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TOWARDS A SYSTEMATISATION OF PALAEOHISPANIC SCRIPTS IN UNICODE: SYNTHESISING MULTIPLE TRANSCRIPTION HYPOTHESES INTO TWO CONSENSUS ENCODINGS*

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1. INTRODUCTION[1]

The Palaeohispanic script family consists of several scripts (fig. 12): the north-eastern Iberian (Untermann 1975; 1980; 1990; Hesperia[2]), the Celtiberian (Untermann 1997; Hesperia[3]), the south-eastern Iberian (Untermann 1990) and the south-western or Tartessian scripts (Untermann 1997). In addition, it is necessary to consider the existence of the Espanca abecedary (Untermann 1997, J.25.1; de Hoz 2010, 488), found in the same area where the south-western or Tartessian script is attested. Nevertheless, this abecedary does not exactly match the Tartessian script or the south-eastern Iberian script. All these writing systems are characterised by a similar corpus of signs and by the coexistence of alphabetic and syllabic signs.

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[1] This paper is a unified version of two preliminary proposals submitted to the Unicode Consortium to encode the Palaeohispanic scripts ("Preliminary proposal to encode the north-eastern Iberian script for the Unicode standard" and "Preliminary proposal to encode the southern Palaeohispanic scripts for the Unicode standard"), which are currently under review by a board of experts.

[2] hesperia.com, database with critical editions of the whole Palaeohispanic text corpus (Luján and Orduña i.p.; Orduña and Luján i.p.; Velaza 2014), is a project carried out by a team of scholars from the Universities of Zaragoza, Complutense of Madrid, the Basque Country and Barcelona. The edition of the corpus of south-eastern Iberian and south-western Palaeohispanic inscriptions is currently in progress, and will be available online soon.

As we will justify in the following sections, all these scripts can be codified according to two different standards: the north-eastern Iberian script standard, which also includes the Celtiberian script, and the southern Palaeohispanic script standard, which includes the south-eastern Iberian script, the south-western script and the Espanca abecedary.

The north-eastern Iberian script, also known as Levantine Iberian, is attested in the north-eastern quarter of the Iberian Peninsula from the second half of the 5th century B.C. to the 1st century A.D. in more than 2,000 inscriptions in the Iberian language (Untermann 1975; 1980; 1990; Hesperia Data Bank). The corpus consists of long texts on lead sheets, which mainly correspond to commercial letters and administrative documents; small inscriptions on ceramic vases, usually with the owner's name; coin inscriptions with the indication of the mint, personal names and marks of value; steles and stone plaques with funerary formulae; stamps on ceramic vessels with the producer's name; painted inscriptions on ceramics of indeterminate linguistic content; rock inscriptions with likely votive formulae; inscriptions on personal objects such as spindle-whorls, weights, or even arms, etc.

The decipherment of this script was accomplished at the beginning of the 20th century by Manuel Gómez-Moreno 1922, 1949. This achievement was essentially possible thanks to the existence of coin inscriptions, which were, in some cases, bilingual, and, in some other cases, clearly linkable to place names known through Greek and Latin ancient sources. The discovery of some Iberian inscriptions written in an adaptation of the Greek alphabet —the most remarkable is the lead sheet from La Serreta d'Alcoi (G.1.1), which revealed the phonetics of the Iberian language— was also helpful in this respect, as well as the existence of a Latin inscription with an extensive relation of Iberian personal names, known as the *Turma Salluitana* (*CIL* I^2, 709). Nevertheless, some aspects of the Iberian script were not entirely deciphered until very recent dates. Such is the case of a variant of this script called *the dual system*, which consists of the use of signs with two variants, each of them with its own distinctive value, differing from each other in presenting an additional stroke (Maluquer 1968; de Hoz 1985; Correa 1992; Quintanilla 1992; Ferrer 2005). In fact, some concrete aspects of this system are even still undergoing research, as will be explained in the following sections (Ferrer 2013b; 2014a).

The Celtiberian script is clearly an adaptation of the north-eastern Iberian script to the particularities of the Celtiberian language. Just as its model, it also presents the so-called dual variant or dual system (Ferrer 2005; Jordán 2005; 2007). This script can be considered as a subset of the north-eastern Iberian one, which would allow the north-eastern Iberian Unicode to be used to represent Celtiberian inscriptions as well. This script is documented between the end of the 3rd century B.C. and the early 1st century A.D. in nearly two hundred inscriptions attested in the interior of the Iberian Peninsula (Untermann 1997; Hesperia Data Bank).

On the other hand, the other scripts mentioned can be grouped under the name of southern Palaeohispanic scripts: the south-eastern Iberian script (Untermann 1990), also known as southern or meridional Iberian script, the south-western (Palaeohispanic) script, also known as Tartessian or south Lusitanian (Untermann 1997) and the Espanca abecedary (Untermann 1997 J.25.1). Despite the differences between them, these scripts show a similar degree of deciphering and the signs with compatible shapes almost always have the same value.

The south-eastern Iberian script is attested in the south-eastern part of the Iberian Peninsula from the 4th century B.C. to the 1st B.C. in about seventy inscriptions in the Iberian language (Untermann 1990; Hesperia Data Bank); however, the westernmost inscriptions might represent a different language (de Hoz 2011, 707). The corpus consists of long inscriptions on lead sheets of different typology, sometimes presenting accounting texts and sometimes with probably trade-related letters, small inscriptions on ceramic vases, usually with the owner's name, inscriptions on silver vessels with votive or me-trological meanings; coin inscriptions with the indication of the mint and the magistrates' names, inscriptions on statues probably with the name of the person represented, stone steles with probably funerary formulae, rock inscriptions, sling projectiles, etc.

The south-western script is employed in a hundred inscriptions in a language of unknown filiation attested in the south-western corner of the Iberian Peninsula, perhaps in a period running from the 7th century to the 4th century B.C. Almost all the inscriptions are large stone steles probably used in funerary contexts (Untermann 1997). Some scholars (de Hoz 2010, 521; Correa 2009, 276) use the denomination of *Tartessian* in a restrictive way to identify only the script in which the Tartessian core-zone inscriptions are written, leaving the denomination *south-western* for the inscriptions of the western peripheral zone, which comprise the main body of the group.

The Espanca abecedary (Correa 1993; Untermann 1997, J.25.1; de Hoz 2010, 488) is a small plaque of stone (fig. 11) found in the same territory where the south-western script is attested. Nevertheless, this abecedary does not exactly match either the south-western script or the south-eastern Iberian script.

2. CODIFICATION OF THE NORTH-EASTERN IBERIAN SCRIPT

2.1. Characteristics of the north-eastern Iberian script

The north-eastern Iberian script consists of vocalic signs **a**, **e**, **i**, **o**, **u**; syllabic signs for the dental plosives **ta**, **te**, **ti**, **to**, **tu**, velar plosives **ka**, **ke**, **ki**, **ko**, **ku**, and labial plosives **ba**, **be**, **bi**, **bo**, **bu;** and consonantal signs for the nasals **m**, **n**, lateral **l**, sibilants **s, ś,** and trills **r, ŕ**.

There are still some other signs of controversial value, which seem to combine both a vocalic and a consonantal component. Such is the case with a relatively frequent sign, transcribed as **ḿ,** which has been commonly inte-

grated into the Iberian sign repertoires. It is also the case with two other extremely rare signs, initially considered as allographs of others, but that have later been confirmed as autonomous after the attestation in some of the abecedaries discovered in recent years. One of them is the sign with the shape of a **T** or **I**, which is transcribed as **m̌**, due to its proximity to the nasal signs, in a general way, and with **ḿ,** in particular, due to the fact that it appears next to this sign in the Ger abecedary (Ferrer 2013a; 2014b). The other controversial sign is  , which would fit as a marked variant of **l**. This sign appears in the Castellet de Bernabé abecedary together with a normal **l** sign, and it is transcribed as **â** (Rodríguez 2001, 286; Ferrer 2009, 474; 2014b), taking into account its apparent vocalic nature and the fact that it always appears after **l**.

The oldest inscriptions (5th to 3rd century B.C.) are written in a script modality called *dual*, which uses, as mentioned above, two variants for every single sign. These variants differ from each other in the addition or lack of a stroke. The most common dual system (which would produce a total of 39 signs [fig. 9]) duplicates only dental syllabic signs, **ta/da, te/de, ti/di, to/do, tu/du**, and velar syllabic signs, **ka/ga, ke/ge, ki/gi, ko/go, ku/gu.** On the other hand, dualities for the labial signs, **ba**, **be**, **bi**, **bo**, **bu**, are not detected, which is due to the low productivity of /p/ in the Iberian language, as can be particularly seen in the longest Greco-Iberian inscriptions, such as the lead sheet from La Serreta d'Alcoi (G.1.1). This dual variant is attested in the Ger (fig. 4), the Tor de Querol (fig. 5) and probably the Bolvir (fig. 3) abecedaries and it probably represents approximately 35% of the total. Nevertheless, in short inscriptions it is not always clear whether the system being used is the dual or non-dual abecedary.

Another variant of the dual system, which would reach a total of 46 signs (fig. 10), expands the repertoire of dualities to vowels, **a/á**, **e/é**, **i/í**, **o/ó**, **u/ú** and to some continuous consonants, **s/ŝ** and **ŕ/ř**. This variant is attested in the Castellet de Bernabé (fig. 1) and Tos Pelat (fig. 2) abecedaries. Inscriptions also displaying dualities for continuous consonants and vowels are scarce: they represent only 5% of the total and are confined to the surroundings of Llíria, Valencia (Ferrer 2013b; 2014a).

On the other hand, the most recent inscriptions (2nd and 1st centuries B.C.) no longer show dualities; the abecedary remains reduced to 29 signs instead (fig. 8), mostly using only the unmarked variant of each pair. Near 60% of inscriptions in the corpus use a non-dual script.

The inscriptions are usually written from left to right, but occasionally from right to left instead. Only around 30 texts (out of 2,000 inscriptions in the north-eastern Iberian script) are written from right to left, although most of them are ceramic stamps in which the model was left-to-right. One of the most remarkable exceptions is the Bolvir abecedary on rock (fig. 3).

2.2. Ordering

2.2.1. Order in the code chart

The north-eastern Iberian abecedaries do not always use the same order of signs. Among the five north-eastern Iberian dual abecedaries attested (Castellet de Bernabé [fig. 1; Ferrer 2009; Velaza 2006], Tos Pelat [fig. 2; Burriel *et al.* 2011], Bolvir [fig. 3; Ferrer 2013a; 2013b], Ger [fig. 4; Ferrer 2013a; 2013b] and La Tor de Querol [fig. 5; Ferrer 2014c]), the initial sequence **kututidibabita** appears in the last two of them. They represent, together with that from Bolvir, the only three abecedaries preserving, with certainty, the initial sequence. In addition, a probabilistic method has recently been proposed to identify non-dual abecedaries in other inscriptions (Ferrer 2014b); two of the abecedaries identified following these criteria, the Esquirol and Can Rodon abecedaries, begin with the sequence **kutukiŕbitatiko**.

The lack of a unique sequence in the Iberian abecedaries forces an ad-hoc order to be adopted, grouping signs according to their value. Therefore, vowels will appear in the alphabetical order **a**, **e**, **i**, **o**, **u**; plosives in the usual alphabetical order **b**, **k**, **t**; and continuous consonants in the alphabetical order **l**, **m**, **n**, **r**, **s**. The marked-sign pairs will be grouped together, the marked character preceding the unmarked, as appears in the north-eastern Iberian abecedaries. The conflictive **T**-shaped sign is grouped together with nasals, as it actually appears in the attested abecedaries. Numerals are grouped at the end, and the last sign is saved as a word separator. The conflictive sign in the shape of a complex Iberian **l** is placed together with this sign, as it appears in the Castellet de Bernabé abecedary.

2.2.2. Order for sorting

Published Iberian lexicons (Tovar 1951; Siles 1985; Velaza 1991, Silgo 1994; Moncunill 2007, 24) use the Latin alphabetical order for the alphabetisation of transcribed Iberian texts, though with some minor changes depending on the author and regarding the treatment of voiceless and voiced occlusive sounds, as well as that of sibilants and trills.

Hence, in general terms the order proposed follows the alphabetical order of Iberian texts transcribed into the Latin alphabet. The exceptions to this principle are due to the aim of keeping groups of signs with similar values together. For this reason, the order proposed would be as follows: **a**, **á**, **â, ba**, **be**, **bi**, **bo**, **bu**, **da, ta, de, te, di, ti, do, to, du, tu**, **e**, **é, ga, ka, ge, ke, gi, ki, go, ko, gu, ku**, **i**, **í**, **l**, **m, n**, **o**, **ó**, **r**, **ŕ**, **ř, ś, s, ŝ**, **u, ú, ḿ**, **m̌**. Specific exceptions to the alphabetical order are as follows:

- Consecutive order for simple sibilant (**s**) and complex sibilant (**ŝ**);
- Consecutive order for voiceless and voiced plosives in order to keep together the dual and non-dual transcriptions of the same elements (for instance, the word **ekiar** / ***egiar***).

- Consecutive order for **m** and **n**, since they are signs that can alternate (for instance **iunstir** / **iumstir**).
- Consecutive order for the supposed nasal **ḿ** and **m̌**, after the two signs for **u**, since the characteristic vocalic component of **ḿ** can be usually identified as **u** (for instance **ḿbaŕ** / VMAR).

2.3. Numbers

Iberian metrological expressions (Untermann 1990, 146, de Hoz 1981; 2011, 191) are basically formed by groups of vertical bars (equivalent to the sign **ba**) to generate the numerical component of the expression: I = 1, II = 2, III = 3, IIII = 4, IIIII = 5. The accumulation of bars can reach up to 20 elements (F.17.1).

There is a subset of metrological expressions, which usually does not exceed six vertical bars, that appears together with a sign similar to Greek **Π.** This element appears to be acting as an auxiliary base, perhaps with the value of 5 (Lejeune 1983, 33; de Hoz 2011, 195), in a decimal context and in accordance with its value in the Greek acrophonic number system (**Π** = *penta*), or maybe with the value of 6 (Ferrer 2014a, 65) optimising its value in a duodecimal context.

Usually the numerical expressions formed by a **Π** followed by several bars appear together with characters of the basic corpus, **a**, **o**, **ki**, **e**, **be**, **l, ti**, **ḿ** and **ka**, which these numerals seem to quantify. These characters could express measurement units in different metrological systems and in most cases they probably stand for the initial of the unit name, for instance, **e** for **etar**, and **ki** for **kitar** (Rodríguez 2005, 45 and 63; Orduña 2005, 499; Ferrer 2011b, 101; 2014), so it does not seem necessary to encode them as different shapes. Nor do we consider it necessary to encode as an independent shape the sign **s** attested on painted amphora inscriptions from Vieille-Toulouse, forming groups of up to 4 elements, **ssss** (Lejeune 1983; de Hoz 2011, 195), as it is also a character of the basic corpus.

Some metrological expressions use a specific **L**-shaped sign, which does not match any other character of the Iberian script; the numerical value for that sign is still uncertain (Untermann 1990, 147). This sign also appears in metrological expressions on painted amphora inscriptions from Vieille-Toulouse (for instance **L III**) and in lead-sheet inscriptions from Iàtova (for instance **L Π IIIII** [F.20.2]).

Some coin inscriptions present value marks (Ferrer 2007), which, in some cases, have an equivalent symbol formed by the initial of the unit followed by the numerical component. In the case of **undikesken** coins, quarters show the – sign and halves the = sign, which is actually a reduplication of the former (¼ + ¼ = ½). These signs can present several other variants depending on the mint, as in the case of **śaitabi,** where < is used for quarters and << for halves. The – sign also appears in some metrological expressions on lead sheets from Iàtova (for instance **ḿ · III · ḿ**– [F.20.2]).

Numerical symbols							
5? / 6? / ?		**?**		**1/4**		**1/2**	

2.4. Word separators

The majority of the two thousand north-eastern Iberian inscriptions are very short and do not need word separators, but long texts (*ca*. 200 items) usually do use them. The most common word separator consists of two vertical dots. Nevertheless, the oldest epigraphic tradition tends to use rather 3 or more vertical dots; in the most recent inscriptions on stone, on the other hand, the use of an isolated dot is frequent, imitating the Roman style. Sporadically, the vertical bar can also be used and, in some rare cases, just a blank (Simón 2011).

2.5. Characters

The standard script has been built taking into account an inventory of signs as large as possible, including all dual variants confirmed in the extant abecedaries, and thus choosing duality as an answer to one of the main doubts posed about how the codification of the north-eastern Iberian script should be carried out (Comes and Moncunill 2009).

Following the criteria and main objectives of the Unicode standards, multiple variants of a single sign have not been included (Untermann 1980, 49; 1990, 246; Rodríguez 2004, 143; de Hoz 2011, 743), but just the signs with different values; such a principle has not been followed in an unofficial proposal for Unicode encoding recently put forward (Huertas 2009). The choice of the most representative variant for each sign has been made according to their concurrency frequency in presumably dual inscriptions.

The most common convention to transcribe dualities for dental and velar plosives signs is to use the voiced signs for simple variants and to save voiceless ones for complex variants (for instance, **ge** / **ke** and **de** / **te**). Such a convention is based on the Iberian phonetics attested in Greco-Iberian inscriptions and in Greek and Latin inscriptions, where simple variants appear represented by voiced signs and complex ones by voiceless signs. An alternative convention to represent this opposition is to arbitrarily maintain the representation of the voiceless sign and to stress the vowel of the marked variant: for instance **ke** / **ké** and **te** / **té**. Be that as it may, these conventions are of little significance as regards Unicode encoding, since they only feature in the name given to each character.

North-eastern Iberian syllabograms									
Velar Syllabic signs									
ka		**ke**		**ki**		**ko**		**ku**	
ga		**ge**		**gi**		**go**		**gu**	
Dental Syllabic signs									
ta		**te**		**ti**		**to**		**tu**	
da		**de**		**di**		**do**		**du**	
Labial Syllabic signs									
ba		**be**		**bi**		**bo**		**bu**	

The standard script also takes into account dualities for all vowels, as attested in the Tos Pelat abecedary for all five vowels, and in the Castellet de Bernabé abecedary, for **a** and **o**. Duality for the sign **e** explicitly appears in some painted inscriptions from Llíria. However, the graphic opposition detected between marked and unmarked vowels has not found any plausible phonetic explanation so far (Ferrer 2013b, 451; 2014a).

North-eastern Iberian vowels									
á		**é**		**í**		**ó**		**ú**	
a		**e**		**i**		**o**		**u**	

The standard Unicode script also includes dualities for continuous consonants explicitly attested in some of the abecedaries preserved. Such is the case of the duality of trill **r** attested in the Tos Pelat abecedary and in several long inscriptions on lead. On the analogy of the use of this exact same duality in the south-eastern Iberian script, where **ř** most frequently appears in an intervocalic context, it has been proposed (Ferrer 2010, 101; 2013b, 448; 2014a) that the marked variant in the north-eastern Iberian script, **ř,** was the multiple trill, whereas the unmarked variant, **ŕ**, should be the simple one. This is also the case for sibilant **s**, attested in the Castellet de Bernabé abecedary and sporadically in some other inscriptions. On the analogy of the value of the mark of occlusive consonants, it has been proposed (Ferrer 2013b, 445; 2014a) that the marked sibilant **ŝ** should be the voiced one (*fortis*), whereas the unmarked variant **s** should be the voiceless one (*lenis*).

North-eastern Iberian Consonants with dual variants			
ř		**ŝ**	
ŕ		**s**	

The remaining continuous consonants, **r**, **ś**, **m**, **n** and **l,** do not present dual variants in the currently known abecedaries.

North-eastern Iberian consonants without dual variants									
r		**ś**		**m**		**n**		**l**	

Although there is at least one extant Iberian inscription (Ferrer *in press*; 2014a) and two Celtiberian inscriptions with an isolated marked variant of **n**, similar to what is attested in the south-eastern Iberian script, the most plausible hypothesis is that sign **m** in the north-eastern Iberian script was actually a marked variant of **n** and, therefore, the explicitly marked variants of **n** were indeed allographs of **m**.

There is a scarcely attested sign  , which according to its shape could work as a marked variant of **l** (X5; Rodríguez 2001, 287; S79; de Hoz 2011, 190 and 744); in fact, in the Castellet de Bernabé abecedary it is found paired with **l**, although inverted with regard to the usual complex-simple order. It has commonly been considered as a variant of **e** (**e7**) or **ka** (**ka7**) (Untermann 1990, 246). In inscriptions, it usually appears in the same order, paired with preceding **l**; for this reason the hypothesis of this sign being a complex variant of **l** must be rejected, although it could have been so originally. Therefore, it is also necessary to reject its transcription as **l'**. In some texts where attested, it seems plausible to consider that this sign had a vocalic component related to lateral **l**. Finally, it is arbitrarily represented in this proposal as **â,** instead of **á** as displayed in other works (Rodríguez 2001, 286; Ferrer 2009, 474) in order to avoid confusion with the complex variant of vowel **a**.

Sign  (S75; de Hoz 2011, 190 and 744), which appears as  or under a double-arrow shape in early inscriptions (S77; de Hoz 2011, 189 and 744), has commonly been regarded as a variant of one of the nasal signs, either **m** or **ḿ** (Untermann 1990, 247, **ḿ5**), or as a non-deciphered sign, but its appearance in the Ger abecedary and probably also in the Tor de Querol abecedary (Ferrer 2013a; 2014b), together with **m** and **ḿ**, proves its independence and its relationship with nasals, as it appears next to **ḿ**.

The transcription of sign  as **ḿ** does not reflect its real value either, since it is commonly accepted that it might have both a nasal and a vocalic component. Yet, we keep the usual transcription **ḿ** out of tradition.

North-eastern Iberian signs with problematic values with both a vocalic and a consonantal component					
m̆		**ḿ**		**â**	

Additionally, there are several extremely rare signs for which it cannot be said whether they are independent signs or local variants for already known signs.

Sign S87, which is similar to a herringbone with two, , or three strokes,  , (X4; Rodríguez 2001, 284; S87; de Hoz 2011, 744), is the most common one in this group. This sign is sometimes transcribed as **e**, as in the coin inscription **sesars** (A.44); however, it could also be either an inverted variant of the complex shape of sign **u** (Ferrer 2011a, 218, note 8), a hypothetical variant of the sign for **bo** (Ferrer and Garcés 2005, 987) or even a sign with another different value. Although this sign does not appear in any of the extant abecedaries, it seems reasonable to encode it in the Unicode standard, since it is used in approximately twenty inscriptions.

The sign  also belongs to this group (X1/X2; Rodríguez 2001, 282; S76; de Hoz 2011, 744). It is only clearly observed once, on the *ostrakon* from Pontós (C.3.1), where it is interpreted as a complex variant of **ke**. Thus, as it must be considered as a hapax, it seems better not to encode it in the Unicode standard.

Another conflictive character (Velaza 2009, 617) is the second sign attested in the coin inscription **a<u>r</u>saos** (A.37). In spite of its irregular shape,  , similar to a **a6** (Untermann 1990, 246), it is usually considered as an allograph of **r**, and thus it does not need to be encoded separately.

Neither has the possibility that some dualities actually show three elements of variability been taken into account in the Unicode repertoire, as on the lead sheet from Castelló (F.6.1) and perhaps on the one from Ensérune (B.1.373*; Hesperia HER.02.773), where variants for sign **ke** composed of two strokes, in the first case, and of two dots, in the second one, are found (Orduña 2013, 518, note 9). Such variants have usually been considered to be allographs of the complex variant, but it must be noted that they appear together in the same text, alternating both with purely unmarked variants and with variants marked with a single stroke or dot. This could be an indication that the three-element variability could also be internally significant. Although this phenomenon is not explicitly attested in any other inscriptions, such an explanation could also be applicable to other signs, which, according to their known shapes, could turn out to have three working variants, instead of the two defined by the dual system (Ferrer 2010, 107, note 122). However, since evidence is currently scarce in this respect, these variants have not been included in this proposal.

In a similar way, in some other inscriptions, for instance on a *kálathos* from Castelillo de Alloza (E.4.2) and on the lead sheet from Olriols, Tamarit de Llitera (Ferrer and Garcés 2005, 988, note 10), two reflected variants of the sign **ki**, in particular **ki1**, 𐬬, and **ki6**, 𐬭, coexist. Again, it is not clear if this must be considered as a deliberate attempt to differentiate the sounds or if it is just the result of the natural variability in manual writing.

Hence, the group of characters proposed to encode the north-eastern Iberian script would be as expressed in the following table. A place for a hypothetical complex **ś** has been saved, not attested in the north-eastern Iberian script, but existing in the south-eastern Iberian script. The remaining saved codes are displayed in the fourth column.

Set of characters to be encoded as the north-eastern Iberian standard script								
	000YYYC[4]		000YYYD		000YYYE		000YYYF	
0	𐬀	**á**	𐬐	**ga**	𐬠	**do**	𐬰	S87
1	𐬁	**a**	𐬑	**ke**	𐬡	**tu**		
2	𐬂	**é**	𐬒	**ge**	𐬢	**du**		
3	𐬃	**e**	𐬓	**ki**	𐬣	**l**		
4	𐬄	**í**	𐬔	**gi**	𐬤	**ã**		
5	𐬅	**i**	𐬕	**ko**	𐬥	**m**		
6	𐬆	**ó**	𐬖	**go**	𐬦	**n**		
7	𐬇	**o**	𐬗	**ku**	𐬧	**ḿ**		
8	𐬈	**ú**	𐬘	**gu**	𐬨	**ǎ**		
9	𐬉	**u**	𐬙	**ta**	𐬩	**r**		
A	𐬊	**ba**	𐬚	**da**	𐬪	**ř**		
B	𐬋	**be**	𐬛	**te**	𐬫	**ŕ**		
V	𐬌	**bi**	𐬜	**de**	𐬬	**ŝ**	𐬱	numeral
D	𐬍	**bo**	𐬝	**ti**	𐬭	**s**	𐬲	numeral
E	𐬎	**bu**	𐬞	**di**			𐬳	1/4
F	𐬏	**ka**	𐬟	**to**	𐬮	**ś**	𐬴	1/2

[4] The specific encoding of this script has not yet been assigned.

2.6. Character Names

Over the last few years, the designation *north-eastern Iberian* script has been the most common name used among scholars, prevailing over *Levantine Iberian* script. In order to establish the terminology for each character, the name of the script is displayed in the first place, followed by its transcription or proposed value. In order to avoid problems with the special characters in the text file, transcriptions **a, á, e, é, i, í, o, ó, u, ú, r, ŕ**, **ř**, **s**, **ś**, **ŝ**, **m**, **ḿ**, **m̌** are represented respectively as **a1**, **a2**, **e1**, **e2**, **i1**, **i2**, **o1**, **o2**, **u1**, **u2**, **r1**, **r2**, **r3**, **s1, s2, s3, m1, m2**, **m3**.

Glyph	Name
𐬇	NE IBERIAN LETTER E2
𐬆	NE IBERIAN LETTER E1
𐬀	NE IBERIAN LETTER KA
𐬁	NE IBERIAN LETTER GA
𐬂	NE IBERIAN LETTER M2
𐬃	NE IBERIAN LETTER N
𐬄	NE IBERIAN VALUE MARK 1-4

3. CODIFICATION OF THE SOUTHERN PALAEOHISPANIC SCRIPTS

3.1. Characteristics of the script

3.1.a. South-eastern Iberian script

Unlike the north-eastern Iberian script, the south-eastern Iberian script has not been fully deciphered, since there are many signs for which there is no agreed value among specialists. The main resources for its decipherment are:

- The similarities with the Phoenician alphabet and the north-eastern Iberian script for shared signs.
- Internal data derived from the particularities of the south-western script, where the syllabic signs are always followed by a vowel in an apparent redundancy. This feature allows the vocalic signs to be differentiated from the syllabic signs, and both from the other alphabetic signs, as well as the vocalism for the syllabic signs to be identified.
- Finally, since the two Iberian scripts represent the same language, it is also possible to identify some well-known elements attested in the north-eastern script in the south-eastern script as well.

The references in brackets accompanying the sign transcriptions correspond to the codes used by de Hoz 2010, 621-622; 2011, 739-741: the signs with a code beginning with a G correspond to signs with an identified value, whereas those beginning with an S correspond to signs still to be identified. However, it should be also noted that the criteria used by this scholar do not always match mainstream conventions.

The value for signs **a** (G1), **i** (G3), **l** (G6), **n** (G9), **ŕ** (G7), **s** (G12), **ś** (G13), **ta** (G19), **tu** (G23), **ka** (G14), **ke** (G15) and **ko** (G17) has been unanimously accepted since the publication of the very first studies, as it coincides with the values given to those signs in the north-eastern Iberian script and, in some cases, with the Phoenician signs, from which the former are derived (Gómez-Moreno 1943, 1961; Bähr 1948, Beltrán 1954, 1962; Caro Baroja 1954; Schmoll 1961; Tovar 1961; Maluquer 1968; Fletcher 1982).

South-eastern Iberian signs with well-known values									
a (G1)		**i** (G3)							
l (G6)		**n** (G9)		**ŕ** (G7)		**s** (G12)		**ś** (G13)	
ta (G19)		**tu** (G23)		**ka** (G14)		**ke** (G15)		**ko** (G17)	

In recent studies (de Hoz 1976; 1986; 1994; 2010, 621-622; 2011, 738-741; Correa 1985, 2004; Silgo 1989; Untermann 1990; Faria 1990-1991; Rodríguez 2002; Ferrer 2010, 71; Velaza 2013) there is also almost full unanimity regarding the identification of signs **o**, **ti**, **u**, **e** and **bi** thanks to the lexical parallels obtained from comparison with north-eastern Iberian texts.

South-eastern Iberian signs whose values are almost unanimously accepted									
o (G4)		**ti/tí** (G21')		**u** (G5)		**e** (G2)		**bi/bí** (S44)	

There is a group of signs for which, even if there is not yet absolute consensus, a specific interpretation has obtained majority support:

- **ki** (de Hoz 1981, 477; Faria 1990-1991, 82; Rodríguez 2002, 235; Ferrer 2010, 71; Velaza 2013, 541).
- **be** (S41) (Untermann 1990, 143; Faria 1991, 193; Rodríguez 2002, 232; Correa 2004, 88; Velaza 2007, 275; Ferrer 2010, 71).
- **ba** (S60) (Untermann 1990, 143; Faria 1991, 193; Rodríguez 2002, 232; Velaza 2007, 275; Ferrer 2010, 71 ; with doubts Correa 2004, 91).
- **r** (S56) and the exchange of value with **ŕ** (G7) (Untermann 1990, 142; Faria 1991, 193; Correa 1993-1994; Rodríguez 2002, 232; Velaza 2007, 275; Ferrer 2010, 71).

- **te** (S47) (de Hoz 1976, 264; Faria 1990-1991; Rodríguez 2002, 233; Correa 2004, 92; Ferrer 2010, 71; Velaza 2013, 541).
- **bo** (G27) (de Hoz 1976, 257; Untermann, 1990, 142; Faria 1991, 193; Rodríguez 2002, 233; Correa 2004, 86).

South-eastern Iberian signs for which one of the values proposed has obtained wide support													
ki (S46)		**be** (S41)		**ba** (S60)		**r** (S56)		**ŕ** (G7)		**te** (S47)		**bo** (G27)	

It must be pointed out that the proposals made by de Hoz 2011, 738-741, regarding the signs commonly read as **ba** (S60), **be** (S41) and **r** (S56) diverge from the mainstream opinion; this scholar interprets **ba** (S60) as **bi**, **be** (S41) as a sixth vowel **í** or an unidentified sign, and **r** (S56) as another unidentified sign. Moreover, he transcribes the first trill, **ŕ** (G7), as **r,** unlike all other scholars, who transcribe it as **ŕ,** since **r** has been identified (S56). Another difference comes from the fact that the signs transcribed by most specialists as **ki**, **ti** and **bi**, are transcribed by this scholar as **kí**, **tí** and **bí**, considering that they might correspond to the syllabic serial for a sixth vowel **í** (de Hoz 2010, 414).

In the case of sign S47,  , opinions are widely divided, but the proposal that it might have the value **bu** (Fletcher 1982, 16; Silgo 1989, 178; Faria 1991, 193) is the traditional one, since this is its value in the north-eastern Iberian script. Others leave it in the group of unidentified signs (Correa 2004, 91; de Hoz 2005, 370; 2011, 738). Untermann 1990, 144, considers it as a variant of the sign **te**. According to Rodríguez 2002, 238, it could match both **bo** or **bu**. For Ferrer 2010, 72, its value might be **bo**, in accordance with the vocalism in the south-western script, where it is usually interpreted as **bo** (Schmoll 1961; Correa 1985 and Untermann 1990, 144).

Controversial sign	
bu (S47a)	

There is another group of signs without a clear mainstream value that are classified as signs pending identification in this proposal:

- The interpretation of the value of sign S48,  , is problematic due to its scarcity: it is only attested in two inscriptions, one of the La Bastida lead sheets (G.7.2) and one of the El Amarejo lead sheets (G.24.1). Taking into account the context in which it appears, some researchers propose its value as **e** (Untermann 1990, 145; Faria 1991, 193; Rodríguez 2002, 238); others, in contrast, taking into account its value in the north-eastern Iberian script, sustain it would fit with **ti** (Fletcher 1982, 16; Silgo 1989, 178; de Hoz 1993a, 637; 2011, 738), whereas, according to others, it would be a sign not

yet identified (Correa 2004, 93; Ferrer 2010, 72); nevertheless, this last scholar considers it possible that it had a vocalic value, corresponding perhaps with the sixth vowel proposed by de Hoz 2010, 414.

- The sign S45, 𐬴, is currently identified with the value **ki** (de Hoz 1976, 259; 2011, 738; Silgo 1989, 177; Untermann 1990, 141; Faria 1991, 193), in accordance with its value in the north-eastern Iberian script. For others it would be either **ku** (Rodríguez 2002, 236), **te** (Velaza 2007, 275) or a non-identified sign (Correa 2004, 92; Ferrer 2010, 72); nevertheless this last scholar considers it might be a velar sign because it alternates with the sign **ka**.
- The sign S42, 𐬸 , only appears with any degree of clarity on the Gador lead sheet (H.1.1). According to de Hoz 1980, 304; 2010, 410, it must be an allograph of S43, 𐬹 with the value **ba**, since in the south-western script S42 it is a syllabic sign associated with the vowel /a/ to which the value **ba** is usually given (Untermann 1997, 144). On the other hand, Untermann 1990, 249, Correa 2004, 90 and Ferrer 2010, 72, consider S42 as a not-yet-identified sign, although the latter considers it plausible that it belongs to the labial series. For Rodríguez 2006, 40, it must be a variant of **ke**. For Faria 1990-1991, 78, it must be a variant of **be**.
- The sign S81, 𐬱, is only attested on one of the lead sheets from La Bastida (G.7.2). According to Rodríguez 2002, 240, it might have the value **to.** For Faria 1990-1991, 78, it would be **ke, ŕ** or **to** (Faria 2002, 128). Other researchers consider it as a not-yet-identified sign (Untermann 1990, 145; Correa 2008, 287; Ferrer 2010, 72), although the latter considers it plausible that it belongs to the dental series.

South-eastern Iberian signs pending identification							
? (S48)	𐬷	**?** (S45)	𐬴	**?** (S81)	𐬱	**? (**S42**)**	𐬸

On the other hand, there are some poorly documented signs. For these signs, we cannot be sure whether they are infrequent independent signs, local variants for some of the already known signs or even just some bad readings. For this reason, these signs have not been encoded into the Unicode standard, at least not until new inscriptions confirm their existence as independent signs.

The sign S65, 𐬵, is only attested on the lead sheet from Gador (H.1.1) and on the lead lid from Arjona (H.56.1*). According to Untermann 1990, H.1.1, it must be a variant of **ti**, whereas Rodríguez 2006, 41, transcribes it as **te**, although he also considers the alternative of the vowel **a**. In one of the newly attested examples in the Arjona inscription (H.56.1*) it seems to require a vocalic value. For this reason de Hoz 2011, 350, considers the possibility that its value is **e**.

According to Ferrer 2010, 97, the sign S65 , the sign ?1 , attested on the lead sheet from Los Allozos (H.51.1*), the sign, ?3, , on the relief from Cerro Boyero (H.53.1*) and the sign S70 , attested in the coin inscription from Salacia (A.97) —outside Iberian territory—, should be considered as complex variants of a possible duality in which S81, , would also act as a complex variant. The supposed simple variant, , has not yet been clearly attested; perhaps, it could be identified as a variant of the sign , on the lead sheet from Los Allozos (H.51.1*), which could also match with **ba (**Rodríguez 2006, 35).

Poorly attested south-eastern Iberian signs									
? (S65)	(H.1.1 / H.56.1*)	? (?1)	(H.51.1*)	? (?2)	(H.51.1*)	? (S70)	(A.97)	? (?3)	(H.53.1*)

Other hapax signs documented only once are:

- S61, , (de Hoz 2010, 417) only attested in a stone inscription from Castulo (H.6.11*) which could be a bad reading (Ferrer 2010, 79).
- S62, , only attested in one of the coin legends from Obulco / ***ibolka*** (A.100). Some researchers consider that it could be a ligature of **a** and **n** (Faria 1990-1991, 81) or **ba** and **n** (Ferrer 2010, 93, note 82).
- S63, , only attested on the lead sheet from Gador (H.1.1). Although de Hoz considers it an independent sign, most scholars consider it as a variant of some other signs: **n** (Untermann 1990, H.1.1; Rodríguez 2006, 35; Ferrer 2010, 98) or **ki** (Faria 1990-91, 76).
- S64, , only attested on the lead sheet from Gador (H.1.1). Untermann 1990, H.1.1, considered it an unidentified sign, whereas Faria 1990-1991, 76, and Rodríguez 2006, 35, consider it a variant of **r**.
- ?4, only attested on the lead sheet from La Bastida (G.7.2). According to some scholars, it must be a simple variant of **ko** (Rodríguez 2002, 237; Correa 2004, 86) whereas for some others it might have the value of **ku** (Untermann 1990, 145, note 64; Faria 1990-1991, 78). According to Fletcher 1982, 48, it would be a ligature of **ko** and **a**. For Ferrer 2010, 72, it would be an unidentified sign.

South-eastern Iberian hapax signs									
? (S61)	(H.6.11*)	? (S62)	(A.100)	? (S63)	(H.1.1)	? (S64)	(H.1.1)	**?4**	(G.7.2)

De Hoz 1993b, 179; 2010, 414, has suggested the possibility that a sixth vocalic series could exist in the south-eastern Iberian script; in particu-

lar, he postulates a series with a vocalic sound similar to **i**, which he transcribes with the diacritic **í**. Its existence would justify the doublets of syllabic signs with vowel **i,** a hypothesis proposed by de Hoz as well: **tí / ti**, **kí / ki**, **bí / bi**. However, this interpretation has not found many supporters (explicitly against: Rodríguez 2002, 234 note 6; Ferrer 2010, 72; and implicitly against: Untermann 1990, 143; Faria 1991, 193; Velaza 2007, 275; Correa 2004, 91, scholars who assign some other different values to the signs interpreted as **ti**, **ki** and **bi** by de Hoz).

An alternative formulation of this hypothesis has been suggested by Ferrer 2010, 72: even though he classifies these signs among the not-yet-identified ones, he accepts the possibility that a sixth vowel might have existed,  , a sign which had already been previously interpreted as a vowel compatible with **e** by other scholars (Untermann 1990, 145; Faria 1991, 193; Rodríguez 2002, 238), as well as a new syllabic series associated with this vowel. This series would be constituted by the signs S81 (t?), S45 (k?) and S42 (b?).

Possible sixth vocalic series in the south-eastern Iberian script								
De Hoz 1993	**í** (S41)		**tí** (G21')		**kí** (G16')		**bí** (G26')	
	i (G3)		**ti** (S48)		**ki** (S45)		**bi** (S60)	
Ferrer 2010	**6th vowel** (S48)		**t?** (S81)		**k?** (S45)		**b?** (S42)	

Ferrer 2010 has proposed the possibility that the south-eastern Iberian script might also have a dual script modality, as actually happens for the north-eastern Iberian script. This would imply the existence of signs with two variants, each of them with its own value, differing from each other in presenting an additional stroke. This hypothesis contemplates the existence of dualities for the plosive dental syllabic signs, **ta/da, te/de, ti/di** and **tu/du**, and velar syllabic signs, **ka/ga, ke/ge, ki/gi** and **ko/go**. However, the dualities for **to**/**do** and **ku**/**gu** cannot yet be identified, but it is possible to identify dualities for the signs S45.2/S45.4 and eventually also for the sign S81. These dualities could respectively match with the syllabic signs **to**/**do** and **ku**/**gu** (Rodríguez 2002, 236 and 240) or with the dental and syllabic velar signs of the hypothetical sixth vowel series (Ferrer 2010, 72). In this hypothesis, Ferrer also identifies dualities for some continuous consonants: **n**/**ń**, **ś/š and ŕ/ř**. This proposal has been accepted by some researchers (Velaza 2011, 96, note 3; Jordán 2013, 117) but rejected by others (Faria 2013, 197; de Hoz 2013, 655, note 27).

Dual signs in the south-eastern Iberian script											
Dual velar syllabograms											
ga (G14)		**ge** (G15)		**gi** (S46)		**go** (G17)				**g?** (S45.4)	
ka (G14)		**ke** (G15)		**ki** (G16')		**ko** (G17)				**k?** (S45.2)	
Dual dental syllabograms											
da (G19)		**de** (S47g)		**di** (G21´)				**du** (G23)		**d?** (S81)	
ta (G19)		**te** (S47f)		**ti** (G21´)				**tu** (G23)		**t?**	

Continous consonants with dual variants duals					
ř (G7)		**š** (G13)		**ń** (G9)	
ŕ (G7)		**ś** (G13)		**n** (G9)	

Even though the south-eastern Iberian script has not yet been fully deciphered, the parallelisms of this script with the north-eastern Iberian script, together with the fact that the inscriptions are mainly in the Iberian language, allow us to postulate that the south-eastern Iberian script features at least five vocalic signs (**a**, **e**, **i**, **o**, **u**), five syllabic signs for the plosive dental sounds (**ta**, **te**, **ti,** [**to**], **tu**), velar sounds (**ka, ke, ki, ko**, [**ku]**) and labial sounds (**ba**, **be**, **bi**, **bo**, **bu**), and consonantal signs: a nasal (**n**), a lateral (**l**), two sibilants (**s** and **ś**) and two trills (**r** and **ŕ**). As is the case in the north-eastern Iberian script, it seems that the syllabic dental signs (**ta/da, te/de, ti/di, to/do** and **tu/du**) and syllabic velar sounds (**ka/ga, ke/ge, ki/gi** and **ko/go**) must present double series to distinguish the voiceless from the voiced variant. A similar mechanism might also be applied to the double nasal (**n/ń**), one of the two sibilant sounds (**ś/š)** and one of the two vibrant sounds (**ŕ /ř**). It also seems plausible to consider the possibility that a sixth vowel (S48 /) might have existed, perhaps with a value compatible with **e**, and perhaps a syllabic series associated with this vowel, although the signs affected by this hypothesis (S81, S45 and S42) are classified among the signs pending identification in this proposal.

Regarding the direction of the script, the texts are usually written from right to left, but also, in some cases, from left to right.

3.1.b. The south-western script

The most significant feature of this script is that the syllabic signs are almost always accompanied by a vowel (Schmoll 1961), a fact that is interpreted by most researchers (Correa 1993 553; Adiego 1993 20; Untermann

in press [1992] note 1; Hoz 2010, 503) as a redundancy of the syllabic signs, while others see it as a redundant alphabet (Rodríguez 2004 33). This means that the syllabic signs of this script are represented differently from the usual form: **k(a)** and **k^{a}** are the most common ones, as opposed to the traditional **ka.**

It must also be borne in mind that the language used in the inscriptions is unknown[5] and therefore the Iberian language conventions applied to the south-eastern Iberian script are not necessarily valid for the south-western script. In particular, it affects the transcription of the vibrant and the transcription of the labial signs, since the voiceless labial (p) cannot be ruled out, as happens in Iberian.

Most of the signs of the south-western script have equivalents with the same value in the south-eastern Iberian script (Correa 1996; de Hoz 2010; Correia 1996; 2014; Untermann 1997; Rodríguez 2000; Valério 2008;[6] Ferrer i.p.).

South-western signs whose value matches the corresponding south-eastern Iberian signs									
a (G1)		**e** (G2)		**i** (G3)		**o** (G4)		**u** (G5)	
s (G12)		**ś** (G13)							
r (G7)		**ŕ** (S56)		**l** (G6)				**n** (G9)	
ka (G14)		**ke** (G15)		**ki** (S46)		**ko** (G17)			
ta (G19)		**te** (S47f)		**ti** (G21')				**tu** (G23)	
				bi (S44)					

The discrepancies between the two scripts fundamentally affect the timbre of some vowels of the syllabic signs and could be reduced if some of the assumptions currently not being considered were finally correct:

[5] Koch's 2009, 2014, proposal that the language of the south-western inscriptions was a Celtic language has been widely rejected (de Hoz 2013, note 23; Gorrochategui 2013, 53; Luján 2013, 103; Eska 2014; Prósper 2014; Valério 2014).

[6] Miguel Valério, in a personal communication, informed us that he has changed his initial proposal (i.p.). In this new approach he seems to be nearer to the general consensus regarding signs S42 / **ba** and S44 / **bi**, among others.

South-western signs whose value does not match the corresponding south-eastern Iberian signs												
SW	**ba** (S42)		**be** (S60)		**?** (S41)		**bo** (S47a)		**bu** (S58)		**ku** (S47g)	
SE	**?** (S42)		**ba** (S60)		**be** (S41)		**bu** (S47a)		**bo** (S58)		**de** (S47g)	

- The sign S60 ( ), interpreted with the value **ba** in the south-eastern Iberian script, is mainly interpreted with the value **be** in the south-western script.
- The sign S42 ( ), which does not have an agreed value in the south-eastern Iberian script, is mainly interpreted with the value **ba** in the south-western script.
- The sign S41 ( ), which is interpreted with the value **be** in the south-eastern Iberian script, does not have an agreed value in the south-western script.
- The sign S47a ( ) and the sign S58 ( ) exchange their values according to the mainstream proposal.
- The sign S47g ( ), interpreted in the south-eastern Iberian script as a complex variant of **te**, is interpreted with different values in the south-western script, although the value **ku** (Untermann 1997, 171; Correa 1996, 69) can be considered as the most accepted value.
- The trills exchange their values, as G7 ( ) is the most frequent one. Although the same happens in the south-eastern Iberian script, this script follows the convention inherited from the north-eastern Iberian script.

The values indicated by signs in the tables are in each case those that have received widest acceptance. The most significant differences are listed below:

- Valério 2008, 134, considers that the sign S42 / **ba** ( ) should have the value **m.**
- Untermann 1997, 172, considers that the sign S46 / **ki** ( ) should be a sign pending identification.
- De Hoz 2010, 621, considers that the sign S56 / **ŕ** ( ) should be a sign pending identification.
- De Hoz 2010, 621, considers that the sign S47a / **bo** ( ) should have the value **bu** whereas Correia 1996, 50; 2014, 93, considers that its value could be **bo** or **bu.**
- Valério 2008, 134, considers that the sign S47f / **te** ( ) could have an aspirated value.
- Rodríguez 2000, 39, and Ferrer i.p. consider that the sign S47g / **ku** ( ) should have the value **bu**, while Valério 2008, 134, considers that it could have an aspirated value. Correia 1996, 50; 2014, 93, considers that it must be a variant of the sign S47f / **te** ( ). De Hoz 2010, 379, considers that it must be a variant of S47a / **bo** ( ).

- Untermann 1997, 172, and Correa 1996, 69, consider that the sign S44 / **bi** () must be a sign pending identification, while Valério 2008, 134, considers that it might be a sibilant.
- Rodríguez 2000, 38, Valério 2008, 134, and Ferrer *in press* consider that the sign S58 / **bu** () should have the value **ku**. De Hoz 2010, 620-621, considers that it should have the value **bo**, while Correia 1996, 44; 2014, 93, considers that it must be an allograph of the **ko** sign.

The signs S41 () and S81 () are generally considered signs pending identification in the south-western script.

Other signs pending identification			
? (S41)		**?** (S81)	

- S41 (): Correa 1996, 69, and Ferrer *in press* consider that it could be a syllabic sign related to the vowel **a**. Valério 2008, 134, considers that it could have the value **ba**. Rodríguez 2000, 38, and Correia 2014, 93, proposed that it could be an aspirated sign, while Untermann 1997, 172, and de Hoz 2010, 376, consider that it must be a sign pending identification.
- S81 (): De Hoz 2010, 381, and Rodríguez 2000, 39, with some reservations, proposed that it might be a variant of **ke.** Valério 2008, 134, considers that it must have the value **te**. Untermann 1997, 171, considers that it has the value **be**. Correa 1996, 69, Correia 2014 and Ferrer i.p. consider that it must be a sign pending identification.

There are some signs of the south-western script that are not documented in the south-eastern Iberian script.

South-western signs without an equivalent in the south-eastern script							
to (S57)		**?** (S80)		**?** (S92 / S87)	 /	**?** (S83)	

- The sign S57 () could be interpreted in south-eastern Iberian script as a variant, probably complex, of **tu**. However, in the south-western script it is mainly interpreted with the value **to**. De Hoz 2010, 376, note 435, considers that the sign S57 must be an allograph of **tu**, while Correia 1996, 50; 2014, 93, considers that it could be **to** or **tu.**
- S80 (): Untermann 1997, 172, and Rodríguez 2009, note 7, consider that it could be the labial nasal **m.** Correa 1996, 69, and Ferrer i.p. consider that it must be a syllabic sign associated with the vowel **u.** De Hoz 2010, 376, considers that it may be an independent sign or just a variant of **ś**, while Correia 1996, 38, and Valério 2008, 134, strictly consider this sign a variant of **ś.**

- S92 (𐊹) / S87 (𐊼): These two signs could be variants of the same sign (Rodríguez 2000, 42; de Hoz 2010, 382). The first appears in inscription J.28.1 and in the new inscription from Monte Gordo (Guerra *et al.* i.p.), in both cases before the vowel **i.** The second sign appears twice in inscription J.12.4, once before a fracture and in the second case before the vowel **i**. For the second, Untermann considered the possibility that it was a variant of **ti**. Rodríguez 2000, 44, considers the alternatives **bi** and **ti**. Correia 1996, 43, Valério 2008, 132, and de Hoz 2010, 381, note 463, consider that it could be a variant of **bi** (S44). Ferrer i.p. considers that it must be a syllabic sign associated with the vowel **i**.
- S83 (𐊿): This sign appears only on inscription J.15.1; therefore it is strictly a hapax, but as there is a common sign in the north-eastern Iberian script with the value of **m**, it receives special attention. Untermann 1997, 171, with some reservations, considers that it could be a strong n, **n(n)**. Correa 1996, 69, and Correia 2014, 93, consider with some hesitation that it could be **m.** Rodríguez 2000, 46, also with doubts, considers that it could have the value **be.** De Hoz 2010, 620-621, and Ferrer i.p. keep the sign among the signs pending identification. Valério 2008, 132, considers that it is a non-existent sign, the result of a mistake when writing an **n**.

There is a group of signs in the form of an H with multiple horizontal bars that always appear in front of a vowel except for the vowel **i** (Untermann 1997, 171; 2010 378; de Hoz and Correa 1987, 279; Ferrer *in press*). These signs are usually considered variants of S47a (𐊰) S47f (𐊵) and S47g (𐊶), depending on the preceding vowel, **o**, **e** or **u**, although some variants tend to be classified among the hapax signs or with unknown value. The variability of shapes could have a geographic explanation, more stable in the south-western script's nuclear area of use and more variable on the periphery (Correa 1987, 279). Rodríguez 2000, 41, considers the forms that appear in front of the vocal **a** must have the value **ta**. Correia 1996, 50; 2014, 93, equates the value to the variants of **te,** while according to Valério 2008, 134, they should be considered be variants of the sign with the value of an aspirated sign.

South-western series of signs with the shape of an H whose value is uncertain															
S47b	𐊰	S47c	𐊱	S47d	𐊲	S47e	𐊳	S47h	𐊴	S47i	𐊴	S47j	𐊴	S86	𐊸

A characteristic feature of the south-western script is the abundance of signs that only appear once. Some of those correspond to inscriptions known only from drawings (J.11.4) or in poor condition (J.5.1, J.14.1 and J.4.2). For almost all of them interpretations as variants of the most frequent signs have been proposed and in some cases they are interpreted as errors or mere decorations (S90). The following table lists the most significant: Correa (Correa

1996); RR (Rodríguez 2000); JdH (de Hoz 2010) and *MLH* (Untermann 1997) or reference to the most recent publication.

South-western hapax signs							
JdH-S50 RR-316 MLH-**ke8**	 (J.5.1)	Guerra-2002	 (San Martinho)	Correa-43 JdH-S90	 (J.4.1)	Correa-39 JdH-S88 RR-302 MLH-**r9**	 (J.9.1)
Correa-49 JdH-S91 RR-312	 (J.28.1)	RR-306	 (J.10.1)	Correa-42 RR-301 MLH-**e4**	 (J.18.1)	Guerra-2009	 (Mesas)
RR-121 MLH-**ŕ6**	 (J.11.4)	Correa-41 JdH-S89 MLH-**r10**	 (J.11.4)	Correa-35 RR-315	 (J.11.5)	Correa-36 JdH-S85 MLH-**to2**	 (J.1.1)
JdH-S93	 (Garvao)	RR-303	 (J.4.2)	Correa-40 JdH-S82 RR-304	 (J.26.1)	Correa-44 RR-309	 (J.14.1)

3.1.c. The Espanca abecedary

The Espanca abecedary (Correa 1993; Untermann i.p. [1992]; 1997 J.25.1; Correia 1996; Adiego 1993; de Hoz 1996, 174; 2010, 488; Rodríguez 2004, 98) consists of two apparently identical lines of 27 signs, although some of the signs in the first line, which is interpreted as the model, are torn on top and some of the signs in the second line, which is interpreted as the copy, are engraved with less strength and precision and are difficult to identify.

Set of signs attested in the Espanca abecedary								
9	8	7	6	5	4	3	2	1
								
n (G9)	**ba** (S42)	**l** (G6)	**ke** (G15)	**i** (G3)	**tu** (G23)	**ka** (G14)	**be** (G2)	**a** (G1)
18	17	16	15	14	13	12	11	10
								
ku o **te** (S47g)	**ti** (G21')	¿? (S41)	**e** (G2)	**u** (G5)	**ta** (G19)	**ś** (G13)	¿? (S50)	**s** (G12)
27	26	25	24	23	22	21	20	19
								
ko (G17)	¿? (S52)	¿? (S45.2)	**o** (G4)	**bi** (S44)	¿? (S48)	**ki** (G16')	¿? (S51)	**bo** (S47a)

Despite its appearance in the territory of the south-western script, the Espanca abecedary lacks some of the characteristic signs of this script, **r** / G7 (ϥ) **ŕ** / S56 (ᚺ), **t** / S47 (ᚻ), S81 (◖), **bu** / S58 (ᛞ), **to** / S57 (A) and S83 (ᛗ); the first five are also common in the south-eastern Iberian script, although S47g (ᚻ) could be for **te** / S47 (ᚻ) and some of the missing signs could be hiding among the most doubtful signs.

For most of the signs there is a clear correspondence with signs identified in the south-eastern Iberian script or in the south-western script. The interpretation of the following is controversial.

- The 8th sign S42 (ϟ) must be avariant of sign S83 (ᛗ), according to Untermann 1997, 327,and Adiego 1993, 13.
- The 11th sign, S50 (Ͽ) could be an irregular form of sign **r** / G7 (ϥ), according to Untermann i.p. [1992] and Adiego 1993, 13. According to Correa 1993, 545, it could be a variant of the sign S81 (ϥ). It was also related (Rodríguez 2000, 41; Correa 2005, 297) to the hapax in inscription J.5.1 (Ͽ). De Hoz 2010, 625, considers the possibility that it is derived from the Phoenician sign pe with the value of **bi**.
- The 18th sign, S47g (ᚻ) in the south-eastern script is a variant of the sign **te** (ᚻ), but in the south-western script it is interpreted with the value **ku.** Generally, both alternatives for this sign are accepted, but de Hoz 2010, 625, considers only the value **te.**
- The 19th sign S47a (Π) could be a variant of **ŕ** / S56 (ᚺ), according to Rodríguez 2004, 98.
- The 20th sign, S51, is known only through the copy and it is not well identified. Its shape differs in the various published drawings (ㅓ/ ㅕ/ ㅕ/ ㅏ) and recalls the sign **u** in some cases, already clearly identified in the 14th sign, and in some others it recalls the hapax of inscription J.26.1 (ᛋ). For Correa 1993, 531, it could be the sign **r** / G7 (ϥ).
- The 22nd sign S48 (Ψ) is clearly identified in the south-eastern Iberian script, but it is not used in the south-western script, although Correia 1996, 42, assimilates it to sign S80 (ᛉ).
- The 25th sign, S45.2 (Ղ) is clearly identified in the south-eastern Iberian script; however in the south-western script it would only appear if the hapax in inscription J.11.5 (⥊) were a horizontal variant, since the other inscriptions where it has been proposed that it could appear (J.7.5, J.7.9, J.17.2, J.18.2 and J.18.3) are controversial readings.
- The 26th sign, S52 (Ф) could be a primitive form of the sign **r** (ᚺ), according to Untermann *in press* [1992]. It was also related (Correa 1992, 92; Untermann 1997 J.25.1; Rodríguez 2000, 41) to the hapax in inscription J.10.1 (ᚺ).

3.2. Ordering

3.2.1. Order in the code chart

The only southern abecedary known is the Espanca abecedary (Correa 1993; Untermann 1997, J.25.1; de Hoz 2010, 488), which reproduces the relative order of the Phoenician alphabet for its thirteen first signs, but it does not fit either the south-western script or the south-eastern Iberian script. However, the discovery of some north-eastern Iberian abecedaries in recent years, which present several kinds of ordering (Ferrer 2014), all of them differing from the example attested in Espanca, leads us not to exclude the possibility that a similar situation might have occurred for the south-eastern Iberian or south-western abecedaries.

Therefore, an ad hoc order has been adopted, grouping signs according to their value. Vowels will appear in the alphabetical order **a**, **e**, **i**, **o**, **u**; plosives in the usual alphabetical order **b**, **k**, **t**; and continuous consonants in the alphabetical order **l**, **m**, **n**, **r**, **s**. The marked-sign pairs will be grouped together, the marked character preceding the unmarked, as appears in the north-eastern Iberian abecedaries. Finally, the signs with more problematic values will appear. In the event of a conflict of values between the south-eastern Iberian script and the south-western script, the conflictive sign will be identified with its code, instead of its value, but the sign will maintain the position in the code chart that would apply under the assumed value in the two scripts, giving priority (arbitrarily) to the south-eastern Iberian script.

3.2.2. Order for sorting

Published Iberian lexicons (Tovar 1951; Siles 1985; Velaza 1991, Silgo 1994; Moncunill 2007, 24) use Latin alphabetical order for the alphabetisation of transcribed Iberian texts, although with some minor changes depending on the author and regarding the treatment of voiceless and voiced plosive sounds, as well as that of sibilants and trills.

Hence, in general terms the order proposed follows the alphabetical order of Iberian texts transcribed into the Latin alphabet. The exceptions to this principle are due to the aim of keeping groups of signs with similar values together. For this reason, the order proposed would be as follows: **a**, S42, S60, S41, **bi**, S92, S58, S47a, **da, ta,** S47g**, te, di, ti, to,** S81**, du, tu**, **e**, S48, **ga, ka, ge, ke, gi, ki, go, ko,** S45.4, S45.2, **i**, **l**, S80, S83, **ń, n**, **o**, **r**, **ŕ**, **ř, ś, š, s**, **u**, S47h, S50, S51, S52. Specific exceptions to the alphabetical order are the following ones:

- Consecutive order for the simple (**ś**) and the complex (**š**) variant of **ś**.
- Consecutive order for voiceless and voiced consonants in order to keep together the dual and non-dual transcriptions of the same elements.
- Aggrupation of the signs S42, S60, S41, S92, S58, S47a, S47g, S48, S45.4, S45.2, S81, S80 and S83 with the signs they have been related to, respectively, **ba**, **ba**/**be**, **be**, **bi**, **bo**, **bu**, **de**/**ku**, **e, gu, ku, to,** and the last two with **m**.

3.3. Numbers

Metrological expressions are not very common in the south-eastern Iberian script (Untermann 1990, 146; 146, de Hoz 1981; 2011, 191). The most representative inscription with that kind of symbols is the lead sheet from La Bastida (G.7.2), where the numerical component of the metrological expression is formed by groups of dots placed vertically in one or two columns · = 1, ·· = 2, ··· = 3, ···· = 4, ····· = 5. There are also some metrological expressions (G.0.1) that, as in the north-eastern Iberian script, are formed by groups of vertical bars: I = 1, II = 2, III = 3, IIII = 4, IIIII =5.

These signs usually appear together with characters of the basic corpus **a**, **o**, **ki**, which coincide with their equivalents in the north-eastern Iberian script. These characters could express measurement units in different metrological systems, so it does not seem necessary to encode them as different shapes.

Given that the dot is a common sign, it has not been considered necessary to encode it independently.

In the south-western inscriptions metrological expressions do not appear.

Numeric symbols	
Value	**Shape**
1	·
1	|

3.4. Separators

The majority of the seventy south-eastern Iberian inscriptions are very short and do not need to use word separators, but long texts (*ca*. 20 items) do use them. The most common word separator consists of a vertical bar, but the use of two, three or even more vertical dots is also common; taken all together they are used with a similar frequency to the bar. It must be remembered that some scholars (de Hoz 2011, 738-741) consider this vertical bar as a phonetic sign with the value of **ba** (S43). Sporadically a blank can also be used as separator and, in some other cases, we do not find any separators at all (Simón 2011).

The south-western inscriptions almost always appear as continuous writing whatever the length of the text. Only in a few cases does it seem that separators are used in the form of a vertical bar. The clearest case is inscription J.10.1.

Separators	
⋮	|

3.5. Characters

The general criterion that has been followed in the cases for which there is no unanimity among scholars has been to adopt for the Unicode the mainstream alternative. The standard script has been built taking into account as large an inventory of signs as possible, including all dual variants (Ferrer 2010) of the south-eastern Iberia script. Nevertheless, it does not include either the sixth vowel, or its syllabic associated series, since it would not respect the mainstream alternatives. It does not include the most doubtful and hapax signs in the south-eastern Iberian script either.

Set of southern Palaeohispanic characters to be encoded in Unicode								
	000XXXC[7]		000XXXD		000XXXE		000XXXF	
0		**a**		**ki**		**ŕ**		
1		**e**		**go**		**s**		
2		**i**		**ko**		**š**		
3		**o**		**da**		**ś**		
4		**u**		**ta**		S48		
5		S42		S47g		S45.4		
6		S60		**te**		S45.2		
7		S41		**di**		S81		
8		**bi**		**ti**		**to**		
9		S58		**du**		S80		
A		S47a		**tu**		S92		
B		**ga**		**l**		S83		
C		**ka**		**ń**		S86		
D		**ge**		**n**		S50		
E		**ke**		**r**		S51		
F		**gi**		**ř**		S52		

[7] The concrete encoding of this script has not been assigned yet. The last column is reserved for new future extensions if some of the controversial signs not encoded were finally confirmed.

On the other hand, it does include the better-documented signs exclusively belonging to the south-western script, S80 and S92, and also a sign from the set of south-western signs in the shape of an H with multiple horizontal bars (S86) as a representative of the cases not compatible with the use of S47a, S47f and S47g. Just as for the south-eastern Iberian script, the hapax signs are not included except for sign S83, as it also exists in the north-eastern Iberian script. Finally the exclusive signs from the Espanca abecedary have also been taken into account: S50, S51 and S52, although the precise shape of S51 is not defined.

The shapes are drawn corresponding to a right to left writing direction.

Following the criteria and main objectives of the Unicode standards, multiple variants of a single sign have not been included, but just the signs with different values. The choice of the most representative variant for each sign has been made according to their concurrency frequency.

Therefore, the set of characters proposed to encode the southern Palaeohispanic scripts would be those expressed in the table.

3.6. Names of the Characters

In order to establish the terminology for each character, the name of the script is displayed in the first place, followed by its transcription or proposed value; most doubtful signs are identified with a conventional code (de Hoz 2010, 620; 2011, 740). In order to avoid problems with the special characters in the text file, transcriptions **n**, **ń, r, ŕ**, **ř**, **s, ś**, **š** are represented as **n1**, **n2**, **r1**, **r2**, **r3, s1**, **s2, s3** respectively.

Glyph	Name
𐬀	SOUTHERN PALAEOHISPANIC LETTER E
𐬁	SOUTHERN PALAEOHISPANIC LETTER KA
𐬂	SOUTHERN PALAEOHISPANIC LETTER GA
𐬃	SOUTHERN PALAEOHISPANIC LETTER S48
𐬄	SOUTHERN PALAEOHISPANIC LETTER N1
𐬅	SOUTHERN PALAEOHISPANIC LETTER N2

4. Conclusions

This work is a preliminary attempt at the systematisation of the Palaeohispanic scripts into the Unicode standard. First of all, it must be pointed out that the aim of the Unicode codifications is not to describe and encode all the attested variants for each sign, but to establish the basic set of meaningful signs in a script, or a group of closely-related scripts.

With regard to the number of character sets needed to encode all the Palaeohispanic scripts, our proposal is to classify them into two main groups, the north-eastern Iberian and the southern Palaeohispanic ones, taking into account the repertory of shapes attested in each script, the value that must be given to every single character, as well as their different levels of decipherment. The first group includes the north-eastern Iberian script itself and the Celtiberian script, a subset of the previous one; while the second group includes the south-eastern Iberian script, the south-western script and the Espanca script.

Despite the fact that all the Palaeohispanic scripts have a common ancestor, as well as common features and a common basic set of signs with the same value, the differences between the two groups are too deep to be appropriately processed into a unique Unicode character set. The main obstacle is the different degree of decipherment between the two groups, which is almost complete for the north-eastern Iberian group and still incomplete for at least a third of the signs attested in the southern scripts. The second obstacle is that a large number of signs shared by these two groups actually have different values: it is the case for most of the vocalic signs, as well as for other frequent signs for which there is clear consensus on their value. Finally, it has to be pointed out that the case of the Old Italic scripts, a good example of closely related scripts unified under a unique Unicode standard codification, is not valid for the Palaeohispanic scripts. As a matter of fact, the internal differences between the Old Italic scripts are even less significant than the internal differences between the different north-eastern Iberian abecedaries and are not comparable at all with the differences between the two groups of Palaeohispanic scripts.

The basic set of signs for the north-eastern Iberian group is relatively easy to establish. As mentioned before, this script, attested in more than 2,000 inscriptions and nearly a dozen abecedaries, is almost fully deciphered. The dual standard abecedaries from Ger, La Tor de Querol and Bolvir support the existence of dualities for dental and velar plosives, while the dual extended abecedaries from Tos Pelat and Castellet de Bernabé support the existence of dualities for vowels and continuous consonants. Finally, the non-dual abecedary from L'Esquirol confirms the existence of a simplified set of signs without dualities. Moreover, some signs seem to be used exclusively in a restricted part of the Iberian territory, as happens with at least one sign exclusively attested in the Edetan zone. The solution adopted to build the Unicode set of signs for the north-eastern Iberian script has been to consider all the possible dual variants and all the different signs, including those with a geographically restricted use.

On the other hand, the selection of a basic set of signs for the southern Palaeohispanic group is a more difficult task, since the decipherment of these scripts is still incomplete. Only less than two hundred southern inscriptions are currently known, and no other abecedary than the one from Espanca is attested. The first problem to consider is that every southern script has

several exclusive signs; in this case the solution adopted is to include all the signs in the final character set. Another problem to deal with is the large number of hapax signs, only once attested, especially in the south-western script; these signs have been excluded until new inscriptions might confirm their autonomous existence. Although it is not a fully accepted hypothesis, we have also considered the existence of dual variants in the south-eastern Iberian script for dental and velar plosives and some of the continuous consonants. Finally, it must be remembered that, unlike the north-eastern Iberian group, where almost all the signs are identified with complete consensus, more than a third of the southern signs are identified merely with a conventional code, since scholars disagree about their values, or they are simply unknown.

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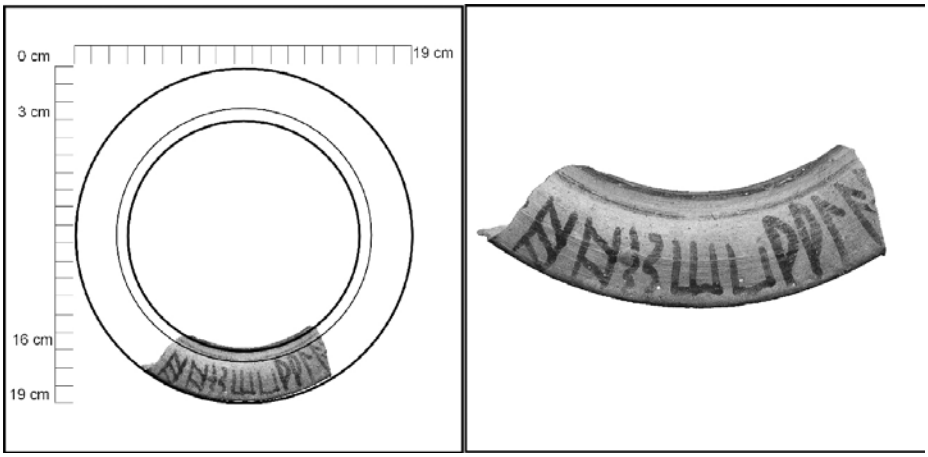

Fig. 1. The Castellet de Bernabé abecedary, extended dual script.

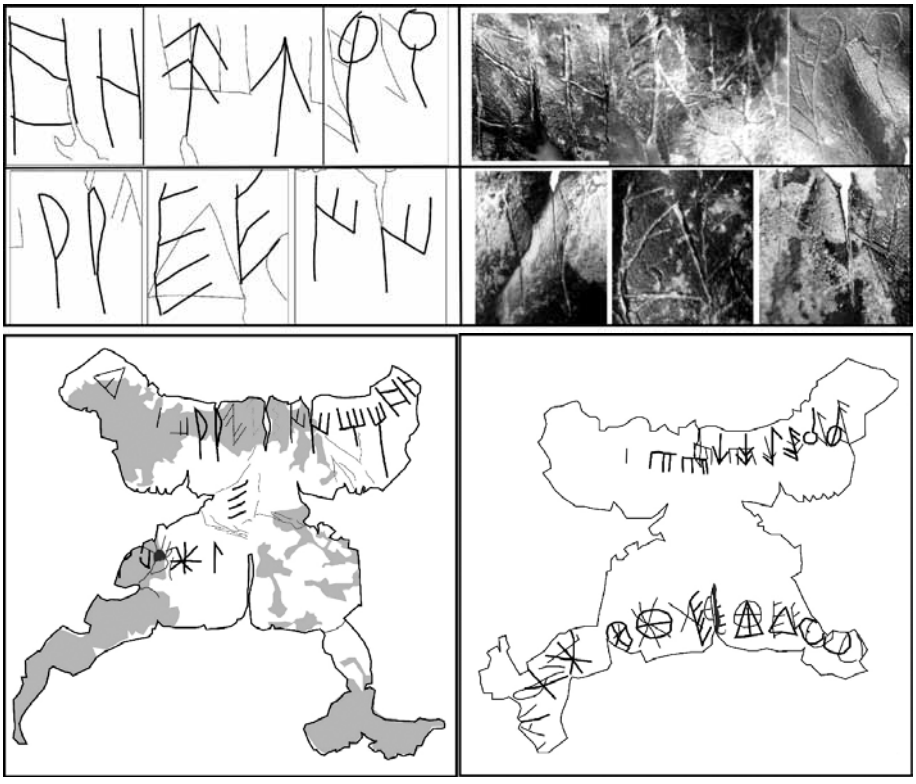

Fig 2. The Tos Pelat abecedary (F.13.77*), extended dual script.
Above, detail of dualities for vowels and trill.

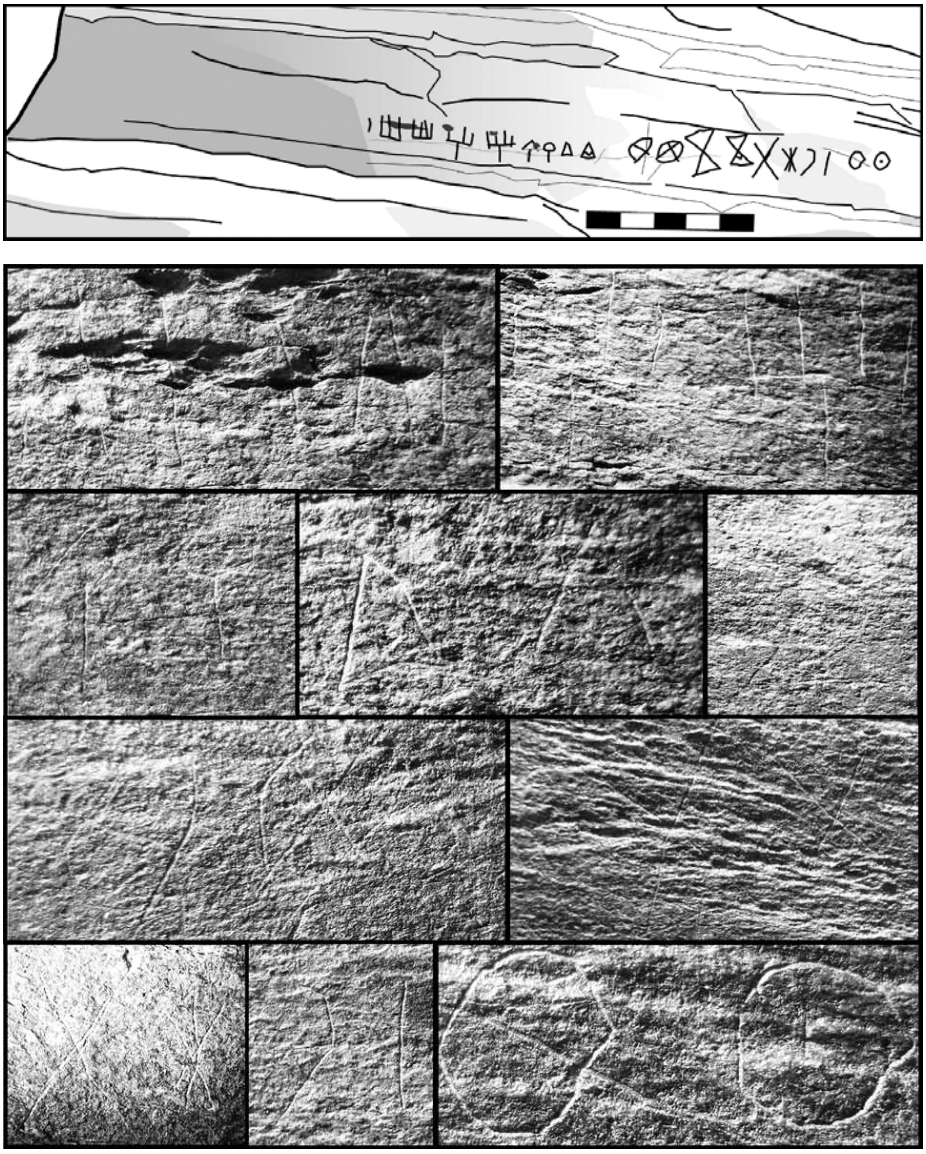

Fig 3. The Bolvir abecedary, standard dual script.

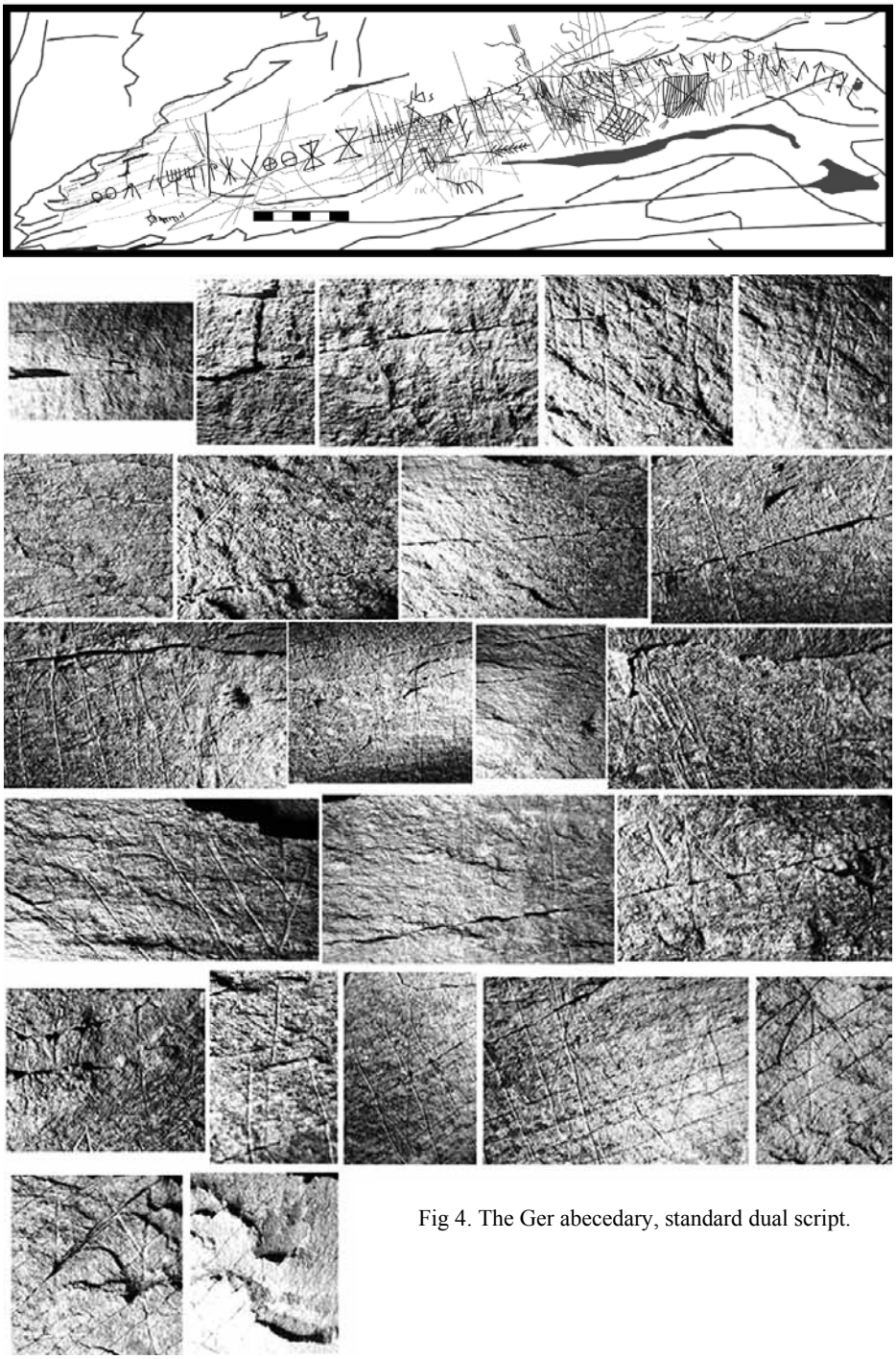

Fig 4. The Ger abecedary, standard dual script.

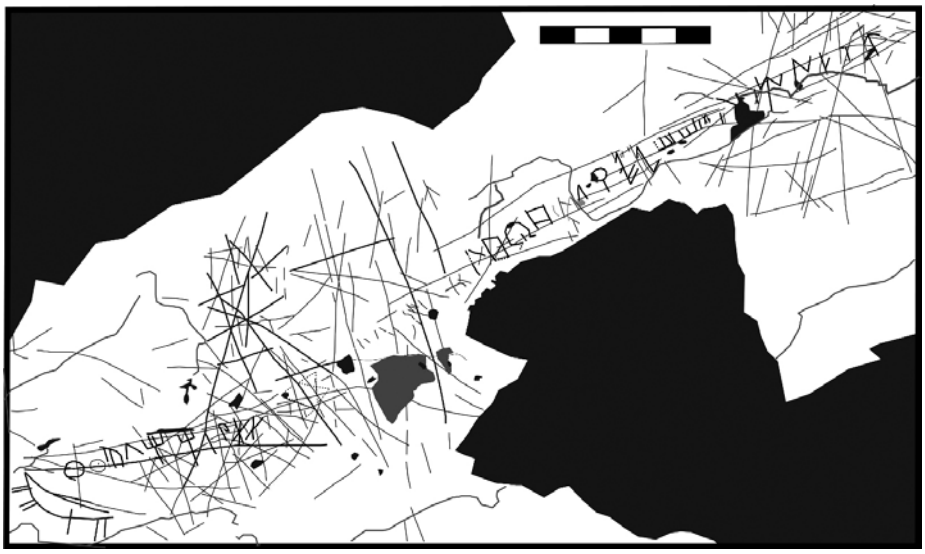

Fig 5. The Tor de Querol abecedary, standard dual script.

Fig. 6. Simplified abecedaries from Can Rodon, non-dual script.

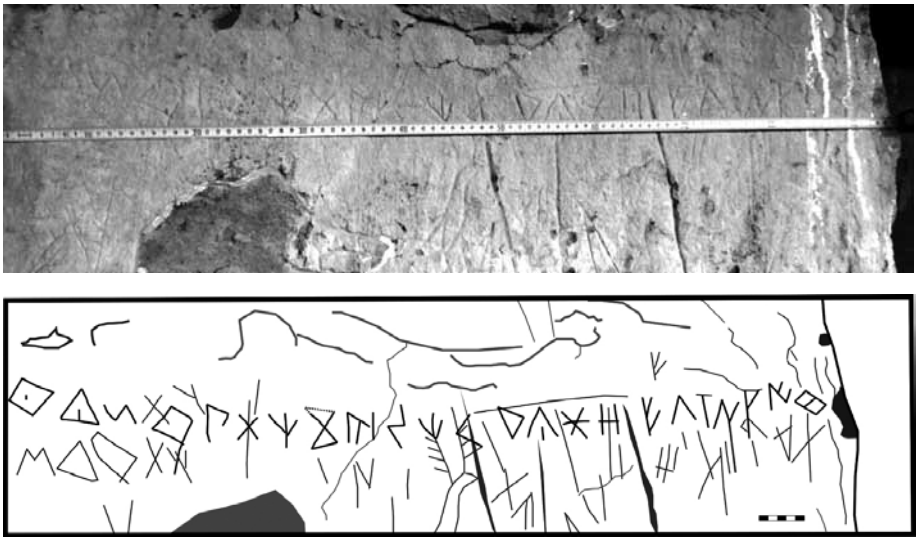

Fig. 7. The Esquirol abecedary, non-dual script.

		G/K	B	D/T				
A					S		Ś	
E					Ŕ		R	
I					M		N	
O					Ḿ		?	
U					L			

Fig. 8. A possible non-dual abecedary.

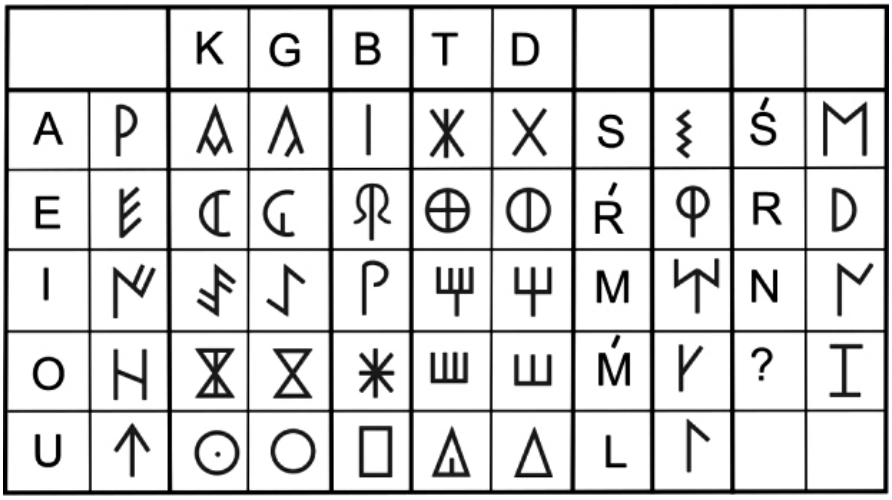

Fig. 9. A possible dual standard abecedary.

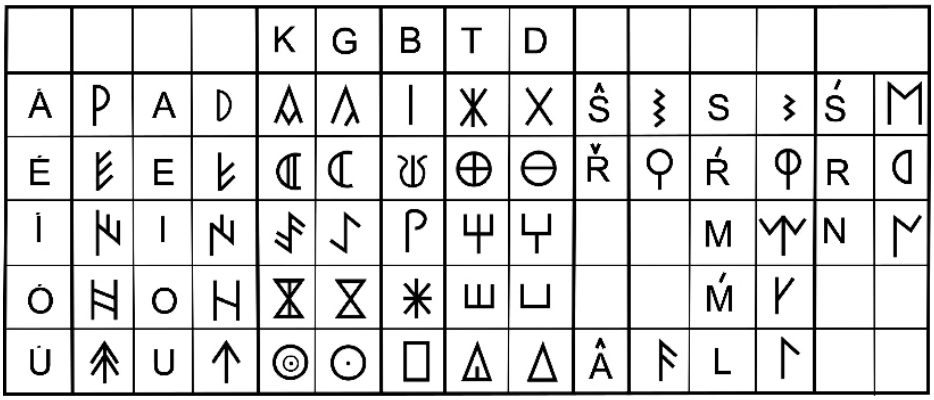

Fig. 10. A possible dual extended abecedary.

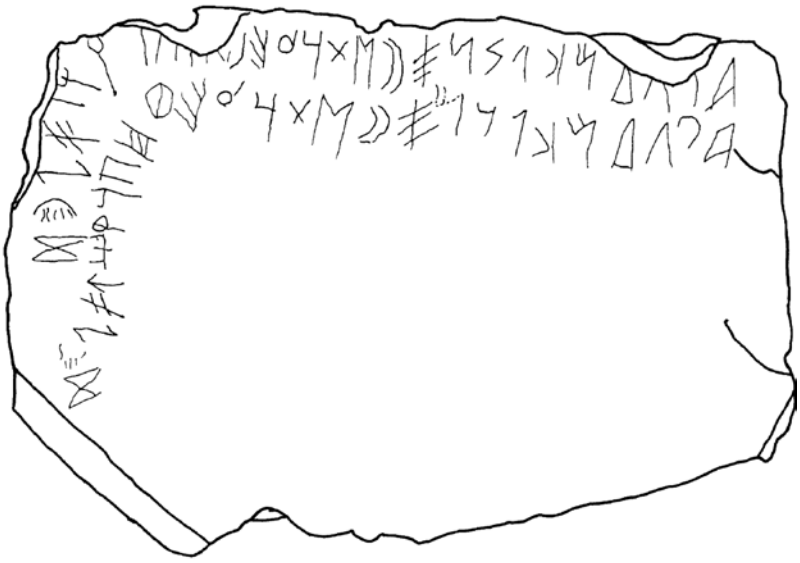

Fig. 11. The Espanca abecedary (Castro Verde, J.25.1).

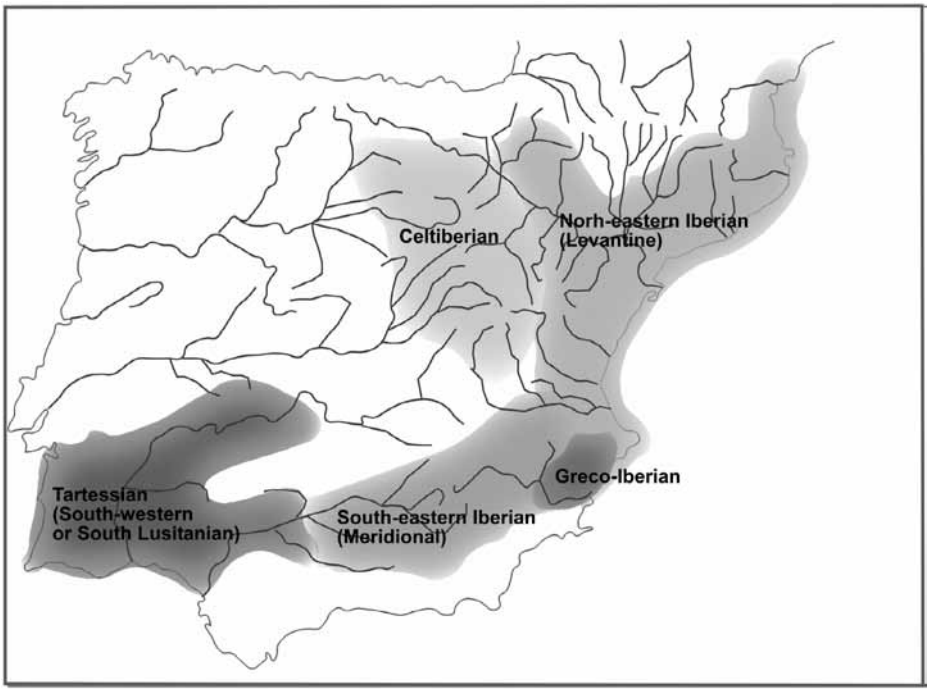

Fig. 12. Palaeohispanic scripts.