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Writing vowels in Punic: from morphography to phonography

Robert Crellin

University of Cambridge

ABSTRACT

This paper traces the employment of original Phoenician-Punic guttural graphemes, <ʾ>, <ʿ>, <h>, and <ḥ>, to represent vowel phonemes in later Punic. Three typologically distinct treatments are identified: 1) morphographic, where the grapheme <ʾ> indicates the etymological glottal stop /ʔ/ (its original function) as well as vowel morphemes without specifying their phonological character; 2) morpho-phonographic, where guttural graphemes continue to indicate etymological guttural consonants, but now both the presence of a vowel morpheme and (potentially) the vowel quality of that morpheme; and 3) phonographic, where the same set of guttural graphemes serve to denote vowel phonemes only, and do not any longer indicate guttural consonants. The threefold division is argued for on the basis of the Late Punic language written in Punic and Neopunic scripts. Despite the availability of dedicated vowel graphemes, these are not obligatorily written in any period of written Punic. It is suggested that a typologically significant path of development may be observed across these three uses of guttural graphemes, with 3) the endpoint of a development from morphography to phonography.

Keywords: orthography; Phoenician-Punic; Neopunic; gutturals; script; morphography; phonography; abjad; alphabet

1. Introduction

The Punic language was written for a large part of its history using a script descended from the West-Semitic scripts of the Near East of the late second and early first millennium BCE (Lehmann 2012: 14–16). It was adopted for writing both Semitic and non-Semitic languages, notably Greek. Semitic languages using this writing system include Phoenician, Hebrew, Aramaic and Arabic, as well as (in a different form) Ugaritic and Southern Arabian dialects (O'Connor 1996). These writing systems as used for writing Semitic languages are well known for the fact that they often do not represent vowel phonemes, and have been classed as a special kind of script, on this account (Daniels 1990). Yet throughout their history various means have been found for representing vowels. In antiquity, this was most often achieved by means of so-called *matres lectionis*, that is, graphemes used with two values, i.e. consonantal and vocalic (see Zevit 1980: 4).[1]

The goal of the present study is to provide an overview of the ways in which particular set of graphemes, <ʾ>, <ʿ>, <h>, and <ḥ>, that is, those representing

[1] Note that I use the term *mater* to refer to any grapheme that carries both vocalic and consonantal values, regardless of how many individual phonemes may be so denoted.

etymological gutturals, are used in Punic writing to represent both consonants and vowels, and provide evidence of a development from morphography to phonography in their use as vowel indicators. These graphemes are henceforth termed 'guttural graphemes'.[2] While the use of these graphemes for the representation of vowels in Punic writing is certainly not unique, it deserves attention for three reasons. First, Punic, especially in its later phases, exhibits some of the most extensive vowel representation in West Semitic writing systems. In particular, inscriptions have been found in which vowels are no longer represented by guttural graphemes with the status of *matres*, that is, with two values, both vocalic and consonantal, but by these same graphemes whose function is to represent vowels only. These developments mean that the orthography of these inscriptions has a fundamentally different character from that seen in other Punic material, as well as more familiar instances of West Semitic writing systems, such as Hebrew, Arabic and Syriac. The second reason is that the Punic writing systems are relatively understudied in the context of writing systems more generally. It is notable, for instance, that Daniels and Bright (1996) have no chapter that discusses it explicitly, although O'Connor (1996: 94) in that volume does mention Punic briefly. (On the way in which the later Punic material is often ignored in discussions of Phoenician-Punic

[2] In phonological terms, 'gutturals' are better described as pharyngeals and laryngeals, per Kerr (2010: 25), or pharyngeals and glottals, per Hackett (2008: 87). However, in Semitic traditional grammar these are often treated together. Furthermore, these all drop out of the spoken Punic language, and consequently it is convenient for these purposes to refer to them as a group.

grammar, see Kerr 2013: 9.) Thirdly, and finally, it will be argued that Punic provides evidence of a typological development in orthography structure, from morphographic to phonographic.

Several scholars have worked in recent years on the question of vowel representation in Punic, notably Robert Kerr (notably 2010, 2014), Karel Jongeling (e.g. 2003) and Daniel Menken (1981); the last of these is largely unreferenced in the literature. In this context, the present study aims to contribute the following three aspects. First, the studies cited immediately above have focused on the phenomenon and development of vowel writing in texts written in Neopunic script. Vowel writing by means of guttural graphemes is, however, also attested in texts written in the Punic script (for the distinction between Neopunic and Punic scripts, see §4). The present study sets out, therefore, to provide an account of the development of vowel writing in Punic orthography which integrates texts written in both scripts.

Secondly, previous studies have tended to focus on particular equations of graphemes and sound values. By contrast, here the phenomenon of vowel writing with guttural graphemes is investigated, without focusing on the particular phonetic values of these graphemes. As such the aim is to identify different orthography types, according to the way in which guttural graphemes are used, and to attempt to trace a path of development between them.

Thirdly, previous studies have not, to my knowledge, explicitly traced the development from morphography to phonography in Punic. Indeed, they have not to my understanding highlighted the fact that Punic orthography can be seen to reach a point, in certain inscriptions, where the erstwhile guttural graphemes serve to represent vocalic

phonemes exclusively, and that this represents a fundamentally different orthography type from that seen elsewhere in Punic.

The set of guttural graphemes are not of course the only source of graphemes used to represent vowels in West Semitic orthographies. The semi-vowel graphemes <y> and <w> are used as *matres* to represent the vowel phonemes /i/ and /u/ in several orthographies. Consider עיר <ʿyr> /ʿir/ ‘city’, Genesis 4:19, where <y> notates /i/, as well as Classical Syriac where /u/ and /o/ are represented by <w>, e.g. ܢܩܘܡܘܢ <nqwmwn> /nqumun/ ‘they shall get up’ (Daniels 1996a: 501; Muraoka 1997: 6). (Daniels 1996a and Muraoka 1997 analyse the phonological inventory of Syriac differently, so that the former presupposes the existence of varying vowel length in these phonemes, while the latter does not.)

In Punic too, <y> and <w> are used to represent vowels, e.g. <ḫydš> /ḫideš/ [renew.ACT.PRF.3SG] ‘he renewed’ (Bir Tlelsa N 1; cf. Krahmalkov 2001: 155; inscription numbers prefixed with N- refer to texts in Jongeling 2008) and <qwlʾ> /quːloː/ ‘his voice’ (see example 5 below). However, semi-vowel *matres* are not considered here, for the reason that in West Semitic orthographies semi-vowel graphemes are never employed to represent vowel phonemes exclusively. They do not, therefore, show the same development as guttural graphemes, which do come to be used to represent vowel phonemes exclusively. Even in Mandaic, regarded as having extended the principle of *matres lectionis* “nearly as far as possible” (Daniels 1996b: 512), <y> and <w> still function as *matres* and do not represent vowels exclusively (Macuch 1965: 9). This is no doubt for the reason that semi-vowel phonemes were not lost from the languages concerned, including Punic. For Punic the continuing presence

of these phonemes in the language is demonstrated in the renderings of Punic in the Latin script, e.g. <iadem> /yadem/ [hand.DU/PL.PRON.M.3SG] and <vy> /wə/ ‘and’ (see Kerr 2010: 203, 185 respectively; cf. also PPG[3] §§ 60–66, 257a). The analysis of the use of semi-vowel graphemes to represent vowels in the terms of the present study is left to future work.

The analysis proceeds as follows. Section 2 sets West Semitic writing systems in a broader context, and introduces terminology relating to typologies of writing systems according to their representation of vowels. Section 3 surveys the use of guttural graphemes to represent vowels in other West Semitic writing systems. Section 4 introduces the Punic material, and the various scripts and orthographies that are used to write the Punic language. The method of identifying guttural graphemes in Punic is introduced in section 5, before three orthography types are discussed in section 6: morphographic, morpho-phonographic and phonographic. Finally, in section 7 it is argued that the Punic material may provide evidence of a typological development in progress in the representation of vowels, specifically from morphography to phonography.

2. Writing systems terminology

Since the terms ‘script’, ‘orthography’ and ‘writing system’ are used variously in the literature, it is important to define what is meant by them in this article. For the purposes of the present study ‘script’ is used in the sense given in Coulmas (1996: 1380), namely, “the actual shapes by which a writing system is visually instantiated”. By contrast, I use the term ‘orthography’ to refer to the rules according to which these

shapes are concatenated, and their relationship to the linguistic system, whether at the phonological, morphological, or lexical levels. I use the term ‘writing system’ to refer to the combination of these two, in the sense of Daniels and Bright (1996: xlv). This study is primarily concerned with the issue of orthography.

In discussions particularly of West Semitic writing systems, the terms ‘abjad’, ‘alphabet’ and ‘segmentary’ are often used. The term ‘abjad’ was introduced by Daniels (1990: 729) to take account of the fact that West Semitic writing systems are often of a fundamentally different kind from either an alphabet, which represents “all or most of the individual segments ... both vocalic and consonantal” and a syllabary, where the syllable is the minimal unit. By contrast, the West Semitic systems “constitute a third fundamental type of script, the kind that denotes individual consonants only” (Daniels 1990: 729).

The use of the term abjad has received criticism (see O’Connor 1996: 88 and references there), most recently from Lehmann (2012), who argues that the West Semitic writing system is in fact an alphabet. To my mind, Lehmann’s approach seems, however, to be to define the term alphabet so as to include the West Semitic writing system, and largely to concern the cultural appropriation of a particular term, namely ‘alphabet’. To collapse the distinction between ‘alphabet’ and ‘abjad’ would result in the loss of a typologically useful distinction between writing system types, whatever one chooses to call them, those corresponding to Daniels’ ‘alphabets’, on the one hand, and to Daniels’ ‘abjads’ on the other. While it is true that “no writing system notates everything relevant to language” (O’Connor 1996: 88), it does not seem to me accurate to characterise the difference between Daniels’ ‘alphabets’ and ‘abjads’ simply as a

"difference of degree" (O'Connor 1996: 88). The fundamental point is that alphabets set out to record the presence or absence of all segments, whereas abjads record only a subset of these, namely the consonants. Crucially, in the case of a word written in an abjad, it is in principle unknowable, without knowing the language concerned or related languages, where consonants are separated by vowels, and where they are not. Conversely, it is precisely this information which Daniels' 'alphabet' conveys, independent of knowledge of the language concerned.

However, abjads do not always represent consonants only. While it is true that in its early form, as for example in Phoenician, the West Semitic abjad (for the most part) did not denote vowels, this is not the case for later variants of it, which do indicate vowels by various means and to varying degrees (for this point, see Gnanadesikan 2017: 23–24). There is in fact considerable variation in the degree to which vowels are represented in these scripts (see Gnanadesikan 2017: 24–25), ranging from almost no representation, as in Phoenician, to almost full representation, as in Mandaic (for which see Macuch 1965: 13–23, Daniels 1996b). This fact leads Gnanadesikan (2017: 28–29; cf. Faber 1992) to identify these scripts as 'linear segmentaries', which are then further distinguished four ways between 'fully vowelled', 'mostly vowelled', 'partially vowelled' and 'consonantal'. A 'fully vowelled linear segmentary' is equivalent to an alphabet in other typologies.[3]

[3] We should note that the present study, unlike Gnanadesikan (2017), is not concerned with developments in late antiquity and the medieval period; namely, the introduction of diacritical points to notate vowels, as happened in Syriac, Arabic and

Distinguishing between types of segmentary in this way is an important step forward. However, Gnanadesikan's four-way distinction is still not able to capture fully the behaviour in particular of different kinds of partially vowelled linear segmentaries. In using the term 'partial', Gnanadesikan appears to refer primarily to the issue that not all vowel phonemes are written, e.g. in Arabic where short vowels are generally omitted: they may be written by means of diacritics, but this is optional in most contexts (Bauer 1996: 562). However, West Semitic writing systems might also be regarded as 'partially vowelled' in the sense that vowels are not denoted with dedicated graphemes, but are instead represented with consonant graphemes in a secondary use (see next section for elaboration). As far as I can see, Gnanadesikan does not draw attention to this issue. Yet her primary example of a fully vowelled linear segmentary, Greek, uses dedicated graphemes for notating vowels, while her primary example of a partially vowelled linear segmentary, Arabic, uses *matres* (Gnanadesikan 2017: 29). The issue comes to the fore in the analysis of Punic orthography. Specifically, in a subset of Late Punic inscriptions, to be discussed below at §6.3, vowels are written with dedicated graphemes, as would be expected in a fully vowelled linear segmentary. Despite this, the notation of vowels is still optional, as is often the case in a partially vowelled linear segmentary.

The dedicated vowel graphemes in question are, from a historical perspective, those graphemes which originally represented guttural consonants. This situation has

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Hebrew. Rather the study is restricted in scope to vowel representation by means of *matres lectionis* and dedicated vowel graphs.

precedents and parallels in West Semitic writing systems. Before exploring the use of guttural graphemes in Punic, therefore, the use of these graphemes for the notation of vowels in other West Semitic writing systems is surveyed, providing a platform for the discussion of the particular developments seen in Punic.

3. Representing vowels with guttural graphemes

The use of guttural graphemes in Punic has precedents and parallels in West Semitic writing systems. When a West Semitic script was borrowed for writing the Greek language early in the first millennium BCE, the guttural graphemes <ʾ>, <ʿ>, <h> and <ḥ> were adopted for representing the vowel phonemes /a/, /o/, /e/ and /eː/ respectively (see Zevit 1980: 5; Faber 1992). Within the history of West Semitic writing systems for Semitic languages, guttural graphemes have in several instances been adopted for the representation of vowel phonemes. In Classical Hebrew two guttural graphemes may be used to represent vowels. In addition to its value representing /h/, <h> may be used to represent a vowel word finally, e.g. חכמה <ḥkmh> /ḥɔxmɔː/ ‘wisdom’ (Exodus 28:3[4]), where final ה <h> represents the long vowel /ɔː/ (cf. Sampson 2015: 84). א <ʾ> may also represent vowel phonemes, albeit rarely (Kerr 2010: 49). This may be lexically determined, as in the case of the negative particle, which is spelled לא <lʾ> /loː/; phonological /ʾ/ was never present in this word (Zevit 1980: 22). In Hebrew, vowel representation by means of *matres* is optional word-internally. ה <h> is never so used. א

[4] The text of the Hebrew Bible is given according to the BHS as provided through the TanakhML project (https://www.tanakhml.org).

<ʔ> may be used in this way, but from an etymological perspective, in some cases at least, it seems rather to represent /ʔ/, e.g. ראש /roːš/ < *rāʔš* (cf. Kerr 2010: 49).

In Classical Arabic ا <ʔ> may represent the vowel /aː/ word-internally and word-finally. For example, /kaːtĭb/ [write.PTCP.SG] is written كاتب <kʔtb>. This is in addition to the role of ا <ʔ> indicating the glottal stop /ʔ/, later reinforced in this role by hamza, ء, viz. أ, e.g. يأمن <yʔmn> /yaʔmanu/ (Ziadeh and Winder 1957: 14–15; Bauer 1996: 561; Karel Jongeling, p. c.).

In Classical Syriac, word-final /aː/ and /eː/ are obligatorily marked with <ʔ> (Daniels 1996a: 501; Nöldeke 2003 [1904]: 5), e.g. ܓܫܪܐ <gišrʔ> /gišraː/ ‘bridge’ (cf. Muraoka 1997: 6). Word-final vowel notation of this kind also carries morphological weight, by identifying the so-called ‘emphatic’ state (Robert Kerr, p.c.). Occasionally <ʔ> is also used to represent word-internal vowels, e.g. ܦܐܪܢ <pʔrn> /peːran/ ‘our fruit’, where <ʔ> represents /eː/ (Nöldeke 2003 [1904]: 5). These vocalic functions of <ʔ> are in addition to its function representing etymological /ʔ/, e.g. ܡܠܐܟܐ <mlʔkʔ> /malakaː/ (Nöldeke 2003 [1904]: 6). /ʔ/ is largely quiescent in Classical Syriac, and so, while retained in the consonantal orthography in many instances, texts using diacritical vowel notation presuppose its absence (cf. Nöldeke 2003 [1904]: 23–25). See also Muraoka (1997: 5–6) for the use of <ʔ> in other contexts to notate /a/.

Common to Classical Hebrew, Arabic and Syriac orthographies is the use of guttural graphemes as *matres*. In Classical Mandaic, however, guttural graphemes are used exclusively for representing vowel phonemes. In this language the phonemes /ʔ/ and /ʕ/ were lost, with only /h/ remaining among guttural phonemes, the product of the merger of /h/ and /ḥ/ (Macuch 1965: 79–80). In consequence, the graphemes <ʔ> and <ʕ>

could be used to represent front and central vowels exclusively (Macuch 1965: 79). This is to say that they are used as vowel graphemes rather than *matres lectionis* (Häberl 2006: 60). Furthermore, vowels were in the majority of cases written in all positions (Häberl 2006: 60). Indeed, etymological spellings involving these consonants were not retained, e.g. <ʿtbyd> /etbed/ √ʿ*bd* [work.PRF.PASS.3SG], where <ʿ> represents /e/, and the etymological consonant /ʿ/ from the root √ʿ*bd* is not written. Compare the same form in Syriac ܐܬܥܒܕ <ʾtʿbd> /etʿbed/ where /ʿ/ of the root is represented by <ʿ> (see Macuch 1965: 90).

From the perspective of the orthography of Semitic writing systems, the Punic corpus is interesting because its use of guttural graphemes to represent vowel phonemes is very extensive, with considerably more guttural graphemes available for this purpose owing to their complete phonological loss by the latest phase of the language (Kerr 2010: 25; PPG[3] §104–109). This can be seen to lead to a situation where guttural graphemes are eventually used to represent vowels exclusively, in a manner familiar from alphabetic writing (Kerr 2010: 25). Despite this development, in inscriptions where guttural graphemes are used as vowel graphemes, the vowels are never written obligatorily. Accordingly, the Punic orthography with dedicated vowel graphemes marks a midpoint between a fully vowelled, i.e. 'alphabetic', segmentary, where vowels are obligatorily written by means of vowel graphemes, and a partially vowelled segmentary where vowels are written by means of *matres*.[5]

[5] Kerr (2010: 25) observes the existence of a distinction in principle between writing vowels with *matres* versus vowel graphemes, but does not go on to detail how

4. Punic language, scripts and orthographies

Before looking at the texts themselves, it is important to cover some preliminaries regarding the Punic language, its scripts and orthographies. The Punic language is a variety of the Phoenician language spoken in the first millennium BCE. The language spread on account of Phoenician colonisation of the western Mediterranean, with distinctive Punic features, from a linguistic perspective, emerging by the middle/end of the 6th century BCE (Amadasi Guzzo 2014: 319, 322). From the late 5th century BCE on, the signs used to write Punic take on distinctive formal characteristics of their own (*ibid*. pp. 322–325), and one may talk of a distinct set of signs, i.e. script. Punic orthography also began over time to diverge from its Phoenician forebear, and the extension of the use of *matres lectionis* to represent vowels is one of its key characteristics. (Even in Phoenician there is occasional evidence for the use of *matres* to represent vowels, especially in personal names, PPG^3 §102). For example, <ʾ> is used as a *mater* in the Motya texts and coins dating from the early 6th to early 4th centuries BCE. This is seen in the spelling of the town name of Motya, e.g. <hmṭwʾ> (where <h> denotes the definite article). This is represented in Greek characters as μοτυη <motuē>, with <ʾ> apparently notating final [eː] (cf. Amadasi Guzzo 2014: 318).

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this works out in the Punic context. Mandaic appears to have passed through such a stage (Häberl 2006: 60), and therefore potentially provides a parallel to the Punic situation. I leave this question to future work.

Menken (1981: 83–94) identifies three stages of Punic orthography development. Initially Punic inscriptions did not in principle write vowels, just as was the case in Phoenician. In the second stage, vowels did start to be written. This was done in Menken's terms, according to the 'domestic' orthography. The domestic orthography was originally employed for writing words of Semitic origin. It is characterised by the use of <ʾ> and <y> to notate vowels word-finally. Finally, in the second century BCE another orthography emerges, which Menken terms the 'foreign' orthography. In this orthography vowels in words and names of non-Semitic origin are written (*ibid*. pp. 41–44, 87–90), although they were later also written in both non-Semitic and Semitic words alike (*ibid*. pp. 90–93). Under the foreign orthography, vowel phonemes are distinguished in terms of quality with <ʾ> used for /o/ and /e/, <h> occasionally for /e/, <ʿ> for /a/, <w> for /u/, and <y> for /i/ (*ibid*. pp. 89, 93–94).

Despite the new possibility of writing vowels, not all inscription writers avail themselves of it. Kerr (2014, esp. p. 159), in an analysis of the material written in Neopunic script, identifies two orthographic tendencies, 'historical-etymological' and 'phonetic'. This distinction primarily concerns the treatment of guttural graphemes, i.e. <ʾ>, <ʿ>, <h>, and <ḥ>. 'Historical-etymological' spellings reproduce the historical spelling, harking back to a stage of the language when the guttural consonants were part of the phoneme inventory. For example, <ʾdn> is used to represent Late Punic /aduːn/ 'lord'. However, the spelling with the guttural <ʾ> reflects an earlier phonological reality /ʔaduːn/, when the glottal stop /ʔ/ was a phoneme in the spoken language. (For this vocalisation of /ʔaduːn/, see the Greco-Punic αδουν <adoun>, El-Hofra GP 1; Kerr 2010: 227). By contrast, in 'phonetic' spellings the guttural graphemes, along with the

semivowels <w> and <y>, represent vowels. For example, <ʿdʾn> (Guelma N 35) represents the same sequence /aduːn/. In this case, <ʿ> represents /a/, and <ʾ> represents /uː/. We will see in §6.2 that the distinction between these two orthographies, viz. 'historical-etymological' and 'phonetic', is not hard-and-fast, since elements of each may be combined (see also Kerr 2014: 169–170 for the implication of this point).

Roughly coinciding with, but developing independently of, the arrival of vowel notation, a more cursive script emerged (Peckham 1968; Menken 1981; Sznycer 1999; Zamora López 2012; Amadasi Guzzo 2014). This script had its roots in the cursive writing practices of the 5th/4th century BCE (see Peckham 1968; for further discussion on the origin and development of the Neopunic script, see Amadasi Guzzo 2014; cf. also Kerr 2013: 11). (Menken 1981 in fact goes further, identifying two Neopunic scripts, an 'Ultra Cursive' script, and a 'Rounded cursive' script.)

Sign shape has been shown to vary according to geographical location (Amadasi Guzzo 2014: 328). The same may also be said of Punic orthography: while the Neopunic inscriptions of Lepcis Magna tend to be conservative, in that etymological consonants are written and the notation of vowels is avoided, those at Guelma (Calama) are much more varied in their notation of vowels (Kerr 2013: 12, 2010: 38–41; PPG[3] §107). The determination of the geographical distribution of orthographic practices is,

however, an enterprise which is beyond the scope of the present article, and awaits full treatment in its own right.[6]

Dating developments in the Punic writing system with precision is difficult. This is not least because "[m]ost neo-Punic inscriptions are undatable on internal evidence, and are dated after 146 BC [that is, after the final defeat of Carthage at the hands of Rome] on the basis of the cursive script – and this dating is then used, by a circular argument, to date the script…" (Wilson 2012: 265; on dating cf. also Amadasi Guzzo 2014: 314, Ferjaoui 2007: 34, Sznycer 1999, Peckham 1968: 193, Hoftijzer and Jongeling 1995: x–xi). However, the occurrence of inscriptions written in the Neopunic script at Carthage shows that the use of this script must predate 146 BCE (Menken 1981: 21; Robert Kerr, p.c.).

One of the major problems is that many of the inscriptions are no longer *in situ* (Hackett 2004: 366). It is clear, however, that the Punic script precedes the Neopunic, and that the latter replaces the former, although there is likely a significant period of overlap in the use of the two (Wilson 2012: 265–6; cf. Amadasi Guzzo 2014: 328; Peckham 1968: 193, 222). For general problems concerning the published treatment of late Punic epigraphy, see Wilson (2012: 267–268) and Millar (1968: 131).

It is important in the Punic context to distinguish between the script and the orthography of the writing system. The use of the Neopunic script does not necessarily

[6] I am grateful to an anonymous reviewer for a statement to this effect. Kerr (2010) goes into some detail on these matters, but focuses attention on the situation in Tripolitania, as most pertinent to the study of Latino-Punic inscriptions.

imply that a phonetic orthography will be used. As we will see in §6.1, it is perfectly possible for an inscription to be written in a Neopunic script, but using a historical-etymological orthography, although the fact that over time the Neopunic script takes over from the Punic may be used to trace the path of development in the orthography (see §7).

I am not concerned in this study with the question of which particular graphemes are used to represent which particular (sets of) phonemes. A summary of *matres* and vowel graphemes used in Punic, along with their consonantal and vocalic values, is given in Table 1, with information based on Jongeling and Kerr (2005: 8) and Menken (1981), as well as work completed for Crellin and Tamponi (forthc.). While this represents the most frequently encountered situation, there is considerable variation. This means that a given grapheme may be associated with more than one vowel phoneme. For information, the reader is directed to Menken (1981), Jongeling and Kerr (2005) and Kerr (2010, 2013, 2014).

Table 1 about here

Instead, I wish to set out the various ways in which guttural graphemes in general are used to represent vowels in the Punic inscriptional material. The particular guttural graphemes used for rendering vowels differed between authors: most commonly employed are <ʿ> and <ʾ>, while <ḥ> and <ḫ> are less frequently used (Kerr 2010: 66; Kerr 2014: 176). By looking at the treatment of the guttural graphemes in

general, it is possible to identify patterns in the use of these graphemes in representing vowels which may have broader typological implications.

The method used for identifying the representation of vowels with guttural graphemes is now discussed in §5, before the various means of vowel representation by guttural graphemes are presented in §6.

5. Procedure for identifying the function of guttural graphemes

The strongest indication that a guttural grapheme is used to write a vowel is that it occurs in a position where one would not expect a consonant phoneme to occur at all (cf. Kerr 2010: 26). Take, for example, <nʿdr> /nadoːr/ [dedicate.ACT.PRF.3SG] ‘he dedicated’ (KAI 87, line 4; KAI 107, line 2) from the root √*ndr* ‘dedicate’. As may be seen, this root does not contain any guttural phonemes. To write a guttural consonant would therefore be anomalous, and, thus, such a grapheme should be interpreted as representing a vowel (cf. Donner and Röllig 1968 §87).

A weaker indication that a guttural grapheme is used to represent a vowel is the use of the etymologically incorrect guttural consonant, albeit in the expected position. As an example of this, take <zʿbʾ> /zaboː/ ‘he sacrificed’ [sacrifice.ACT.PRF.3SG] (Guelma N 19, line 1). This instance is from the root √*zbḥ* ‘sacrifice’; the active perfect had been /zaboːḥ/ at a point when /ḥ/ was still a phoneme in the spoken language. The first guttural grapheme in <zʿbʾ>, namely <ʿ>, denotes the vowel /a/ according to the principles outlined in the previous paragraph. The grapheme <ʾ>, by contrast, appears in the position of the etymological guttural, /ḥ/, and could in principle, therefore, indicate

either a phonological weakening of /ḥ/ > /ʾ/, or the denotation of a vowel /o/, with which <ʾ> is also associated (see Table 1). Whether the guttural phonemes are best seen as having entirely disappeared from spoken Late Punic is a point of disagreement in the literature (cf. PPG^3 §§29–36 and Kerr 2010: 26–27). In general, however, I follow Kerr in assuming that the guttural has been lost in such cases, and the guttural grapheme indicates a vowel. Inevitably, however, given the nature of the primary material, conclusions reached may be open to further question, depending on the assumptions made regarding the phonology of the language for the author.

Finally, Kerr (2010: 26) notes that where an etymologically correct guttural is used, as in <bʿl> /bal/, it may be the case that the guttural grapheme, in this case <ʿ>, indicates a vowel, but that this "cannot be verified" (*ibid.*). Accordingly, Kerr is only prepared to "posit vocalic spellings when a non-etymological guttural is used as a vowel" (*ibid.*). However, such a view is not, in the view of the present author, strictly required. It is instead important to bear in mind the context of a given spelling: if etymological gutturals are routinely represented in a given inscription, it is indeed highly likely that in a given instance the etymological guttural is intended. However, if the author of an inscription does not represent etymological gutturals consistently in an inscription, it should be considered whether guttural graphemes are being used to write vowels. More specifically, where a given etymological guttural is written as expected, but where the vowel that would be denoted by the guttural grapheme used would also be expected in that position, we should entertain the possibility that the guttural grapheme in that instance is intended to represent the vowel rather than the guttural phoneme.

6. Orthographies of vowel notation in Punic

This section identifies three orthographies for the writing of vowels in Punic. The variables considered are: a) whether guttural graphemes function as *matres* carrying both consonantal and vocalic values, or as graphemes whose only function is to denote one or more vowel phonemes; and b) whether the vowel indicator denotes the presence of a morpheme, without indication of its phonological character, or of a vowel phoneme, with indication of the quality of the vowel in question. The vowel orthographies identified are: a) a morphographic orthography that in principle marks the presence of a vocalic morpheme by means of the *mater* <ʾ>; b) a morpho-phonographic orthography that marks the presence of vowel morphemes using more than one guttural grapheme, thus allowing for optional marking of vowel quality; and c) a phonographic orthography, where the guttural graphemes are in principle used only to represent vowel phonemes according to their quality. Owing to the difficulties in dating the material, the study proceeds by analysing individual inscriptions, rather than by analysing groups of inscriptions associated with or found in particular places, or dated to certain periods (on dating see §4; for the approach, see Kerr 2013: 12–14).

6.1 Morphographic vowel representation

The earliest and most basic means of vowel notation by means of guttural graphemes in Punic inscriptions is by means of <ʾ>. Vowel writing in this orthography serves principally to indicate morphology rather than phonology (Menken 1981: 46, 85–86), that is, to indicate the presence of a vocalic morpheme, rather than the phonological character of that morpheme. A full list of morphemes represented by <ʾ> may be found

in Menken (1981: 62). The indication of vowels in this orthography is, furthermore, typically restricted to the word end (*ibid*. p. 83). This orthography variant corresponds to Menken's 'domestic' orthography, as well as Kerr's 'historical-etymological' orthography (see §4 above). An example from Carthage is given in example 1 below.[7]

1. KAI 84 (Punic script; length = 1 line; interpretation follows KAI)

[n]dr		*bʿlšlk*	*bn=*	*ʿkkr*
dedicate.PRF.IND.ACT.3SG		bʿlšlk	son	ʿkkr
ʿl	*bn=m*	*tšmʿ*		*ql=ʾ*
for	son=his	hear.MODAL.ACT.2SG		voice=his
tbrk=ʾ				
bless.MODAL.ACT.2SG=him				

'*bʿlšlk* the son of *ʿkkr* made a dedication for his son. May you hear his voice. May you bless him.'

In example 1 two morphological units, namely the possessive and direct object pronominal suffixes, both /-oː/, are represented by <ʾ> in <qlʾ> /quːloː/ 'his voice' and <tbrkʾ> /tibrakoː/ 'may you bless him' (for vocalisation cf. Menken 1981: 84), respectively. This example exhibits no words involving etymological /ʾ/. Consequently, the use of <ʾ> as a *mater* cannot be seen. Etymological /ʾ/ can, however, be seen in

[7] The texts of examples in Punic script are given according to KAI, albeit transliterated from the Hebrew script in which they are published, while those written in Neopunic are given according to Jongeling 2008. Translations given are my own, although produced in consultation with those given in Donner and Röllig 1968 and Jongeling 2008.

example 2 below, a Punic inscription from Sicily dated to C3rd and C2nd BCE (Donner and Röllig 1968 *ad loc.*).

2. KAI 63 (Punic script)

[1] *l=ʾdn*	*l=bʿl*	*ḥmn*		*ʾš*	*ndr*	
to=lord	to=Baʿl	Ḥammon		REL	dedicate.PRF.ACT.3SG	
ḥnʾ	*bn*	[2]	*ʾdnbʿl*	*bn*	*grʿštrt*	
Ḥanno	son=		ʾdnbʿl	son	grʿštrt	
bn=	*ʾdnbʿl*	[3]	*k*			
son	ʾdnbʿl		because			
šmʿ	*ql=ʾ*	*ybrk=ʾ*				
hear.PRF.ACT.3SG	voice=his	bless.MODAL.M.3SG=him				

‘To the lord, to Baʿl Ḥammon, [that] which Ḥanno son of *ʾdnbʿl* son of *grʿštrt* son of *ʾdnbʿl* dedicated, because he heard his voice. May he bless him.’

As can be seen in example 1, example 2 again gives an example of the possessive and direct object pronominal suffixes, both /-oː/, both morphemes, represented by <ʾ> in <qlʾ> /quːloː/ ‘his voice’ and <ybrkʾ> /yibrakoː/ ‘may he bless him’ (vocalisation according to Menken 1981: 84). Additionally in this inscription, however, we see <ʾ> representing the etymological consonant phoneme /ʔ/, i.e. /ʔaduːn/ ‘lord’ (cf. §4 above), showing the value of <ʾ> as a *mater*.

The notation of vowel morphemes by means of <ʾ> is not limited to inscriptions in the Punic script. This may also be seen, for example, in the Neopunic inscription Bir Bou Rekba N 1, which is not given here, owing to its length. For the most part <ʾ> is used in this inscription where it would be expected on etymological grounds, e.g. in <ʾdn> /aduːn/ ‘lord’ (line 1), where <ʾ> represents etymological /ʔ/, as we saw in

example 2. Vowel notation is avoided in this inscription, and guttural graphemes denote etymological gutturals.

It is not often observed in this orthography that even word-final vowel notation is optional. Particularly striking is the absence of marking of the 3PL morpheme /-u:/ on finite verbal forms, which one would expect to be marked by <ʾ>, as it is elsewhere, e.g. <npʿlʾ> [make.PRF.PASS.3PL] (Labdah N9 = KAI 130, line 1, not quoted in this study). The instances in question in Bir Bou Rekba N1, where expected word-final vowel notation is missing, are the following:

- Line 1: <pʿl> for expected <pʿlʾ> /felu:/ √*pʿl* [make.PRF.ACT.3PL] 'made' (for vocalisation, see Kerr 2010: 235)
- Line 5: <npʿl> for expected <npʿlʾ> /nefalu:/ √*pʿl* [make.PRF.PASS.3PL] 'were made' (cf. PPG[3] §14, Labdah N 9, line 1; Krahmalkov (2001: 167) gives /nefʾalu:/; the basis on which he posits the presence of the glottal stop is not, however, clear);
- Line 6: <nntn> for expected <nntnʾ> /nintanu:/ √*ntn* [give.PRF.PASS.3PL] 'were given' (for vocalisation see Krahmalkov 2001: 167).

There are, however, two instances of word-final vowel notation with <ʾ> (my thanks are due to an anonymous reviewer for pointing out these examples):

- <knʾ> /xânu:/ √*kwn* [be.PRF.ACT.3PL] 'were' (line 2), where <ʾ> notates the /u:/ termination of the 3rd person plural (for vocalisation see Kerr 2010: 48);
- <hbnʾ> /habano:/ √*bny* [ART.build.INF.ACT] 'the (act of) building' (line 2) (for vocalisation see Krahmalkov 2001: 209).

The case of <bʾ> (line 4) √*bwʾ* [come.PRF.ACT.3PL] ‘came’ (line 4) deserves special comment. It would in principle be possible to see the final <ʾ> as notating a final vowel, as pointed out by an anonymous reviewer. However, since in this case the final root letter is /ʔ/, and in view of the conservatism of the text as a whole, it seems just as possible that the final root letter is notated here, and not the final vowel. Thus Krahmalkov (2001: 166) gives /bóʔuː/, cf. Classical Hebrew באו <bʾw> /bɔːʔuː/ [go.PRF.3PL] ‘went’ (e.g. Genesis 7:9).

6.2 Morpho-phonographic vowel representation

In the morphographic orthography discussed in the previous section, <ʾ> is used to represent vowel morphemes. In this section, by contrast, inscriptions are considered where guttural graphemes are used not only to indicate the presence of a vocalic morpheme, but also something of the vowel quality of that morpheme, in addition to their role denoting etymological gutturals. In order for this to be possible, of course, a wider range of guttural graphemes must be employed beyond <ʾ>. The orthography therefore combines elements of both morphography and phonography, and is hence here termed ‘morpho-phonographic’. The representation of vowels remains, however, optional. Insofar as both phonetic and etymological features of the language are represented, this orthography brings together elements of Kerr’s ‘historical-etymological’ and ‘phonetic’ orthographic tendencies, as well as incorporating elements of Menken’s ‘foreign’ orthography (see §4 above).

The orthography is exemplified in KAI 87, from Carthage, written in a Punic script, given in example 3.

3. KAI 87 (Punic script)

[1] *[l]=rbt*	*l=tmt* [sic]	|[2]	*[p]n*	*bʿl*	*w=l=ʾd*|[3] *n*				
to=mistress	to=Tinnit		face=	Baʿl	and=to=lord				
l=bḥlmn	*ʾš*	|[4]	*nʿdr*			*ḥtlt*	*bt*		
Bal Amun	which		dedicate.PRF.ACT.3SG			PN.F	daughter		
|[5] *ḥnʾ*	*ʾ=špṭ*		*bn*	|[6] *ʿzmlk*	*ʾ=špṭ*				
Hanno	the=sufet		son		*ʿzmlk*	the=sufet			

‘To the mistress, to Tinnit, the face of Bal, and to the lord, to Bal Amun; [the offering] which *ḥtlt*, the daughter of Hanno, the sufet, the son of *ʿzmlk*, the sufet, dedicated.’

As was the case in the morphographic orthography discussed in the previous section, <ʾ> is used as a *mater* to indicate both vowels and etymological guttural consonants. It is used to indicate word-final vowel /o/ in <ḥnʾ> (line 5), cf. Latin *Hanno* (Jongeling 1984: 38), and the consonant /ʔ/ in <ʾdn> /ʔaduːn/ (ll. 2–3). In <ʾdn> /ʔaduːn/, <ʾ> corresponds to etymological /ʔ/. The morphographic function of <ʾ> is furthermore evident in <ʾšpṭ> (twice, lines 5 and 6), where it represents the definite article morpheme (cf. §6.3 below). This was historically represented by the grapheme <h>, but the /h/ had quiesced (see §6.3).

What is new in this inscription, with respect to those written with a morphographic orthography, however, is the marking of the phonological property of vowel quality, in addition to the presence of a vowel morpheme. Thus <ʿ> is used to indicate /a/ in <nʿdr> /nadra/ at line 4 (see discussion immediately below), and <ḥ> is used to indicate /a/ in <bḥlmn> /bal(a)mun/ (line 3) (for the phonetic rendering, cf. βαλ αμουν <bal amoun> /bal amuːn/, El-Hofra GP 1 Kerr 2010: 227, line 1). Once more, however, these graphemes have in principle two values. Thus in the personal name <ḥnʾ>

/ḥanno/ (line 5), <ḥ> is written where it is etymologically expected, as is <ʿ> in <bʿl>, etymologically /baʿl/, but probably pronounced /bal/ (line 2).[8] (For parallels in the use of <ʿ> as a *mater, see* KAI 102 and KAI 105 (not quoted here), and the renderings <pʿn bʿl> /fane baʿl/ 'face of Bal', where <ʿ> denotes /a/ in /fane/, and <šmʿ> /šamōʿ/ √*šmʿ* 'he heard', where <ʿ> notates the etymological root guttural /ʿ/.)

Despite the increased readiness of the authors to represent vowel phonemes word-internally, they still regarded this as optional. In example 3 this can be seen in the substantial number of words written without any vowels notated. Furthermore, as we saw in the case of Bir Bou Rekba N 1, §6.1 above, word-final vowels may also lack notation, as is indicated by the form <nʿdr> /nadra/ [dedicate.PRF.ACT.3SG[F]], where the final /-a/ is not written. We expect a feminine form because the subject, <ḥtlt>, is feminine given her description as <bt ḥnʾ> 'daughter of Hanno'. Under these circumstances a feminine form terminating in /a/ would be expected. We see such a termination on the same form elsewhere, e.g. Carthage N 7 with <ndrʾ>, Constantine N 56 with <nʿdrʾ>. Further examples may be found in Jongeling (2008: 398). For the vocalisation and expected ending see Kerr (2014: 167) and Krahmalkov (2001: 34, 160).

A further step towards phonography can be seen in example 4 written in Punic script, and found near Cirta (see Smelik 1995: 135 n. 12).

[8] However, since the expected first vowel in <ḥnʾ> is also /a/, again given Latin *Hanno* (Jongeling 1984: 38), its synchronic interpretation as representing the vowel /a/ is not out of the question. Similarly, the <ʿ> in <bʿl> could be (re-)interpreted as representing the phoneme /a/.

4. KAI 107 (Punic script. For the interpretation of <bšr>, cf. Hoftijzer and Jongeling 1995: 204. Adonibal given per Jongeling 2008: 204.)

[1] *l=ʿdn*	*l=bʿl*	*ḥmn*	|[2]	*ndr*			
for=lord	for=Bal	Amun		offering			
ʾš	*nʿdr*		|[3]	*ʾdnbʿl*	*bn=ʿbdʾšmn*		
which	dedicate.ACT.PRF.3SG			Adonibal	son=Abdusmyn		
|[4]	*mlk=*	*ʾdm*	*bšr=m*		*bn=ʿ*		
	offering=	person	offspring=his		son=his		
tm	|[5]	*šmʾ*	*ql=ʾ*	*brk=ʾ*			
complete		hear.PRF.3SG	voice=his	bless=him			

‘For the Lord Bal Amun, an offering which Adonibal son of Abdusmyn dedicated, an offering of a person, his complete son. He heard his voice. He blessed him.’

In the same way as we saw in example 3, in example 4 the verb /nado:r/ is written <nʿdr>, with non-etymological <ʿ> serving to indicate the phoneme /a/. However, unlike the previously examined inscriptions (examples 2 and 3 above), where /adu:n/ is spelled <ʾdn> with <ʾ> indicating the etymological guttural /ʔ/, in example 4, this word is spelled <ʿdn>, with a word-initial <ʿ> denoting /a/ (/u:/ is not notated). This is to say that in the writing of this word, no account is taken of the etymological /ʔ/ in the writing of this word, and instead the phonological nature of the first phoneme of the word, /a/, is indicated by means of the guttural grapheme <ʿ>.

In other respects, however, the use of guttural graphemes resembles the inscriptions examined in the two previous sections. Thus the grapheme <ʾ> has both vocalic and consonantal values. Compare <qlʾ brkʾ> /qu:lo: barako:/ (line 5), where <ʾ> indicates the word final possessive and direct object pronoun morphemes, with <ʾdm>

/ʔadom/ (line 4; for vocalisation, see Krahmalkov 2001: 127), where <ʔ> corresponds to original etymological /ʔ/.

6.3 Phonographic vowel representation

In the phonographic orthography, the erstwhile guttural graphemes, <ʔ>, and <ʕ>, <h>, and <ḥ>, indicate vowel quality only. This is in contrast to the orthographies previously discussed, where these graphemes functioned as *matres*, carrying two values, vocalic and consonantal, and where the vocalic function is primarily morphographic. The glides <y> and <w> may still be used as *matres*, but the change in function of the guttural graphemes nevertheless entails a shift in the character of the writing system, so that consonant and vowel graphemes are now in only partially overlapping sets, sharing the glides <y> and <w>, while in the other orthographies the set of vowel graphemes is fully included in the set of consonant graphemes.

The phonographic orthography identified here corresponds to Kerr's 'phonetic' orthographic tendency, as well as to Menken's 'foreign' orthography (see §4 above). However, neither scholar to my knowledge points out that there are inscriptions that allow for the writing system to be understood as having undergone a fundamental shift whereby the guttural graphemes need no longer be interpreted as indicating etymological guttural consonants at all, and may represent only vowels.

Neopunic inscriptions from Guelma furnish a number of examples of this orthography, e.g. N 4, 9, 18, 21, and 28 (on vowel writing at Guelma, see also Jongeling 2003). It is important to observe, however, that the orthography is not limited to this site, with the same orthographic principles, that is, with guttural consonants interpretable as

indicating vowels only, employed at other sites including Maktar N 9, Carthage N 7 and Constantine N 33. Guelma N 19 is provided in example 5.

5. Guelma N 19 (Neopunic script; for the phonological rendering of the proper names <mylkʿtn> and <bʿlytn>, see Jongeling 1984: 21, 181)

[1] *l=ʿdn*	*bʿlmn*	*zʿbʾ*			
to=[the]=lord	Bal-Amun	sacrifice.ACT.PRF.3SG			
m|[2]*ylkʿtn*	*bn=*	*bʿlytn*	*b=m|*[3]*lk*		*ʾzrm*
Milkaton	son	Balyaton	in=molk_offering		*ʿzrm*
h=yš	*w=šʿ|*[4]*mʾ*		*ʾt*	*qwl=ʾ*	
the=man	and=hear.ACT.PRF.3SG		OBJ	voice=his	

‘To the Lord Bal Amun, Milkaton, son of Baliton, made a sacrifice as a *hzrm* molk-offering of a man, and he heard his voice.’

Three guttural graphemes are used in this inscription, namely, <ʾ>, and <ʿ> and <h>. What distinguishes the use of these graphemes in this inscription from their uses in the other inscriptions is that, where a guttural grapheme is used to represent a vowel, it is not also used to represent a consonant:

- <ʿ> is used to notate /a/ in <ʿdn> /aduːn/ ‘lord’ (√*ʾdn*) (line 1), in <zʿbʾ> /zaboː/ ‘he sacrificed’ (√*zbḥ*), and in <šʿmʾ> /šamoː/ ‘he heard’ (√*šmʿ*).
- Similarly, <ʾ> is used to notate the final /o/ vowels in both <šʿmʾ> /šamoː/ and <qwlʾ> /quːloː/.

Conversely, guttural graphemes would be expected on etymological grounds in the following cases, and yet they are not found:

- <yš> /iːš/ is given for expected <ʾyš> (e.g. Guelma N 27) or <ʾš> (e.g. Guelma N 20), ‘man’; cf. Hebrew אִישׁ <ʾyš> /ʾiːš/ (e.g. Genesis 4:1);

- <šʿmʾ> is given for expected <šʿmʾʿ> (or similar) (√*šmʿ*), ‘he heard’;
- <zʿbʾ> is given for expected <zʿbʾḥ> (or similar) (√*zbḥ*), ‘he sacrificed’.

Guttural graphemes do occur where they would be expected etymologically in <bʿl> /bal/ (cf. Greco-Punic βαλ <bal>, El-Hofra GP 1; Kerr 2010: 170, 227) and in <ʾt> /ət/ (cf. Latino-Punic *yth;* Kerr 2013: 236). However, the vowels in each case, namely /a/ and /ə/, are compatible with marking by <ʿ> and <ʾ> respectively (see Kerr 2010: 38–42; 49). Given that etymological gutturals are not written in the other cases listed immediately above, it is possible to read the guttural graphemes <ʿ> and <ʾ> in <bʿl> and in <ʾt>, respectively, as denoting vowels.

<ʾzrm> (line 3) deserves special comment. This is likely a sacrificial term, albeit of uncertain interpretation, and a variety of spellings are attested, namely <ʿzrm> and <hzrm>, alongside the spelling <ʾzrm> seen here (see Jongeling 2008: 400). The fact that three conservatively spelled, inscriptions at Labdah (N 13, 16, 19) have the spelling <ʿzrm> suggests that spelling with initial <ʿ> was regarded as the correct etymological spelling (cf., however, Kerr 2018: 75 n. 78). Accordingly, it is reasonable to suppose that spelling with <ʾ> is an attempt to render an initial vowel.

Finally, the guttural grapheme <h> is used in <hyš> (line 3) to indicate the definite article. In example 3 discussed at §6.2 above, this morpheme is indicated by the morphographic <ʾ>. At first sight one might think that <h> representing this morpheme is a case of historical spelling, hence also morphographic, since the correct etymological guttural consonant is /h/ (per Kerr 2014: 176). However, given that the author of this inscription appears to show very little regard for etymological guttural consonants, it seems equally possible that we have here a phonological representation of the article as

a vowel, since the etymological /h/ had long quiesced by this point (Kerr 2014: 176; Menken 1981: 59–60, 93, 96). The vowel might be expected to be /a/ (Kerr 2014: 176), although Menken has argued that the expected vowel is /e/ (Menken 1981: 59–61; for further discussion on the use of <h> for representing vowels, see Kerr 2010: 63–66 and Menken 1981: 70–71; see also Jongeling 2008: 381–382 for discussion of the representation of the article with <ʾ(y)š> 'man').

In sum, I propose that it is possible to view the orthography of Guelma N 19, along with that of similar inscriptions listed earlier in this section, as representing a major shift with respect to the morphographic and morpho-phonographic orthographies discussed to this point: whereas in these other orthographies guttural graphemes functioned as *matres*, their primary purpose in denoting vowels being morphographic, in this case it is possible to analyse guttural graphemes as representing vowel phonemes exclusively.

For all its innovation in the context of Punic writing, however, we should note that the phonographic orthography is still 'partially vowelled'. This is owing to the fact that vowel notation is still not obligatory. Thus while all expected final vowels are notated in this inscription, viz. <zʿbʾ>, <šʿmʾ> and <qwlʾ>, in the inscription as a whole, many word-internal vowels are not e.g. <ʿdn> for /aduːn/, where /uː/ lacks notation; <mlk> for /mulk/ (vocalisation per Kerr 2018), where /o/ lacks notation. In another inscription, Guelma N 22, the optional nature of word-internal vowel notation is manifest in the spellings <nʾšʾ> /našoː/ from √*nšʾ* [present.PRF.ACT.M.3SG] and <šmʾ> /šamoː/ [hear.PRF.ACT.M.3SG]: both verb forms are of the same morphology, viz. perfect

3rd person singular, but the first has the internal vowel /a/ marked, while the second does not.

7. Discerning a trajectory of development from morphography to phonography

From the foregoing, the Punic linear segmentary demonstrates a wide range of behaviour in the degree and manner of using guttural graphemes for the representation of vowels, from morphographic representation, through morpho-phonographic and phonographic. With Menken (1981: 83–96), it is tempting, therefore, to see evidence of a trajectory of development from one to the other. Indeed, notwithstanding the difficulty of dating Punic texts (see §4), the Punic material may provide such evidence.[9] This is indicated by the fact that inscriptions written with morphographic orthography are well-evidenced in inscriptions written in the Punic script, which are in general earlier. By contrast, phonographic inscriptions are much more in evidence in inscriptions written in the Neopunic script.

[9] Menken (1981: 83–96), who focuses on the material written in Neopunic script, suggests that the foreign orthography, our phonographic orthography, develops first for writing non-Semitic names, and is gradually adopted for writing Semitic words. Menken is more confident than I am on the matter of the relative dating of the developments.

This is not, of course, to assume a teleology analogous to Gelb (1963, esp. pp. 200–201), whereby a partially vowelled segmentary is bound ultimately to develop into an alphabet (for the refutation of this thesis, see Daniels 1990). Remarkably, despite the availability of vowel graphemes, the ubiquity of alphabetic writing in Latin and Greek, and indeed the existence of a small number of relatively early Punic inscriptions written in Greek characters where all the vowels are written, in Punic texts written in Punic or Neopunic script vowels were only ever optionally written (PPG^3 §104). Furthermore, despite its attestation at sites other than Guelma (see §6.3 above), this orthography type is not adopted wholesale across sites where Neopunic inscriptions are found. As we saw in Bir Bou Rekba N 1, §6.1, orthographic practices at certain sites remained very conservative, despite the employment of the new cursive script, thus demonstrating the lack of any requirement for innovation in the direction of an alphabet.

The lack of wholesale adoption of the phonographic orthography perhaps suggests that the orthography did not come about by the edict of a central authority (cf. Menken 1981: 87). However, the change involved is no less significant a typological development for its potentially decentralised nature: for at least some scribes, the erstwhile guttural graphemes did not represent etymological gutturals, and had come to be used almost exclusively to represent vowels. Guelma, at least, may have been a relative backwater (Kerr 2013: 12), or may have been perceived as such from the vantage point of supposedly cultivated centres such as Carthage, but such categorisations are inherently relative, and given different sociocultural circumstances, the new orthography could have been adopted more broadly. That it was not may be regarded simply as an accident of sociocultural history.

Nevertheless, there is no reason in principle why the idea of using guttural graphemes to write vowels should not spread, to the extent that they adopt this function exclusively, as indeed occurred independently in the case of Mandaic. The Punic material may, therefore, illustrate the stages by which this could take place. Daniels (1996a: 8) implies this possibility in saying that, "It must simply be recognized … that abjads are not (any longer) syllabaries and not (yet) alphabets …"[10] To be certain of development in the case of Punic, however, we would need more granularity and reliability on the dating of individual inscriptions than is currently available.

8. Conclusion

I have argued that guttural graphemes, <ʾ>, <ʿ>, <h> and <ḥ>, can be analysed as representing vowels in Punic in three ways: a) morphographically, where <ʾ> serves as a *mater* to represent vowel morphemes; b) morpho-phonographically, using a wider range of guttural graphemes, viz. <ʾ> as well as <ʿ>, <h> and <ḥ>, as *matres* to indicate not only the presence of vowel morphemes, but also their vowel qualities; and c)

[10] An anonymous reviewer stated that this has been taken out of context, and that the quoted sentence in fact describes a change in terminology, so that "Abjads are no longer to be called syllabaries, abugidas are no longer to be called alphabets (as in the Gelb scheme)." However, to the mind of the present author, the only way of understanding the sentence in this way would be to read it as implying that eventually abjads will be regarded as alphabets. This seems unlikely, since Daniels coined the term 'abjad' specifically in order to differentiate 'alphabets' from 'abjads'.

phonographically, using guttural graphemes to represent vowels phonemes only. Despite the innovative character of the phonographic orthography, in no inscription are vowels obligatorily represented, a fact that distinguishes the phonographic orthography from an alphabetic one. I suggested that, since the phonographic orthography is strongly associated with the use of the Neopunic script, it may be possible to discern a path of development from morphography to phonography. The phonographic orthography is not, however, universally adopted, and more conservative orthographies continue to be used elsewhere. From the perspective of orthography development in general, therefore, the trajectory from morphography to phonography is not argued to be a necessary development, but rather a possible one. This finding, if confirmed by better dating of the inscriptional material, would have important implications for orthography development over time in writing systems generally, by providing an instance of directional change in a writing system from a morphography to phonography.

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Addresses for correspondence:

Email: robertcrellin@cantab.net

Postal:

Robert Crellin

c/o CREWS Project

Faculty of Classics

Sidgwick Avenue

Cambridge

CB3 9DA

UK

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Abbreviations and symbols

|	line break
√	root
ACT	active
c.	*circa*
C3rd	3rd century

KAI	Donner & Röllig (2002)
PPG[3]	Friedrich, Röllig & Amadasi Guzzo (1999)
PTCP	participle

Table

Table *1* - *Matres lectionis* and vowel graphemes in Punic orthography

Grapheme	Name	Etymological consonantal value	Most common vocalic value(s)	Type
<ʾ>	*ʾalef*	/ʔ/	/o/, /e/, /u/	Guttural
<ʿ>	*ʿayin*	/ʕ/	/a/	Guttural
<h>	*he*	/h/	/e/, /a/	Guttural
<ḥ>	*ḥeth*	/ħ/	/a/	Guttural
<w>	*waw*	/w/	/u/	Semi-vowel
<y>	*yodh*	/y/	/i/	Semi-vowel