L2/19-299
2019-07-30

Revisiting the Encoding of Proto-Sinaitic in Unicode

Anshuman Pandey

pandey@umich.edu
pandey.github.io/unicode

July 30, 2019

1 Introduction

The 'Proto-Sinaitic' script is first attested on inscriptions beginning in the 19th century BCE at Wadi el-Hol at the Qena bend of the Nile River in Egypt and at Serabit el-Khadim in the Sinai Peninsula. It consists of a set of pictographic signs, most of which are believed to be derived from Egyptian Hieroglyphs. The signs correspond to the consonants of a Northwest Semitic language, possibly belonging to the Canaanite family. The script is a consonantal alphabet, and the first attested independent writing system of this type. Proto-Sinaitic was used for several centuries, over the course of which its pictographic signs transformed into abstract glyphs. Its evolution into a linear script led to the rise of other distinctive scripts, such as the Old South Arabian alphabet in the 9th century BCE and the Phoenician alphabet in the 13th century BCE. Proto-Sinaitic is not only the first alphabet, but through Phoenician it is the ancestor of Aramaic, Greek, and all the other scripts descended from these.

Despite its foundational significance to the history and practices of writing, Proto-Sinaitic has not yet been encoded in The Unicode Standard. A preliminary proposal for 'Sinaitic' was submitted by Michael Everson in 1998 (L2/98-035), which was followed in 1999 by a revised code chart for 'Proto-Sinaitic' (L2/99-069). Apart from the code chart and names list, the proposal did not contain substantial information about the script or a justification for encoding. The proposal was one of several others submitted during that period for encoding early Semitic scripts, such as Phoenician and Aramaic. There were discussions on the Unicode mailing list about the suitability of encoding these scripts independently or potentially unifying early Semitic scripts with the Hebrew block. Points were raised about the need for representing such scripts distinctively in plain text. There were also concerns about encoding undeciphered scripts, and the status of Proto-Sinaitic as a true 'writing system'. The key points of these discussions are summarized in L2/04-181. Whether due to the nature of the proposal, or differing perspectives about taxonomies and typologies of ancient Semitic scripts, or contemporary guidelines for encoding scripts, or a combination of these, the proposal to encode Proto-Sinaitic was disapproved by the Unicode Technical Committee. Without offering much detail, the minutes of ISO 10646 / WG 2 meeting 38, held in March 2000 in Beijing simply state that "[t]he user community has rejected Proto Sinaitic." The disapproval is stated on the Unicode Standard's 'Not The Roadmap', where the script was placed in 2001, under the heading "Scripts (or pseudoscripts) which have been investigated and rejected as unsuitable for encoding", where it still remains.

The request to encode Proto-Sinaitic has not been raised since then. Perhaps the status of the script on 'Not the Roadmap' has been interpreted as being definitive; or, perhaps the Unicode community has entirely forgotten about the script. In any case, the lack of attention to Proto-Sinaitic within the Unicode world is not reflective of the active interest in the script in the scholarly community or its currency in discussions and studies on the origins of 'the alphabet'.

2 Overview of the Script

While the exact process of evolution is unknown, most scholars of Semitic palaeography agree that the script is derived from Egyptian Hieroglyphics, according to the 'alphabet hypothesis', first put forth by Alan Gardiner (1916) and expanded by Orly Goldwasser (2006). This hypothesis holds that the signs of the script were created through a process of appropriation and reinterpretation of certain hieroglyphs, which involved the following steps:

1. selecting a hieroglyph based upon pictorial recognition of the object represented by the sign
2. assigning a Semitic name to the sign
3. deriving a sound value from the name using the acrophonic principle
4. assigning a sound value to the image

For example, the hieroglyph 𓁶 (Gardiner D1 = U+13076 EGYPTIAN HIEROGLYPH D001) has the value *tp* in Egyptian and is also a determinative or ideograph for 'head'. Based upon it's graphical attributes and high iconicity, it could be recognized as a 'head' even by those unfamiliar with hieroglyphic writing. It is likely that the creators of the alphabet encountered this sign in Egyptian inscriptions in their surroundings. Despite the Egyptian meaning, they could have referred to the sign using the word for the object in their Northwest Semitic language. Then based upon the initial consonant of the name, the creators of the script could assign a phonetic value to the sign. In this way, the users of the alphabet drew the sign 𐤓, which was called *raš* 'head', and understood that it had the phonetic value /r/. The appropriated sign did not possess any of the original Egyptian phonetic or grammatical values, apart from the ideographic sense. It was also devoid of the aesthetic details of the source 𓁶. Users of the new script wrote 𐤓 as well as 𐡓 𐩓 𐎗 when expressing the sound /r/. Here, graphical refinement was not as important as the ability to recognize the intended sign. Even the form 𐤒 which occurs in one inscription has the necessary basic graphical attributes to aid in identification, despite differing from related forms in terms of detail and ductus. These above five forms effectively conveyed the archetype of the 'head', which when read by a user, would remind them of the name *raš* and, by extension, the sound /r/.

By applying the same process of iconically selecting a hieroglyphic sign, giving it a Semitic name, and deriving a value from the initial consonant of the name, the creators produced a unique sign for each consonant in their language. Apart from a sign for the glottal stop, signs were not developed for the vowels of that language. The vowels would need to supplied by the interpreter, which is the case with Hebrew, Arabic, and other Semitic scripts ultimately derived from Proto-Sinaitic. Most Proto-Sinaitic signs can be theoretcally be traced back to at least one hieroglyphic source, with the exception of one or two signs, which could have been created independently. Each Proto-Sinaitic sign is graphically distinguishable from the others, which is certainly part of the design of the script: signs need to be memorable and unique in order to reinforce the connection between sign and sound.

As the script was not standardized, a single consonant may have been represented using two different, but unique signs. Such cases are restricted to a particular inscription or two. Several signs have glyphic variants, some of which are rotated or mirrored versions of what may be considered the regular sign. Some variants

differ in the complexity of detail and aesthetics, but all variants are readily identifiable with the graphical prototype. Proto-Sinaitic signs may not be as refined as hieroglyphs, but this may be expected from users employing a newly-created script, and perhaps attempting to write for the first time.

There is no attested 'abecedary' that enumerates the characters of the script. Scholars estimate that the script consisted of at least 27 signs. This assumption is based upon the inventory of the Ugaritic script, whose signs align with the historical consonantal repertoire of a Northwest Semitic language. It is possible that Proto-Sinaitic possessed signs for the full complement of historical Semitic consonants, as attested by the 29 signs of the Old South Arabian script, which is a direct off-shoot of Proto-Sinaitic. A repertoire of distinctive signs is presented in § 4.3 along with details about the inventory.

Given the process by which the alphabet was originated, it is natural that its users would employ its signs in a variety of creative ways. The naming of signs and the derivation of sound value through acrophony opens doors to ascribe signs with both logographic and phonetic attributes to the extent that the language of the script's users might allow. It is quite possible that in addition to understanding that 𐤓 has the value /r/, users could have employed the sign for representing the actual object being depicted, eg. a 'head'. They may have also used the sign for representing other semiotic referrents of 'head' within their cultural and linguistic worldview, ie. leader, chief, first, top, etc. Hypothetically, given the context of its occurrence, 𐤓 could represent /r/ or *raš* or any concept related to *raš* in the mind of the writer. Brian Colless (2014: 73) suggests the following potential usages of a Proto-Sinaitic sign:

- 'acrophonic consonantary': the sign value is the initial sound of its name, and is consonantal only
- 'logo-consonantary': the sign value could be the concept or word represented by its name or glyph
- 'morpho-consonantary': the sign value could be the name or the initial sound of the name

A sign could theoretically exhibit polysemia within a single text, where it might represent a single sound in a purely alphabetic context, or used in another instance as a rebus in combination with other signs.

These signs were written in linear sequences. These sequences flow right to left, but also left to right, as well as boustrophedon, and from top to bottom. The directional orientation of the script is inconsistent, even within a given inscription. For example, in Sinai 357, the text flows from top to bottom, then curves rightward at the physical boundary of the surface (see fig. 3). The Proto-Sinaitic inscriptions do not show usage of spaces or punctuation for delimiting word boundaries or line terminations.

The stance of a sign within a text sequence may also vary, depending upon the direction of the text flow. Signs whose glyphs are directionally oriented, that intrinsically 'face' toward or away from the origin of the line — for example, 𐤁, 𐤋, 𐤍 — may face towards the direction of writing in right to left sequences and 𐤁, 𐤋, 𐤓 in left to right text. Changes in the stance of these types of signs are horizontal; they are not rotated, even in vertical sequences, eg. Sinai 349. Some signs whose shapes are conducive to vertical rotations — for example, 𐤉, 𐤆, 𐤌 — are likewise rotated in some inscriptions, eg. 𐤆, 𐤉, 𐤌.

3 Revisiting the Suitability of Encoding Proto-Sinaitic

Over the past two decades there have been advances in both knowledge about Proto-Sinaitic and in the principles and practices for encoding ancient scripts in Unicode. Some of these points are described below and suggest revisiting the encoding of Proto-Sinaitic in Unicode:

1. Proto-Sinaitic is a proper 'script'. It was invented "by Canaanites" and the "number of letters representing the consonantal system was initially twenty-seven", and the "signs were pictographs and most had acrophonic values" (Naveh 1997: 42). Each sign in Proto-Sinaitic possesses a distinctive phonetic value that represents a consonant of the Northwest Semitic language spoken by its creators and users. Although the signs are pictographic, there is not an endless array of images that were used in the script. The signs were deliberately selected so that users would recognize the value of the sign based upon the shape and name of the image. As there was a nearly one-to-one correspondence between sign and sound, the script was a closed set of signs. The signs were written or inscribed using regular conventions, such as the linear sequencing of signs in alignment with the phonetic order of words being represented; proportionate sizing and scaling of signs; orientation of signs in relation to the direction of writing. Although the direction of writing was not fixed, and could vary within a single inscription, the above conventions were maintained. By definition, Proto-Sinaitic is a true 'writing system'.

2. Proto-Sinaitic is an independent script. Although Proto-Sinaitic signs may have been derived from Egyptian Hieroglyphs, the values and function of signs and the rules of orthography differ between the two scripts, as exemplified by the concurrent appearance of inscriptions in both scripts (see, for example, fig. 5). Although it is the ancestor of Phoenician, Hebrew, Old South Arabian, Aramaic, and all scripts descended from these, it is not a 'variant' or 'style' of any of these (see a comparison in fig. 18). Proto-Sinaitic differs from its children in the size of its character repertoire; the shapes and variations of the glyphs of the characters; and unregulated direction of writing. A basic comparison of Proto-Sinaitic and Phoenician illustrates the differences between the two scripts, namely the transition from pictographic to abstract glyphs; the normalization of sign orientation; and the reduction of the repertoire from 27 to 22 signs, likely as a result of the loss of consonants as the Semitic languages continued to develop (see figure 20). Hebrew and Aramaic also possess this reduced inventory, of both signs in their respective scripts and consonants in their phonetic repertoire. There are certainly characters with similar shapes across Proto-Sinaitic, Phoenician, Old South Arabian, and others, as is to be expected of scripts that share an evolutionary relationship. Proto-Sinaitic is distinct from its descendants, as elucidated by Naveh (1991: 42):

   > When the stances of the twenty-two linear letters became wholly stabilized and were written only horizontally from right to left, the terminology changes: the script is no longer called Proto-Canaanite, but Phoenician. The transition took place in the mid-eleventh century B.C. The Phoenician script is a direct offshoot of the Proto-Caananite.

   The independent nature of Proto-Sinaitic is further emphasized by Rollston (2016), a professor of Semitic epigraphy at George Washington University:

   > [I]t is absolutely and empirically wrong to suggest that the script of the inscriptions from Serabit el-Khadem and Wadi el-Hol is the Hebrew script, or the Phoenician script, or the Aramaic script, or the Moabite script, or the Ammonite script, or the Edomite script. The script of these inscriptions from Serabit el-Khadem and Wadi el-Hol (etc.) is not one of the distinctive national scripts (such as Phoenician or Hebrew or Aramaic, etc.), but rather it is the early ancestor of all of these scripts [...]

3. Proto-Sinaitic was used by an ancient community of Semitic speakers for writing their language. Their expressions are attested in nearly 50 inscriptions, which have been identified to date. These range from short texts consisting of three signs to longer texts consisting of 20 signs. The oldest are from Serabit el-Khadim, an area in the southwest Sinai, known for its torquoise mines, which were identified by William Petrie in 1905. These account for the bulk of the corpus, with nearly 40 inscriptions. Some of these were published in facsimiles by Alan Gardiner and T. Eric Peet (1917) (see fig. 1–2), Hans Bauer (1918), and later by Albright (see fig. 3). The British Museum possesses some of these inscribed artifacts from Serabit el-Khadim, such as a sandstone sphinx (see fig. 5). Two inscriptions at Wadi

el-Hol, in Egypt proper, were identified by John Darnell in 1999 and published in 2005 (see fig. 4). The remaining inscriptions are short texts inscribed on various objects. These inscriptions indicate that people used the script to communicate their language to others familiar with that language.

4. It is presently used by a community of scholars and enthusiasts who study epigraphy, palaeography, archaeology, religion, linguistics, and in the history of writing systems. The foundational work on Proto-Sinaitic was established by Alan Gardiner (1916) and advanced by William Albright (1965) and Frank Moore (1950, 1980). The script was introduced to a broader audience by G. R. Driver (1948), Joseph Naveh (1982), and John Healey (1991). Our understanding of the script has been advanced by Brian Colless (2014), John Darnell (2005), Orly Goldwasser (2006, 2011, 2012, 2015, 2016), Gordon Hamilton (2002, 2006), Paul LeBlanc (2016), Christopher Rollston (2010, 2016, 2019), Benjamin Sass (1988, 2005), Aren Wilson-Wright (2016), Stefan Wimmer (2012), and several others. The script has entered into popular culture, as well. James Rumford (2002) references Proto-Sinaitic in his children's book on the alphabet, and Don Robb (2007) used the script as the basis for his children's book on the history of the alphabet (see fig. 16-17).

5. These current users create and share new understandings about Proto-Sinaitic using modern print and digital content. As evidenced in articles by Gardiner, Goldwasser, Colless, and others, Proto-Sinaitic signs are used in-line in regular text alongside Egyptian Hieroglyphs, Phoenician, Old South Arabian, Hebrew, and other scripts, particularly for palaeographic descriptions and comparative purposes (see fig. 10–15). In older printed works, metal types were cut for Proto-Sinaitic signs. In modern materials, the signs are represented as either images or using a digitized font. A few such fonts have been developed, such as a Postscript Type 1 font and a related TEX package by Peter Wilson (2005; see fig. 21–22).

6. There is a precedent for encoding early Semitic scripts independently in Unicode. Although Proto-Sinaitic was disapproved for encoding in 2000, several early Semitic alphabetic scripts have been encoded since then, such as Hatran, Imperial Aramaic, Nabataean, Old North Arabian, Old South Arabian, Palmyrene, Phoenician, and Samaritan. Alphabetic scripts derived from Imperial Aramaic also have been encoded, such as Elymaic, Inscriptional Parthian, Inscriptional Pahlavi, and Old Sogdian (see Pandey 2016, 2017 for encoding proposals for the first and last of these). The encoding of these scripts was made possible in large part by strong evidence showing distinctive development and usage, such that descendant and sibling scripts should not simply be considered variations of ancestors or unified with encodings of existing scripts that may be related. Moreover, such developments affirm the practical and technical requirements for representing ancient scripts in digital plain text.

7. Although there is consensus on the value of the majority of signs, Proto-Sinaitic is not fully deciphered. The identity of some signs remains unknown. The decipherment status of a script was seen as an obstacle to encoding when Proto-Sinaitic was first proposed for inclusion in Unicode. In a rebuttal to the proposal to encode Phoenician in 2004, Elaine Keown (L2/04-181) wrote that "Unicode should not encode scripts which are still being deciphered today", but also stated that "Unicode should consider corpus size and the true needs of epigraphers when encoding new archaic 'script' blocks", and concluded that "[f]or small ancient corpora, i.e., Wadi el-Hol, Proto-Sinaitic, Proto-Canaanite, standard encoding practices are actually irrelevant." Given the developments in the practices of encoding scripts since 2004, it is quite clear today that character encoding is relevant for all scripts and for all users of a script, be they well-published epigraphers or arm-chair palaeographers. Despite the decipherment status of a script, it is a fact that such scripts are used in representations of the original text and in publications about the script. These user requirements, and the need for a Unicode encoding, are not contingent upon the decipherment status of the script.

It is clear that Proto-Sinaitic is a true, distinctive, and independent 'script'. The extant inscriptions show that there was a community of users who understood the meaning and usage of the script and choose to employ it for communicating with other members of their linguistic community. There is a long-standing tradition of scholarship that is focused on understanding this community and their language and culture. These scholars and enthusiasts are modern users of the script, who publish and exchange information about the script in print media and digital platforms. The continued advancement in knowledge and research on the script, and its usage by an active community of scholars, establishes that Proto-Sinaitic is suitable for encoding in Unicode and that, after two decades, there are ample requirements for doing so.

4 Towards an Encoding for Proto-Sinaitic in Unicode

The goal of a Unicode encoding for Proto-Sinaitic is to provide a character-encoding standard that will enable plain-text representation of the script in modern digital content and platforms. This will allow users to input, store, display, and process text in Proto-Sinaitic using databases, documents, webpages, and other ubiquitous applications. In addition to enabling usage and processing of Proto-Sinaitic on par with the other ancient Semitic scripts and 100+ others already in the standard, inclusion in Unicode has the potential to expand the scope and technological boundaries of scholarship on Semitic epigraphy and palaeography. I have taken steps to develop a formal proposal for encoding Proto-Sinaitic, which are based upon the considerations outlined below.

4.1 Encode as an independent script

An independent encoding for Proto-Sinatic will preserve the semantic identity of its signs, or 'characters' in Unicode parlance, in plain text. For example, in multilingual documents containing Hebrew, Phoenician, Egyptian Hieroglyphs or other scripts, each script is distinguishable not only by the graphical distinction of its glyphs, but also by the underlying characters.

At present, without a Unicode encoding, Proto-Sinaitic can be represented typographically, but not as distinctive text. The display of Proto-Sinaitic signs within current software applications would require 'hacking' the font of another script in Unicode with similar properties. For example, a user could modify a font for Phoenician by replacing the glyphs with Proto-Sinaitic forms. When producing a document that contains Hebrew and Proto-Sinaitic, the user would use the modified Phoenician font for Proto-Sinaitic text and a regular Hebrew font for the Hebrew text. This may achieve the goal of simply displaying text at the graphical level. However, to actually type Proto-Sinaitic characters, the user would need to enter Phoenician characters because the underlying encoding for the modified font is Phoenician. Selecting the text displayed in the Proto-Sinaitic font using copy-and-paste would actually copy the underlying script. Pasting it in a clipboard would reveal that the text is actually in Phoenician. This becomes especially problematic if the user adds actual Phoenician content to the document. There would be no distinction between Proto-Sinaitic and Phoenician at the level of plain text. Without an encoding, Proto-Sinaitic would be need to be treated as a typographic or stylistic form of another script and would rely complete on the usage of a font. The absence of a dedicated encoding for Proto-Sinaitic prevents conveyance of the semantic identity of its characters.

Usage of an existing block, or 'unification' in Unicode parlance, has practical and technical limitations. Unification assumes that there is a one-to-one correspondence between the repertoires of Proto-Sinaitic and the existing block. This is certainly not the case, especially as Proto-Sinaitic has at least 27 distinctive letters, while Phoenician, Hebrew, and Aramaic have 22. Unification with one of the latter scripts would require the creation of synthetic characters specific to Proto-Sinatic in the respective code block. This is an unnecessary approach that does not adequate support distinctive representation of Proto-Sinaitic while

muddling the encoded repertoire of another script. It is, therefore, not possible to unify Proto-Sinaitic with an existing script block.

In addition to the above, it is important to encode Proto-Sinaitic separately in order to manage palaeographical varieties of characters. In terms of the Unicode character-glyph model, it is more meaningful, for example, to unify various forms of *raš* with a Proto-Sinaitic 'head' character than it is to consider them as variants of a Phoenician or Hebrew RESH, as the latter characters each have their own palaeographical variants. It is taxonomically and typographically more practical and useful to manage varieties and styles of a script at the level of a distinctive script rather than unifying a script with another scripts whose characters not only have different glyphs, but may also possess different semantics.

4.2 Scope of the encoding

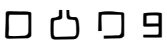
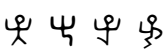
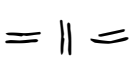
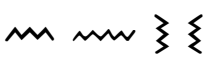
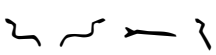
The basic encoding for Proto-Sinaitic should be based upon the distinctive characters attested in the Wadi El-Hol and Serabit El-Khadim inscriptions. There are some inscriptions outside of Egypt whose characters resemble those of Proto-Sinaitic. The script of these inscriptions is often referred to as Proto-Canaanite (a term that has also been used for an early stage of the Phoenician script). Depending upon the relationship between these scripts, it may be practical to expand the encoding to include both the Proto-Sinaitic and Proto-Canaanite varieties. Such a unified block would encode all characters of the early pictographic alphabet, potentially up to the boundary with Phoenician. This approach aligns with the aforementioned demarcation between Proto-Sinaitic (rather, Proto-Canaanite) and Phoenician as described by Naveh.

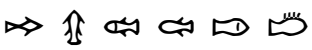
Following a conversative scope, the encoding would be limited to the script of the Proto-Sinaitic corpus. Following a more liberal approach, the encoding could encompass Proto-Canaanite. In any case, the scope will be determined by further research on the relationships between the Proto-Sinaitic and Proto-Canaanite scripts, as well as in consultation with scholars who are active in the field.

4.3 A repertoire to enable full representation of extant texts

The guiding principle for this encoding is to establish a repertoire of distinctive graphical signs that occur in the Proto-Sinaitic (and potentially related corpora) for the purpose of enabling digital plain-text representation of all attested text in the script. To achieve that goal, and in conjunction with Unicode principles, the repertoire will be based upon characters, not phonology. There is a tendency in certain traditions of scholarship to enumerate and identify Proto-Sinaitic signs according to the phonological repertoire of particular languages and the signs of associated scripts. While such relationships may be valid, the polysemic aspect of Proto-Sinaitic signs and the size of the repertoire may often make such alignments seem forced. It is more practical to focus on the graphical prototypes of characters. This is especially important in cases where two different signs may have been used for the same consonant in different phases of the script's development or in differ regions. The palaeographical approach all the more poignant for characters that have not yet been fully deciphered. In any case, the phonetic values of characters is outside of the scope of Unicode, where the focus is on encoding distinctive textual elements.

The table below shows a tentative repertoire for Proto-Sinaitic that is based upon the palaeographical distinctiveness of attested signs. The signs are referred to using the reconstructed Semitic names proposed by Albright (1969), Colless (2014), and others. The repertoire is a superset of signs collated from primary materials and secondary literature. The intention is to establish a baseline for further analysis. Signs identified as being based upon a distinctive prototype have been grouped under the Semitic name. The list of forms is not exhaustive; but includes major stance variants and excludes forms that differ from those presented by slight variations in the ductus.

Letterforms	Name	Meaning	Value
	*ʾalp*	ox head	ʾ
	*bayt*	house	b
	*gaml*	throw stick	g
	*dalt*	door	d
	ḥe	fence	ḥ
	*ho*	man calling	h
	hll	jubilate	h
	wāw	hook	w
	*ḏayp*	eyebrow	ḏ
	*ziq*	fetter	z
	*ḥaṣir*	mansion	ḥ
	*ḫayt*	thread	ḫ
	*ṭab*	good	ṭ
	*ẓil*	shade	ẓ
	*yad*	hand	y
	*kap*	palm	k
	*lamd*	goad	l
	*maym*	water	m
	*naḥš*	snake	n

	*samk*	fish (?)	s
	digg	fish	d
	*ʿayn*	eye	ʿ
	*piʾt*	corner	p
	*pu*	mouth	p
	ʿayn	eye	ʿ
	*ṣad*	plant	ṣ
	*qop*	monkey	q
	ṣirar	bag	ṣ
	*qaw*	cord, line	q
	*raš*	head	r
	*šamš*	sun	š
	*ṯad*	breast	ṯ
	ṯann	composite bow	ṯ
	*taw*	owner’s mark	t
	*ġinab*	grape	ġ
	*ṯa* ?	?	ṯ ?
	?	?	?
	*šin* ?	?	š ?

It will be necessary to identify all unique characters and their variants. Ultimately, for each distinctive character, one glyph would be selected as the normative glyph in the encoding and the others would be considered glyphic variants. In most cases it will be practical to unify obvious stylistic variants, such as signs that have similar shapes, but that differ minimally from each other. Such signs would be candidates for unification as a single character. However, for some signs it may be practical to encode such variants as alternate forms, especially when both variants are used concurrently in a given inscription, eg. mirrored or rotated forms (see the left-facing and right-facing ox-head in Sinai 349 (see fig. 3). The same may apply to certain signs that appear to be stylistic variants, but have different features that may set them apart as alternates.

Although maintaining variations in the presentation of signs is important from a palaeographical perspective, for character encoding the importance lies in determining the underlying prototype of similar signs. The approach aligns with Goldwasser's discussion of the importance of 'recognition cues', that the reader be able to identify the archetype of the letter to understand its value. When users wrote a sign the resulting glyph did not always possess the precision and general aesthetics of hieroglyphs. The presence or absence of a particular detail did not affect the abiilty of that variant to reflect the basic graphical and visual attributes that would enable them to be identified by users as possessing a distinctive meaning. Moreover, the notion of 'recognition cues' aligns quite well with the Unicode character-glyph model, which essentially states that graphical signs that possess stylistic variation but carry the same semantic meaning are considered variants of the same character and are identified as variants of a single character. The differences between characters used in particular inscriptions would be expressed using fonts designed for those sources with the font glyphs associated with the same underlying Unicode character.

The Proto-Sinaitic block will require a minimum of 32 code points and possibly a maximum of 60 code points. The number would be greater if the scope of the encoding were expanded to include Proto-Canaanite and related varieties.

4.4 Names for characters in the Unicode encoding

The names for Proto-Sinaitic characters should be based upon the reconstructed Semitic name from which its sound value may have been derived acrophonically. These names will differ from the conventional names used for Unicode characters belonging to Semitic scripts. This is done so purposefully, to avoid the issue of assigning consonantal values to characters whose value is not yet certain and also to avoid the strict 'one grapheme to one phomene' problem in cases where two signs may have been used for representing a single consonant in different sources.

4.5 Designation for the script in Unicode

The designation 'Proto-Sinaitic' is based upon the findsite of the inscriptions at Serabit el-Khadim. Even though the Wadi el-Hol inscriptions are outside of the Sinai, this name is used for referring to that script as a matter of convenience. But, it is somewhat of a misnomer. The prefix 'proto-' implies the existence of a distinctive 'Sinaitic' script, which evolved from the Serabit el-Khadim and Wadi el-Hol varieties. Such a script does not exist. The 'Proto-Sinaitic' script itself may be considered the proper 'Sinaitic' script. In fact, Everson's proposal from 1998 used 'Sinaitic' as the name for the script block.

As inscriptions in this script have been found in the southern Levant, or Canaan, scholars also refer to it as 'Proto-Canaanite'. This term references both regional and linguistic contexts, as it is believed that the language recorded using the script belongs to the Canaanite family of Northwest Semitic languages.

Other scholars prefer names that focus less on geography and more on orthographic features, eg. 'proto-alphabetic', 'early alphabetic', 'West Semitic alphabet', etc. Rollston (2016) suggests: "as for the script of these inscriptions from Serabit el-Khadem and Wadi el-Hol, the best terms are 'Early Alphabetic,' or 'Canaanite.' Some prefer the term 'Proto-Sinaitic Script.' Any of these terms is acceptable." He goes on to say that as "it is the early ancestor of all ... scripts and we term that early ancestor: Early Alphabetic."

The name used for the block should be one that is readily identifiable and unique. 'Proto-Sinaitic' is conventional nomenclature; however, if the scope of the encoding is expanded to include Proto-Canaanite, then 'Canaanite' may be a suitable name. Rollston's suggestion of 'Early Alphabetic' avoids the regional connections, but may be too vague for Unicode. Ultimately, the name should based upon current scholarly preferences. In any case, the name would be used only for identifying the script within the domain of Unicode and does not prescribe usage in any other context.

5 Next Steps

I am continuing to develop a formal proposal for Proto-Sinaitic, which will contain full descriptions of each character; a proposed encoded repertoire for fully representing the extant corpus; background on the script; and specimens of usage. Some issues that require further discussion are:

1. What parameters should define the scope of the encoding?
2. Which distinctive signs should be included in the proposed encoded repertoire?
3. Which form should be selected as the representative glyph for each character.
4. What are the criteria for determining if a variant is a stylistic or an alternate form of a sign?
5. What naming convention should be used for identifying the characters in Unicode?
6. What is an appropriate designation for the script in Unicode?

As with all of my other script-encoding efforts, I welcome any and all feedback on this document, and request any materials that would expand my understanding of this script and its repertoire. I look forward to collaborating with individuals who are interested in developing an encoding to represent this very first alphabet from the 2nd millenium BCE using the digital technologies of the 3rd millenium CE.

6 References

Albright, William F. 1969. *The Proto-Sinaitic Inscriptions and Their Decipherment*. Harvard Theological Studies, XXII. 2nd printing. Cambridge: Harvard University Press.

Bauer, Hans. 1918. *Zur Entzifferung der neuentdeckten Sinaischrift und zur Entstehung des semitischen Alphabets*. Halle: Verlag von H. Niemeyer.

British Museum. "Sandstone sphinx; Sinaitic hieroglyphs on the right shoulder and base", museum number EA41748. https://www.britishmuseum.org/research/collection_online/collection_object_details.aspx?objectId=163467&partId=1&images=true

Colless, Brian E. 2014. "The origin of the alphabet: An examination of the Goldwasser hypothesis", *Antiguo Oriente: Cuadernos del Centro de Estudios de Historia del Antiguo Oriente*, 12, pp. 71–104.

———. undated. "The Evolution of the Alphabet", https://sites.google.com/site/collesseum/alphabetevolution

Cross, Frank Moore. 1954. "The Evolution of the Proto-Canaanite Alphabet". *Bulletin of the American Schools of Oriental Research*, no. 134 (April), pp. 15–24.

———. 1980. "Newly Found Inscriptions in Old Canaanite and Early Phoenician Scripts", *Bulletin of the American Schools of Oriental Research*, no. 238 (Spring), pp. 1–20.

Darnell, John Coleman; Dobbs-Allsopp, F. W.; Lundberg, Marilyn J.; McCarter, P. Kyle; Zuckerman, Bruce; Manassa, Colleen. 2005. "Two Early Alphabetic Inscriptions from the Wadi el-Hôl: New Evidence for the Origin of the Alphabet from the Western Desert of Egypt". In "Results of the 2001 Kerak Plateau Early Bronze Age Survey", Meredith S. Chesson [ed.]. *Annual of the American Schools of Oriental Research*, vol. 59, pp. 67–124.

Driver, G. R. 1948. *Semitic Writing: From Pictograph to Alphabet*. London: British Academy.

Everson, Michael. 1998. "Proposal to encode Sinaitic in Plane 1 of ISO/IEC 10646-2" (WG2 N1688 L2/98-035). http://std.dkuug.dk/JTC1/SC2/WG2/docs/n1688/n1688.htm and https://www.unicode.org/L2/L1998/98035.pdf

———. 1999. "Proposal for the Universal Character Set: TABLE XX - Row xx: PROTO-SINAITIC" (L2/99-069). https://www.unicode.org/L2/L1999/protosinaitic.pdf

———. 2004. "Final proposal for encoding the Phoenician script in the UCS" (N2746R2 L2/04-141R2). https://www.unicode.org/L2/L2004/04141r2-n2746r2-phoenician.pdf

Gardiner, Alan H. 1916. "The Egyptian Origin of the Semitic Alphabet", *Journal of Egyptian Archaeology*, vol. 3, no. 1 (January), pp. 1–16.

Gardiner, Alan H; Peet, T. Eric. 1917. *The Inscriptions of Sinai*. Pt. I – Introduction and Plates. London: Egyptian Exploration Fund.

Goldwasser, Orly. 2006. "Canaanites Reading Hieroglyphs. Part I – Horus is Hathor? Part II – The Invention of the Alphabet in Sinai". *Ägypten und Levante*, vol. XVI, pp. 121–160.

———. 2011. "The Advantage of Cultural Periphery: The Invention of the Alphabet in Sinai (circa 1840 B.C.E)". *Culture Contacts and the Making of Cultures: Papers in Homage to Itamar Even-Zohar*, Rakefet Sela-Sheffy and Gideon Toury [eds.], pp. 251–316. Tel Aviv: Tel Aviv University / Unit of Culture Research..

———. 2012. "The Miners Who Invented the Alphabet — A Response to Christopher Rollston". *Journal of Ancient Egyptian Interconnections*, vol. 4, no. 3, pp. 9–22.

———. 2015. "The Invention of the Alphabet: On 'Lost Papyri' and the Egyptian 'Alphabet'. *Origins of the Alphabet: Proceedings of the First Polis Institute Interdisciplinary Conference*, Christophe Rico and Claudia Attucci [eds.], pp.124–140. Cambridge: Cambridge Scholars Publishing.

———. 2016. "From Iconic to Linear – The Egyptian Scribes of Lachish and the Modification of the Early Alphabet in the Late Bronze Age". *Alphabets, Texts and Artefacts in the Ancient Near East: Studies presented to Benjamin Sass*, Israel Finkelstein, Christian Robin, and Thomas Römer [eds.], pp. 118–160. Paris: Van Dieren Éditeur.

Hamilton, Gordon. 2002. "W. F. Albright and Early Alphabetic Epigraphy". *Near Eastern Archaeology*, vol. 65, no. 1 (March), "The House That Albright Built", pp. 35–42.

———. 2006. *The Origins of the West Semitic Alphabet in Egyptian Scripts*. Catholic Biblical Quarterly Monograph Series no. 40. Washington, D.C.: Catholic Biblical Association of America.

Healey, John. 1991. "The Early Alphabet". Reading the Past, vol. 9. Berkeley, California: University of California Press and London: British Museum.

Keown, Elaine. 2004. "Rebuttal to 'Final proposal for encoding the Phoenician script in the UCS', ISO/IEC JTC1/SC2/WG2, N2746 L2/04-141, 2004-04-26" (L2/04-181).
https://www.unicode.org/L2/L2004/04181-keown-phoenician.pdf

LeBlanc, Paul D. 2016. *Deciphering the Proto-Sinaitic Script: Making Sense of the Wadi el-Hol and Serabit el-Khadim Early Alphabetic Inscriptions*. Ottawa, Ontario: Subclass Press.

Naveh, Joseph. 1997. *Early History of the Alphabet: An Introduction to West Semitic Epigraphy and Palaeography*. Reprint, 2nd rev. ed. (1987), of 1st ed. (1982). Jerusalem: Magnes Press, Hebrew University.

Pandey, Anshuman. 2016. "Proposal to encode the Old Sogdian script in Unicode" (L2/16-312R).
http://www.unicode.org/L2/L2016/16312r-old-sogdian.pdf

———. 2017. "Proposal to encode the Elymaic script in Unicode" (L2/17-226R).
http://www.unicode.org/L2/L2017/17226r-elymaic.pdf

Robb, Don; Smith, Ann. 2007. *Ox, House, Stick: The History of Our Alphabet*. Watertown, Massachusetts: Charlesbridge Publishing.

———. *Ox, House, Stick: Activity Guide*. Watertown, Massachusetts: Charlesbridge Publishing.
https://cdn.shopify.com/s/files/1/0750/0101/files/ox-house-stick-activity-guide.pdf?4512903798686760336

Rollston, Christopher. 2010. "The Probable Inventors of the First Alphabet: Semites Functioning as rather High Status Personnel in a Component of the Egyptian Apparatus".
https://www.rollstonepigraphy.com/?p=195

———. 2016. "The Proto-Sinaitic Inscriptions 2.0: Canaanite Language and Canaanite Script, Not Hebrew". https://www.rollstonepigraphy.com/?p=779

———. 2019. "The Alphabet Comes of Age: The Social Context of Alphabetic Writing in the First Millennium BCE". *The Social Archaeology of the Levant: From Prehistory to the Present*, Assa Yasur-Landau, Eric Cline, and Yorke Rowan [eds.], pp. 371–390. Cambridge: Cambridge University Press.

Rumford, James. 2002. *There's a Monster in the Alphabet*. Boston: Houghton Mifflin.

Sass, Benjamin. 1988. *The Genesis of the Alphabet and its Development in the Second Millennium B.C.* Ägypten und Altes Testament 13. Wiesbaden: Otto Harrassowitz.

———. 2005. *The alphabet at the turn of the millennium: The West Semitic alphabet ca. 1150–850 BCE; the antiquity of the Arabian, Greek and Phrygian alphabets*. Tel Aviv University Institute of Archaeology Occasional Publications no. 4. Tel Aviv: Tel Aviv University.

Umamaheswaran, V. S.; Ksar, Mike. 2000. "Unconfirmed Minutes of WG 2 meeting 38, Beijing, China, 2000-03-21–24" (WG2 N2203). https://www.unicode.org/wg2/docs/n2203.rtf

Unicode Consortium. 2001. "Not The Roadmap", v.1.0.
http://www.unicode.org/roadmaps/not-the-roadmap/not-the-roadmap-1-0.html

———. 2019. "Not The Roadmap", v.12.0.1.
http://www.unicode.org/roadmaps/not-the-roadmap/not-the-roadmap-12-0-1.html

Wilson, Peter R. 2005. "protosem – Fonts for proto-Semitic cuneiform script".
https://www.ctan.org/tex-archive/fonts/archaic/protosem

Wilson-Wright, Aren Max. 2016. "Sinai 357: A Northwest Semitic Votive Inscription to Teššob". *Journal of the American Oriental Society*, vol. 136, no. 2,, pp. 247–263.

Wimmer, Stefan Jakob. 2010. "A Proto-Sinaitic Inscription in Timna/Israel: New Evidence on the Emergence of the Alphabet". *Journal of Ancient Egyptian Interconnections*, vol. 2, no. 2, pp. 1–12.

7 Acknowledgments

This project was made possible in part by a grant from the U.S. National Endowment for the Humanities, which funded the Universal Scripts Project, PR-253360-17 (part of the Script Encoding Initiative at the University of California, Berkeley, which is directed by Dr. Deborah Anderson). Any views, findings, conclusions or recommendations expressed in this publication do not necessarily reflect those of the National Endowment of the Humanities.

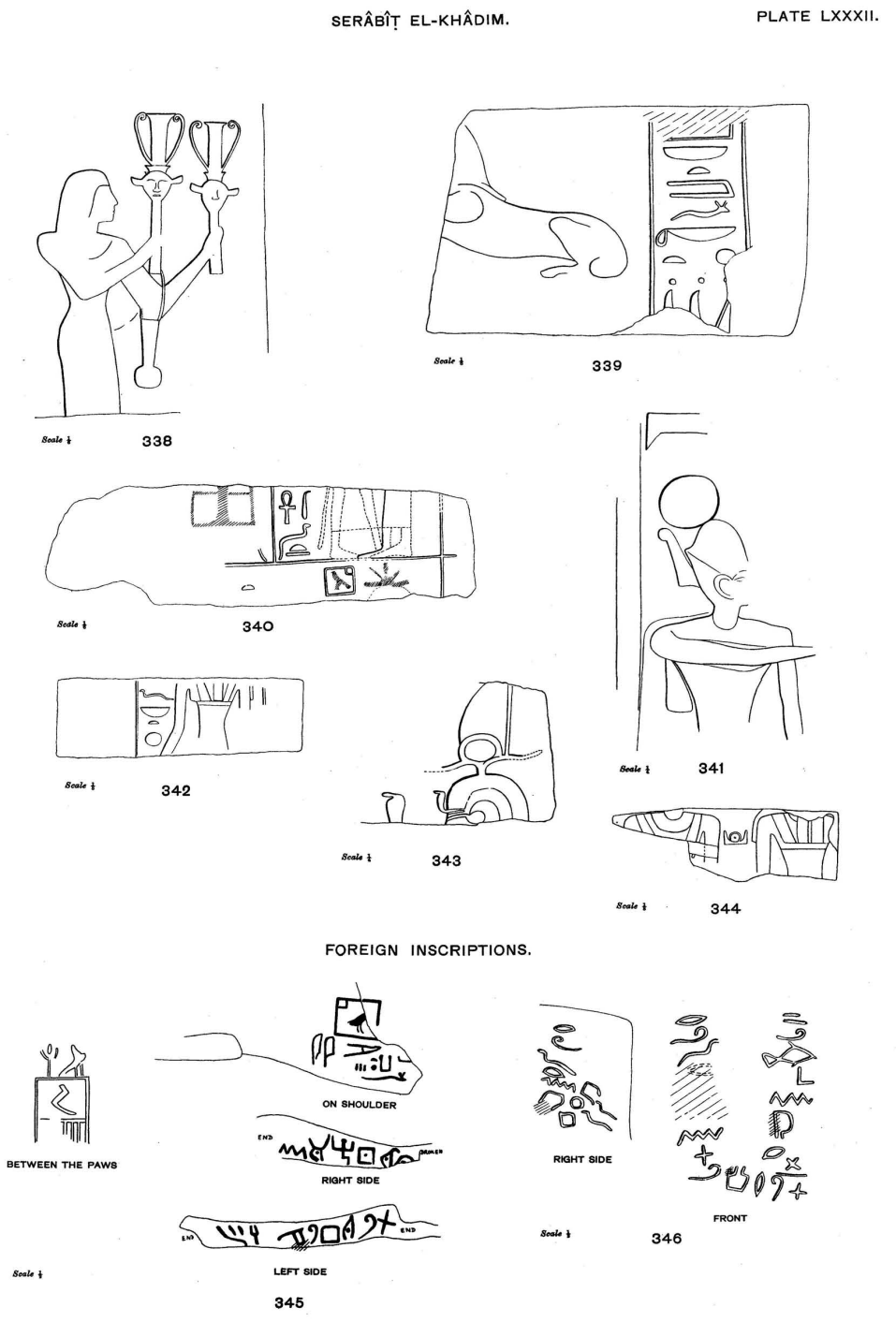


Figure 1: Facsimiles of ‘foreign’ or Proto-Sinatic inscriptions from Serabit el-Khadim (from Gardiner and Peet 1917: Plate LXXXII.

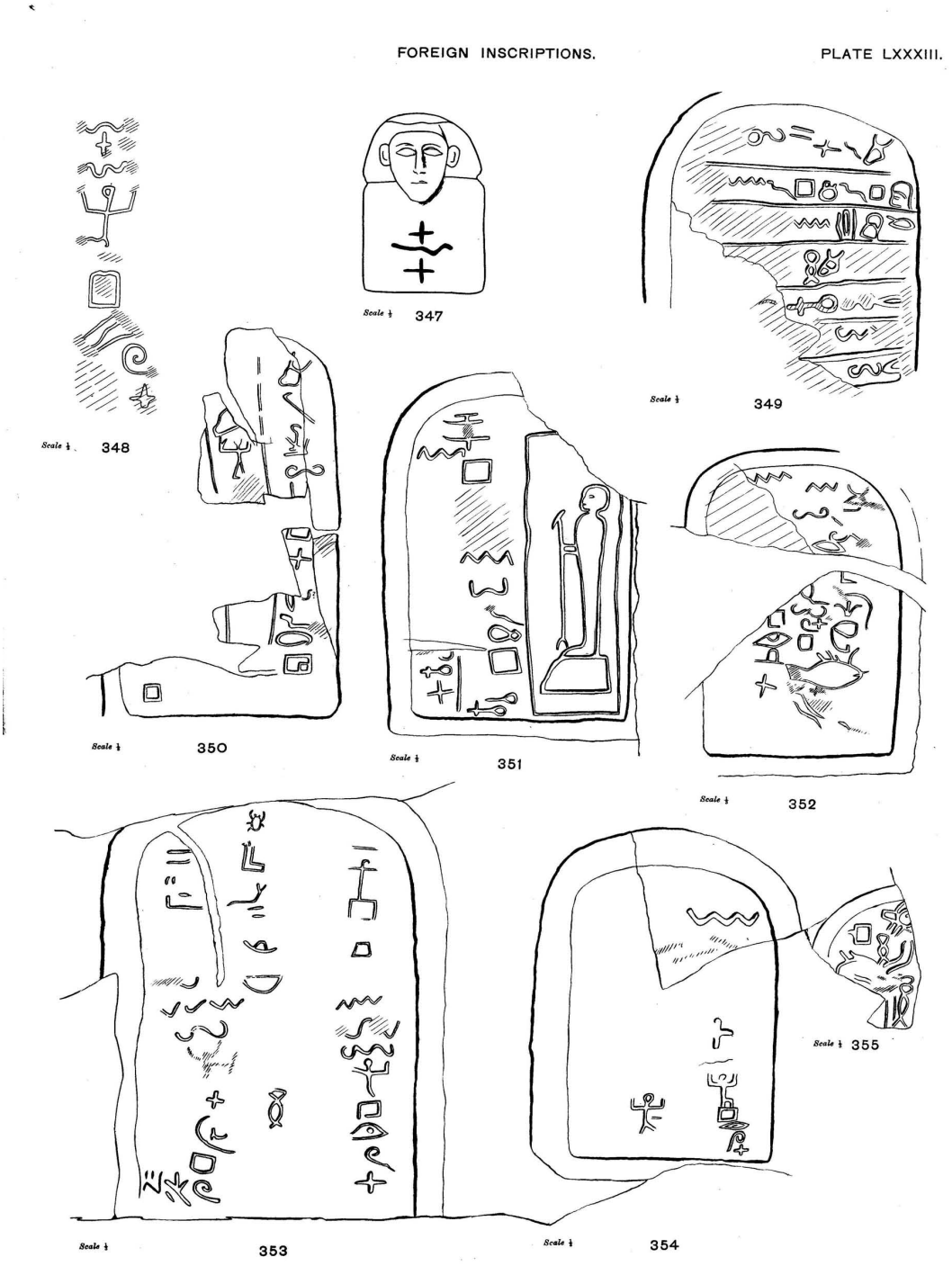
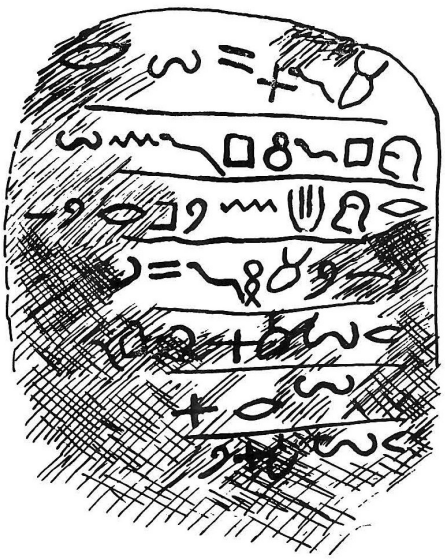
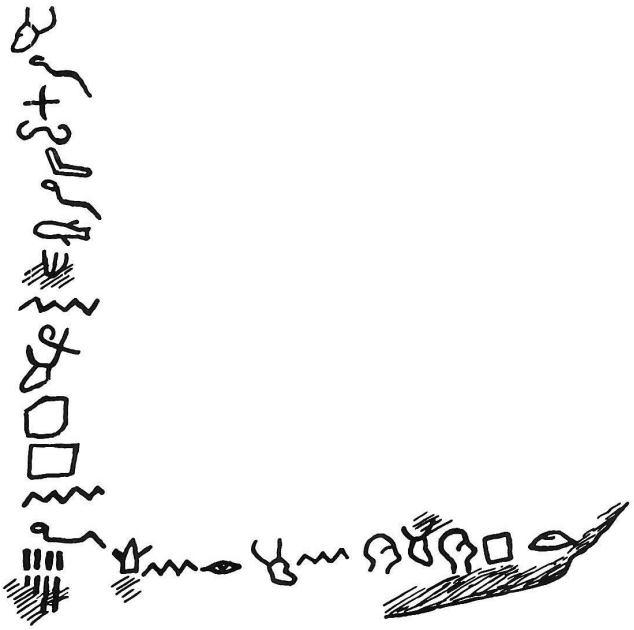


Figure 2: Facsimiles of 'foreign' or Proto-Sinatic inscriptions from Serabit el-Khadim (from Gardiner and Peet 1917: Plate LXXXIII.



No. 349, traced from photograph and collated with original.



No. 357, traced from Butin's facsimile copy and corrected from the original and photographs of it.

Figure 3: Facsimiles of Proto-Sinatic inscriptions from Serabit el-Khadim (Sinai 349 and 357, from Albright 1969: fig. 4, 8).

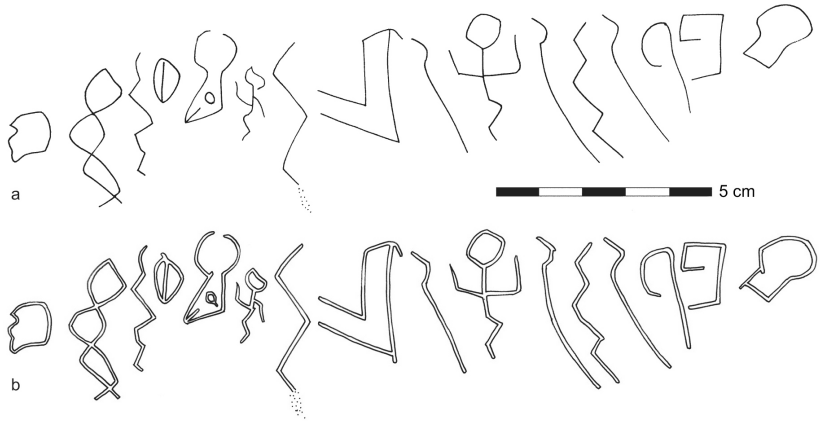


Fig. 2. *Wadi el-Hôl Alphabetic Inscription 1; the Horizontal Inscription. a) facsimile of the base of the incised lines; b) facsimile of the outer edges of the incised lines.*

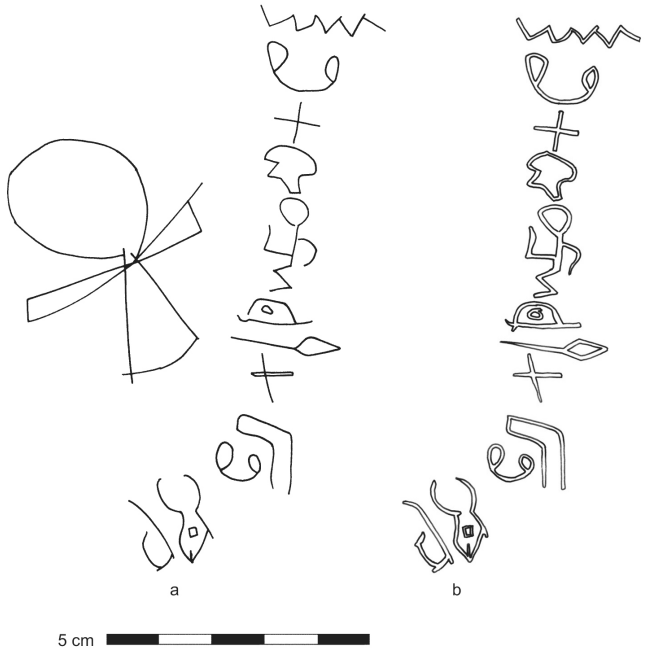
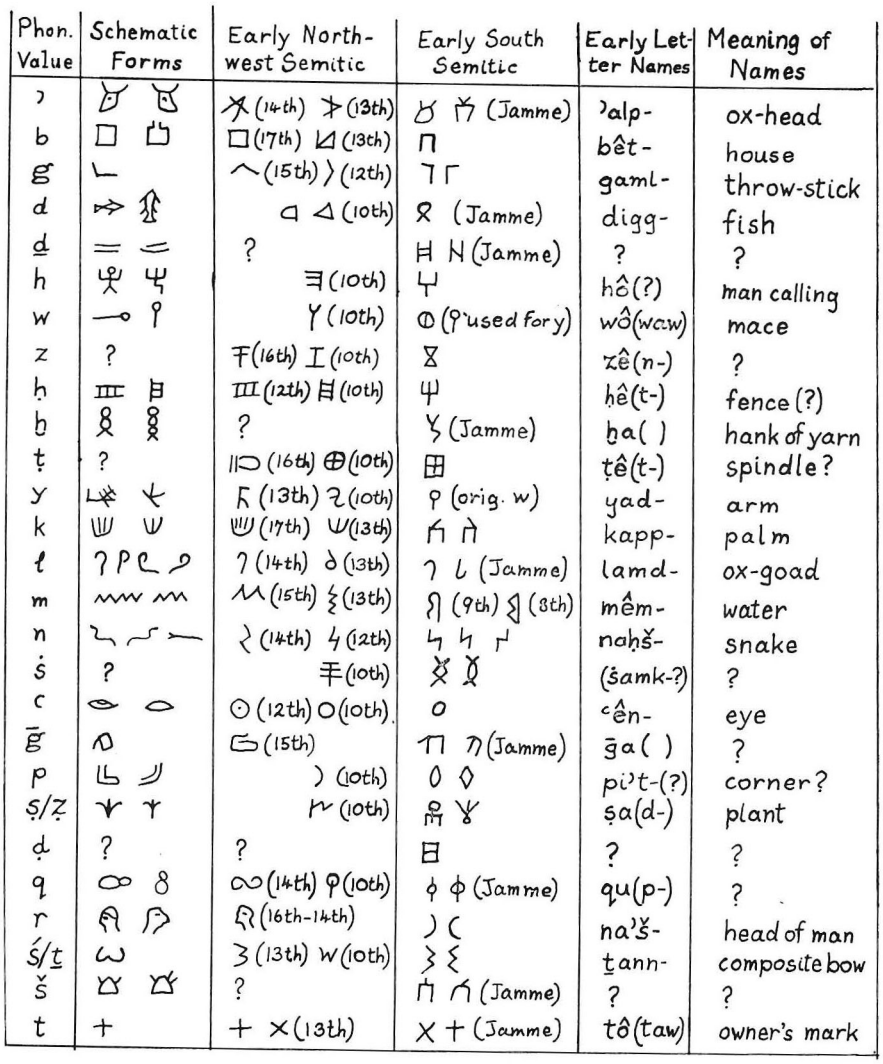


Fig. 16. *Wadi el-Hôl Alphabetic Inscription 2; the Vertical Inscription. a) facsimile of the base of the incised lines; b) facsimile of the outer edges of the incised lines.*

Figure 4: The two 'Proto-Sinatic' inscriptions from Wadi el-Hol (from Darnell, et al. 2005: fig. 2, 16). See fig. 9 for an inventory of letters.

Figure 5: Proto-Sinatic inscriptions on a sandstone sphinx from Serabit el-Khadim, dated to c. 1800 BCE (from the British Museum, EA41748). These are known as 'Sinai 345' (see fig. 1 for tracing). The top image (right-facing) shows an Egyptian Hieroglyph inscription on the shoulder and a Proto-Sinaitic inscription on the base. The bottom image (left-facing) also has a Proto-Sinaitic inscription on the base.



Phon. Value	Schematic Forms	Early North-west Semitic	Early South Semitic	Early Letter Names	Meaning of Names
ʾ		(14th) (13th)	(Jamme)	ʾalp-	ox-head
b		(17th) (13th)		bêt-	house
g		(15th) (12th)		gaml-	throw-stick
d		(10th)	(Jamme)	digg-	fish
ḏ		?	(Jamme)	?	?
h		(10th)		hô(?)	man calling
w		(10th)	(ḳ used for y)	wô(waw)	mace
z	?	(16th) (10th)		zê(n-)	?
ḥ		(12th) (10th)		ḥê(t-)	fence (?)
ḫ		?	(Jamme)	ḫa( )	hank of yarn
ṭ	?	(16th) (10th)		ṭê(t-)	spindle?
y		(13th) (10th)	(orig. w)	yad-	arm
k		(17th) (13th)		kapp-	palm
l		(14th) (13th)	(Jamme)	lamd-	ox-goad
m		(15th) (13th)	(9th) (8th)	mêm-	water
n		(14th) (12th)		naḥš-	snake
ṡ	?	(10th)		(ṡamk-?)	?
c		(12th) (10th)		ʿên-	eye
ḡ		(15th)	(Jamme)	ḡa( )	?
p		(10th)		piʾt-(?)	corner?
ṣ/ẓ		(10th)		ṣa(d-)	plant
ḍ	?	?		?	?
q		(14th) (10th)	(Jamme)	qu(p-)	?
r		(16th-14th)		naʾš-	head of man
ś/ṯ		(13th) W (10th)		ṯann-	composite bow
š		?	(Jamme)	?	?
t	+	+ (13th)	(Jamme)	tô(taw)	owner's mark

Schematic Table of Proto-Sinaitic Characters

FIG. 1.

Figure 6: Table of Proto-Sinaitic characters (Albright 1969: fig. 1)

.

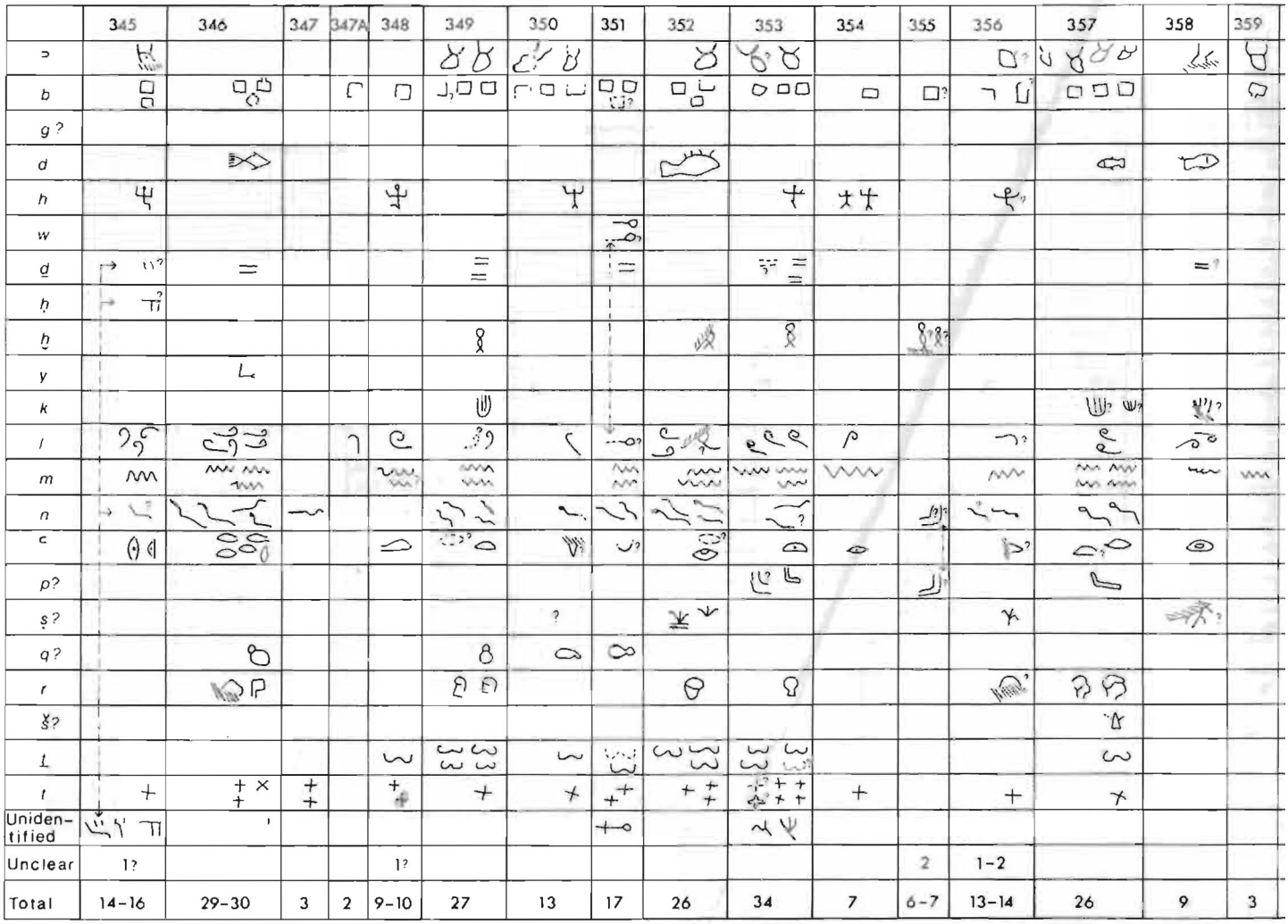
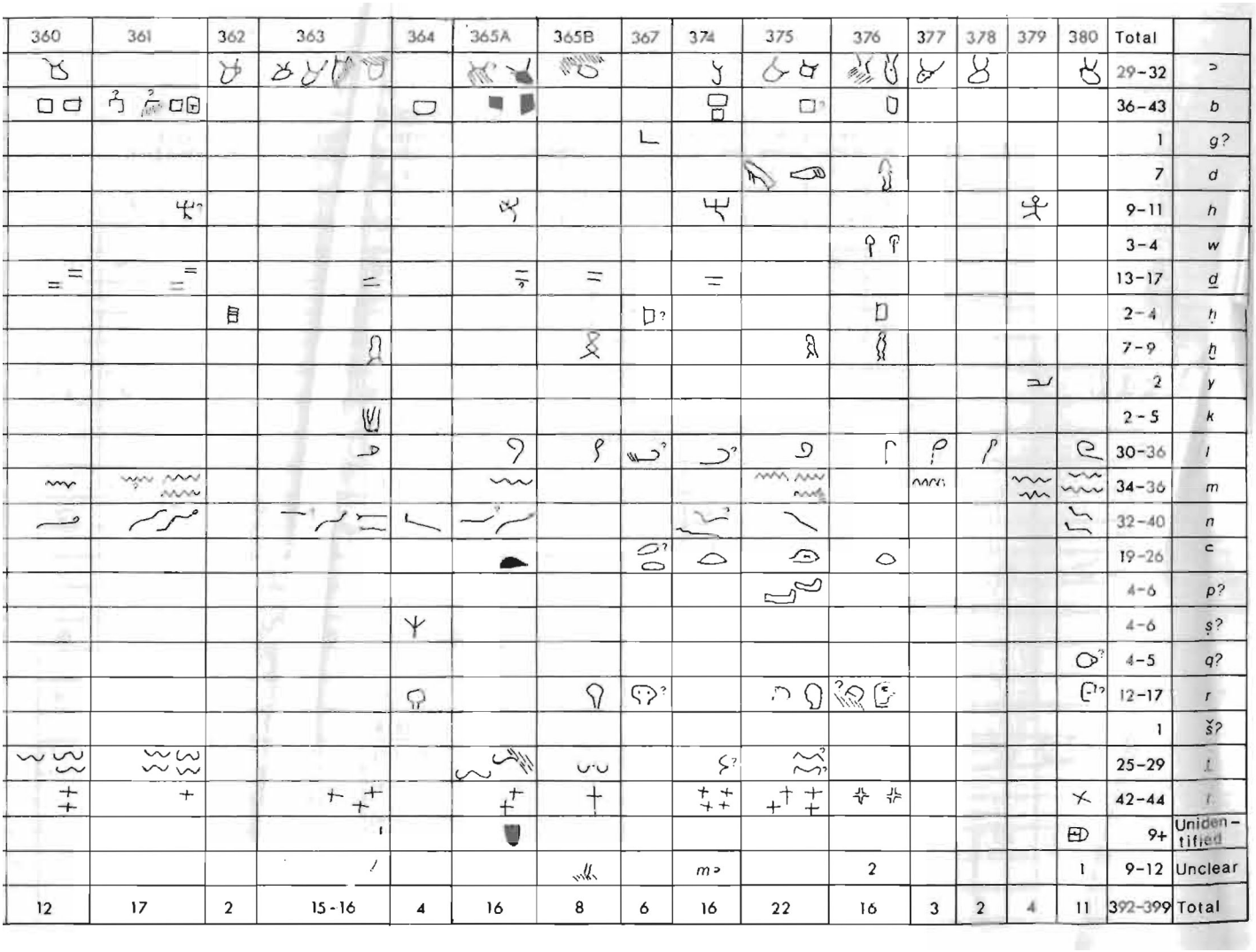
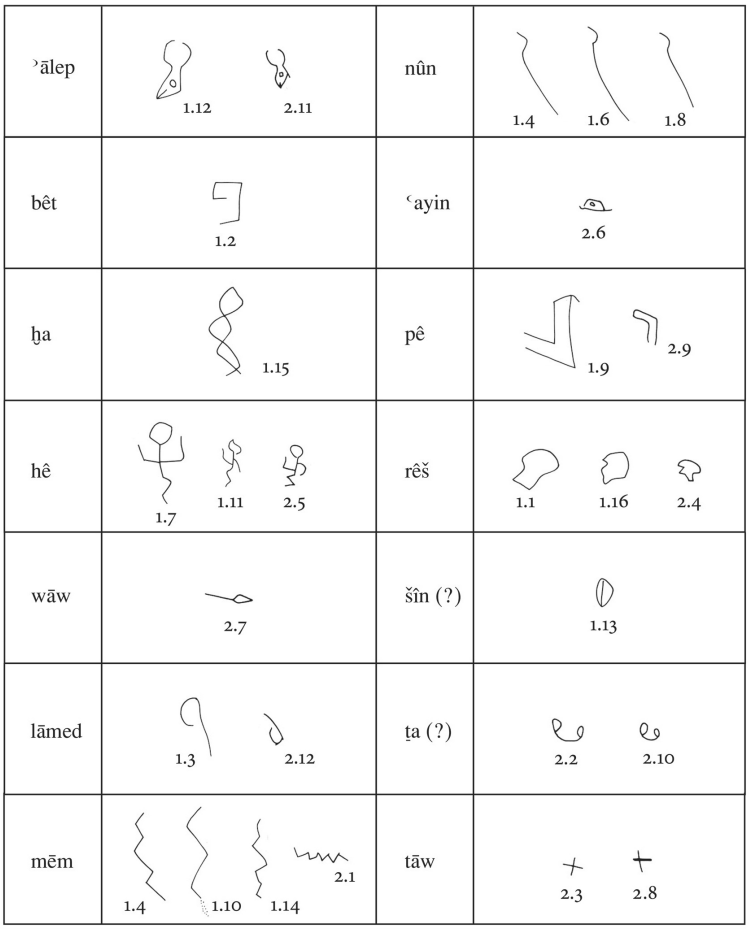


Figure 7: Letters used in each of the extant Proto-Sinaitic inscriptions (Sinai 345–359) from Serabit el-Khadim (Sass 1998: Table 4). Left-side excerpt, continued in fig. 8.



360	361	362	363	364	365A	365B	367	374	375	376	377	378	379	380	Total	
															29–32	ʾ
															36–43	b
															1	g?
															7	d
															9–11	h
															3–4	w
															13–17	ḏ
															2–4	ḥ
															7–9	ṯ
															2	y
															2–5	k
															30–36	l
															34–36	m
															32–40	n
															19–26	ʿ
															4–6	p?
															4–6	ṣ?
															4–5	q?
															12–17	r
															1	š?
															25–29	t
															42–44	ṯ
															9+	Uniden-tified
															9–12	Unclear
12	17	2	15-16	4	16	8	6	16	22	16	3	2	4	11	392–399	Total

Figure 8: Letters used in each of the extant Proto-Sinaitic inscriptions (Sinai 360–380) from Serabit el-Khadim (Sass 1998: Table 4). Right-side excerpt, continued from fig. 7.



Pl. X. *Paleographic chart of the two Wadi el-Hôl Early Alphabetic Inscriptions (signs reproduced by scale).*

Figure 9: Inventory of signs used in the Wadi el-Hol inscriptions, shown in fig. 4.

part in the Egyptian expeditions[1]. These indications, however, must be admitted not to amount to very much.

Before proceeding further one important point must be emphasized: it is to the last degree improbable that the monuments bearing the new script are the work of the indigenous Semitic nomads who have eked out a bare existence in the Sinaitic peninsula since time immemorial. There can be little or no doubt that the monuments are due to strangers from other parts who accompanied the Egyptians on their expeditions, though these strangers may not have come farther than from Palestine or from the *Hinterland* of Syria. Were the new inscriptions indigenous, they would undoubtedly have been more numerous than they are; nor should we have expected to find them in the temple or in the neighbourhood of a mine.

To turn to the inscriptions themselves: they are not in Egyptian hieroglyphic, yet many of the signs are obviously borrowed from that source. There are the human head, the ox's head, and the human eye, the very signs postulated by LENORMANT as the originals of proto-Semitic *rōsh* ר, *'alf* א and *'ain* ע. There is the zigzag, which we are sorely tempted to connect with מ *mēm* "water." There is one instance of a hand (no. 349), which might be *yōd*; the fish and snake, recalling and , are alternative candidates for the value נ (*nūn* or *nahās*). Finally, there are some other signs which have Egyptian analogies, , and , but which cannot as yet be identified with letters of the proto-Semitic alphabet.

The trend of my argument is now clear. Have we not, in this unknown script, something strangely like the long-sought proto-Semitic script? Looking closer, we discern signs foreign to the Egyptian hieroglyphs, but answering well to the names or forms of proto-Semitic letters. Such are , precisely similar to Semitic + for ת *tau*, "a mark" or "cross," very common in the inscriptions, corresponding to the frequency of ת in Semitic as an inflexional element; or or provides a suitable equivalent for ב *bēt* "house," Sabaean ; may be compared with forms of ל *lamd* which run through all the different alphabets; or might be equated to the Semitic forms of ז *zai* or *zain*. Without having much faith in them I have added to my table of comparisons = כ = Phoenician , = פ = Sabaean , and = ש = Semitic , .

In comparing the forms of some of the individual picture-signs with their earliest Semitic equivalents we can hardly fail to be struck with the ease with which the transition from the one to the other could be effected. The comparison may be left to the reader in the cases of the ox-head, the human head and the water-sign; but in the case of the human eye it is worth pointing out that the necessary step of the omission of the pupil has already been accomplished on the statue no. 346.

The inscriptions are too fragmentary for any very serious attempts at consecutive reading. There is, however, one sequence of four letters that recurs five, if not six times, as the following facsimiles show:—

[1] Nos. 24, 85, 87, 92, 110, 112, 115. On several of these a brother of the prince of Rethenu, by name *Ḫbdd* or *Ḫbddm*, is mentioned, and it is perhaps not fantastic to conjecture that some of the stelae were dedicated by him or by members of his staff.

Figure 10: Proto-Sinaitic signs used in running text and for purposes of comparison to Phoenician and Old South Arabian (Gardiner 1916: 14)

I have been able to show that all models for the new letters can be found in the hieroglyphic inscriptions (all dating to the Middle Kingdom) at the site (see Tables 2a, 2b). I called the attention of scholars to the fact that Gardiner, Černý and Peet, the great Egyptologists who excavated at Serabit and published the inscriptions from the site (*Sinai* I–II), mentioned the fact that the letter  *h* of the alphabet is a clear borrowing of the famous "Middle Kingdom" hieroglyph from Sinai  ; an obscure title, known almost only in Sinai during the Middle Kingdom, which they translated as "*Rêis.*"[22] This title appears in hundreds of examples in the Middle Kingdom inscriptions but is absent from the later Sinai inscriptions (see also discussion below, 5.2.4).

I have also shown (Goldwasser 2006a: 144, 151, and Goldwasser 2010a: 45–46) how an unexpected connection can be drawn between a *hieroglyphic inscription* of the highest Canaanite dignitary known to work in the Middle Kingdom with the Egyptian expedition, Khebeded (Sinai Stela 92, see Figs. 4a, 4b) and the new alphabetic script, in a special study on the origin of the letter *bêt*. My main claim in this case is that it seems that the writer of the inscription on Stela 92 mixed the alphabetic letter *bêt*  with the correct Egyptian hieroglyph for "house"  . The gist of this claim, if it is accurate, is that some Canaanites, either Khebeded, or someone in his entourage, *was already versed in both Egyptian hieroglyphs and in the newly invented Canaanite alphabetic script*.[23] The somewhat imperfect knowledge of the hieroglyphic script of the person who wrote on Stela 92, and his concurrent acquaintance with the alphabetic system, may have caused him some confusion. It led him to incorrectly exchange, in a few cases, the Egyptian hieroglyph for the new alphabetic sign  that carried the same *iconic* meaning. This writer was probably not the inventor, as he knew Egyptian hieroglyphs. Yet as an educated Canaanite, he could have

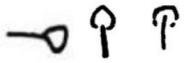
[22] *Sinai* II: 67, note 1: "It seems to be due to its frequent occurrence in the Sinai inscriptions that the sign ( O.G.) has passed into the Proto-Sinaitic alphabet."

[23] For individual scribal "graphic bilingualism," see Cromwell forthcoming.

Figure 11: Usage of Proto-Sinaitic characters in running text (Goldwasser 2011: 266)

.

It also seems that real life objects may have played a role in the choice of prototypes for the alphabet letters.[27]

An interesting example is the alphabet letter *waw* 
.

The models for this sign are most probably the two very different Egyptian hieroglyphs depicting "oar,"  (P8),[28] and "mace," (T3).[29] Some cursive versions of these signs in the Egyptian inscriptions of Sinai, such as  (Table 2a), look very similar to the Canaanite letter *waw*. Both signs may have served as the pictorial prototype for borrowing.

But why would the inventors choose these particular signs?

Since they could not read Egyptian, they were not aware and probably did not care that the horizontal hieroglyph that looks so similar to the vertical is actually a different hieroglyph in the Egyptian system. The horizontal Egyptian hieroglyph  [30] may be the prototype for the horizontal *waw*, well known in the Sinai Canaanite corpus of alpha-

---

[27] As for real life models as the source for the letters: *pê (*pi't-)*  *"corner"* (Hamilton 2006: 195, note 248), I suggested that an actual building tool may be the source for this sign (Goldwasser 2006a: 141–142). As for the letter *kāp (*kapp)*  , such a hieroglyph is unknown in Egyptian, and it seems that a real life palm was the prototype. As for *šîn* (**θann-), "bow,"* a real life model may have also played the role of prototype. Many of the Canaanites in the expeditions to Sinai were employed as soldiers (Černý 1935; Valbelle and Bonnet 1996).

[28] This enumeration refers to the sign list in Gardiner 1957: 438 ff.

[29] Hamilton 2006: 86–90 also regards  T3 as the model for this letter. However, he differs from me in that he looks for hieratic models and models from Egypt, whereas I look for all models of letters in Sinai. Darnell et al. (2005: 85) suggest the hieroglyph O29 as a possible source.

[30] This example, which is a cursive version of the P8 "oar" hieroglyph, is taken from an inscription in Wadi Maghârah, on the way to Serabit. See *Sinai* I: Pl. XI, 27.

Figure 12: Usage of Proto-Sinaitic characters in running text (Goldwasser 2011: 269)

.

3.2 Two Different Hieroglyphs Serve as a Model for a Single Letter

Two hieroglyphs that constitute diverse signs that can never be exchanged for one another in the Egyptian hieroglyphic system often serve as the model for a single letter.

A possible example is the letter *resh* [34]. Here two hieroglyphs may have served as models – D1 and D2 . In Egyptian they can never be interchanged. D1 carries the meaning "head" and D2 carries the meaning "face."

A second clear case is the letter *nûn*. Again, two snakes, the Egyptian cobra (I9) and the viper (I10) , which have very different meanings in the hieroglyphic script, seemed to serve as model for a single alphabetic letter — *nûn* — (Hamilton 2006: 154). For the inventors, they were simply "snakes."

3.3 "Incorrect" Direction of Writing

Another phenomenon that strongly points to the fact that the inventors did not know how to read hieroglyphs is that in all the alphabetic inscriptions in Sinai the direction of writing is incorrect according to Egyptian rules. In Egyptian, signs that have fronts and backs must all face the beginning of the inscription.[35] (See Fig. 6 and Fig. 7 from an inscription at the mines.)

Written in Egyptian stela form, imitating the Egyptian base lines system, the alphabetic Inscription 349 (Fig. 8) is one of the better examples of the early alphabetic inscriptions.[36] It was found in the entrance

---

[34] See (Sinai 364) in Hamilton 2006: 224 (Fig. 2.70), and Sinai 365b, Hamilton 2006: 369.

[35] There is a very rare phenomenon in Egyptian where inscriptions may partially be written in other directions. However, this is a rare, sportive, use.

[36] It seems that the "Canaanite direction" is the direction preferred by the uninitiated who does not know Egyptian rules of reading. Students in my beginner classes almost always try the "Canaanite direction" as the first option for tack-

Figure 13: Usage of Proto-Sinaitic characters in running text (Goldwasser 2011: 271)

.

Bet,"house." Even if based on an incorrect reading of an Egyptian hieroglyph (Goldwasser 2006: 143–146), all examples of the letter *Bet* show iconicity, presenting what the Canaanites seemingly perceived as a minimal plan of a house. In the case of *Bet*, it may be argued that from the point of view of the "recognition cues" the rare variations that show the entrance are the better variations, as they bring to the mind of the beholder a more specific plan of a house, i.e., more cues. They probably also brought about, at least in some cases, the common image of the  "soul house."[16] This type of widespread clay offering model, typical of non-prestige finds in Egypt in this time, would fit the social context of the miners (Goldwasser 2006: 143; 2012b; Hamilton 2006: 38–52). The unique example of the two-column house  (Sinai 367) is even more instructive iconically (after Hamilton 2006: Fig. A.39).

"fish" *Dalt* (?).[17] At least seven examples of a letter represented by a fish icon are known from Sinai. Its identification is still debated. The level of iconicity of the fish is mediocre but it has sufficient "recognition cues." Most examples keep the Egyptian horizontal stance. A single example that makes up part of a graffito on the road to the temple at Serabit el–Khadem presents what is probably an independent reproduction of a vertical fish  (Sinai 376[18]).

"door"? *Dalt*/*Ḥet* (?).[19] The iconic meaning, and "recognition cues" of this letter are unclear and the signified could hardly be recognized pictorially without previous knowledge. Its reproduction would be difficult as it is a culture-bound referent that may refer to many different kinds of doors(?).

He, "Man standing with lifted arms." At least nine examples of this letter are known in Sinai, all of them of high "recognition cues." The "Canaanite reading" of this hieroglyph seems to refer metonymically to a shout uttered by this person, "Hoy" or "Hey," that would then explain nicely the name of the letter.[20]

16 See Hamilton 2006: 40.

17 Cross and Lambdin 1960: 25; Sass 1988: 113–114. Hamilton (2006: 62–74 with detailed bibliography and discussion) enthusiastically embraces Cross and Lambdin's suggestion of alternation with the door [*dlt*] icon which in his opinion may also stand for this letter in the Sinai script. He suggests two examples, 362, and 376 . However these signs are read by Sass 1988: 32,118 and Table 4 as *Ḥet*.

18 This inscription shows many idiosyncrasies even within the framework of the unstable Sinai alphabetic repertoire.

19 See note 11 above.

20 In Sinai II, 67 note 1, Gardiner, Černý and Peet define this sign as a "Sinai hieroglyph." This fact is already mentioned by Sass 1988: 115. For discussions of this letter Goldwasser 2006: 137–138, and Hamilton 2006: 76–86. Cross and Lambdin 1960: 25 mention the name of the letter in Ethiopian—*Hoy*. Scholars that try to suggest an acrophonic reading from the Semitic root *hll* breach the basic hypothesis that the *names* of the letters refer to the original Canaanite readings (e.g., Morenz 2011: 118).

Figure 14: Usage of Proto-Sinaitic characters in running text (Goldwasser 2016: 129)

.

specific *call*—"Hoy." As the "upright held hands," which are the main "recognition cue" of this hieroglyph as well as that of the Sinai letter, do not always feature in Wadi el-Ḥôl,  (one out of three)—it may point to an already blurred understanding of the iconic original. I have cautiously suggested an additional explanation for two variations— in inscription no. 2 and possibly also  in inscription no. 1. It is conceivable to read them as intrusions of the Egyptian classifier  [human-male] into these alphabetic inscriptions.[35]

The influence of local Egyptian environment may also be traced by a different version of the *Kaf*, reminiscent of an Egyptian hieroglyph with a fitting phonetic signified (*k3*)  and a rather close iconic meaning—up-held hands (Goldwasser 2006: 150; Hamilton 2006: 330).[36]

The Wadi el-Ḥôl inscriptions present a new prototype for the letter *Bet*. The hieroglyph  (Gardiner 1957: 49, O4), which could be interpreted iconically as [house] (Darnell *et al.* 2005: 77; with a single possible example in Sinai, Goldwasser 2006: 149), appears very clearly here in inscription no. 1 (Fig. 11). The incorrect stance of the letter in comparison to the possible hieroglyphic original strongly suggests that the writer of inscription no.1 did not master hieroglyphic Egyptian.

An important innovation that seems to have been born in Egypt, at least as far as our knowledge of this point, is the introduction of the vertical *Mem* which is highly unusual in the hieroglyphic system. This unusual stance is introduced for the first time in the Wadi el-Ḥôl inscription no. 1. It may have its roots in a "Canaanite Reading" of Egyptian cursive hieroglyphs that were drawn in the vicinity of the alphabetic inscriptions in Wadi el-Ḥôl that carry very different meaning in Egyptian, but may still look like "water" to the uninitiated (detailed discussion in Goldwasser 2006: 147–148). Nevertheless, they still carry a strong "recognition cue," whereas to the uninitiated they look like "water" drawn vertically, a common iconographic representation of water in Egypt and the Ancient Near East (Fig. 13).

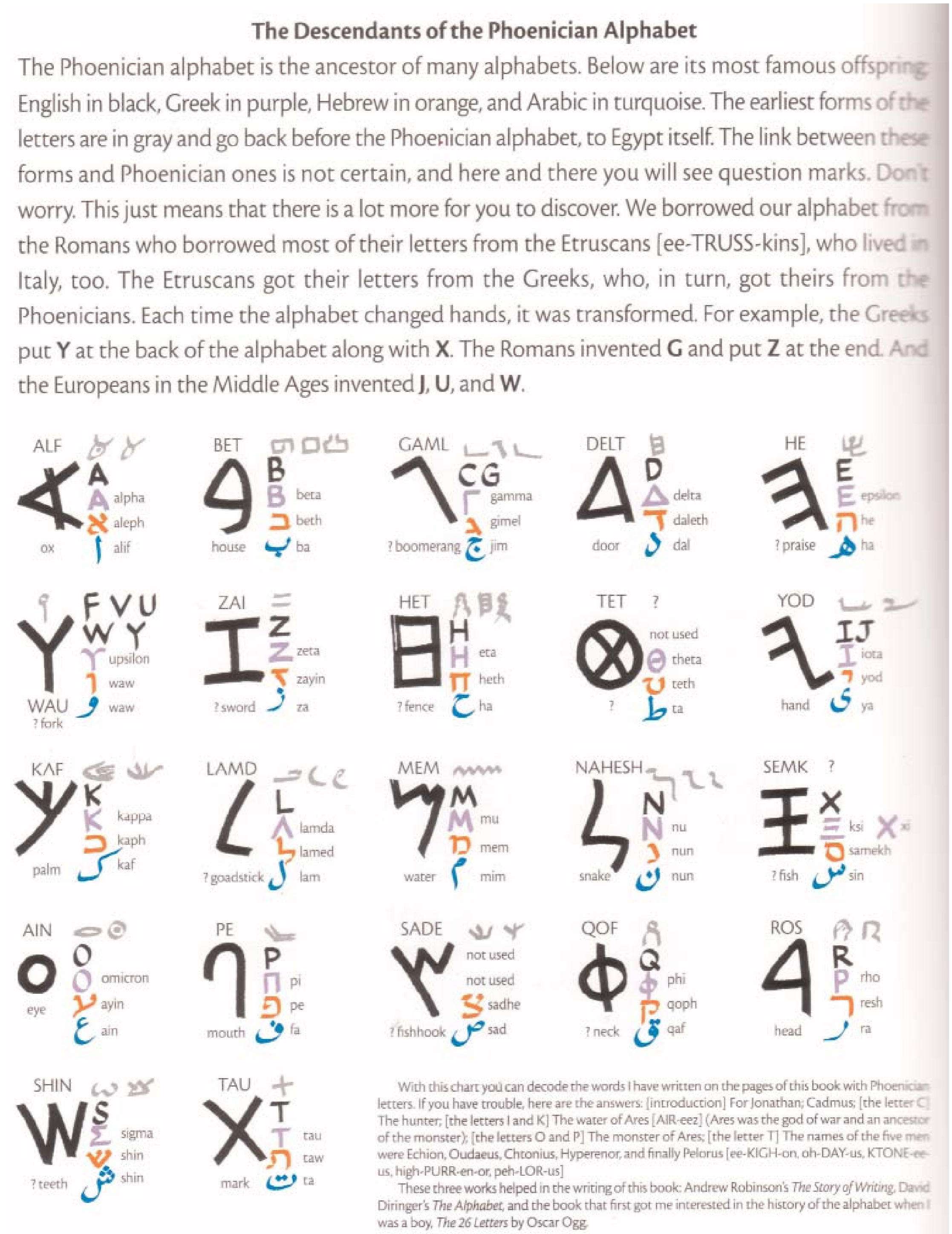
Were the two inscriptions in Wadi el-Ḥôl carved by different hands? The highly differing [head] letters may bear witness to that or they may be the result of experimental "reproduction" (see below). Inscription no. 2 is a clear case of "reproduction"  , while inscription no. 1 presents at least one universal, minimal  [head]. No [head] letter in Wadi el-Ḥôl bears resemblance to the Egyptian hieroglyphic original  . Yet the two highly iconic bulls-heads  are almost

35 On the mechanism of this possible intrusion with parallel examples from Egyptian, see Goldwasser 2006: 147–149.

36 For a different reading of this letter, see Vanderhooft 2013.

Figure 15: Usage of Proto-Sinaitic characters in running text (Goldwasser 2016: 137)

.



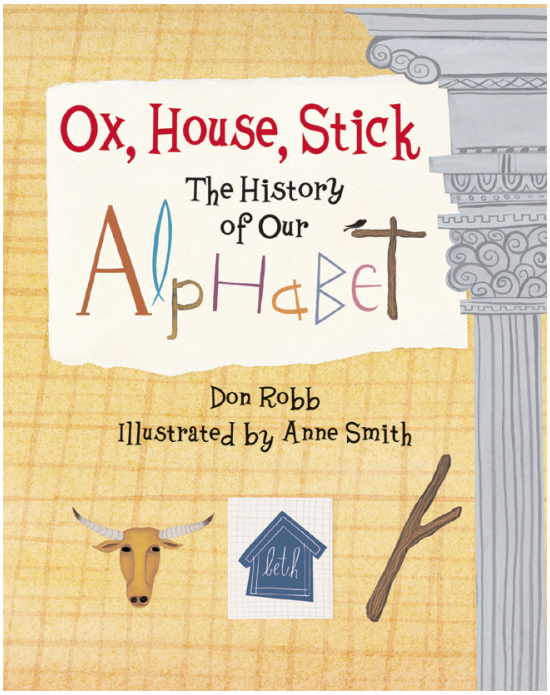
The Descendants of the Phoenician Alphabet

The Phoenician alphabet is the ancestor of many alphabets. Below are its most famous offspring: English in black, Greek in purple, Hebrew in orange, and Arabic in turquoise. The earliest forms of the letters are in gray and go back before the Phoenician alphabet, to Egypt itself. The link between these forms and Phoenician ones is not certain, and here and there you will see question marks. Don't worry. This just means that there is a lot more for you to discover. We borrowed our alphabet from the Romans who borrowed most of their letters from the Etruscans [ee-TRUSS-kins], who lived in Italy, too. The Etruscans got their letters from the Greeks, who, in turn, got theirs from the Phoenicians. Each time the alphabet changed hands, it was transformed. For example, the Greeks put **Y** at the back of the alphabet along with **X**. The Romans invented **G** and put **Z** at the end. And the Europeans in the Middle Ages invented **J**, **U**, and **W**.

With this chart you can decode the words I have written on the pages of this book with Phoenician letters. If you have trouble, here are the answers: [introduction] For Jonathan; Cadmus; [the letter C] The hunter; [the letters I and K] The water of Ares [AIR-eez] (Ares was the god of war and an ancestor of the monster); [the letters O and P] The monster of Ares; [the letter T] The names of the five men were Echion, Oudaeus, Chtonius, Hyperenor, and finally Pelorus [ee-KIGH-on, oh-DAY-us, KTONE-ee-us, high-PURR-en-or, peh-LOR-us]

These three works helped in the writing of this book: Andrew Robinson's *The Story of Writing*, David Diringer's *The Alphabet*, and the book that first got me interested in the history of the alphabet when I was a boy, *The 26 Letters* by Oscar Ogg.

Figure 16: Description of descendant, and ancestors, of Phoenician letters in a children's book on the history of the alphabet (from Rumford 2002; sourced from Everson 2004). Rumford notes that "The earliest forms of the letters are in gray and go back before the Phoenician alphabet, to Egypt itself"; these Proto-Sinaitic sources are at the top of the column next to each letter.



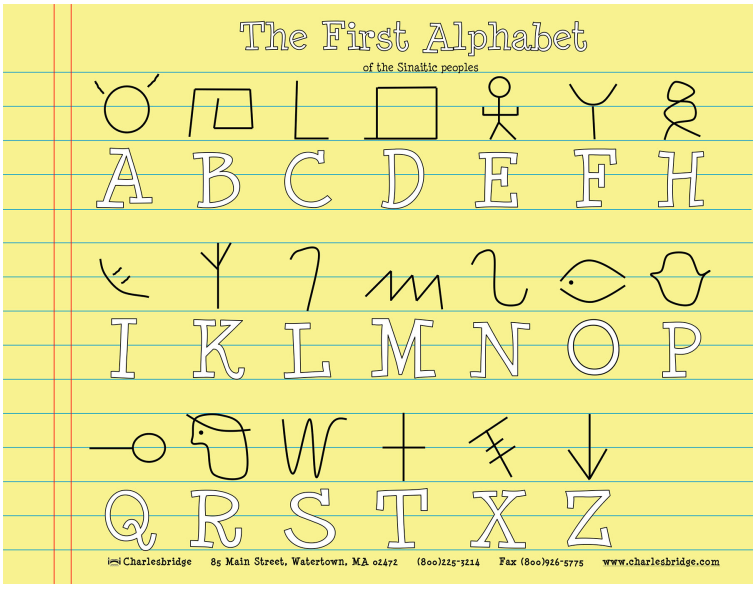


Figure 17: Cover of the children's book *Ox, House, Stick* and an activity guide showing the letters of the Proto-Sinaitic alphabet (from Robb 2007). The title refers to the first three letters: *ʾalp*, *bayt*, *gaml*. The graphical structure of some Proto-Sinaitic signs and some stated correspondences between the Latin letter and its Proto-Sinaitic source may not be palaeographically correct; however, the primary aim of the book is to convey an understanding of such historical connections to children.

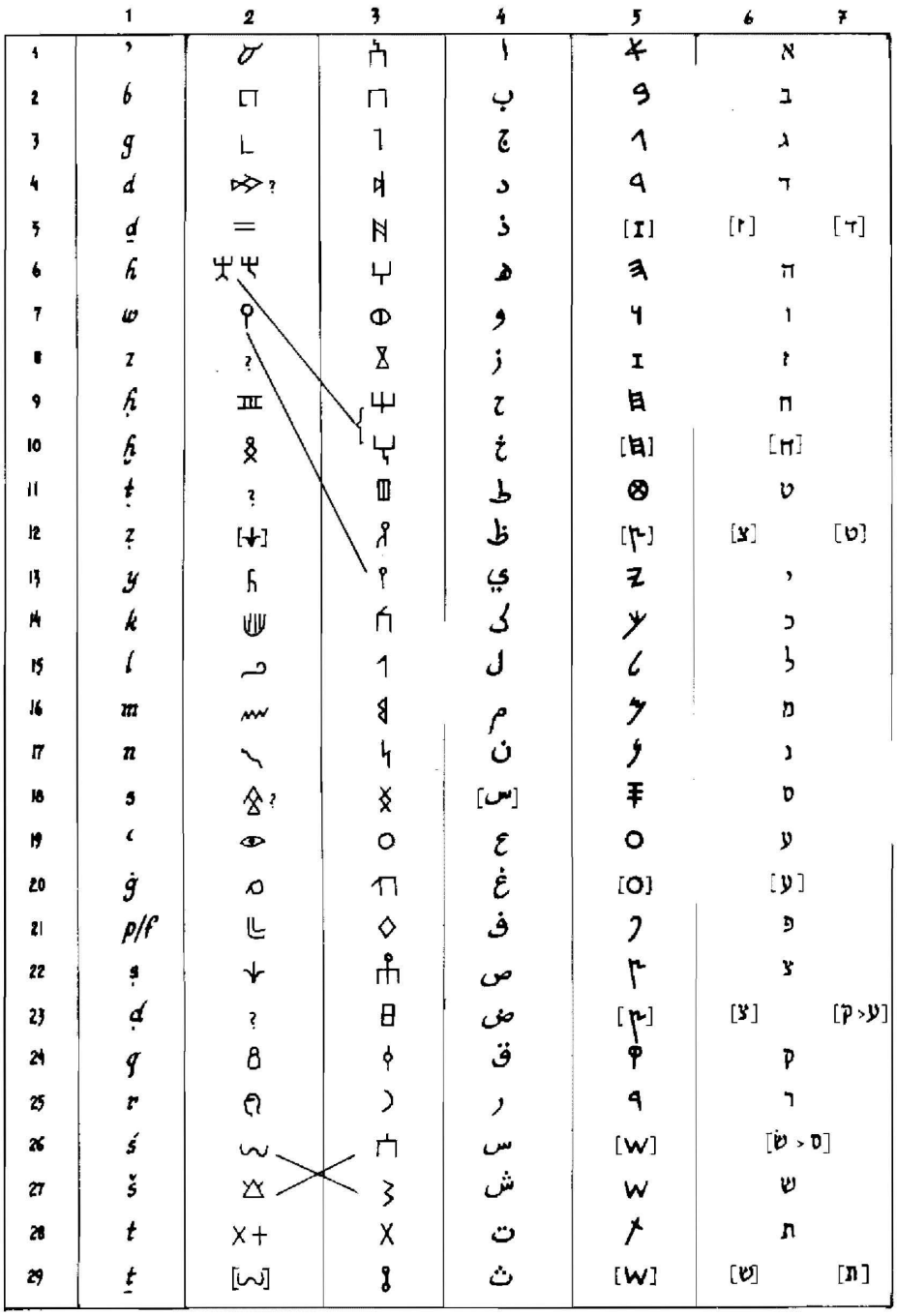


Fig. 26. Phonemic systems in West and South Semitic: 1. Proto-Semitic; 2. Proto-Canaanite; 3. South Arabic; 4. Arabic; 5. Phoenician; 6. Hebrew; 7. Aramaic

Figure 18: Comparison of Proto-Sinaitic with Phoenician and related scripts (from Navehh 1997: 32). This chart shows the distinctiveness of Proto-Sinaitic as compared to its descendants.

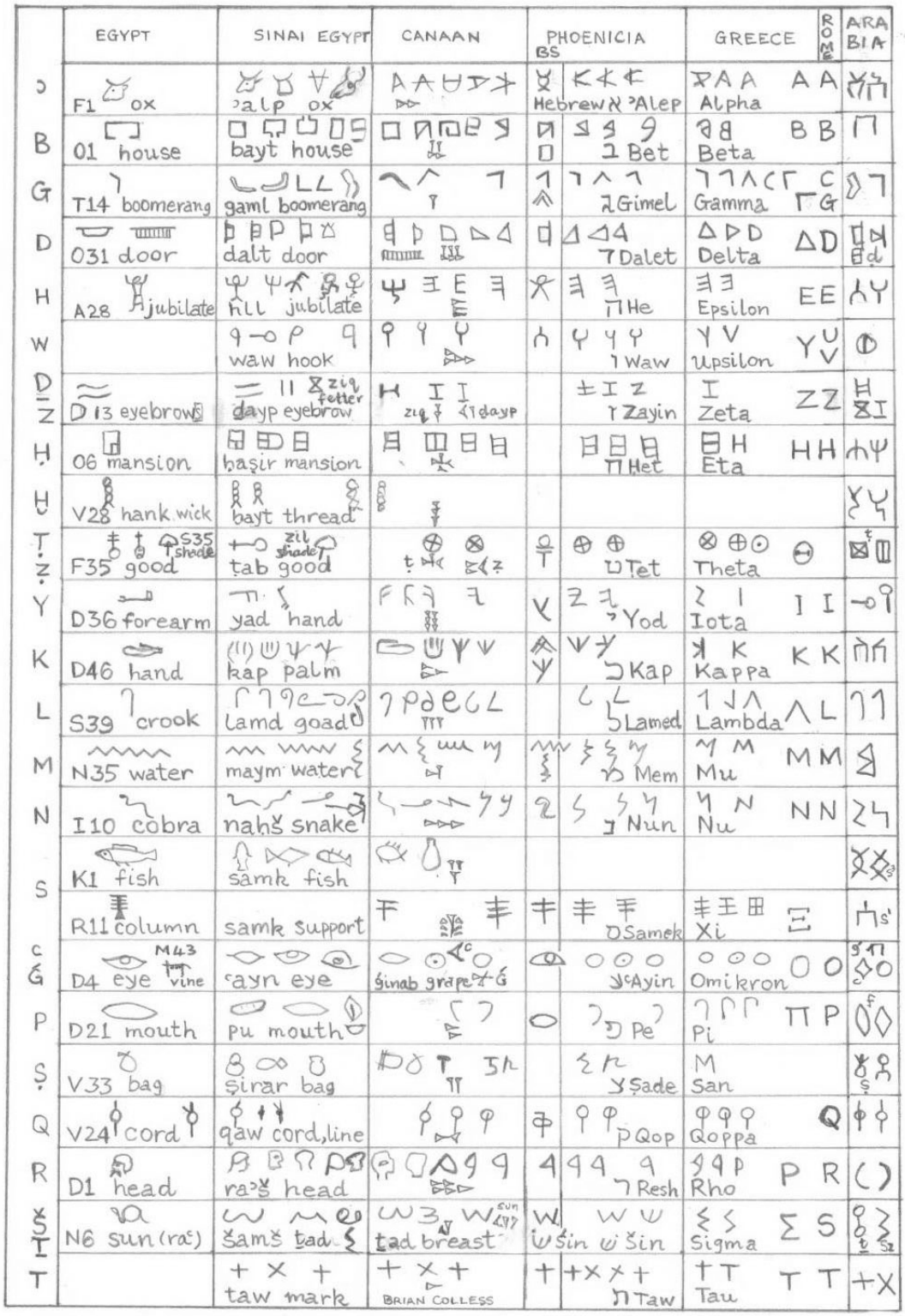


Figure 19: Comparison of Proto-Sinaitic with postulated sources from Egyptian Hieroglyphs; analogues in the Byblos Syllabary and Ugaritic; and its descendants Proto-Canaanite, Hebrew, Phoenician, Greek, Latin, and Old South Arabian (from Colless 2014: fig. 1).

.

Proto-Sinaitic		Phoenician	
	ʾalp	𐤀	*ʾalp*
	bayt	𐤁	*bet*
	gaml	𐤂	*gaml*
	dalt	𐤃	*delt*
	hilal	𐤄	*he*
	wāw	𐤅	*wau*
	ḏayp	𐤆	*zai*
	ziq	—	—
	ḥaṣir	𐤇	*het*
	ḫayt	—	—
	ṭab	𐤈	*tet*
	ẓil	—	—
	yad	𐤉	*yod*
	kap	𐤊	*kaf*
	lamd	𐤋	*lamd*
	maym	𐤌	*mem*
	naḥš	𐤍	*nun*
	samk, *digg*	—	—
—	—	𐤎	*semk*
	ʿayn	𐤏	*ʿayn*
	piʾt	𐤐	*pe*
	pu	—	—
	ṣad	𐤑	*sade*
	qop, *ṣirar*	𐤒	*qof*
	qaw	—	—
	raš	𐤓	*reš*
	šamš	—	—
	ṯad, *ṯann*	𐤔	*šin*
	taw	𐤕	*tau*
	ġinab	—	—
	ṯa?	—	—
	?	—	—
	šin?	—	—

Figure 20: Comparison of Proto-Sinaitic and Phoenician characters. The Phoenician glyphs are from the 'Google Noto Sans Phoenician' font.

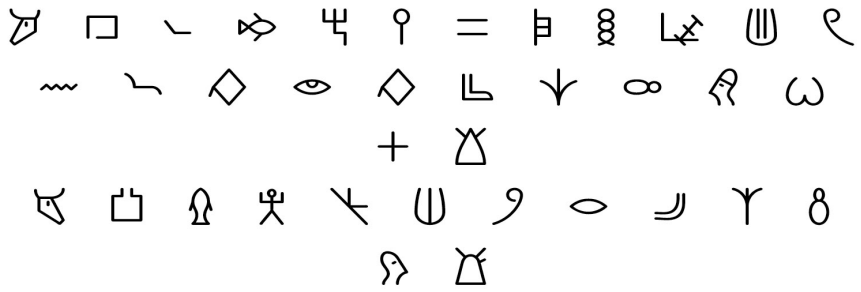
The Proto-Semitic Fonts

Peter Wilson
herries dot press at earthlink dot net

This provides a short test of the characters in the Proto-Semitic fonts — the `proto` font family.

Following the declaration `\protofamily` the Proto-Semitic font is used. For just a few characters the `\textproto{arg}` macro will typeset `arg` in the Proto-Semitic font.

The Proto-Semitic font, and alternate glyphs, in the huge size



The font, and alternates, in its normal size followed by the Computer Modern Roman for comparison

a b g d e w z h T y k l m n s o s p x q r S t v

A B D E Y K L O P X Q R V

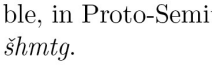
The macro `\translitproto{<cmds>}` will give a transliteration of the commands in its argument. For example, Proto-Semitic, as near as possible, in Proto-Semitic is:  , which transliterates as *pr't' šhmtg*.

Figure 21: A description of the 'protosem' package for LaTeX by Peter Wilson (2005), which enables typesetting of Proto-Sinaitic using a Postscript Type-1 font.

Table 1: Alphabet and commands

Name	Meaning	Value	Glyph(s)	ASCII	Commands
alpu	ox	’	𐤀 𐤁 𐤂	’ a A	\Aa \Aaleph \AAa \AAaleph
betu	house	*b*	𐤃 𐤄	b B	\Ab \Abeth \AAb \AAbeth
??	throw-stick?	*g*	𐤅	g	\Ag \Agimel
??	fish?	*d*?	𐤆 𐤇	d D	\Ad \Adaleth \AAd \AAdaleth
??	man?	*e*?	𐤈 𐤉	e E	\Ah \Ahe \AAh \AAhe
wawwu	hook/peg	*w*	𐤊	w	\Aw \Avav
??	??	*z*	𐤋	z	\Az \Azayin
hotu	fence	*ḥ*	𐤌 𐤍	h H	\Ahd \Aheth \AAhd \AAheth
??	twisted flax	*ṭ*?	𐤎	T	\Atd \Ateth
yadu	hand/arm	*y*	𐤏 𐤐	y Y	\Ay \Ayod \AAy \AAyod
kappu	palm of hand	*k*	𐤑 𐤒	k K	\Ak \Akaph \AAk \AAkaph
lamdu	ox goad	*l*	𐤓 𐤔	l L	\Al \Alamed \AAl \AAlamed
mayyuma?	water	*m*	𐤕	m	\Am \Amem
nahasu	snake	*n*	𐤖	n	\An \Anun
enu	eye	‘	𐤗 𐤘 𐤙	‘ o O	\Ao \Aayin \AAo \AAayin
??	??	*s*?	𐤚	s	\As \Asamekh
??	leg/foot?	*p*?	𐤛 𐤜	p P	\Ap \Ape \AAp \AApe
??	plant?	*ṣ*?	𐤝 𐤞	x X	\Asd \Asade \AAsd \AAsade
??	knot?	*q*?	𐤟 𐤠	q Q	\Aq \Aqoph \AAq \AAqoph
rasu	head	*r*	𐤡 𐤢	r R	\Ar \Aresh \AAr \AAresh
??	lotus pool?	*š*	𐤣	S	\Asv \Ashin
tawwu	mark	*t*	𐤤	t	\At \Atav
??	??	*ʔ*	𐤥 𐤦	v V	\Av \Ahelmet \AAv \AAhelmet

Figure 22: The glyphs of the ‘protosem’ Postscript font and the LaTeX() macros for producing them (Wilson 2005).

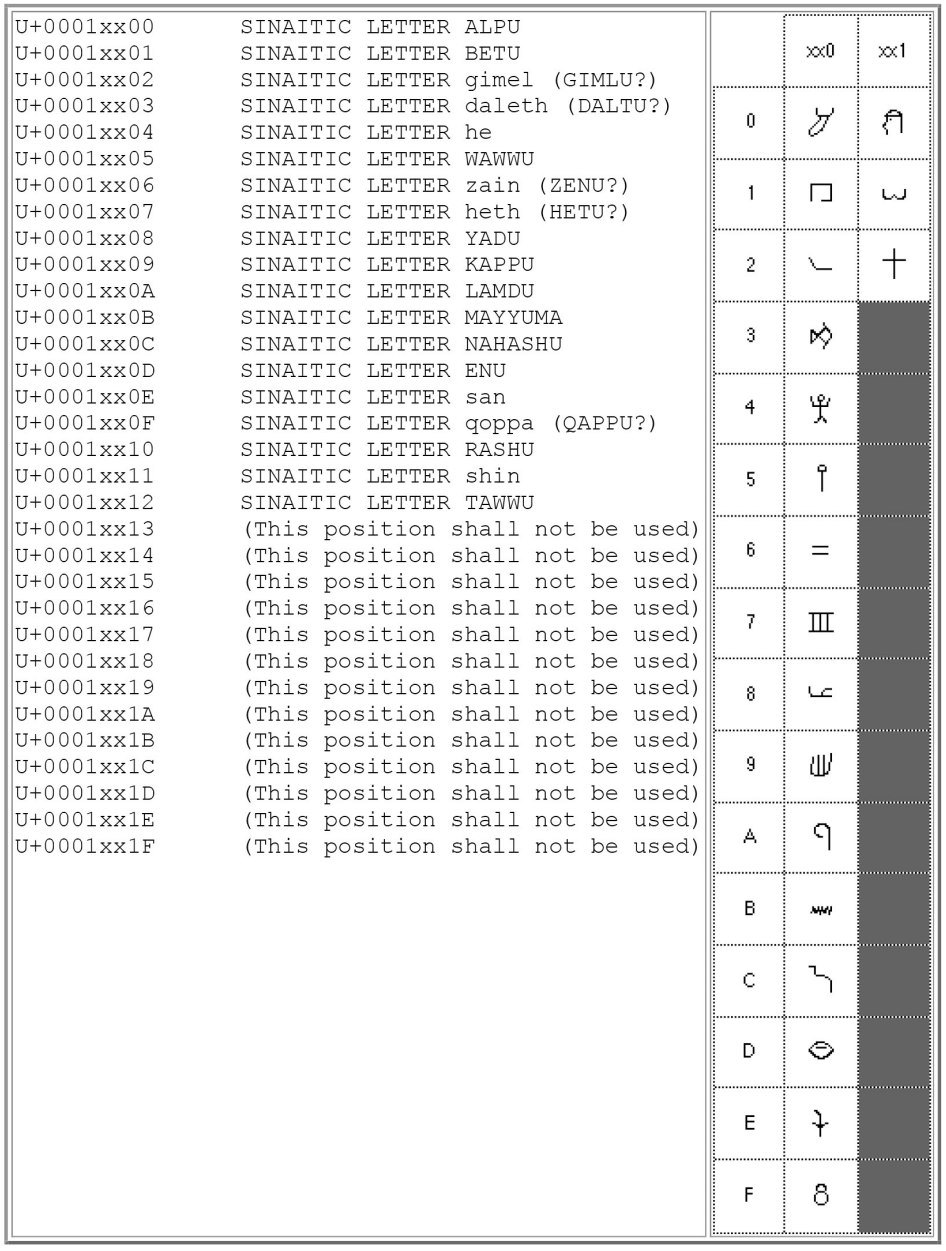


Figure 23: Repertoire for ‘Sinaitic’ proposed by Everson (WG2 N1688 L2/98-035).