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SOMMARIO

FORUM ARTICLE

Responses

LINGUISTIC AWARENESS IN THE DEVELOPMENT OF THE ANATOLIAN HIEROGLYPHIC SIGN VALUES

Miguel Valério

Summary

One theory sustains that the invention of writing is linguistically determined and limited to societies whose language is rich in monosyllabic morphemes (Daniels 1992; Boltz 2000). Its validity, however, depends on an assessment of the role of acrophony in the invention of scripts across the globe, something which is still unrealized. As far as the Anatolian Hieroglyphic script is concerned, Hawkins (1986) set forth the only attempt to understand the linguistic rationale behind the use of rebus and acrophony in the script's invention. In his opinion, a pattern is observable: the syllabic values of the signs were always drawn from monosyllabic or reduplicated stems of Luwian or Hittite words. Thirty years on, this picture of Anatolian Hieroglyphic, while not far from reality, needs to be fully reassessed. This article represents an effort towards that goal.

THE ORIGINS OF THE ANATOLIAN HIEROGLYPHIC SCRIPT

In the past four decades several works (Morpurgo Davies, Hawkins 1978; Hawkins 1986; 2003; Marazzi 1990, 38 n. 17; Mora 1991; Neumann 1992; Yakubovich 2008; 2010b; Waal 2012; Payne 2008, 119-121; 2015, 65-103; Weeden 2014; 2018; Rieken 2015; Ferrara 2017) have addressed the origins of the Anatolian hieroglyphic script, which was created almost certainly in Anatolia after the introduction of Mesopotamian cuneiform writing in the region. The most consensual view, supported by the archaeological evidence available at present, is that the Anatolian hieroglyphic signs became phonetic and hence full writing around 1400-1300 BCE (Hawkins 1986, 368; 2003, 166; Yakubovich 2008, 12; Weeden 2014, 82). From that point onwards, the script was used to transcribe most consistently the Luwian language. Some scholars agree as well that Anatolian Hieroglyphic developed out of a system of iconic symbols used on the seals of high-ranking Hittite individuals. It has been argued that some of these symbols have precursors in the imagery of Cappadocian seal engravings of the so-called Assyrian 'Colony' period (2000-1800 BCE) (Mouton 2002; Yakubovich 2008, 10), sometimes even as a form of early writing (Alp 1968, 281-301, criticized in Boehmer, Güterbock 1987, 36-37). Yet, the first relatively consensual example of the use of symbols to 'name' an individual is the bulla of Isputahsu, a king of Kizzuwatna in the fifteenth century BCE. Found at Tarsus, the object features the name of the monarch inscribed in cuneiform alongside the iconic signs <TONITRUS> 'thunder' and <REX> 'king'. The pictographs seem to convey the idea that Isputahsu's authority emanated from the Storm-god (Mora 1987, #8.1.1 *apud* Yakubovich 2008, 11 n. 8). Differently, Waal (2012, 288-303) suggests that the Anatolian Hieroglyphic script was in use already by the early second millennium BCE, in the context of Old Assyrian trade in Anatolia. Her claim, however, is based strictly on indirect evidence, namely the allusions in the cuneiform letters of Mesopotamian traders to a type of document called *iṣurtum* or *uṣurtum* (Akkadian for 'drawing' or 'plan, regulation').[1]

1 According to Waal (2012, 292, citing Veenhof 1995, 326), most attestations of the term *iṣurtum* in the period of 2000-1800 BCE in Anatolia refer to documents issued by an Anatolian person or institution in acknowledgement of debt to an Assyrian creditor. These documents usually dealt with amounts of a certain commodity (*e.g.* metal or grain) and were used *in parallel* with written (cuneiform) tablets and other forms of bookkeeping. Waal (2012, 295) is right that we need to account for the fact that *iṣurtum* "was only used when dealing with Anatolians" and mentioned in the same letter alongside the different term *tuppum harmum* 'tablet'. However, this is not necessarily an indication that Anatolians had their own writing system at this time. It is equally possible (and more in line with the absence of archaeological evidence for an early appearance of Anatolian Hieroglyphic) that they simply had a *functionally* different type of accounting document. In the absence of writing, Anatolians could have used a system of tallying or numerical notation consisting *e.g.* of marks scratched on wood (hence the term *iṣurtum*), this being their way of keeping track of their debt to Assyrian traders.

The date of the creation of Anatolian Hieroglyphic is of course of great importance, and so is the hypothesis that it developed on seals with the purpose of naming members of the Hittite elite. But regardless of the uncertainties surrounding its origins, the script shows all the traits of an autonomous invention. The creators of Anatolian Hieroglyphic do not seem to have borrowed a template. Even Hawkins (1986, 374; 2003, 168), who has suggested that the Aegean syllabic scripts provided a typological stimulus, concedes that Anatolian Hieroglyphic appears to be a "native construct."[2] In fact, empiric evidence indicates that the script was formed by taking a set of iconic signs that depicted objects of the real world (body parts, living beings, man-made objects, natural phenomena, etc.) and assigning them syllabic sound values. These values were based mainly on one Indo-European Anatolian language (Luwian), with another (Hittite) seemingly playing also a role in their creation (Morpurgo Davies, Hawkins 1978, 776-777; Hawkins 1986, 373-374; Neumann 1992, 39; Yakubovich 2008; Rieken 2015; Payne 2015, 42). The process was therefore internal, and to an extent we can see it at work in the material.

ANATOLIAN HIEROGLYPHIC AND OTHER INVENTIONS OF WRITING

Inherent to any invention of writing is the transformation of iconic word-symbols (or logograms) into phonetic signs – what we might call *phoneticization*. This is true of both 'primary' and 'secondary' inventions of scripts. By 'primary inventions' we mean those that were or seem to have been created independently. The *potential* historical cases include Sumerian cuneiform, Egyptian Hieroglyphic, Chinese and Mayan glyphs (or some other Mesoamerican phonetic script that may predate Mayan) (Houston 2004a; Ferrara 2017, 11). The undeciphered *rongorongo* of Easter Island/Rapa Nui may also deserve to be on this list. Conversely, with 'secondary inventions' I refer to cases of societies that probably knew about the existence of writing as a technique, but still created their own script in an original way, without borrowing extensively. Besides Anatolian Hieroglyphic, examples of secondary inventions include the Nahuatl (Aztec) script (see Lacadena 2008; Whittaker 2009) and likely Cretan Hieroglyphic (Ferrara 2015; 2017).[3]

The phoneticization of iconic logograms in invented writing can be achieved by means of one or two well-known strategies. The primary strategy used is rebus, which relies on close homophony and is common to all inventions of writing. Through rebus, an iconic sign becomes phonetic by no longer representing just the object it depicts, but also the sound of that object's name in a given language. The sign's range of use therefore expands and it becomes capable of transcribing also the names (or part thereof) of other things that sound more or less the same. The classic example of rebus is the drawing of a <BEE> and a <LEAF> in representation of the word *belief* (DeFrancis 1989, 50). Inventors of writing who resorted to this strategy looked to their language and focused on the closest match between the *minimal unit of meaning* (a morpheme or word) and the *minimal unit of sound* (usually the syllable) (Daniels 1992, 83-84). In this way, they obtained a very close match between WORD DEPICTED BY SIGN and SOUND VALUE OF SIGN. As far as we can tell, archaic cuneiform and the earliest Chinese writing were phoneticized exclusively through rebus. In the Sumerian and Old Chinese languages (regardless of their morphological differences) many morphemes were composed of just one syllable, and many could stand alone as words. The potential for rebus was enormous.

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2 The two features highlighted by Hawkins are typological commonalities and cannot be diagnostic of Aegean interference. One is the iconicity of the signs, which is characteristic of all potential inventions of scripts in Mesopotamia, Egypt, China and Mesoamerica. The second feature is the logo-syllabic type of Anatolian Hieroglyphic. Again, this is seen in all invented writing systems just mentioned, with the exception of Egyptian Hieroglyphic. Moreover, the Aegean group is of a different type, at least as far as we can tell from Linear B. The Mycenaean script had ideographic signs to denote manageable commodities, such as vessels, furniture, animals, and even human beings (*e.g.* MUL 1 'woman, one'), but it did not allow for logo-phonetic spellings of the kind seen in Hieroglyphic Luwian (cf. *e.g.* FEMINA-*ti-ia-ti* for Luwian */wanattiyad(i)-/ 'female', where FEMINA is a logogram for /wanatt(i)-/ 'woman'; Payne 2010, 116, 154). Finally, Hawkins stresses that both the Anatolian and the Aegean systems used signs that transcribed only open syllables (in the case of Anatolian Hieroglyphic, of V, CV and CVCV types), but this is also typologically common.

3 Yet another writing system that needs to be mentioned is the Indus Valley script. However, given its geographical proximity to south-western Asia, the contacts of the Harappan culture with the Persian Gulf, and the more reduced iconicity of its sign shapes, there is a higher probability that this system was the product of substantial borrowing, rather than invention.

By contrast, homophony and the potential for rebus is much more constrained in languages in which fewer morphemes can stand alone as words, or in which most words are polysyllabic, or both. This was the case of Luwian and Hittite. Thus, the phoneticization of iconic signs in Anatolian Hieroglyphic, as well as Egyptian, Mayan and Nahuatl involved another procedure. When the potential for rebus was exhausted, the next-best-thing was acrophony, a principle that operates with 'imperfect' homophony. If available in the language to be committed to writing, monosyllabic morphemes were still preferred as sources for sound values, but sign-name and sign-value did not match in full. I can cite as examples of acrophonic derivations the Anatolian hieroglyphs L66 <DARE>, <pi> and L175 <LINGUA>, <la>,[4] which probably derive their values from the Luwian words *pi*(*ya*)- 'give' and *lal(i)*- 'tongue',[5] respectively (more details on these will be given below). It is to be noticed that the highest similarity possible between sign-name and sign-value was still preferred (no doubt because it aided memory), so the creators of the new script 'dropped' certain sounds at the end of the chosen morphemes.[6] The way it operates has often led authors to confuse it with mere *abbreviation* and, in fact, the term 'acrophony' has been used in the literature to describe different processes related to script creation or teaching. I will return to this issue below.

Gelb (1931, 71, 83) was among the first to propose acrophony as an important mechanism in the creation of Anatolian Hieroglyphic – as well as other early scripts, like Egyptian. Oddly enough, in his influential *A Study of Writing* he would dismiss its role altogether: "acrophony as a principle seems to play no part in the history of writing" (Gelb 1963, 251, but see also 111). In the following decades, the cumulative work of decipherers and linguists on Anatolian Hieroglyphic confirmed that many of the sign values of the script were derived through rebus or acrophony. The implications are far from trivial. One theory sustains that the invention of writing was linguistically determined. Namely, it is argued that it was limited to societies whose language was rich in monosyllabic morphemes (Daniels 1992; Boltz 2000), because these offer the optimal homophony required by rebus. The validity of this theory, however, depends on an assessment of the role of acrophony in the invention of scripts across the globe. This is something which is still unrealized, but an effort towards it is in preparation elsewhere (Valério, Ferrara in preparation). Regarding Anatolian Hieroglyphic, Hawkins (1986, 374) set forth the only attempt to understand the linguistic rationale behind the use of rebus and acrophony in the script's invention. In his opinion, a pattern is observable: the syllabic values of the signs were always drawn from "monosyllabic or reduplicated (…) roots" of Luwian or Hittite words. Thirty years on, this picture, while not far from reality, needs to be fully reassessed.

THE PHONETIC VALUES OF ANATOLIAN HIEROGLYPHS: PATTERNS OF DERIVATION

What follows is an effort at a systematic study of how the sound values of Anatolian Hieroglyphic signs were obtained. The goal is to detect patterns as well as particularisms. In this survey, I will refer to derivations of values as they have been proposed by specialists, discuss problematic cases and make some new suggestions. All in all, four patterns of derivation are proposed: one corresponding to the use of rebus and three reflecting different applications of acrophony. Wherever they can be detected, parallel features in other invented scripts of the world (especially Egyptian Hieroglyphic and Nahuatl, as we will see) will be mentioned. Finally, exceptions are discussed, alongside their possible motivation.

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4 Anatolian Hieroglyphic signs are here cited according to 530 repertoire numbers (after Hawkins 2000 and Payne 2010) that represent an update to the catalogue of 497 signs by Laroche (1960). In reference to the original publication, sign numbers are preceded by an 'L'. As is often the case with ancient logo-syllabic scripts, these figures do not correspond with the real number of independent graphemes. According to Weeden (2014, 82), ca. 250 is a closer estimate and this number still includes many allographs.

5 In this text, citations of Luwian words in cuneiform and hieroglyphic transmission, as well as reconstructed forms or phonological interpretations, follow, for the most, the transliteration system proposed in Yakubovich 2015.

6 Daniels 1992, 93 cites Pulgram 1970, 71-73 as a study pointing out that the end of phonological sequences is more redundant in terms of the information it carries than the beginning. This would constitute further psycholinguistic motivation for the application of acrophony.

Pattern 1: Rebus

Only a small number of Anatolian Hieroglyphic signs seem to have been phoneticized through rebus, as certain linguistic constraints severely reduced its potential. While the script's predominant types of syllabogram were monosyllabic V and CV, the majority of Luwian and Hittite words are polysyllabic. Moreover, Luwian and Hittite morphemes are predominantly bound (*i.e.* most of them cannot occur as separate words). Thus, the available examples indicate that rebus applied to morphemes, in isolation from any sort of inflectional elements (Table 1). For instance, the phonetic value of sign L82  <CRUS>, <ta_6>, which depicts a leg, matches the Luwian verbal stem /ta-/ 'to stand, step; arrive', not /tatta/ '(he/it/she) stepped (in)' or any other inflected form of the verb. It is well-known that Anatolian Hieroglyphic possessed also some logograms used as (C)VCV phonetic signs, such as L13-14  <PRAE>, <pari>. However, to the best of my knowledge, only L133-134  <AQUILA / $AVIS_4$> <ara/i>, is attested phonetically (and not with certainty) at an early phase in the development of the script (cf. Payne 2015, 73).

It is also important to separate genuine phonograms whose value originates in a particular word-play, but is then extended to spell other words (which are the cases that concern us here), from logograms used in logo-phonetic spellings: cf. *e.g.* sign L363  <MAGNUS>, which may have been used phonographically in the transcription of the personal name Urhi-Tešub, but mostly spelled compound anthroponyms containing the Luwian word /ura/ 'great' (Payne 2015, 40-41, 73). It must also be stressed that I am referring to *rebus as a device for deriving sound values in the development of a writing system*, not as an orthographic strategy for spelling certain words (which may contain more than one morpheme) once a script is fully formed. Thus, I exclude from consideration cases such as the use (in an Iron Age inscription) of logogram L121  <SPHINX> to spell Luwian *awiti* 'it comes' or *awita* 'it came', presumably because the sign concealed a homophonous Luwian word, cognate with Hittite *awiti-* 'a leonine animal' (Singer *apud* Hawkins 2000, 81; see Puhvel 1984, 246-247 for the Hittite lexeme).

Sign		Value	Source	Reference
41		<CAPERE>, <tà>	Hitt. *dā-* 'to take'	Morpurgo Davies and Hawkins (1978, 777) (Cf. also Yakubovich 2008)
42		$<CAPERE_2.CAPERE_2>$, $<ta_x>$		
82		<CRUS>, <ta_6>	Luw. /ta-/ 'to stand, step'	Yakubovich (2008, 27)
14		<PRAE>, <pari>	Luw. /p(a)ri/ 'before'	Yakubovich (2008, 26)

Table 1. Anatolian Hieroglyphic sign values probably derived through rebus (Pattern 1).

It has been suggested that sign L376  <zi> (which at a later stage of the script was specialized as / <zi/za>) also owes its value to rebus, in this case involving the Luwian word *zā-/zi-* 'this' (Neumann 1992, 25; cf. also Yakubovich 2008, 25-26, tab. 3). However, this is not necessarily the case. To be sure, the sign resembles an arrow, which some scholars assume indicates direction and see as the ideal solution to convey near-deixis. Yet an arrow-like grapheme is less iconic than signs depicting, for example, a foot or an animal, and therefore we may argue that it would be much more dependent upon conventions to be properly interpreted as meaning 'this'. A similar problem hinders the interpretation of sign L332  <NEG> (later specialized as = $<NEG_3>$ and = $<NEG_2>$, <ná>), whose value has been linked to the Luwian words *nis* 'not (prohibitive)' and *na-* 'not (factual)' (cf. Rieken 2015, 220). Here too we are dealing with a quite abstract notion that is hard to depict naturalistically. Thus, I contend that it is more likely that L376 and L332 originally represented other objects, which are now difficult for us to recognize.

Pattern 2: CV < CVw/ya-

Broadly speaking, what I define as Pattern 2 comprises derivations of V or CV values from stems whose structure is (C)V + glide + V. The last vowel is almost always /a/. Table 2 features a list of proposed derivations from

which this pattern has been deduced. Because the target value entails a reduction of the source stem, this pattern is acrophonic.

Sign		Value	Source	Reference
391		<4>, <mi>	Hitt. *me*(*y*)*u* ~ *mi*(*y*)*u*- 'id.' (vs. C. Luw. *māwa*- 'four')	Otten (1953, 28 n. 56, *apud* Laroche 1960, 211); Morpurgo Davies, Hawkins (1978, 777)
35		<na>	C. Luw. *nāwa/i*- 'new' (vs. Hittite *newa*- 'id.') ?	This paper
55		<VERSUS>, <nì>	Luw. */niya-/ 'to turn, follow'?*	Neumann (1992, 39)
66		<DARE>, <pi>	Luw. /piya-/ 'to give'	Morpurgo Davies, Hawkins (1978, 777)
328		<pu>	C. Luw. *pūwā*- 'to pound, press, crush' (> 'to (im)press, stamp'?)	This paper
108		<CORNU>, <sú>	Luw. /suwa-/ 'to fill'?	Melchert *apud* Yakubovich (2008, 24, n. 27)
90		<PES>, <ti>	Hitt. *tiya*- 'to walk, step'?	Yakubovich (2008, 25)
105		<BOS>, <u>	Luw. /waw(i)-/ ~ */uw(i)-/ 'cow'?	Laroche (1954, 109); Morpurgo Davies, Hawkins (1978, 777)

Table 2. Anatolian Hieroglyphic sign values probably derived through acrophony (Pattern 2).
* Cf. the Hieroglyphic Luwian verb *ni*(-*ya*)-*za*- /ni(ya)zza-/- 'to pass down to (change ownership to)' (see Hawkins 2000, 127). I thank I. Yakubovich (pers. comm.) for calling my attention to this form.

More can be said about the precise rationale involved in the derivations of Pattern 2. First, however, I would like to discuss one of them, because to the best of my knowledge it has not been proposed before. The derivation in question, as listed in Table 2, concerns sign L328 <pu>. While I am not aware of any attempt to identify its iconic origins, I would like to propose that it depicts a type of stamp seal. The main piece of evidence is the fact that some of its paleographical variants are very similar to certain examples of sign L327  (see Table 3), which reads as <sa_5> but is also a logogram for <SIGILLUM> or 'seal'. At the same time, several paleographical variants of L327 and L328, especially those whose topmost part is T-shaped, are consistent with archaeologically-attested specimens of Anatolian stamp seals (see already Gelb 1949, 69, Pl. I). The best formal parallels are provided by various types that feature knob- or hammer-shaped handles and span from the Old Assyrian to Middle Hittite periods (see Beran 1967 and Boehmer, Güterbock 1987). I would like to suggest that around or shortly after the mid-second millennium BCE a symbol depicting a stamp seal appeared on Hittite glyptic.[7] Afterwards, it developed into two separate syllabograms of the Anatolian Hieroglyphic script. But what might this tell us about the source of the phonetic value of L328 <pu>?

7 A comparable development seems to have taken place on Crete. Cristiani and Ferrara (2016, 25-31) have cogently re-interpreted the Cretan Hieroglyphic sign 044 (one of the most recurrent on stone seals) as an iconic depiction of a *Petschaft*. *Petschafte* are one-face stamp seals used in the Protopalatial period (Middle Minoan IB through III), during which the practice of using such devices to make impressions on clay is attested.

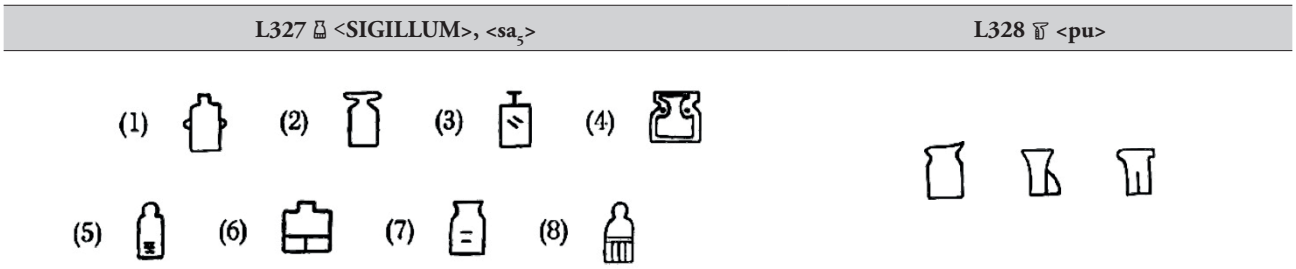

Table 3. Paleographical variants of Anatolian Hieroglyphic signs L327 and L328 (after Laroche 1960, 168-169).

Cuneiform Luwian has a verb *pūwā-* 'to pound; press; crush' (Melchert 1993, 182, Giusfredi 2009). Much can be said about the etymology of this word, but I will limit myself to three pieces of evidence regarding its semantics. First, it translates the Akkadian verb *hašalu* 'crush'. Second, its Indo-European cognates (which include Greek παίω 'to beat, to hammer" and Latin *pavīre* 'id.') suggest that it derives from a Proto-Indo-European root meaning roughly 'to beat' or 'to hit'. Finally and most importantly, the word is related to Hieroglyphic Luwian ("LOQUI")*pu-pa-la/li-* /puPala/i-/ 'to inscribe(?)' or 'dictate(?)' (cf. Hawkins 2000, 542) and Lycian *pu-* and *puwe-* (= Greek γράφω), whose semantics probably arose via the sense of 'to hammer' or 'engrave' (see Giusfredi 2009, 60-61, 64 and n. 7). These points support the idea that Luwian *pūwā-* was also used with more specialized meanings, and I would like to suggest that one of them was 'to (im)press' or 'stamp'. I further propose that it was from Luwian *pūwā-* in this sense that sign L328 , as a depiction of a stamp seal, derived its value <pu>. This scenario is consistent with the pattern CV*wa-* (word-stem) > CV (sign value).

In Table 2, I further suggest, with due caution, that sign L35 <na> may take its value from Luwian *nāwa/i-* 'new'. One piece of favorable evidence is its similarity to L34 <POST>, a logogram used in the spelling of Luwian *appari* 'after, later' (Hawkins 2000, 634). Already Laroche (1960, 24-25) noticed the resemblance of the two graphemes, which he tentatively interpreted as depictions of a 'folded forearm' (see Payne 2015, 56-58 for a paleographical discussion). If the interpretation of their iconicity is correct, then L34 and L35 may ultimately derive from a symbol that conveyed the notion of posteriority, for which Luwian *nāwa/i-* 'new' would be a good fit (cf. also Hieroglyphic Luwian (INFANS)*na-wa/i-* 'great-great-grandson').

Another point that requests discussion concerns three derivations of Pattern 2 that need to be taken with a pinch of salt. The signs in question are L108 <CORNU>, <sú> and L105 <BOS>, <u>, as shown in table 2, and L395 <9>, <nú>, which is not featured in the list. Sign <nú> almost certainly derives from Luwian **nu(wi)n-* 'nine' and at first sight it might seem to fit in this group. However, in addition to possessing glide and vowel components, the word-stem ends with a nasal. This is the reason I have not included it here and will discuss it only in the next subsection. In the meantime, let us focus on the other two signs, <sú> and <u>. These are problematic because, in both cases, the proposed derivation requires one assumption. Thus, Melchert has proposed that L108 CORNU derived its <sú> value from Luwian /suwa-/ 'to fill', but we need to assume a connection between the notion of 'fullness' and the picture of a horn via the metaphor of cornucopia. As for L105 <BOS>, <u>, it has long been proposed that it takes its value from a contracted variant of Luwian /waw(i)-/ 'cow', *i.e.* */uw(i)-/ (Hawkins 1986, 374; Neumann 1992, 25-26 n. 1). Yet, while the cognate Lycian word for 'cow' shows this morphological variation (*wawa*, *uwā*, etc.), there is no direct evidence for it in Luwian (cf. Melchert 1993; Yakubovich 2008, 19-20 n. 17). We can only mention that Anatolian Hieroglyphic features a variation of the sign, L107 , which is a logogram for Luwian /muwa-/ 'might, power' and consists of a ligature of L105 and L391 <4>, <mi>. The latter sign obviously functions as a phonetic indicator M_x- and seems to cooperate with <u> to produce the reading <mu(wa)> (see Yakubovich 2008, 20; Oreshko 2013, 394

n. 133). This is indirect evidence that L105 <u> also concealed the morpheme */uw(i)-/ 'cow', but the derivation still cannot be considered as proven.[8]

Before closing our treatment of Pattern 2, a brief discussion of two further signs is in order. Yakubovich (2008, 27, tab. 4) has suggested derivations for sign L329 <kwa/i>, conventionally labeled REL, and the very similar 508 <hwa/i>, formerly termed REL_2 and more recently CURRERE. His scheme associates the phonetic values of these signs with the Luwian words /kua/i-/ 'which' and /hwi(ya)-/ 'to run', respectively (as well as Hittite *kui-* and *huwāi-*/*hu*(*i*)*ya-* 'id.'). I am drawing attention to this because the phonological shape of these stems would vouch for their consideration as examples of C(V)*w*/*y*V- > CV derivations. However, such associations are indisputable only in terms of the vocabulary items that these signs usually represented, as logograms, in the Hieroglyphic Luwian inscriptions: often the Luwian relative pronoun /kwa-/ ~ /kwi-/ and derivatives, in the case of L329 (hence "REL"); and forms of /hwi(ya)-/ 'to run', in the case of L508 (Hawkins, Morpurgo Davies 1993). I argue that most probably these stems bear no relation to the sound values of the signs, because their shapes have no obvious connection with pronouns and running. In fact, a relative pronoun is an abstract notion hard to translate into a picture (at least without a good measure of conventionalism), whereas the action of running could perhaps have been depicted in more iconic ways (for example, by drawing a pair of flexed legs). All this speaks against the words /kua/i-/ and /hwi(ya)-/ being the acrophonic sources of these sign values.

The solution may well lie in the resemblance between L329 and L508 , and a pointed tool. In fact, Laroche (1966, 204) interpreted L329 as a depiction of a chisel and, indeed, the two signs are very similar to the logogram L268 , <SCALPRUM> or 'chisel'. Following this line of reasoning, I would like to suggest as a hypothesis that L329 <kwa/i> derives from L268 <SCALPRUM> and takes its phonetic value from the first syllable of the Luwian word **kwa(n)za-* 'to carve, incise'. The verb is directly attested in Hieroglyphic Luwian as (CAPERE+SCALPRUM) REL-*za*, i.e. *kwa*/*i-za* (Hawkins 2000, 70, 482, 494; see also Yakubovich 2014). In more extensive inscriptions, L329 was mostly used for writing the relative pronoun, with its shifting stem /kwa/i-/, as well as a series of conjunctions containing the syllables /kwa-/ or /kwi/. Perhaps because of this distribution, the sign came to be perceived as ambiguous for vocalism: hence L329 <kwa> → <kwa> ~ <kwi>. At the same time, the lack of a <hwi> syllabogram in the Anatolian Hieroglyphic system would have made it difficult to transcribe Luwian words like /hwi(ya)-/ 'to run', and /hwisar-/ and /hwidar-/ 'wild animal'. With its value <kwi>, L329 may have been used secondarily to fill the gap and transcribe the Luwian syllable /hwi/.[9] It must be noticed that the logogram PES_2 classified /hwi(ya)-/ 'to run' semantically, whereas ANIMAL and BESTIA determined /hwisar-/ and /hwidar-/ 'wild animal'. If these orthographies came into use early enough, they would have assured the reader that /hwi-/, not /kwi-/, was the intended sound. Still under the same hypothesis, we can propose that after a while the sign split, and the variant <hwi> diverged paleographically. One possible challenge to this scheme is the fact that L508 <hwa/i> and L329 <kwa/i> already appear as different signs, with distinct shapes and readings, in the Empire-period inscription of YALBURT (Hawkins 2000, 30). Yet YALBURT dates to the reign of Tudhaliya IV, who was king in the second half of the thirteenth century BCE (Hawkins 2003, 139). The development proposed here could have taken place somewhere within the period of ca. 1400-1250 BCE, though more likely not long before

8 As an alternative, Yakubovich (2008, 20) has suggested that the values <u> and <mu(wa)> of L105 L107 reflect "various renderings of the bellowing of the bulls and the mooing of the cows." That is, onomatopoeias. However, it seems methodologically more cautious to treat this as the last resource when all other hypotheses have been discarded (cf. also Oreshko 2013, 394 n. 133). For instance, onomatopoeias have been evoked to explain the Linear A signs 80 <ma> and 23 = <BOS> / <mu>, pictorially a cat's face and a bovine (Younger 2010). However, these may simply derive their values from onomatopoeic words (rather than 'pure' onomatopoeias), which cross-linguistically are common sources for animals' names: cf. *e.g.* ancient Egyptian *mỉw* 'cat' or Mandarin *mao* 'id.'. Returning to Anatolian Hieroglyphic, Yakubovich's suggestion has better chances in the case of L110 <ma>, pictorially a ram's head. As the author stresses, this sign's value cannot be derived from Luwian *haw(i)-* 'sheep'. He therefore mentions Greek μηκάζω 'bleat' and Armenian *makʰi* 'sheep', both words of onomatopoeic origin, as a possible typological parallel (Yakubovich 2008, 20 n. 21).

9 It is not too farfetched too hypothesize a sign with an originally ambiguous consonantal value <k- ~ h->. We may compare L314 , which apparently had the ambivalent phonetic value <ka, ha> (Melchert 1999, 129).

the inscribing of YALBURT.[10] In conclusion, if we accept that L329 <kwa/i> was phoneticized from /kwa(n)za-/ 'to carve, engrave', then the sign cannot be included in Pattern 2.

It is now time to address the interpretation of the derivations that can be gathered in this second pattern with a degree of security. In at least some cases, they implicate words or families of words containing a stem that fluctuates either between C-*u*- and C-*uwa*-, or between C-*i*- and C-*iya*-. Thus, the paradigm of the Cuneiform Luwian verb *pī(ya)*- 'to give' includes, for example, 3rd singular preterit *piya-tta* but also 1st plural present *pi-unni* (Melchert 1993, 178). Besides the attested Cuneiform Luwian *šūwa*- 'to fill', we can reconstruct the verbal stem **su-nna*- 'to make full', based on the adjective *šunatruwant(i)*- 'rich in outpourings/blessings' and the cognate Hittite verb *šunna*- 'to make full' (cf. Melchert 1993, 197). Similarly, Giusfredi (2009, 64) reconstructs as **pu-nni* the 1st plural present form of Cuneiform Luwian *pūwā*- 'to press'. These three derivations seem to suggest that the creators of Anatolian Hieroglyphic preferred this type of morphemes and the signs depicting them because, all grammar considered, they called to mind the contracted CV stems.

However, morphological alternations of C*u*(*wa*)- and C*i*(*ya*)- stems cannot account entirely for Pattern 2. In other proposed derivations, the stem involved does not exhibit such alternations. This is the case of L391 <mi> vs. Hittite *me/i(y)u*-, L90 <ti> vs. Hittite *tiya*- 'walk, step' and L105 BOS, <u> vs. hypothetical Luwian */uw(i)-/ 'cow', as well as L35 <na> vs. Luwian *nāwa/i*- 'new'. What all derivations in Pattern 2 really have in common is the 'deletion' of a final sequence of sounds that consists of a glide, /w/ or /j/, plus a vowel. Very similar acrophonic processes, whereby (C)V sign values are obtained from (C)VG morphemes (where G = glide) are attested for other invented scripts. The Nahuatl phonogram <cue> or <kwe>, for example, takes its value from the Nahuatl morpheme *cuei*- 'skirt' (already Aubin 1849, 36, no. 39, but see also Whittaker 2009, 67). The creators of Anatolian Hieroglyphic may have perceived these final sounds, glide and vowel, as 'weak' or negligible, and therefore prone to minimizing the divergence between the word depicted by a sign and the intended phonetic value. Under this view, we can still hold that the rationale behind the derivation of signs in Pattern 2 had to do with linguistic awareness, but the motivation was phonological rather than morphological.

Pattern 3: CV < CV(w/yV)n(V)- (nasal dropping)

The third pattern we can deduce comprises CV sign values derived from morphemes at first sight very similar to the ones in Pattern 2. They are different, however, in that their final part may contain also a nasal, or a nasal and a vowel (see Table 4).

Sign		Value	Source	Reference
395		<9>, <nú>	Luw. **nu*(*wi*)*n*- 'nine'	Hrozný 1937, 219 n. 2, *apud* Laroche 1960, 212; Morpurgo Davies, Hawkins 1978, 777
160		<VITIS>, <wi>	Luw. /wiyani-/ 'vine'	Laroche 1956, 106; Neumann 1992, 39

Table 4. Anatolian Hieroglyphic sign values probably derived through acrophony (Pattern 3).

As already mentioned above, the phonetic value of L395 <9>, <nú> was extracted from Luwian **nu*(*wi*)*n*- 'nine'. This stem is reconstructed based on the attested Cuneiform Luwian 9-*un-za* and Hieroglyphic Luwian 9-*wa/i-i-za* 'nine(?)' or 'ninth(?)', phonetically *[nuwi(n)ts-] or *[nu(n)ts-] (cf. also Lycian *nuñtata* 'nine(?)' or 'ninety(?)') (Melchert 1993, 298; Hawkins 2000, 116, 484). The reconstruction is not wholly certain, because the families of words for 'nine' and other numbers in the Anatolian languages are concealed by logographic and logo-phonetic spellings in both the cuneiform and the hieroglyphic script, and this makes their interpretation

10 Payne (2017, 222) duly notes that the use of determinatives (such as ANIMAL and BESTIA) was infrequent during the Empire period, especially on seals. Determinative orthographies became more widespread from the thirteenth century BCE onwards and seem to be connected with the rise of stone inscriptions.

difficult. In any case, **nu(wi)n-* is a compelling reconstruction for a stem that ultimately derives from PIE *(h_1)*newn̥-* 'nine' (cf. Pokorny 1959, 318).

Sign L380 ‖ <UNUS>, <sa_8> also deserves some comment in connection with this dossier. Neumann (cited in Payne unpublished) suggested as its source **sani-* 'one', presumably the stem underlying Cuneiform Luwian 1-*i-* (Melchert 1993, 29). The stem **sani-* 'one' appears to be reconstructed from the related Hittite adjective *šani-* 'the same; one and the same' and the assumption that both go back to PIE **sem-*/*sm̥-* 'one' (> Greek ἕν). This would make it a good candidate for Pattern 3. However, the etymology is far from certain (see the critique in Kloekhorst 2008, 722-723). Moreover, <UNUS> is attested in phonetic usage only in later Hieroglyphic inscriptions (cf. Payne 2015, 72-74). Hence, it is likely that the sign was phoneticized only at a later stage, when Anatolian Hieroglyphic was already fully established as a writing system.

The evidence for this 'nasal dropping' pattern is thus far not abundant, and it remains to be seen if future research on Anatolian Hieroglyphic will unveil additional examples. In any event, acrophonic derivations that ignore stem-final nasals are well-attested in Nahuatl: cf. *e.g.* phonogram <pa>, from *pan-tli* 'banner' (Aubin 1849, 37, no. 63; Lacadena 2008; Whittaker 2009).[11] Although the Anatolian strategy involves the discarding of more sounds than just /n/, the parallel is striking.

Pattern 4: CV < CVCV- or 'de-reduplication'

Pattern 4 concerns derivations in which the target value 'de-reduplicates' a stem consisting of two identical syllables, as seen by Hawkins (1986, 347).

Sign		Value	Source	Reference
175		<LINGUA>, <la>	Luw. /lal(i)-/ 'tongue'; Hitt. *lala-* 'id.'	Morpurgo Davies, Hawkins 1978, 777
104		<GAZELLA/CAPRA>, <sà>	Luw. /sasa-/ 'gazelle?'; Hitt. *šaš(š)a-* 'wild caprid or gazella'	Hawkins 1986, 374, but cf. already Laroche 1954, 109, n. 45
327		<SIGILLUM>, <sa_5>	H. Luw. *sa-sa-za* /sas(s)a(n)za/ 'seal' (< Luw. /sassa-/ 'release, grant'?)	Morpurgo Davies, Hawkins 1978, 777; this paper

Table 5. Anatolian Hieroglyphic sign values probably derived through acrophony (Pattern 4).

Of the three cases shown in Table 5, only the derivation of L327 <SIGILLUM>, <sa_5> needs some comment. Morpurgo Davies and Hawkins (1978, 777) tied the sign's phonetic value to the Luwian word for 'seal', /sas(s)a(n)za/ (but cf. already Laroche 1954, 104). They also mentioned the Hittite verb *šāi-*/*šiya-*, which translates with two senses, 'to throw, shoot' and 'to press, seal', and yields the derived noun *siyattar* 'seal'.[12] The link between /sas(s)a(n)za/ and Hittite *šāi-*/*šiya-* implied by Morpurgo Davies and Hawkins might at first sight appear far-fetched, but it hints at a clue that may lead to a better understanding of the sign's acrophony. Because Hieroglyphic Luwian *sa-sa-za* /sas(s)a(n)za/ is attested only in the nominative, we know that is a neuter noun and must therefore contain the /-sa ~ -za/ extension that is typical of this kind of nouns (see Yakubovich 2015). Thus its stem can be */sas(s)a-/, */sas(s)an-/ or */sas(s)ant-/. What I would like to suggest is that, just as Hittite *šiyattar* 'seal' appears to be a derivative of *šiya-*, Luwian /sas(s)anza/ 'seal' may go back to */sassant-/, a hypothetical participle of the Luwian verb /sassa-/ 'release, grant' (attested in Cuneiform Luwian as šašša-). We can envisage for */sassant-/ the etymological sense of 'dispatching' or 'granting (device)'. Importantly, Luwian /sassa-/ is a reduplicated form of /sa-/ 'to release, let go' (Melchert 1993, 183, 192; cf. also Starke 1990, 238 n. 819). When they phoneticized L327 <SIGILLUM>, the

11 Egyptian Hieroglyphic features a possible example, if we associate hieroglyph *g*, depicting a ring-stand for vessels, with the Egyptian word *gn* 'stand for ritual bowl' (see Faulkner 1962, 290 for the word and Takács 1994, 47 for the comparison). However, this case is isolated and not wholly certain.

12 Cf. already Gelb 1949, at an early stage in the decipherment of Anatolian Hieroglyphic.

developers of the Anatolian hieroglyphic script may well have had in mind the morphological connection between these lexemes. In other words, they might have perceived Luwian /sa-/, /sassa-/ and */sassanza/ 'seal' as belonging to the same 'family'. This association could have facilitated the acrophonic process that provided L327 with the value <sa_5>.

The attainment of syllabic sound values by de-reduplicating stems is not unique to Anatolia. Again, suitable comparisons emanate from the Nahuatl script. Examples include signs <ne> and <to>, whose values were sourced from the Nahuatl morphemes *nene-* 'doll' and *toto-* 'bird' (first seen by Aubin 1849, 37, 39, nos. 59 and 82).

Exceptions

Let us now have a look at the derivations that do not follow any of the previous four patterns. Chrisomalis (2013), who specializes on notation systems, has duly noted that exceptions are important because they serve to test patterns or 'rules'. If we can show that exceptions operate only under special circumstances, then the patterns become even more pervasive.

The *r*V syllabograms

The CV syllabograms of Anatolian Hieroglyphic whose consonant is <r> are a notable set of exceptions to the patterns examined so far. The reason is that the creation of *r*V signs in the script was linguistically constrained. The constraint is phonotactic and a well-known one: in Bronze Age Luwian as well as Hittite, the liquid /r/ was prohibited in word-initial position.

Sign L383 ◟, a simple stroke traditionally called 'thorn', was certainly created as a consequence of this prohibition. The sign has the value of <ra/i>, but it functioned as a sort of diacritic which could only be attached to other signs to spell the sound /r/ in medial and final position. It was also coupled to a number of signs with <(C)Vra/i> values, such as <tara/i>, <ara/i>, <hara/i>, etc. (Hawkins 2000, 30-31; 2003, 165).

The logogram of the Stag-God Runtiya, L103 <CERVUS>, was used also as the syllabogram <rú> (see Table 7). At first sight this may seem to escape the constraint just described. However, this development too finds a phonologically-grounded explanation. In a small number of Late Luwian words that began with the cluster **kr-*, the latter was simplified to /r-/, in that way producing a few examples of words beginning with this sound. This was precisely the case with /Runtiya-/, which seems to originate from **K(u)runtiya-* (another example is provided by Luwian /ruwan/ 'formerly' < **karuwan*, comparable to Hittite *karu* 'id.') (see Rieken 2015, 222). Crucially, <rú> acquired its phonetic value only in the first millennium BCE, after this secondary /r-/ had emerged in Luwian (see *e.g.* Yakubovich 2010a, 148). As a result, it does not tell us much about how the initial phoneticization of Anatolian syllabograms.

More instructive in that matter is sign L412 , which reads <ru> and became phonetic before L103 <CERVUS>. To the best of my knowledge, no plausible theory on its source has ever been put forward. Laroche described the sign's shape as a "stairway inside a circle." In light of this stairway component, I would like to propose that L412 <ru> extracts its value from Luwian /aru-/ 'high' or a related morpheme. The known relatives of /aru-/ are the Cuneiform Luwian verb *aru*(*wa*)*ruwa-* 'to lift'[(?)] (Melchert 1993, 32) and Hieroglyphic Luwian /aruwara-/ (Hawkins 2000, 324, 625). The meaning of this last word is disputed, but could plausibly be restored as 'to rise, become high'.[13] Two scenarios can account for the process by which the phonetic value <ru> could have

13 The Hieroglyphic Luwian verb *á-ru-wa/i+ra/i-* /aruwara/ (presumably from a denominative **aruwada-*) is attested on line §3 of the ŞIRZI inscription (Hawkins 2000, 324; 2004, 360-361): *i-MARA* (DEUS)CERVUS$_2$-*ia-sa* MONS-*ti-zi* "DOMUS+SCALA[??](-)*ha-ti-i* | PRAE-*na* | *á-ru-wa/i+ra/i-tu* "May the mountains of the Stag-God of the Countryside bow down(?) before the *h*.-building." Hawkins follows Melchert in rendering the verb tentatively as 'to bow down', based on Hittite *aruwai-* 'id.'. However, the overall theme of the inscription is the exaltation of the Stag-god, so it would be strange to find in this passage a submissive posture. Because *aruwara-* seems related to Cuneiform Luwian *aru-* 'high' and *aru*(*wa*)*ruwa-* 'to lift'[(?)] (cf. Melchert 1993), it would be much less problematic to translate the verb as 'rise'. Thus: "May the mountains of the Stag-God of the Country rise(?) before the *h*.-building." It must be noticed that the uncertain word at the end of the sentence is classified by the determinative DOMUS+SCALA (L252 = L253). This sign contains the same

been derived from this family of words. The first possibility is that it derived directly from Luwian /aru-/ 'high', with the discarding of initial /a-/. It is curious that the aphaeresis of /a-/ is a sound change that affected Iron Age Luwian (Yakubovich 2010a, 152, n. 93), but it does not seem to have operated in the language during the phase of 1400-1000 BCE, except perhaps irregularly.[14] This scenario assumes that the stem /aru-/ was used because it was economical, as it only required the inventors of the script to ignore a vowel. In alternative, the acrophonic source could have been the verb /aru(wa)ruwa-/, if in addition to the discarding of /a-/ we assume a combination of 'de-reduplication' (Pattern 4) and the 'deletion' of the glide + vowel component (Pattern 2). This would mean that even in exceptional circumstances the creators of Anatolian Hieroglyphic kept with the tendencies seen in the phoneticization of other signs as much as possible. Admittedly, however, this second interpretation is much less economical than the one involving /aru-/.

As a final comment, it is interesting that the possible derivation of L412 <ru> from Luwian /aru-/ 'high' (which may have an identical cognate in Hittite; cf. Kloekhorst 2008, 212) finds a good match in the comparison between sign L370 <BONUS$_2$>, <su> and Hittite *aššu-* 'good' (in contrast to L165 <BONUS>, <wà/ì>, from Luwian /wasu-/ 'good'; see Table 7).[15]

Irregular derivations

Finally, I have managed to locate only three signs that were phonetic from an early stage of the script (cf. Payne 2015, 72-74) and yet do not seem to follow any of the patterns proposed so far (Table 6).

Sign		Value	Source	Reference
56		<INFRA>, <ká>	Hitt. *katta* 'down'? (vs. Luw. /zanta/ 'id.')	Laroche 1956, 106; Yakubovich 2008, 25
329		<REL>, <kwa/i>	H. Luw. REL-*za-*, /kwa(n)za-/ 'to carve'	In this article
334		<pa>	Hitt. *pattar-* 'basket'? Cf. also C. Luw. *paddun-* or **paddur* 'a container'*	Neumann 1992, 39; in this article

Table 6. Anatolian Hieroglyphic sign values derived through irregular acrophonies.
* The word is attested in the ablative form *ba-at-tu-na-a-ti* (Melchert 1993, 175).

As the origin of several Anatolian Hieroglyphic signs is still uncertain, perhaps other irregular derivations took place, which remain to be discovered. Yet, at the same time, the possibility remains that <ká> and <pa> were inspired not by the words currently considered, but from others, so far unattested or difficult to identify, that would fit the above patterns much better. Be it as it may, at present the exceptions which are not explained by some linguistic constraint are comparatively few.

Secondary acrophonies: signs phoneticized in the late second and early first millennium BCE

The acrophonic derivations considered so far are all examples of phoneticization of iconic signs at the formative stages of Anatolian Hieroglyphic. This type, which we may term 'primary acrophony', can be described as the result of what was almost a process of discovery on the part of the script's creators.

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stairway (SCALA) component as L412 <ru> and elsewhere is the determinative for an elevated building (Hawkins 2000, 324). Thus, the translation proposed here implies that the mountains of the Stag-god of the Countryside would rise in front of a high building, indicating an impressive feat by the deity.

14 Cf. the opposition between the ethnonym Ahhiyawa, found in the Hittite documentation, and Hiyawa, attested in documents from Ugaritic no later than the early twelfth century BCE (Yakubovich 2010a, 79, 152, nn. 2, 93).

15 L370 <BONUS$_2$, su> is among the earliest signs attested with a phonetic value (Payne 2015, 74). It spells the name of the fourteenth-century BCE Great Queen Gassulawiya, in the so-called 'Cruciform seal' (Dinçol *et al.* 1993).

We may contrast this kind of acrophony and the modifications made to a script in the later stages of its life, when all its users are people who learned the sign values in second-hand. Viewed from the perspective of someone who did not create the script, the signs' phonetic values and their source words might seem to reflect a different process. Namely, the later users of a writing system may perceive an acrophonic relation as simply a mechanism by which the *sound value* of sign is the *first unit of sound* (syllable or phoneme) of the word depicted by that sign. This 'misunderstanding' of acrophony as mere abbreviation accounts for developments typical of script reformations and even secondary script creations. A case in point is Proto-Sinaitic, a writing system partly inspired by Egyptian Hieroglyph that is considered the first consonantal alphabet (or abjad) of the world. Along with other early Semitic consonantal alphabets, Proto-Sinaitic has become the very paradigm of acrophony, and is frequently cited by scholars to illustrate the principle (cf. *e.g.* Yakubovich 2008, 19; 2010b, 205). Ironically, however, Proto-Sinaitic should not be considered an autonomous invention, as the shapes of many (if not all) of its signs were modeled upon Egyptian hieroglyphs (Vernus 2016, 144-145; first Gardiner 1916). Moreover, the signs' values are derived through a secondary type of acrophony. The creators of the script must have learned of the acrophonic principle also from the Egyptians, who had continued to use it in readjustments made to Egyptian Hieroglyphic well beyond its invention in the late fourth millennium BCE. For example, in the New Kingdom the biconsonantal hieroglyph  *rw* was used also with the uniconsonantal value *r* (Vernus 2016, 157-158). Thus, the creators of Proto-Sinaitic never experimented with rebus and moved straight to acrophony. They must have perceived it as nothing more than abbreviation, useful to memorize the readings of the letters. As a consequence, early Semitic acrophony emerged as an extreme reduction of the segmental type seen in Egyptian Hieroglyphic, far from the syllabism of Anatolian Hieroglyphic and other scripts. The phonetic values of the Proto-Sinaitic letters are uniconsonantal and match the initial phonemes of the longer and sometimes polysyllabic names of the objects they depict: *ʔ* from Canaanite *ʾalp-* 'ox', *b* from **be(y)t-* 'house', and so forth. Clearly, there was no concern with preserving as much similarity as possible between the source word and the iconic shape of the sign.

I suggest that we can observe a similar reinterpretation of acrophony in Anatolian Hieroglyphic from *ca.* 1200 BCE onwards. Certain signs that for some time had been only logographic were eventually phoneticized as well. Yet the process now focused on the first syllable of morphemes, departing from the patterns that had operated in the early formation of the script (Table 7).

Sign		Value	Source	Reference
196		<HATTI>, <há>	Luw. / Hitt. *Hattuša-*	Hawkins 2003, 159
347		<hú>	Luw. */huppar(i)-/ 'pot'? C. Luw. [D]UG*hupuwaya-* 'type of vessel'?*	Yakubovich 2008, 27; this paper
241		<ki$_4$>	C. Luw. *kiša*(*i*)- 'comb'?	This paper
362		<DEUS>, <má>	Luw. /massan(i)-/ 'god'	Laroche 1960, 190
103		<CERVUS>, <rú>	Luw. /Runtiya-/ 'Stag-god'	Yakubovich 2008, 27
100		<ASINUS>, <ta>	Luw./Hitt. *targasna-* 'donkey'	Laroche 1960, 63; Neumann 1992, 39
326		<SCRIBA>, <tù>	H. Luw. SCRIBA-*la-* /tuppala-/ 'scribe'	Hawkins 2000, 33
165		<BONUS>, <wà/ì>	Luw. /wasu-/ 'good' (vs. Hitt. *aššu-* 'id.')	Yakubovich 2008, 26
313		<VIR>, <zí>	Luw. /zid(i)-/ 'man'	Neumann 1992, 39

Table 7. Anatolian Hieroglyphic sign values derived through 'secondary acrophony'. * Singer (1983, 163, n. 36; see also Neumann 1992, 38-39) suggested a derivation based on Hittite *huppar* 'a type of vessel'. Differently, Yakubovich (2008, 27) takes notice of C. Luwian *huppart(i)-* 'pelvis' and argues that a cognate word **huppar(i)-* 'pot' is likely to have existed in Luwian. The word [D]UG*hupuwaya-* /hubuwaya-/ 'type of vessel' provided here is attested in Cuneiform Luwian (Melchert 1993, 75) and, because it is an attested word, it represents a less problematic alternative.

With this 'secondary acrophony', obtaining the closest matches between source morpheme and sound value was no longer a goal. Sign values were now extracted from polysyllabic words containing all sorts of phonemes.[16]

DISCUSSION

This survey presents evidence that rebus and acrophony assisted the formation of the Anatolian Hieroglyphic script in ways that are far from random. Rebus was severely constrained by the morphological arrangement and syllabic structure of words, and it is surely as a result of this that we do not find many examples of its application. Acrophony intervened more extensively, as has long been recognized, but it was not limited to extracting the initial syllable of any kind of word. As I have hypothesized them, Patterns 2, 3 and 4 suggest that the creators of Anatolian Hieroglyphic aimed at the easiest associations between the iconicity of symbols and their target phonetic values. In many cases, this apparently involved signs expressing words whose stem differed from the intended values only in that they contained certain final sounds. These sounds were vowels, semivowels or glides, and the nasal /n/. In a few cases, the process involved signs associated with stems containing repeated CV syllables. Finally, if the patterns above are correctly discerned, rebus and acrophony applied strictly to morphemes (stems), as perceived in isolation from any inflectional elements.

One potential criticism is that all acrophonic patterns I propose to distinguish have in common the "selection" of the first syllable of the word depicted by the signs. In other words, if one focuses on this fact and disregards the patterns, then there is no visible difference between the 'regular' acrophonic derivations I have hypothesized and the so-called exceptional (*e.g.* L103 <rú> < *Runtiya-*) and irregular cases (*e.g.* L56 <ká> < *katta*). Yet this counterargument would be valid only if the number of exceptions and irregularities was comparatively too high. Moreover, what I suggest is that these acrophonic patterns applied in the initial development of the Anatolian Hieroglyphic script, while signs phoneticized at later stages (after *ca.* 1200 BCE, though it is difficult to draw the line) indeed acquired their values by extracting the first syllable of a word (what I term 'secondary acrophony'). There is some quantitative evidence that the number of exceptional and irregular derivations was not high in proportion among the earliest phoneticized signs of Anatolian Hieroglyphic. Payne (2015, 72-74) lists 40 syllabic signs of the V and C(w)V types attested in phonetic usage in inscriptions dated until the reign of Hattusili III (mid-twelfth century BCE), of which we must exclude three that have questionable readings. Out of those 37 early phonograms, 11 (29.7%) have values whose derivation fits one of the hypothesized acrophonic patterns, one (2.7%) is the exceptional L383 +*ral/i* or 'thorn', two (5.4%) originated in irregular derivations, and 23 are of unknown or uncertain origin (62.2%). The 11 signs that are part of the earliest syllabary (following Payne) and fit one of the acrophonic patterns distinguished here are: L175 <la>, L104 <sà>, L41 <tà> and L42 <ta$_x$>, L391 <mi>, L55 <nì>, L90 <ti>, L160 <wi>, L107 <mu>, L395 <nú> and L328 <pu>. The two irregular instances are: L56 <INFRA, ká> and L334 <pa>.[17] In other words, if we set aside the cases where the sound value is of unclear origin, we observe that only 2 out of 14 early phonetic signs owe their reading to irregular derivations. Future data and investigations may yet balance or reverse the situation, but in the meantime such signs remain the minority.

16 Yakubovich (pers. comm.) suggests to me the possibility that the early acrophonic derivations that do not follow the patterns proposed could arise in a situation where *some* of the creators of the Anatolian Hieroglyphic script were familiar with the principles of cuneiform writing. While I do not exclude this scenario, investigating its plausibility and implications is beyond the scope of this article.

17 Payne (2015: 73) includes L508 <hwa/i> in her list. If this sign is accepted as having split from L329 <kwa/i> (< Luwian *kwa*(*n*) *za-*), then it must be added to the number of irregular cases. If, conversely, one rejects this suggestion in favor of Yakubovich's (2008, 27, tab. 4) view that this is based on Luwian /hwi(ya)-/ 'to run', or Hittite *huwāi-*/*hu*(*i*)*ya-* 'id', then it needs to be counted as a regular derivation. At present, I prefer to include it among the 23 uncertain instances.

CONCLUSIONS

We have seen that if the patterns distinguished here are correct, then the creators of Anatolian Hieroglyphic derived sign values from stems, rather than inflected forms of words. Hence, they would have had to possess some notion that words could be parsed into smaller meaningful units – what modern linguistics has termed morphemes. This is consistent with what we know about other invented scripts of the world. The logograms of the Nahuatl script, which mainly represented nouns, were systematically phoneticized by disregarding the absolutive suffix *-tl* and its allomorphs *-tli* and *-li*, used in 'dictionary forms' (*i.e.* in the non-possessed singular forms of nouns). Hence, sign <a> derives from the logogram for *a-tl* 'water', <mi> is from *mi-tl* 'arrow', <pa> is from *pan-tli* 'banner', and so forth (see Aubin 1849 and Lacadena 2008 for the derivations, and Launey 2011, 16, 19 on Nahuatl morphology). Likewise, a number of uniconsonantal Egyptian hieroglyphs were acrophonized by ignoring the Egyptian feminine ending *-t* of source words (Sethe 1926 *apud* Edgerton 1940, 478-479): *e.g.*  *n* < *nt* 'water' and  *h* < *ht* 'belly' (see Allen 2013, 44-45 for the latter example).

The possible similarities between the phoneticization of Anatolian Hieroglyphic and other invented writing systems are not limited to instances of morphological awareness. They also extend to the realm of phonology. We have seen that in the application of acrophony, stems that ended with specific types of sounds or chains of sounds were preferred as 'droppable' or superfluous (vowels, semivowels or glides, and the nasal /n/). All of them must have been perceived as 'weak' or less 'noisy' because they correspond to phonemes with the trait [+sonorant]. Sonorants, we might usefully recall, are speech sounds articulated with 'a relatively free airflow' and no kind of stricture ('noise') in their production (Crystal 2008, 442). Even the strategy of 'de-reduplicating' morphemes that consisted of doubled syllables, seen both in Anatolian Hieroglyphic and Nahuatl, points to a concern with phonological resemblance between source-morpheme and intended sign value.

With some irony, that Anatolian Hieroglyphic mirrors the behavior of other independently invented writing systems only emphasizes its originality. But beyond Anatolia and the comparisons put forward here, it would be desirable to undertake a comparative survey of rebus and acrophony in the invented scripts of the world that have been deciphered. It will be clear to the reader that many points raised here on the phoneticization of individual writing systems are already found in very old literature, yet a global perspective on the phenomenon is still lacking today. Further research in this direction will be of great relevance for the question of linguistic constraints on the creation of writing.

If confirmed, the discovery that the sign values of Anatolian Hieroglyphic responded to well-defined acrophonic strategies will have implications for our own understanding of the script. Future studies should look into the possibility of detecting further derivations of sign values that followed the same patterns. If they can be demonstrated through independent evidence, then they will reinforce the tendencies proposed in this survey in addition to improving our knowledge on the origins of the script. Crucially, this new information might also assist us with the decipherment of the signs that remain untransliterated. We will only need to be cautious and avoid circular arguments.

Finally, the possible role of Hittite-Luwian bilingualism in the early formation of Anatolian Hieroglyphic (cf. Yakubovich 2008) remains a question of interest. The present survey implies that no more than four early syllabograms need be based on Hittite words. It would seem, therefore, that this language played a smaller role even at the first stages of phoneticization of the script. This is in line with what we know about other inventions of writing: bi- or multilingualism may be a reality or possibility in the 'proto-writing' stage of a primary script's formation. In the case of Mesoamerica, the shift from an 'open' or fluid system of notation to a 'close' or language-specific one has been proposed as a key development in the emergence of writing (Houston 2004b). Yet full phoneticization involves and targets a single language. Generally speaking, this is well justified. No matter how closely related two languages are they will always have differences in terms of their lexical and phonological inventories. These divergences are enough to make counterintuitive any attempt at extracting recognizable values from a set of iconic signs while using them for recording the sounds of two different languages simultaneously. The implication is that Hittite may have been, alongside Luwian, on the minds of the writers and readers of Anatolian hieroglyphs when the latter still comprised a restricted set of symbols. Yet, as soon as the system was fully expanded and began to transcribe more than just designations of persons, Luwian became dominant.

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