14) for *idātīni* 'our wages' (on the same tablet we find aberrant *i-pá-du-šu-nu-ti-ma* 'they imprisoned them' as well, cf. below); *i-ir-du* (40.05, 14) for *irtu* 'chest' (on the same tablet we find aberrant *im-tú-ut* 'he has died' as well); *na-pi-iš-du* (40.06, 21) for *napištu* 'person'; and *qa-da-ti* (31.03, 8, 31.04, 10) for *qātāti* 'guarantees'.
The forms *it-ta-ra-ar* (30.10, 7, 31.16, 5 [fr.], 32.02, 11, 32.04, 9) and *it-tu-ra-ar* (32.03, 9) are since Tsevat (1958), 115) interpreted as *iddarar* and *iddurar* 'shall become an object of litigation' on the basis of an etymological connection with Talmudic *dṯwn' drr'* 'money of disputed ownership'. Since the semantics of *it-ta-ra-ar* and *it-tu-ra-ar* cannot be independently determined, and since Tsevat's formal connection with the root *drr* is based on his presumption that in Alalaḫ texts the signs *ta* and *tu* can be read as *dá* and *dú*, respectively (1958, 115[33]), his interpretation is circular, and these forms cannot therefore be used as arguments in our discussion.
The form "*ú-dá-pi-ir*", read thus by Dietrich/Loretz (2004, 63) in 20.02, 6, is in fact *ú-ša-pí-ir* 'he sent'.

[106] Always spelled with TU: *iš-tu* (11.01, 21, 20.01, 32, 20.02, 29, 20.08, 21, 38).

[107] Always spelled with TI or TA: *qa-ti* (10.01, 18, 10.03, 27, 21.07, 12, 30.12, 5, 30.18, 2, 41.07, 5, 42.01, 17, 42.03, 8, 42.05, 8, 42.06, 11, 42.08, 5, 42.09, 8, 42.10, 7, 42.11, 7, 42.16, 4, 43.01, 5, 43.05, 3, 43.07, 11, 43.08, 5, 43.09, 27, 43.13, 9, 44.01, 14), *qa-ti-šu* (10.01, 16), *qá-ti-šu-ma* (41.38, 9), *qa-ti-šu-ma* (51.03, 10), *qá-ti-šu-nu-ma* (41.38, 5), *qa-ta-ka* (10.03, 38).

[108] Always spelled with TA or TU: G.pres.3sg. *i-ta-a-ar-ma* (20.01, 33, 20.01A, 35), *i-ta-ar-ma* (20.07, 33), 1pl. *ni-ta-ar* (51.01, 13), G.pret.3sg. *i-tu-úr-ru-ma* (20.02, 31, 22.18, 5 [fr.]), *i-tu-ra* (20.05, 38), *li-tu-úr* (20.05, 15), 3pl. *i-tu-ru-ma* (20.07, 36), G.perf.3sg. *it-tu-úr* (20.05, 24), *i-tu-ur* (20.09, 26 [fr.], 21.04, 8).

[109] Always spelled with TA or TE: *ta-na-aq-qí* (10.03, 23) (G.pres.2sg. of *naqû* 'to sacrifice'), *te-el-qú-u* (20.01, 10, 20.01A, 11) (G.pret.2sg. of *leqû* 'to take'), *te-ep-pu-uš* (10.03, 24, 28, 34) (G.pres.2sg. of *epēšu* 'to do, to make'), *te-ru-ub* (10.03, 39) (G.pret.2sg. of *erēbu* 'to enter').

[110] Always spelled with DI: *a-di* (20.08, 7, 22.05, 21, 30.04, 9, 30.04A, 7 [fr.], 30.18, 5, 40.05, 6, 44.02, 22, 51.03, 2).

as', *dīnu*[111] 'legal decision, lawsuit', and *qadu(m)*[112] 'together with, including'.

It is clear that although a small number of forms indeed exist that are spelled with the incorrect stop, the overwhelming majority of words containing *t* or *d* are spelled with the correct stop. There can be no doubt, therefore, that in Alalaḫ Akkadian the voiceless dental stop *t* and the voiced dental stop *d* were separate phonemes.

The question whether the emphatic dental stop *ṭ* must be regarded a separate phoneme as well is more difficult to answer since the number of relevant forms is considerably lower than with *t* and *d*. Nevertheless, if we look at all forms where we would expect to find *ṭ*, we find the following interesting facts.

The syllable *ṭa* is in the Alalaḫ texts primarily spelled with the sign DA, which we therefore can read as ṬA (ten times: *pa-ṭa-šu* (22.01, 1, 22.20, 2, 23.03, 3) 'its district', *pa-ṭa-šu-nu* (22.04, 3) 'their district', *ṭa-a-ab* (22.13, 15, 22.15, 7, 23.03, 14), *ṭa-ab* (22.02, 13, 22.09, 14) 'is satisfied', and *ṭa-bi-iḫ* (22.03, 18) 'slaughtered'). Three times, we find forms spelled with the sign ḪI, which then must be read as ṬÀ: *pa-ṬÀ-šu* (22.03, 2, 22.06, 2) 'its district', and *ṭà-ab* (22.06, 10) 'is satisfied'. In three forms, the syllable *ṭa* seems to be spelled by the sign TA, however, namely *ta-ab-tum* (41.38, 4, 8) = *ṭābtum* and *ta-ab-ti* (41.92, 6) = *ṭābti* 'salt'. Since the two attestations of *ta-ab-tum* are found on the same tablet where we find incorrectly spelled *ga-ti-šu-nu-ma* (5) and *ga-ti-šu-ma* (9) for *qatī-šunu-ma* and *qatī-šu-ma* 'their/his hand', respectively,[113] I would regard them as erratic as well.[114]

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[111] Always spelled with DI: *di-i-ni-im* (21.03, 10 [fr.], 27), *di-nam* (20.01, 3, 20.02, 31, 20.04, 6, 20.05, 28, 20.07, 10, 37, 20.09, 16, 20.18, 4, 22.18, 5, 51.02, 3).

[112] Always spelled with DU: *qa-du* (22.06, 8, 22.01, 13, 22.03, 13, 30.10, 14, 32.03, 2, 40.08, 26 [fr.], 40.09, 26, 61.05, 4), *qa-du-um* (10.02, 1, 22.02, 2, 22.05, 4, 22.08, 1, 31.02, 5, 31.13, 7, 51.09, 4).

[113] Cf. below for a treatment of these forms.

[114] Although personal names were excluded from this research, it is illuminating to look for instance at the spelling of the names that bear the stem *ṭāb* as their second element. This stem is spelled 22 times with DA = ṬA, namely *A-bi-ṭa-ba* (30.04, 12, 30.04A, 10, 30.08, 3, 8, 41.22, 16, 41.35, 4, 45, 41.36, 13, 41.57, 10, 41.63, 3, 41.69, 18, 42.05, 10), *Am-mi-ṭa-ba* (21.07, 1 [fr.], *A-qar-ṭa-ba* (22.03, 23), *İ-lí-ṭa-ba* (21.04, 26), *İ-li-ṭa-bi* (20.12, 11), *Ia-aḫ-ḫi-ṭa-a-bi* (20.12, 10), *Su-mi-ṭa-ba* (20.01, 44, 20.01A, 47, 20.01A, h), *Šu-mi-ṭa-ba* (21.03, 43), and only once with TA = ṬÁ, namely *Am-mi-ṭá-ba* (21.07, 12). Moreover, the one aberrantly spelled form is found on a tablet where we find other aberrant forms as well (*ú-we-d*[*i*] (21.07, 5) 'has appointed', *i-ka*$_4$-<*ša*->*du-šu* (ibid., 14) 'they will conquer it', *ip-pá-qá-du* (ibid., 23) 'they will put someone in charge', *pá-aq-du* (ibid., 23) 'person in charge', cf. below).

The syllable *ṭe* is spelled by the sign TE, which we therefore could read TE_4 (five times: *i-iṭ-ṭe$_4$-ru* (31.07, 13) 'they will pay', *li-ṭe$_4$-eb-bi* (10.02, 20) 'may impress',[115] MUNUS.MEŠ*ṭe$_4$-mi-tum* (41.44, 13) 'wise women', *ṭe$_4$-e-nim* (41.01, 26, 27) 'milling'). It is interesting to note that in Alalaḫ the sign DI is not used in its value ṬE.

The syllable *ṭi* is four times spelled by the sign DI, which can therefore be read as ṬI (*ba-al-ṭi-š*[*u*] (31.13, 12) 'his life', *bu-ul-ṭi-šu-ma* (21.01, 3) 'his lifetime', *li-iṭ-ṭi* (31.12, 5) 'pledge', *pá-aṭ-ṭi-šu* (22.02, 2) 'its district'). Twice, it is spelled with the sign TI = ṬÌ (*bu-ul-ṭi-ša* (21.06, 8) 'her lifetime', *pa-ṭi-šu-nu* (22.05, 4) 'their district'). Although the low number of forms precludes making significant statements, the sign DI seems to be the normal way of spelling *ṭi*.

The syllable *ṭu* is always spelled with the sign TU, which then could be read as ṬÚ (eleven times: *ba-al-ṭú* (22.05, 21, 29, 30.10, 9) 'alive', *ip-ṭú-ur* (32.01, 12, 32.02, 8, 32.03, 7, 32.04, 7) 'he released', *iš-ṭú-ru* (21.03, 16, 43.12, 5 [fr.]) 'they wrote', *ṭú-uḫ-ḫu* (22.06, 17)[116] 'added', *ú-ḫa-aṭ-ṭú-ú* (10.02, 44, 52) 'they are damaging').[117] Once, we find the sign TUM = TU_4, in *ba-al-ṭu$_4$-um-ma* (31.02, 11) 'alive', but this is due to the fact that we are here dealing with the syllable *ṭum*: we could also transliterate *ba-al-ṭum^{um}-ma*.[118] It should be noted that the sign ṬU does not occur in Alalaḫ Akkadian.

Our conclusions should be the following. The forms that contain the syllable *ṭa* show a preference for being spelled with the sign DA = ṬA (10 out of 16, three others being spelled with ḪI = ṬÀ, and the remaining three being spelled with TA = ṬÁ).[119] This seems to indicate that the emphatic stop *ṭ* was phonologically distinct from the voiceless stop *t*. The syllable *ṭu* is always spelled with the sign TU = ṬÚ (9 times), and not with DU, which shows that the emphatic stop *ṭ* was distinct from the voiced stop *d* as well. The combination of these two insights leads to the conclusion that Alalaḫ Akkadian must have had three distinct dental phonemes, namely voiceless *t*, voiced *d* and emphatic *ṭ*.

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[115] Cf. Giacumakis (1970, 109), who derives this form from *ṭebû* 'to sink, impress' (*pace* CAD B, 257, which rather reads *liṭebbi* 'may remove' as if belonging to the verb *ṭebû*).

[116] Falsely cited by Giacumakis (1970, 109) as "*ṭu-uḫ-ḫu*".

[117] The interpretation of the form *mu-ud-du* in 41.32, 1, which is transliterated by Zeeb (2001, 553) as "*mu-uṭ-ṭu*" (correctly "*mu-uṭ-ṭú*"), is far from clear, cf. the discussion by Zeeb (2001, 452–3).

[118] Cf. the spelling *ba-al-ṭum-ma* in 31.01A, 16.

[119] If we include the personal names containing *-ṭāb-* (cf. footnote 114) in these numbers, we see a much clearer distribution: 32 times DA, 3 times ḪI, and 4 times TA.

For the velar and labial stops, I will not present the full body of evidence here: I have limited myself to the syllables *ka*, *ga*, *qa* and *pa*, *ba*. Of each syllable I have counted how often they are spelled with which sign. For the velar stops, this gives the following numbers: the syllable *ka* is spelled 50 times (89,3 %) with the sign KA, five times (8,9 %) with the sign GA = KÀ (which all occur on the same tablet)[120], and once (1,8 %) with the sign QA = KA_4;[121] the syllable *ga* is consistently spelled (37 times) with the sign GA;[122] the syllable *qa* is spelled 69 times (94,5 %) with the sign QA, once (1,4 %) with the sign KA = QÀ,[123] and three times (4,1 %) with the sign GA = QÁ[124]. We see that the overwhelming majority of forms containing a syllable *ka*, *ga* and *qa* are spelled with the correct sign (89,3 %, 100 % and 94,5 %, respectively), and that the aberrantly spelled forms are clustered on a few tablets only. This clearly shows that there must have been phonemic distinction between *k*, *g* and *q*.

The same goes for the labial stops: the syllable *pa* is spelled 455 times (97,6 %) with the sign PA and 11 times (2,4 %) with the sign BA = PÁ;[125] the syllable *ba* is spelled 86 times (97,7 %) with the sign BA and twice (2,3 %)

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[120] *i-ga-b*[*it-ma*] (10.03, 6) = *ikabbit-ma* 'he becomes fat', *i-ig-ga-al* (10.03, 15, 19 [fr.]) = *ikkal* 'he eats', *ga-ša-ap-tum* (10.03, 30) = *kaššāptum* 'sorceress', *i-pu-uš-ga* (10.03, 30) = *īpuš-ka* 'has treated you'.

[121] *i-*ka_4*-*<*ša*>*du-šu* (21.07, 14, cf. the correct spelling *i-ka-ša-du-šu* in ibid. 11) 'they will conquer it' (on the same tablet we find incorrect *ú-we-d*[*i*] (5) 'has appointed', *ip-pá-qá-du* (23) 'they will put someone in charge' and *pá-aq-du* (23) 'person in charge' as well).

[122] The form "*ga*$_{14}$*-az-zu-tim*" 'sheared' as cited by Dietrich/Loretz (2004, 107) and Giacumakis (1970, 75) for 22.05, 31, which would be the only example where the syllable *ga* is spelled by the sign KA = GA_{14}, can also be read *ka-az-zu-tim*, cf. CAD G, 60.

[123] *iq-qà-ab-bi* (21.02, 17) 'he says'.
The forms "*qà-at-tu-šu-nu*" (31.05, 12) and "*qà-tu-šu-nu*" (31.12, 11), read thus by Dietrich/Loretz (2005, 265, 271), are according to CAD K, 308 to be read "*ka-at-tu-šu-nu*" and "*ka-tu-šu-nu*", 'their guarantors', respectively.

[124] *qá-ti-šu-nu-ma* (41.38, 5), *qá-ti-šu-ma* (ibid., 9) 'their/his hand' (on the same tablet we find aberrant *ṭá-ab-tum* [4, 8] 'salt' as well), *ip-pá-qá-du* (21.07, 23) 'they will put someone in charge' (on the same tablet we find aberrant *ú-we-d*[*i*] (5) 'has appointed', *i-*ka_4*-*<*ša*>*du-šu* (14) 'they will conquer it' and *pá-aq-du* (23) 'person in charge' as well).

[125] *pá-aṭ-ṭi-šu* (22.02, 2) 'its district', *i-ša-ap-pá-ku* (22.09, 20, 22.09A, 20, 22.09B, 19) 'they pour', *i-ip-pá-lu* (30.04, 10, 30.18, 6) 'they will pay', KÙ.BABBAR-*pá-am* (31.03, 10, 31.04, 11) 'silver' (on these tablets we find aberrant *qa-tá-ti* [31.03, 8, 31.04, 10] 'guarantees' as well), *i-pá-du-šu-nu-ti-ma* (51.01, 8) 'they imprisoned them' (on the same tablet we find aberrant [*i*-]*dá-ti-i-ni* (14) 'our wages' as well), *ip-pá-qá-du* (21.07, 23) 'they will put someone in charge' and *pá-aq-du* (21.07, 23) 'person in charge' (on the same tablet we find aberrant *ú-we-d*[*i*] (5) 'has appointed' and *i-*ka_4*-*<*ša*>*du-šu* (14) 'they will conquer it' as well).

with the sign PA = BÁ.[126] Again, we see that the vast majority of forms (97,6 % and 97,7 %, respectively) are spelled with the correct stop, which indicates that *p* and *b* must have been distinct phonemes.

All in all, we must conclude that in Alalaḫ Akkadian there was a phonemic distinction between all members of the dental series (*t, d, ṭ*), the velar series (*k, g, q*) and the labial series (*p, b*). In the following table I have indicated for each syllable which sign is most commonly used in writing it.

		a	*e*	*i*	*u*
dentals	*t*	TA	TE	TI	TU
	d	DA	--[127]	DI	DU
	ṭ	DA = ṬA	TE = ṬE$_4$	DI = ṬI	TU = ṬÚ
velars	*k*	KA	KI = KE	KI	KU
	g	GA	GI = GE	GI	GU
	q	QA	KI = QÉ	KI = QÍ	KU = QÚ
labials	*p*	PA	BI = PÉ	BI = PÍ	PU
	b	BA	BE	BI	BU = PU

For the sake of convenience, I also give here a corresponding table for the Hittite spelling practices as unravelled above.

		a	*e*	*i*	*u*
dentals	/t-/	TA	TE	TI[128]	TU
	/t$^?$-/	DA = ṬA	TE = ṬE$_4$		TU = ṬÚ
velars	/k-/	KA	KI = KE	KI	KU[129]
	/g-/	GA	GI = GE	GI	
	/g$^?$-/	--	--	KI = QÍ	--
labials	/p-/	PA	BI = PÉ	BI = PÍ	PU

As we see, there is a perfect match between the two tables.

[126] *ib-bá-la-ak-ka-tu* (23.05, 12) 'they act against an agreement' (on the same tablet we find aberrant *i-mi-it-tá-šu* (14) 'his right hand' as well), *bá-ap-pí-ri* (41.13, 16) 'malt'.

[127] The syllable *de* is unattested in texts from Alalaḫ VII. In texts from Alalaḫ IV, it is spelled with the sign TE = DE$_4$ (*i-de$_4$* (AIT 297, 17) 'he knows' and *ti-i-de$_4$* (AIT 297, 21) 'you know').

[128] Before *i* there is no opposition between /t-/ and /t$^?$-/.

[129] Before *u* there is no opposition between /k-/ and /g-/.

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