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The Phoneticisation of the Luwian Hieroglyphic Writing System

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Abstract: This paper offers a new perspective on the phoneticisation of the Luwian hieroglyphic writing system. It investigates to what extent we can determine the time frame in which they acquired their syllabographic values by relating them to key phonological and morphological changes in the Luwian language. Several hieroglyphic signs plausibly developed phonetic readings before particular linguistic developments took place, which suggests that the phoneticisation process took place over a long time and may have started centuries before the first texts (perhaps even in Proto-Luwic times), continuing gradually and continuously until the writing system was abandoned in the 7th century BCE.

Keywords: Luwian, hieroglyphs, phoneticisation, syllabograms

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Introduction[1]

The syllabic values of most Luwian hieroglyphic signs are derived from their logographic values through *acrophonic derivation*, the process by which the syllabic value of a sign is determined by the first part of the word it stands for. Thus, L 100 𔕰 ASINUS acquired its syllabic value *ta* on account of the fact that the underlying Luwian word *tarkasna-* 'ass, donkey' started with *ta*. Acrophonic derivation seems to be the most common strategy in writing systems around the world to derive syllabographic values from logograms. It is attested in Egyptian hieroglyphic, Linear A, Proto-Sinaitic, Greek and Maya hieroglyphic writing.[2]

Acrophonic derivation is a special case of 'paronomastic' sign use, whereby signs are applied to represent words that have a (near-)identical pronunciation but a different meaning compared to the word the signs were originally meant to signify.[3] An example is the Old Chinese sign depicting an elephant (that has been turned 90 degrees clockwise): 象.

1 The term 'Luwian hieroglyphs' is adopted here from Simon 2020, 42 n. 1.

2 For the creation of monoliteral signs in Egyptian hieroglyphic: Vernus 2015, 151–153. Linear A: Neumann 1957; Steele – Meißner 2017, 106–107. Proto-Sinaitic: Gardiner 1916; Hamilton 2006, 22. Greek vowel signs: Brixhe 2007, 284–285. Maya hieroglyphic writing: Mora-Marín 2003.

3 The term paronomastic is taken from Boltz's (1986, 426–429) analysis of Old Chinese but lends itself well to the analysis of other writing systems, including Luwian hieroglyphic writing. This type of sign reuse is also known as 'rebus writing' or *connexio homophonica* (Neumann 1992, 30).

This sign originally represented the Chinese word for 'elephant' (*xiàng* in modern Mandarin Chinese), but was also used to represent the unrelated but homophonous word 'image, to depict' (still homophonous to this day: *xiàng*).[4] Similarly, the Egyptian hieroglyph  (Gardiner O1), depicting a house, was not only used to write the word *pr* 'house' but also the homophonous verb *pr* 'to go forth'.[5] In Luwian hieroglyphic texts, paronomastic sign use is well attested: it is commonly assumed that L 115 LEPUS  ,  is used paronomastically to write the verb *tapariya-* 'to rule' (and derivatives) because the word is *phonetically* similar to the Luwian word for 'rabbit/hare' (presumably **tapari-*).[6] This use of a single sign for multiple words (polysemy) leads to sign desemanticisation, the dissolution of the connection between a sign's shape and its original pictographic referent. Consequently, signs could be used to refer to wholly different words, paving the way for their application as syllabograms through acrophonic derivation.[7]

The process of acrophonic derivation lies at the origin of the Luwian hieroglyphic syllabogram inventory, which consists mostly of consonant-vowel (CV) signs.[8] In addition, we find a few CVCV signs, mainly with a resonant as the second consonant, such as L 389 *tara/i*  and L *hara/i*  . Only two signs appear to be of a structure VC: L 363  *ur* and L 421  *us*. However, these two signs are only used in onomastic spellings for the names of the ruler *Urḫi-Tešub* and the goddess *Šauška*, for instance in: TELL AHMAR 6 §2 (DEUS)*sà-us-ka-sa*). The limited distribution of these signs suggests that VC-spelling was an innovation that did not catch on, and it may well have been inspired by cuneiform writing.[9]

The Luwian hieroglyphic inventory of syllabograms is not a rigid and fixed system. Throughout our corpus we find a host of acrophonic derivations that occur only in a geographically or chronologically restricted set of texts and seem to be new derivations that did not exist beforehand. Examples of these new syllabographic uses of logograms are L 207  MONS, representing Luw. *watti-* 'mountain' and attested syllabographically as *wa/i*$_4$ in TOPADA §1 *wa/i*$_4$*-su-SARMA-ma-sa* 'Wasusarmas'; L 332b  NEG$_2$, representing Luw. *nā* 'not' and used syllabographically as *ná* to write the acc. sg. c. ending /-n/ in ALEPPO 2 §9 ^{l}*ha-mi-i*[*a*]*-ta-ná* 'Hamiyatan'; L 82  CRUS, representing Luw. *tā-* 'to stand' and attested syllabographically as *ta*$_6$ in TELL AHMAR 1 §17 *ta*$_6$*-ni-*[*mi*]*-i-sa* 'all' (nom. sg. c.).[10] The reuse of these and other logograms as new syllabograms in first millennium BCE texts within the historical period shows that the acrophonic derivation of new syllabograms was an

4 Boltz 1986, 428–429.

5 Ritner 1996, 75.

6 CHLI, 544.

7 In addition to paronomasia, another type of sign reuse in writing systems around the world is parasemanticity, which operates on the principle of *semantic* similarity. It refers to the use of a sign to denote words that are semantically close to, yet phonetically distinct from, the word to which the sign originally referred. This procedure is well-known from Sumerian cuneiform, where, for instance, the sign *ka* 'mouth' is used also used for *inim* 'word' and *zú* 'tooth' (Rüster – Neu 1989, 155–156; Cooper 1996, 41). In the context of the Luwian hieroglyphic writing system, L 90 PES is used to represent both its direct referent (Luwian word *pāta-* 'foot') and, parasemantically, the verb *awī-* 'to come'. Similarly, L 341  COR, representing a heart, is not only attested as a determiner to Luwian *zartiya-* 'to desire', but also represents the lexemes *atri-* 'self' and **att(a)ni-* 'soul' throughout our corpus (van den Hout 2002, cf. Yakubovich 2021 for a discussion and more literature on the reconstruction).

8 See CHLI, 29, 32. Hawkins 1986, 374 has argued that the predominance of CV signs in the Luwian hieroglyphic syllabary is a sign of Cretan/Aegean influence, but given that CV signs are the most common type of syllabogram in writing systems around the world (a clear consequence of acrophonic derivation being a dominant strategy of deriving phonetic signs), this cannot be taken as a non-trivial sign of external influence, cf. Yakubovich 2008, 17.

9 Across writing systems, VC signs are much rarer than CV signs, so their presence, rather than their systematic absence, in any syllabographic inventory calls for explanation. Payne 2015, 41–42 raises the possibility that these two VC-signs should be read as word-internal logograms or determiners (i.e. *sà-**421-*ka-sa*) referring to the divine name *Kubaba*, which is often found spelled *ku*-AVIS-*pa-pa*. If this is true, the Luwian hieroglyphic syllabary would not have any VC signs at all.

10 More examples can be found in Valério 2018, 153–155.

ongoing process, even at times when an extensive syllabary already allowed the expression of all Luwian words.[11] This continuous renewal of the script fits well with other signs of the living character of the writing system throughout the centuries of its attestation, such as the change of appearance of various signs and the discontinuation of certain spelling practices.[12]

Confronted with the continuous reuse of logograms as syllabograms in our Luwian texts, we may wonder for how long the process of acrophonic derivation had been going on by the time the first extant texts were composed. Is the derivation of syllabograms from logograms in the prehistoric period best conceived of as a gradual process, similar to what we find in the historical period, or can we clearly see that they were all derived at a relatively brief moment in time? To answer this question, this paper attempts to date the acrophonic derivation of several syllabograms as precisely as possible and place these derivations within the history of the Luwian language, using the idea that the acrophonic derivation of a sign can be thought of as a snapshot, capturing a particular moment in the history of the underlying language. If we can show that the derivation or development of some sign values must have pre- or postceded certain linguistic changes, we thus gain a more detailed picture of the time span associated with the creation of the established syllabographic inventory.

To give a concrete example: the syllabogram L 176  *la*, whose value is based on Luw. *lāli-* or Hitt. *lāla-*, could have been acrophonically derived at any point in time, as the phonetics of this word do not appear to have changed substantially in the period from Proto-Anatolian to Hittite or Luwian. Consequently, it is impossible to tell when sign L 176 first came to be used as a syllabogram.

Sign L 41  , on the other hand, is likely to have been derived relatively early.[13] The sign functions both as a syllabogram (<tà>), used to write the voiced dental fricative [ð], and a logogram ('CAPERE'), representing words related to 'taking', most commonly the Luwian verb *lā-* 'to take'. In his paper, Kloekhorst proposes an alternative to the suggestion that the syllabographic value of L 41 was based on Hitt. *dā-* 'to take'.[14] Following a suggestion by Stefan Norbruis, he takes [ð] as the regular Luwian result of Proto-Anatolian *$*dh_3$-* 'to take', and states that this value was acrophonically assigned to L 41 before [ð] developed to Proto-Luwian [l] in word-initial position, yielding Luwian *lā-* 'to take'.[15] If this scenario is correct, the acrophonic derivation of L 41 must be pushed back to the 18th century BCE, which thus provides a very rough *terminus ante quem*.

In the following sections, I provide an overview of syllabograms that, like L 41, may have acquired or developed their phonetic values before or after particular linguistic developments. As such, the history of the Luwian language informs the history of one of its writing systems, and vice versa.

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11 Neumann 1992, 40. This situation, in which the pre-existence of a syllabary does not prevent the derivation of syllabographic values for logograms is somewhat reminiscent of the Japanese *ateji* (lit. 'called upon') use of Chinese characters. Next to spellings with the established syllabographic *kana* writing system, some words are spelled with logographic characters (*kanji*) that are chosen for their sound, not for their meaning, e.g. *gasu* 'gas', spelled 瓦斯 *ga-su* with the semantically unrelated characters for 'tile' *ga* and 'this' *su*, respectively.

12 For instance, it has been noted that <tá> is gradually being replaced with <ta> in our texts (Rieken 2010, 308; Vertegaal 2019, 4–5) and that the use of 'initial-a-final' reaches its peak at the end of the Bronze Age before disappearing rapidly after the Transitional Period, cf. Burgin 2016, 7.

13 Kloekhorst 2019c, 42.

14 Yakubovich 2010, 291.

15 Kloekhorst 2019c.

2. Sign derivations

2.1. L 412 <ru>

Sign L 412 <ru> is one of several signs with the syllabic value [ru]. Laroche noted that the sign consists of a circle containing a ladder, as visible in L 252/3 DOMUS+SCALA, which contains the exact same element.[16] The ligature DOMUS+SCALA is found in KARKAMIŠ A11a §19 DOMUS+SCALA-*tá-wa/i-ni-zi*. The meaning of the word is unknown, but Hawkins remarks that it stands in apposition to (DOMUS)*ha+ra/i-sà-tá-ni-zi*, probably denoting an 'upper storey' since it is determined elsewhere by the logographic complex (DOMUS.SUPER).[17] Based on this analysis, Valério ingeniously argues that the syllabic value [ru] was non-acrophonically derived on the basis of the Luwian adjective *aru-* 'high', attested as such in Cuneiform Luwian and in Hieroglyphic Luwian in ŞIRZI 3 §3 *á-ru-wa/i+ra/i-tu* 'raise, lift' (3pl. imp. act.).[18] For this derivation to work, it appears that the scribes had to ignore the initial *a-* in the stem *aru-*, which is highly irregular given the otherwise overwhelming preference for acrophonic derivation.[19]

Next to <ru>, we find a group of three other signs that are transliterated syllabographically as <rú> and take the form of a stag or stag antlers: L 102a (= CERVUS), L 102b (= $CERVUS_2$) and L 103 (= $CERVUS_3$). The value [ru] of these latter three signs (for instance in KARATEPE §55, 314–319) appears to be a straightforward acrophonic derivation from the name of the Stag God, whose name is attested as *Runtiya* in our Iron Age texts.[20] The name is commonly believed to continue a PIE adjective **ḱr-u(e)nt-* 'having horns, antlers', with simplification of the word-initial cluster of **kr-* to *r-*.[21] The older form *Krunt(iy)a* is also found on Empire period seals and in texts transmitted to us in cuneiform.[22]

A question that has not been addressed yet is when this derivation of L 412 <ru> from *aru-* took place and why the scribes resorted to the uniquely rare process of non-acrophonic derivation, instead of taking the name of the Stag God *Runtiya-* as its base for acrophonic derivations (as would happen later for the creation of <rú>). I propose that the form *Runtiya-* did not yet exist at the time <ru> was created, and that the name of the Stag God was still *Kruntiya-*. At this point in time, there would have been no other Luwian words starting with *r-*, for etymological reasons. The scribes, therefore, lacking a suitable base for the acrophonic derivation of *ru-*, would have had no option but to resort to non-acrophonic derivation of <ru> on the basis of *aru-* 'high' instead (perhaps /ʔru-/ or /ʔāru-/). This allows us to place the derivation of <ru> before the simplification of the word-initial cluster of **kr-* to *r-*. If the attestations of *Ru-tí-a*, *Ru-u̯a-tí-a* in Akkadian documents dated to the *kārum* period (20th–18th centuries) BCE are truly early attestations of this name, as per Yakubovich, this would put the creation of <ru> before the first attestations of *Runtiya-* in the *kārum* period (18th century BCE).[23] Recently, however, some doubt has been cast on the interpretation of these forms, which makes the absolute dating less certain.[24]

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16 Laroche 1960, 217–218.

17 CHLI, 99.

18 Valério 2018, 152–153. For CLuw. *aru-*, cf. CLL s.v. *aru-*.

19 The Egyptian hieroglyphic script likewise shows that 'weak' consonants (i.e., those phonetically liable to dropping) could be ignored for acrophonic derivation, cf. Vernus 2015, 154–157. Within Luwian, this is very rare. For one possible parallel case, cf. Section 2.4.

20 CHLI, 33. The name *Runtiya-* is found, for instance, in MARAŞ 1 §6.

21 It is not fully clear whether this sound change was regular. The velar is retained in CLuw. *zaru̯ani(i̯a)-* 'horn' and HLuw. *zurni-* 'horn', although the former could continue a full grade (**ḱer-/ḱor-*) and the latter seems to show the effects of an irregular metathesis (< **ḱr-un-*?), cf. Sasseville 2020.

22 Yakubovich 2010, 80 n. 5 with references to Hawkins *apud* Herbordt 2005, 290.

23 Yakubovich 2010, 211–212.

24 Kloekhorst 2019a, 60–61.

2.2. L 329 <kwa/i>

The Luwian hieroglyphic syllabary contains several ambiguous signs that can be read with two or more different vowels, and L 329 *kwa/i* is one of these, showing evidence for *a* and *i* vocalism already in Empire texts.[25] Although there are many writing systems in the world in which vowel quality is underspecified or in which vowels are not expressed at all (such as early varieties of the Phoenician writing system), vowel ambiguity in the Luwian hieroglyphic writing system is not a simple case of underspecification. The restriction to the vowels *a* and *i* (but, in most cases, not *u*) and the structural absence of such ambiguity in other signs such as *ta* and *pa* make it a non-trivial feature in the Luwian hieroglyphic writing system that is in need of explanation. In a rich paper dealing with various archaic aspects of Luwian hieroglyphic writing, Rieken has suggested that the ambiguity of *a*/*i* in *kwa/i* may come from its association with the paradigm of *kwa/i-* 'who, what', which shows the same alternation in its paradigm.[26] The process is treated in most detail by Valério: originally a depiction of a chisel-like tool, L 329 obtained its syllabic value through acrophonic derivation from *kwanza-* 'to carve' (or a related form), presumably as *<kwa>.[27] Valério plausibly argues that L 329 secondarily acquired its vocalic ambiguity as it came to be used frequently to write the interrogative/relative pronoun 'who, which', which is still ablauting in the Hieroglyphic Luwian texts, cf. HLuw. nom. sg. c. *kwa/i-i-sa* /kʷis/ (or /kʷīs/) vs. nom.-acc. sg. n. *kwa/i-a-za* /kʷanza/.[28]

The relation between L 329 <kwa/i> and the orthographically and phonetically similar sign L 508 <hwa/i> is debated, but despite their relative orthographic dissimilarity in some Empire texts, I follow Valério in assuming that they ultimately originated from a single sign.[29] The characteristic curly point at the top end of <hwa/i> was presumably added to disambiguate the two. Since the sign <hwa/i> is also ambiguous with regard to its vocalism, the disambiguation of [k] ~ [h] must have taken place relatively recently, at least after the association of *kwa/i* with the relative-interrogative pronoun paradigm of *kwa/i*. Thus, we arrive at a chain of at least 3 different events, summarised below.

- acrophonic derivation of a sign *kwa* from *kwanza-* 'to carve';
- association with *kwa/i-* 'who/which', yielding vocalic ambiguity: *kwa/i*;
- graphic differentiation of <hwa/i> from <kwa/i>, yielding two independent signs.

Each of the steps above must have been completed in the prehistoric period. It is difficult to date each of these steps with more precision, but it seems clear that the differentiation of <hwa/i> from <kwa/i> was the final stage of this development, since we cannot otherwise explain the vocalic ambiguity of this sign.

One question that remains is why <hwa/i> appears to be a derivation from <kwa/i> rather than an independent creation. The consonantal phonemes that <hwa/i> represents, viz. /hʷ:/ and /hʷ/, are both reconstructible for Proto-Anatolian, so the derivation of the sign <hwa/i> from <kwa/i>

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[25] E.g. EMİRGAZİ §4 *kwa/i-i(a)-sa* = *kʷis*; §19 *kwa/i-tá-zi/a* = *kʷatanz*.

[26] Rieken 2015, 220–221.

[27] Valério 2018, 149–150.

[28] For the length in /kʷīs/, cf. Vertegaal 2018, 184–186, where also the cuneiform data is treated. In a similar way, Rieken (2015, 220–221) explains the allomorphy in L 376 , which is ambiguously read as <za/i> in Bronze Age texts, e.g. *zi* in EMİRGAZİ §11 DEUS-*ní-zi/a* (= °*inzi* [nom.-acc. pl. c.]) vs. *za* in *zi/a-i(a)* (= *zaia* [nom.-acc. pl. n.]). In the Iron Age, it only expressed <zi>, the value <za> being expressed by the dedicated sign L 377 *za*, a ligature of *zi* and *a*. (The constituent parts are clearly recognisable in inscriptions such as KÖTÜKALE, cf. CHLI, 299.) The ambiguity of <za/i> must be explained by its association with the paradigm of *za/i-* 'this', in which stem variants with *a* and *i* occur.

[29] CHLI, 30; Valério 2018, 149–150. Against a common origin of *kwa/i* and *hwa/i* based on these signs' shapes in YALBURT, see Hawkins – Morpurgo Davies 1993, 54–55.

cannot mimic a secondary origin of the sound /hʷ(:)/.[30] Moreover, unlike <za> and <zi>, whose sounds occur in alternation within the same paradigm, the consonants in <kwa/i> and <hwa/i> never alternate and are found in different paradigms. Instead of explaining the graphic similarity of <kwa/i> and <hwa/i> through morphological convergence, we should consider phonetic similarity as a cause for conflation. The fact that <hwa/i> was probably derived from <kwa/i> suggests that the pronunciations of /kʷ/ and /hʷ/ were once quite close. This is also suggested by the signs L 314 <ha$_x$> and L 315 <kar> (with *ra/i*).[31] The idea that /k$^{(w)}$/ and /h$^{(w)}$/ were perceived as very similar sounds is not easily understandable from their synchronic values, which differ both in mode and manner of articulation: /kʷ/ is generally thought to be a (labio)velar stop [kʷ], while /hʷ/ has recently been argued to represent a uvular (labialised) fricative [χʷ].[32] To have an ambiguous sign for these is especially awkward in a language in which frication appears to be an important phonological marker.[33] For this reason, we might consider the possibility that the situation in which /Hʷ/ and /kʷ/ were written by a single sign arose in a time when both were phonetically more similar.

Recently, Alwin Kloekhorst has reviewed the phonetic development of the laryngeals in Anatolian, arguing that PIE/PIA *h_2 and *h_3 are to be reconstructed as (labialised) uvular stops (/qː/, /qʷː/).[34] In non-Anatolian Indo-European, these developed into pharyngeal fricatives. In the Anatolian languages, however, these uvular stops were independently fricativised in Hittite and Luwian (but not in Lycian).[35] If this scenario holds, PIE *h_2*(u)* and *h_3*(u)* would have remained uvular stops until the Proto-Luwic stage, and only then developed into the fricatives [χ] / [χʷ]. The period before this fricativisation, then, when both /kʷ/ and /Hʷ/ were both phonetically realised as stops, provides a much more plausible time frame for the creation of an ambiguous sign than the pre-Proto-Luwian period, when their phonetic values had started to drift apart. Thus, the Proto-Luwic stage provides a plausible *terminus ante quem* for the derivation of <kwa/i>: originally this sign represented both [kʷa] and [qʷa]. Then, under the influence of the paradigm of the interrogative/relative pronoun *kwa/i-*, it came to be readable as [kʷa/i] and [qʷa/i] after which [qʷa/i] regularly developed into [χʷa/i].

2.3. L 391 <ma/i>

The characteristic four vertical lines that make up L 391 <mi> quickly led scholars to consider it the result of acrophonic derivation from either Cuneiform Luwian *māwa-* or Hittite *mieu-*/*miu-*, both meaning ‘four’. Yakubovich takes <mi> as a clear example of a sign that was phoneticised based on its Hittite reading, arguing that its phonetic value [mi] more closely resembles the beginning of Hittite *miu-* than Luwian *mawa-*.[36] While this is true, there are strong indications of an original ambiguous reading *ma/i* for L 391. The evidence for this consists of spellings containing L 391 of words that are to be read as [ma] rather than [mi].[37] Several examples are given by Hawkins, such as AEDIFICARE.*MI-* (= *tama-*) ‘to build’, (DEUS)LUNA+*MI-* ‘Arma’ (DN),

[30] For the Proto-Anatolian reconstruction, cf. Kloekhorst 2006, 100 and Melchert 2015, 262. See Simon 2011b, 544 for a counterargument.

[31] For the reading of the former, compare TELL AHMAR 6 §24 (*314)*ha-sa-ta-na-ti^{i}* ‘?’ (abl.-ins.) with §6 (*314)*sa-ta-na-ti* (id.) in the same text. The latter sign <kar> is abundantly attested in spellings of the name for the city Carchemish, e.g. KARKAMIŠ A15b §3 *kar-ka-mi-sà-na*(URBS) (acc. sg.).

[32] Simon 2011a; Weiss 2016.

[33] Rieken 2010, 306; Vertegaal 2019, 28.

[34] Kloekhorst 2018.

[35] Kloekhorst 2018, 75–76.

[36] Yakubovich 2010, 291.

[37] Cf. Laroche 1960, 210–211 and Güterbock 1998, 203. This is also acknowledged by Yakubovich 2010, 291. See also the relevant forms and critical discussion in Oreshko 2013 and Simon 2020, 45–46.

AUDIRE+*MI* (= *tummanti-*) 'to hear' and PURUS.FONS.*MI* 'Suppiluliuma' (PN).[38] It thus seems that L 391 had an ambiguous syllabic value *ma/i* at some point.[39]

It is tempting to explain the ambiguity in **ma/i* in the same way as *za/i* and *kwa/i* seen above, by relating it to the ablaut we find in the paradigm of the numeral 'four'. The relevant forms from the Hittite and Cuneiform Luwian paradigms are given below, in Table 1.[40]

Table 1. Attestations of the stem '4' in Hittite and Cuneiform Luwian.

	Hittite	**Cuneiform Luwian**
nom.c.	*mi-e-u̯a-aš(-ti-iš)* *mi-e-i̯a-u̯a-aš(-te-eš)*	–
acc.c.	*mi-e-ú-uš*	–
gen.	*mi-i-ú-u̯a<-aš>*	–
dat.-loc.	*mi-ú-u̯a-aš*	–
abl.-ins.	–	*ma-a-u-u̯a-a-ti, ma-a-u-u̯a-ti*
Derivations	*mi-u-u̯a-ni-i̯a-an-ti-š(-)* *mu-u-u̯a-ni-*[*i̯a-an-te-eš*] 'running in teams of four(?)'	*ma-u̯a-al-li-in* 'four-span' *ma-a-ú-*[*u̯*]*a-al-la-aš-ša* 'of a four-span'(?) *ma-a-u-u̯a-ni-* 'to hitch as a four-span'
Uncertain	*me-u-u̯a-aš* (unclear)	–

The formal interpretation of these forms is quite difficult, and the extant forms are not easily brought back to a single reconstructed stem. In Hittite we predominantly find a stem-form *mieu-* next to *miu-* and 1× (*mu-*).[41] In Luwic there is a stem *mău-* (cf. CLuw. *ma-a-u-u̯a-a-ti*) alongside *mu* (cf. Lyc. *mupm̃me/i-* 'fourfold(?)' and Carian *muo-* 'four(th)'.[42] Neither Hittite nor Luwic provides a straightforward basis for the acrophonic derivation of the hieroglyphic sign <ma/i>. However, whereas Hittite neither shows evidence of a variant with *-a-* in the root syllable nor has any obvious way to obtain it secondarily, we *can* explain allomorphy of *ma* and *mi* within our current understanding of Luwian phonology. If we depart from an original ablauting paradigm, as is generally assumed, the Luwic stem-forms *mău-*/*mu-* are the mechanically expected outcome of **méu-*/*mu-*, while an allomorph *miu-* would be the expected stem-form of an unaccented full-grade **meu-*, combined with pretonic weakening of *e* > *i*.[43] We can thus explain the alternation between *ma/i* by relating it to forms in the Luwian word for 'four'. However, the original allomorphy *mău-* ~ *miu-* ~ *mu* that is supposed to have been at the base of this alternation, appears to have been completely lost by the time of our earliest attestations: In the CLuw. paradigm transmitted to us, the full-grade stem *mău-* has been generalised and occurs in case-forms and derivations in which we would rather expect to find zero-grade **mu-* (or, secondarily, a weakened unaccented

38 CHLI, 28.

39 Oreshko 2016, 93–94.

40 All relevant forms are listed and treated in Bauer *et al.* 2021. For the Hittite forms, cf. CHD L-N s.vv. *meu-*, *miu-* B and *miuwaniyant-*, *mūwani*[*yant*]-. For the Cuneiform Luwian forms, cf. CLL s.vv. *māu̯a-*, *mawalla/i-*, and *mawallašša/i-*. Unfortunately, all Hieroglyphic Luwian attestations of this stem (e.g. ASSUR *a* §10 "4"-*zi* [acc. pl. c., = *mawanzi*?]) are written logographically, showing nothing of the underlying phonetic value.

41 The analysis and attribution of *me-u-u̯a-aš* in 375/v i 7 is unclear, cf. CHD L-N s.v. *meu-*, *miu-* B. The main Hittite dictionaries cite *meu-* instead of *mieu-* (cf. CHD L-N s.v. *meu-*, *miu-* B; HEG L-M s.v. *meyu-*, *miyu-*; HED M s.v. *me*(*y*)*u-*, *mi*(*y*)*u-*), apparently reading *mi* as *mé*. This makes etymological analysis easier, but Hittite cuneiform *does* have distinct signs for ME and MI. More research into the use of these signs is needed to judge if these interpretations of Hitt. *mi-e-* as *mé-e-* are warranted.

42 Adiego 2019, 19. For more literature on *mupm̃me/i-*, cf. Sasseville 2021b.

43 For this change, cf. Hajnal 1995, 102 n. 72–73.

full-grade **miu-*). This scenario would put the derivation of **ma/i* in the prehistoric period of the use of the Luwian hieroglyphic writing system, potentially going as far back as Proto-Luwic.

It must be stressed, however, that this scenario hinges on the etymological reconstruction of the word for 'four' as **meu-/*mu-*, which is not certain in light of the attested Hittite forms with *m(i)eu-* and *miu-*. As a result, this dating can only remain speculative.

2.4. L 133 <ara/i>

The hieroglyphic sign L 133 AQUILA (cursive variant L 144) is used syllabographically as *ara/i*, showing a phonetic shape of VCV, which is entirely unique in the Luwian hieroglyphic syllabogram inventory. In itself, this already suggests that the attested value of this sign may not be the original value at the time of its derivation. Instead, it is more likely to have been an original CVCV sign, starting with a weak element that was subsequently dropped, even though our HLuw. texts show no sign of an initial consonant in the phonetic reading of L 133 (e.g. MARAŞ 4 §15 *á-pa-ara/i* 'in that way'). Assuming that L 133 started off as a CVCV sign avoids having to assume an unprecedented derivational base, and would place it among other, securely established *Cara/i* signs, such as L 389 *tara/i* and L 290 *hara/i*.

The next question, then, is what the initial consonant of L 133 originally could have been, and for this we need to speculate on the underlying word that served as the basis for the acrophonic derivation. Laroche (followed by Puhvel and Neumann) proposed a connection with Hittite *aramni-* (falcon- or hawk-like object in metal or stone) and *aramnant-* (an ornithomantic bird).[44] If this connection is correct, there is unfortunately not much to say about what the initial consonant of L 133 might have been, as the etymology of these words is unknown. More commonly, however, the bird is taken as an eagle and connected to the amphikinetic *n*-stem PIE **h$_3$er-n-* 'eagle', which yielded Hittite *ḫāran-* 'eagle' and Luwian *ḫarraniia-* (eagle-like bird).[45] In this interpretation, the missing initial consonant in the original syllabographic value of L 133 was presumably a PIE laryngeal (**h$_3$*), which was lost before the historical period. In the direct cases with a full-grade root (such as the nom. sg. c. **h$_3$ér-ōn*), the laryngeal is retained and shows up as Luwian *h-*. In the oblique cases, however, the expected zero-grade root (**h$_3$r-n-* is likely to have yielded *ʔar-*, which may well have served as the basis for this sign's later syllabographic value.[46]

It is uncertain to what extent the reflex of an initial laryngeal in the form of a glottal stop is retained in word-initial position in the Hieroglyphic Luwian texts transmitted to us. However, cases like *á-pa-ara/i* mentioned above show that there is no trace of any consonantal element when the sign was used word-internally.[47] Therefore, if the phonetic value of *ara/i* truly finds its origin in PIE **h$_3$r-n-*, we need to explain how the laryngeal was ultimately lost. On the one hand, this is possible by assuming that the laryngeal yielded a glottal stop, which given its restricted distribution in word-initial position, was only marginally phonemic and could therefore easily be ignored, cf. Section 2.1. In this scenario, we can interpret the sign *ara/i* as *(ʔ)ara/i*.

Alternatively, however, we can try to date the loss of the laryngeal reflex of *ara/i* more specifically by connecting it to the general loss of intervocalic **h$_1$/h$_3$* in Luwian. If *ara/i* was originally used to write words containing a reflex of PIE **Vh$_{1/3}$Vr* (e.g. the 3sg. pres. med. verbal ending *-ari* added to a laryngeal-final verbal stem), this creates a situation in which the laryngeal stood in intervocalic

[44] Laroche 1961, 83; HED A s.v. *aramni-*; Neumann 1992, 38.

[45] CHLI, 31, whence its logographic reading AQUILA. For CLuw. *ḫarraniia*, cf. Vertegaal 2020, 214–215. Oreshko 2020, 81 rather suggests that *ḫāran-* goes back to a separate root: PIE **h$_2$er-(on)-*. He agrees, however, that L 133 *ara/i* is somehow derived from PIE **h$_3$er-n-* 'bird'.

[46] Melchert 1994, 260; Kloekhorst 2006, 95–96.

[47] For the discussion on whether or not cuneiform and hieroglyphic spellings show evidence for a glottal stop phoneme in Luwian, cf. the discussions in Kloekhorst 2004; Melchert 2010 and Simon 2013.

position and could have easily been lost. This would have led the sign to be usable in words without a laryngeal as well, such as *á-pa-ara/i* mentioned above. In this case, the loss of intervocalic laryngeals provides a *terminus ante quem* for the derivation of L 133 *ʔara/i* from *ʔarn-* 'eagle' (*vel sim.*). It is unclear when in the history of Luwian *h_1 and h_3 were lost in intervocalic position, but if Kloekhorst is correct in assuming that Old Hittite forms such as *ne-e-a-ri* 'he turns' (3sg. pres. med.) << PIE *$néh_1$-o*, still preserve a reflex, this loss must have happened *einzelsprachlich* after the disintegration of Proto-Anatolian.[48]

2.5. L 35 𓂝 *<na>*

The sign L 35 *na* represents a bent arm, as can be seen in texts such as KARKAMIŠ A11*a*, where an attached hand is clearly visible. Laroche rightfully noted this sign's similarity to L 34 𓂞 POST, which is used for words beginning with *appa-*, such as *appa* 'back' (attested in, e.g. YALBURT 2 §2 POST-*a*), *appan* 'after, behind' (POST-*na* [KAYSERİ §11] also spelled *á-pa-na* [SULTANHAN §32]), *appari-* (POST+*ra/i-* [ANKARA §8]) 'lesser, younger', *apparadi* (POST+*ra/i-ti* [TOPADA §16]) 'afterwards', and *apparanta* (POST+*ra/i-ta*, POST+*ra/i-tá* [KARKAMIŠ A5a §9]) 'id.'.[49] Valério cautiously suggests that the syllabic value *na* may derive from the Luwian adjective *nāw(i)-* 'new', given that both the adjective and L 35 POST express concepts related to posteriority.[50] This idea hinges on a semantically motivated association between the concepts of NEW and FOREARM, but the connection is not immediately obvious. Intuitively, one could say that events that happen 'afterwards', or which are 'new' (relative to the present) are located ahead of you, so that a forearm would *prima facie* be an apt representation of the future as something that lies in front of the observer. However, the localisation of 'future' as it is lexically expressed in the Anatolian languages does not seem to match this. Rather, lexemes expressing temporal posteriority such as Luw. *appari* (see above) and Hitt. *ap-pa-ši-u̯a-at-t°* 'future' are clearly related to words such as Luw. *āppan* 'behind' and Hitt. *appezzi(i̯a)-* 'backmost, rear'. In other words, according to Luwian lexical expression, the future appears to lie behind you, not in front of you.

For this reason, I propose two more concrete scenarios for the association between the 'bent forearm' of L 35 and the phonetic readings *na* and *app(a)*, which are based on phonetic, rather than semantic similarity.

For the reading *app(a)*, L 34 may actually represent a taking arm, if we are allowed to compare it to the verbal stem *app-* 'to take', probably attested in Cuneiform Luwian (3sg. pres. act. *a-ap-ti*).[51] Related forms are its Lycian cognate 3sg. pret. act. *appte* 'he took' as well as the Hittiticised verb form *āppalāi-* 'to entrap' (from a Luwian base **āppal-* 'trap').[52]

For the reading *na*, I propose with all due caution that the reading may not be based on the fact that it is a *forearm*, but rather on the fact that it is *bent*, comparing it to Hittite *kanen(i̯e/a)-* 'to bow down'. This is strengthened by the fact that the bent upper-arm is present in all forms of this sign.[53] Neu suggested that the Hittite verb should be connected to PIE **ǵen-u-* 'knee', on the basis of which we can reconstruct a root **ǵen-* 'to bend'.[54] A nasal-infixed verbal stem **ǵ-ne-n-* 'to bend' would then yield the attested Hittite verb. In Luwian, the same verbal stem would undergo a regular loss of the word-initial lenis velar stop. Thus, PIE **ǵnen-* would yield Luw. **nan-*, which could

48 Kloekhorst 2014, 374–377.

49 Laroche 1960, 24–25.

50 Valério 2018, 148.

51 Sasseville 2021a, 261–262.

52 CLL s.v. **āppal-* and Starke 1990, 317–322.

53 This is observed by Payne 2015, 56–58.

54 Neu 1972, 291–292; for the reconstruction, cf. Kloekhorst 2008 s.v. *kanen(i̯e/a)-*zi.

have served as the basis for the acrophonic derivation of L 35 *na*. If this is true, the syllabographic association between L 35 and *na* would postdate the loss of word-initial lenis velars.

2.6. L 209 𔓁 <i(a)>

The abstract shape of L 209 leaves us without a clear indication of its ultimate logographic origins. Parallel to L 376 <za/i>, this sign's phonetic ambiguity (<i(a)>) is resolved in the historical period by the graphic split into a variant with an added <a> at the bottom (= L 210 𔓂 <ia>), and one without (= L 209 𔓁 <i>). In order to account for this sign's original vocalic ambiguity, Rieken proposes a connection between this sign and the syncope from /iya/ to /i/ as assumed for cases such as HLuw. *i-zi-ia-ta* ~ *i-zi-i-ta*.[55] According to Rieken, the sporadic nature of this development would have caused free variation between /i/ and /iya/, which were interchangeable and not distinguished in writing until the end of the Bronze Age, when the need to disambiguate caused the creation of a separate sign variant for <ia>.[56]

The available evidence for syncope is, however, difficult to interpret, as we have alternative explanations available for most alleged cases. In the case of *iziya-* ~ *izī-*, we may be looking at a different suffix.[57] Another well-established sound change (**-ie-* > *-ii-*/*-ī-*) can explain the shape of the verbal suffix *-ī-* (< PIE **-ie-*) in CLuw. *a-an-ni-i-ti* 'carries out' or *a-ri-i-it*[- 'raises'(?).[58] Lastly, cases such HLuw. *tá-ti-za* 'paternal' (dat.-loc. pl.) can be explained by simple analogy: nom. sg. *huhas* : dat.-loc. pl. *huhanz*, nom. sg. *tadīs* : dat.-loc. pl. X →X *tadinz*.[59] The strongest examples seem to be HLuw. *wi*(*ya*)*ni-* 'vine' (SULTANHAN §23 *wa*/*i-ia-ni-i-sa* ~ KÖRKÜN §11 (VITIS)*wa*/*i-ni-na*) and CLuw. *mi*(*i̯a*)*ša-* 'flesh?' (*mi-i-ša-an-za* ~ *mi-i̯a-ša-an-za*). All in all, contraction from *iya-* to *-ī-*, if to be assumed at all, seems to have played a modest role in Luwian historical phonology, and it is therefore unlikely that it contributed to a widespread confusion of *i* and *iya* that would explain the homography of *i* and *iya* with L 209 in the Bronze Age.

Nevertheless, as Rieken argues, the vocalic ambiguity of <i(a)> does require a principled explanation. I therefore tentatively propose an alternative scenario by invoking the same phonetic development as mentioned above, i.e. *ye* > *yi* > *i*. This change is most commonly held responsible for the the anlaut of HLuw. *i-sa-tara*/*i-* 'hand' and Lyc. *izre-* 'id.' < **yes-ro* < **ǵʰés-ro-*, as well as the shape of the Luwian denominal verbal suffix *-ī-*/*-ia-* < PIE **-ie/o-*. The original phonetic value of L 209 would then be *ya/i* (< **ie/o*), and after the monophthongisation of **yi* > *ī*, there would be enough motivation to disambiguate the structurally dissimilar values *ī* and *ya* by creating a ligature (L 210 𔓂 <ia>) to mark the latter. In this scenario, the phonetic use of L 209 must predate the change from *yi* to *ī*. At the same time, it must postdate the weakening of PAnat. **ǵ* to **y* before front vowels, as this seems to feed the subsequent vowel raising from **e* to *i*.

3. Influences from Hittite

In the preceding sections we have reviewed sign values and orthographic features of the Luwian hieroglyphic writing system that can be chronologically anchored relative to key events in the timeline offered by Luwian historical phonology. However, phonetic readings of hieroglyphic signs may not only have been based on Luwian lexical material. In some instances, it seems more

[55] Rieken 2015, 220. Cf. also Melchert 1994, 276 and Plöchl 2003, 20.

[56] In the Bronze Age corpus, we find *i*(*a*) with the value *i* in YALBURT 4 §1c. *i*(*a*)*-zi*/*a-ha* 'I made' (1sg. pret. act.) and with the value *ia* in YALBURT 4 §1a. *pi-i*(*a*)*-ha*ʔ 'I gave' (1sg. pret. act.), cf. unambiguous JISR EL HADID 4 §2 *i-zi-i-ha* and BABYLON 1 §9 *pi-ia-ha*.

[57] Kloekhorst 2019b, 172.

[58] Melchert 2004, 474.

[59] This analogy has to be invoked anyway to explain the secondary '*i*-stem' forms in the oblique cases of *i*-mutated stems, such as AKSARAY §5 DEUS-*ni-za massaninz* 'gods' (dat.-loc. pl.; << *massananz*) and KARKAMIS A12 §10 "IUDEX"-*ni-ti*-*i tarwanidi* 'ruler' (abl.-ins.; << *tarwanadi*).

appropriate to assume that readings were taken from Hittite words. Hittite-based readings of Luwian hieroglyphics have been investigated in depth by Yakubovich.[60] He lists six commonly used signs with phonetic values that, to his mind, correspond more readily to Hittite rather than to Luwian lexemes.

- L 41 *tà* (= CAPERE) < Hitt. *dā-*^{i}*/d-* 'to take' rather than Luw. *lā-*^{i} 'id.'.

- L 391 *mi* < Hitt. *miu-* 'four' rather than Luw. *māu-* 'id.'.

- L 90 *ti* (= PES) < Hitt. *tiie/a-*^{zi} 'walk, step' rather than Luw. *tā-*^{i} 'to stand'.

- L 56 *ká* (= INFRA) < Hitt. *katta* 'down' rather than Luw. *zanta*.

- L 334 *pa* < Hitt. *pattar* 'basket'.

- L 315 *kar* < Hitt. *karzan-* 'basket of wool'.

The signs *tà* and *mi* have been treated above in Sections 1 and 2.3, respectively. As noted there, there are indications that the related Hittite lexemes are not necessarily better sources for these phonetic readings than their Luwian cognates. The last two signs (L 334 *pa* and L 315 *kar*) are marked by Yakubovich as non-probative on account of the fact that there may have been Luwian cognates for Hittite *pattar* 'basket' and *karzan* 'wool basket' that are not attested yet may well have provided a suitable model for the respective values *pa* and *kar*. Until these supposed cognates are found, we cannot definitively say whether these two signs are solely inspired by Hittite or not.

The same can be said, however, for L 90 *ti*. The evidence for Hittite provenance is ultimately inconclusive, since we do not know what the Luwian corresponding form to Hittite *tiie/a-* 'to step, take a stand' (presumably < *(*s*)*th*$_2$-*ie*/*o*-) would be. The Luwian comparandum *tā-* 'to stand' (< *(*s*)*toh*$_2$-) is a derivative of the same root, but shows a different formation. Also semantically these two verbs are similar but not identical: while Hittite *tiie/a-* is mainly eventive, Luwian *tā-* shows both stative 'to stand' and eventive 'to take a stand' semantics.[61] The stative use of Luw. *tā-* is underlined by the fact that Luw. *tā-* is always written logographically with L 82 CRUS 'to stand' (never with L 90 PES, which rather appears as a logogram with eventive verbs such as *áwi-* 'come'), as noted by Oreshko.[62] Thus, similarly to L 334 *pa* and L 315 *kar*, it is likely that there was a Luwian reflex of PIE *(*s*)*th*$_2$-*ie*/*o*- 'to step, walk' with purely eventive semantics. A good candidate for this is Luw. *tiia-* 'to take a step(?)', found in cuneiform texts.[63] This verb may well have been ousted by *tā-* by the time of our hieroglyphic texts, but not before the phonetic value of L 90 was derived from it.

This does not mean that Hittite involvement was completely absent from phonetic writing. There are a few cases in which a Hittite rather than a Luwian reading is more appropriate.

A reading *ká* is claimed for L 56 in the FRAKTIN inscription, which reads: *pu-tu-ḫi-pa* MAGNUS.DOMINA *ka*/*i-zu*(*wa*)-*na*(REGIO) FILIA DEUS *á-zi*/*a-mi* 'Puduhepa, Great Queen, daughter of Kizzuwatna, loved by the gods.'[64] Note that we extraordinarily have to read L 56 as *ki* instead of

[60] Yakubovich 2008 and 2010, 285–299.

[61] HEG T, D s.v. *tiya-* lists clearly eventive meanings for Hitt. *tiie/a-*: 'treten, hintreten, sich (hin)stellen'. For the semantics of the Luwian verb, cf. Morpurgo Davies 1987, 217–220.

[62] Oreshko 2013, 406.

[63] Cf. Sasseville 2021a, 325–326 for a treatment of all relevant forms in context.

[64] Translation after Güterbock 1978, 130–133. In Laroche's (1960) sign list, L 56 is kept distinct from L 57, but they are most likely variations of the sign (as Laroche himself mentions): there is no text in which the two are systematically opposed, and a logographic reading INFRA is required for both L 56 (e.g. ARSUZ 1 §10 INFRA-*tá*) and L 57 (e.g. TELL AHMAR 5 INFRA-*ta+ra/i*). The phonetic value *ká*, however, is only attested for L 56.

ka here, that *zu* has to be taken as *zuwa* and that the *t* of *Kizzuwatna* is not expressed in writing. These shed doubt on the correctness of the reading, but no clear alternative presents itself.

Apart from this inscription, we find L 56 with the reading *ká* on various seals bearing the name of *Gaššulaṵiia*, e.g. SBo I 37 and 104.[65] Yakubovich rightfully observes that the reading <ká> for L 56 is most plausibly taken from Hittite *katta* 'down, below' on account of the fact that the sign represents an exaggerated finger pointing down.[66] Luwian *zanta* 'down, below', recognised as the cognate to Hittite *katta*, is much less suitable in this respect.[67] Beyond the above-mentioned instances, however, we do not find the reading *ká* for L 56 in our Iron Age corpus, nor does it ever alternate with L 434 ♂ *ka*. Most often we find L 56 followed by *ta* or *tá*, where it is translated INFRA-*ta*/*tá* and read as *zanta*.[68] Thus, the <ká> readings for L 56 are restricted to texts directly related to the Hittite royal house and the Empire period.[69] They do not seem to have caught on and did not become part of the standard syllabary.

Apart from the cases mentioned here, there is one additional sign that may show a Hittite reading rather than a Luwian one: ANCOZ 9 §2 (DEUS)CRUS+*MI*(-*ha*) may well stand for Arma, the Moon God (normally written LUNA+*MI*-) if Yakubovich's identification is correct.[70] In the context of this name, L 82 can hardly be interpreted logographically and must rather be taken as a phonetic sign, writing the syllable *ar*-. I propose that the Hittite verb *ar*-$^{tta(ri)}$ 'to stand' (< PIE *h_3*r-to*) would provide a suitable lexeme from which this *ar*- could have been taken. At the same time, however, the dating of ANCOZ 9 (late 9th–early 8th centuries BCE) make an *ad hoc* use of Hittite quite unlikely, as the language had presumably ceased to be used for centuries at that point.[71] If (DEUS)CRUS+*MI*- truly refers to Arma and thus contains a phonetic use of L 82 that is based on a Hittite lexeme, then it must be an archaism, much like the use of L 391 *mi* as *ma* in the same name, in a time where it was no longer vocalically ambiguous (cf. Section 2.3). Alternatively, we could suppose that the reading of CRUS here is based on a lost Luwian cognate of Hittite *ar*-$^{tta(ri)}$, which would supposedly also have been ***ar*-. In this case, no Hittite influence is required, although it would still require us to posit an archaising reading for (DEUS)CRUS+*MI*, given that this supposed cognate is not attested in any Luwian text.

In conclusion, there are a few indications of Hittite influence on the phonetic readings of Luwian hieroglyphic signs, but they do not seem to have permeated through the system. The VC-syllabograms and the reading <ká> for L 56 are restricted to personal and divine names linked to the Empire period, associated mostly with Hittite royalty. Only the reading for the sign <ti> seems to have made it into the classical syllabary of the Iron Age, but we cannot exclude that a Luwian rather than a Hittite source provided the derivational base for this phonetic value. All in all, Yakubovich's claim that the writing system was 'historically the joint venture of the Hittite and the Luvian speakers' is fundamentally correct, but requires the qualification that Hittite influence in the phonetic use of the Anatolian writing system was decidedly more modest and largely transitory.[72]

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65 Güterbock 1940.

66 Yakubovich 2008, 25. This can be seen very clearly in the drawings of the recently discovered inscription TÜRKMEN-KARAHÖYÜK 1, where it is read as INFRA: §2 INFRA-*tá-a*, cf. Goedegebuure *et al.* 2020, 30.

67 For the identification of *zanta*, cf. Goedegebuure 2010, 312.

68 The alternation of <ta> and <tá> in the spelling of this word points to an underlying consonant cluster, cf. Rieken 2010, 304–307 and Vertegaal 2019, 12–13.

69 Oreshko 2013, 405.

70 Yakubovich (online) s.v. *Arma*-. CHLI, 359 takes an agnostic stance on phonetic interpretation of this name.

71 The dating of ANCOZ 9 is taken from CHLI, 359.

72 Yakubovich 2008, 28.

4. Conclusion: the 'age' of the Luwian hieroglyphic writing system

In the preceding sections, we have seen various features and syllabographic sign values of the Luwian hieroglyphic writing system whose development cannot be easily understood in the stage of the Luwian language as we have it attested. Instead, we can understand these features much better if we assume they preceded or followed certain phonological developments that occurred in the prehistory of the language. In particular, the following features can be dated relative to certain prehistoric developments, cf. Table 2.

Table 2. Syllabographic values and their relative dating.

Syllabogram	Relative dating
L 412 <ru>	Before the change **Kr-* > **r-* (*kārum* period?).
L 41 <tà>	Before the change (**dh$_3$* >) */ð/ > /l/ (Proto-Luwian).
L 329 <kwa/i>	Before the change */q/ > /χ/ (Proto-Luwian).
L 391 <ma/i>	Before the generalisation of *măw-* 'four' (Proto-Luwian).
L 133 <ara/i>	Before the loss of intervocalic laryngeals (Proto-Luwic/Luwian).
L 35 <na>	After the loss of lenis velars? (Proto-Luwic).
L 209 <i(a)>	Before the change **ye* > **yi* (Proto-Luwic).

Even if some of the relative datings proposed in this paper are more speculative than others, the resulting picture is that the development of the Luwian hieroglyphic writing system is best conceived of as a process rather than a singular event. Some sign derivations must be of great antiquity (e.g. <ru>, which must predate the loss of the lenis velars) while others were probably more recent (e.g. the derivation of *ma/i* before the regularisation of the paradigm for 'four'). Based on this piecemeal reconstruction of the prehistory of the script, we can see that it was in constant development over a longer period of time, perhaps even from pre-Proto-Luwic times onward.[73] Acrophonic derivation and the creation of new syllabographic values for signs that originally did not have them appear to continue right until the latest texts of our corpus, as we saw from examples like L 207 MONS = *wa/i$_4$* (cf. Section 1).[74]

In more general terms, the conclusions reached here speak against the view that the Luwian hieroglyphs were a relatively recent invention, being consciously created (whether by a Hittite ruling elite or not) around the 15th century BCE.[75] As we have seen above, some of the features of the Luwian hieroglyphic writing system are unlikely to have developed this late and must be quite a bit older than our records can show. This has been argued on independent grounds by Waal, who argues that there may have been a Luwian hieroglyphic scribal tradition on perishable materials such as wood, well before our first extant texts.[76] The perishable nature of these texts had the unfortunate consequence that we cannot trace the development of the Luwian hieroglyphic writing system in more detail. Nevertheless, the absence of such texts does not invalidate the hypothesis

[73] Note that this does not mean that the script had always been in use for the representation of complete sentences or texts. Individual syllabographic values may originally only have been used to write names of people and places, supporting iconographic depictions, cf. Whittaker 2021, 24–25. Nationalistic concerns (Yakubovich 2008, 28) or competitive tension with Egypt (Ferrara 2017, 22), may well have contributed to a wider application to the script and worked as a catalyst for development.

[74] Given this continuity between the script's prehistory and the attested texts, the distinction between 'primary acrophony' during the stage of the formation of the script and 'secondary acrophony' made by Valério (2018, 153–155) does not seem very meaningful.

[75] E.g. Mora 1991, 24–25; Yakubovich 2008 and 2010, 285–299.

[76] Waal 2011.

that the script had been in development and constant use from the Proto-Luwic period onward, and the arguments put forward in this article support that idea. The study of Chinese writing is similarly plagued by the relatively late appearance of texts in the archaeological record.[77] By the time of the earliest texts (oracle bone inscriptions and bronzeware from the Shāng dynasty, ca. 1200 BCE), a fully developed writing system is already in place. The fact that this implies a long genesis history is not in doubt. The existence of earlier texts on perishable materials such as bamboo and silk is even suggested in the writing system itself by the character 冊 'book', representing a series of bamboo strips bound together.[78]

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3 Radner 2008; 2009a, 181, 190; 2009b.
4 Radner – van Koppen 2009, 95–101.
5 Radner *et al.* 2014, 141–145, 147–151.

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