Beyond the Semantic

Typographic Representation of Ancient Monetary Inscriptions

Morgane Pierson

Abstract. The PIM research project (meaning "Police pour les Inscriptions Monétaires") aims to produce a suitable tool for transcribing the information contained on monetary inscriptions, beyond their semantic content. The textual information and graphic features that a coin carries can provide many valuable information regarding its origin and the society in which it was minted (Codine-Trécourt and Guillaume, 2012). Since there was previously no digital font that could fully and accurately render the monetary inscriptions, this project was initiated in 2013 by Florence Codine, curator in charge of the Merovingian coins at the Bibliothèque nationale de France (BnF), and is currently supervised by Frédérique Duyrat.

1. The PIM project

Since Gutenberg's invention of his printing system with movable type, technological advances have continuously transformed transcribing methods in scholarly research. Various transcription tools have facilitated researchers' access to sources, processing of data and academic publishing. Digital humanities has opened up new possibilities for type design as well as other research fields, which until the twentieth century were part of book paradigm. However, despite recent technological progress, researchers still suffer from the lack of suitable tools such as digital typefaces, interfaces and encoding to support their work. The absence of well-designed typefaces, and often using of images instead of encoded text, have been two of the main shortcomings in conducting research on various historical fields. Therefore, a significant contribution to digital humanities research will be made by creation and use of fonts in digital publishing projects and different online platforms.

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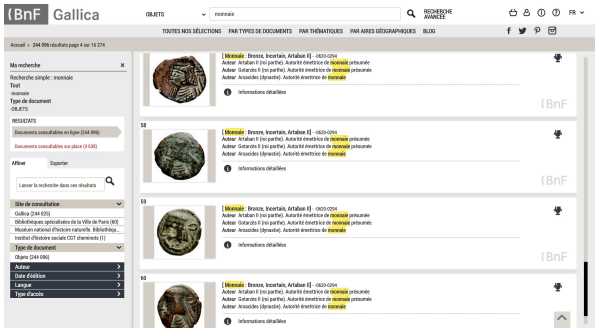
FIGURE 1. Judean, Greek, Nabatean, and Phoenician coins, BnF

(a)



(b)

FIGURE 2. (a) Department of coins and medals, BnF, Paris. (b) Gallica Web site. Bibliothèque nationale de France, Paris

1.1. The Bibliothèque nationale de France

The BnF houses one of the largest collections of coins, most of which, have already been digitised and are publicly available online through the Gallica website[1]. Thanks to this extensive digital resource, and software called NumiPal (Thevenin, 2018) (Fig. 3), specialists from the BnF's department of coins and medals were able to establish an inventory of the characters. NumiPal helps scholars to study the coins very closely and most importantly, annotate the inscriptions (Fig. 4). Once the annotation has been carried out, all the annotated allographs are recorded for each coin and for each allograph all the identified forms are inventoried with the reference number in the online software. This database makes it possible to find every form which have been assigned to a single allograph.

1.2. The Atelier National de Recherche Typographique

In 2013, the department of coins, medals, and antiques at the BnF began a partnership with the Atelier National de Recherche Typographique (ANRT)[2], to develop a digital typeface that would bring together all identified stylistic variants of the inscriptions on the coins, in a consistent manner. This project began with Elvire Volk Leonovitch, a student at ANRT, and under the direction of Thomas Huot-Marchand (Volk Leonovitch, 2014). Initially, the main goal was to develop a digital font for the transcription of the Merovingian monetary inscriptions on screen and paper. While previously, image files had to be inserted in editorial projects to display the appropriate variant, the implementation of Unicode-encoded fonts presented a significant evolution for digital humanities—in particular for digital platforms such as online catalogues.

Based on the classification of the letters found on the coins from the BnF, which was conducted by a team of researchers, an accurate and relevant interpretation of the various letterforms can be deduced. However, it is important to find the best approach or possible compromise in response to different criteria of readability in contemporary readership and loyalty to historical models. The goal is therefore to combine the advantages of imitative transcription with those of interpretative transcription. In this 'diplomatic' approach, the ontograph, which is the 'standard' representation of the grapheme, and the allograph, which is a morphological variant of the letter are distinguished. Unicode does not allow the integration of the variants and focuses on providing a unique code for every character, language, program, and platform. Admittedly,

1. https://gallica.bnf.fr/
2. https://anrt-nancy.fr/en/presentation-en/

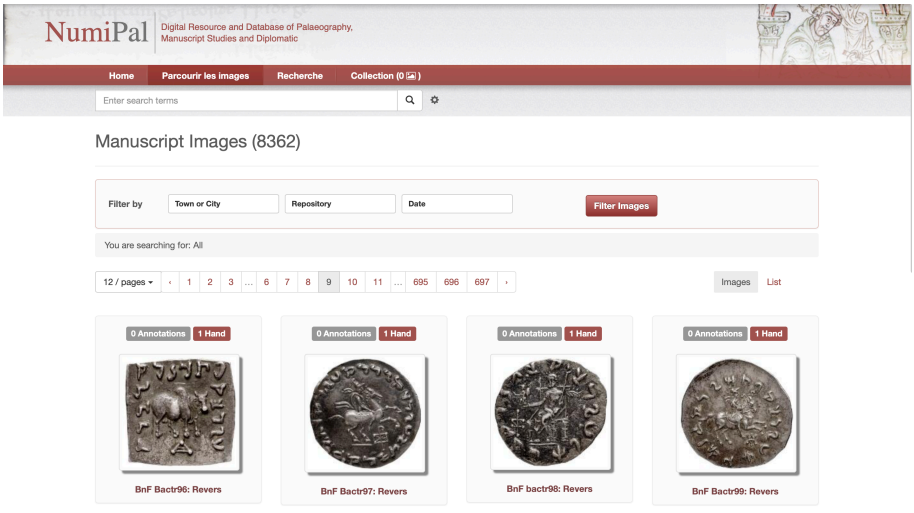


FIGURE 3. NumiPal website

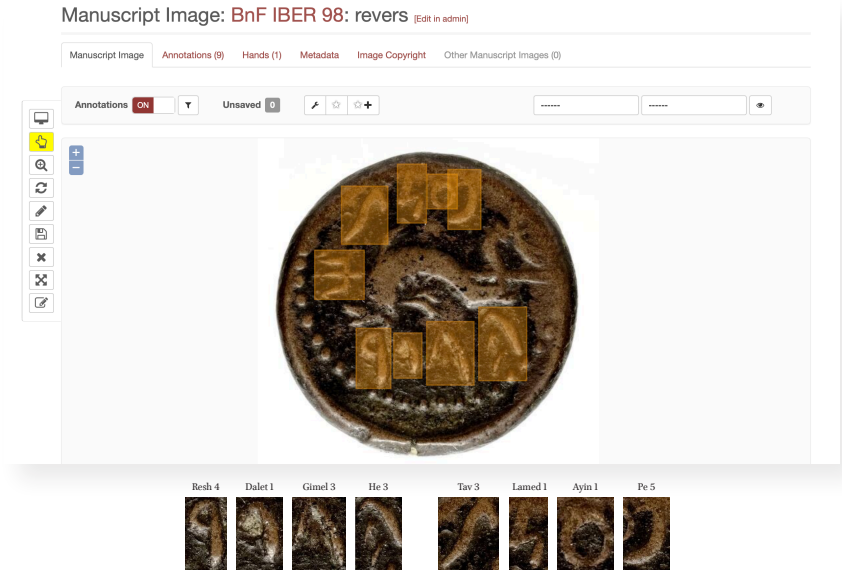


FIGURE 4. Example of coin's annotations on NumiPal

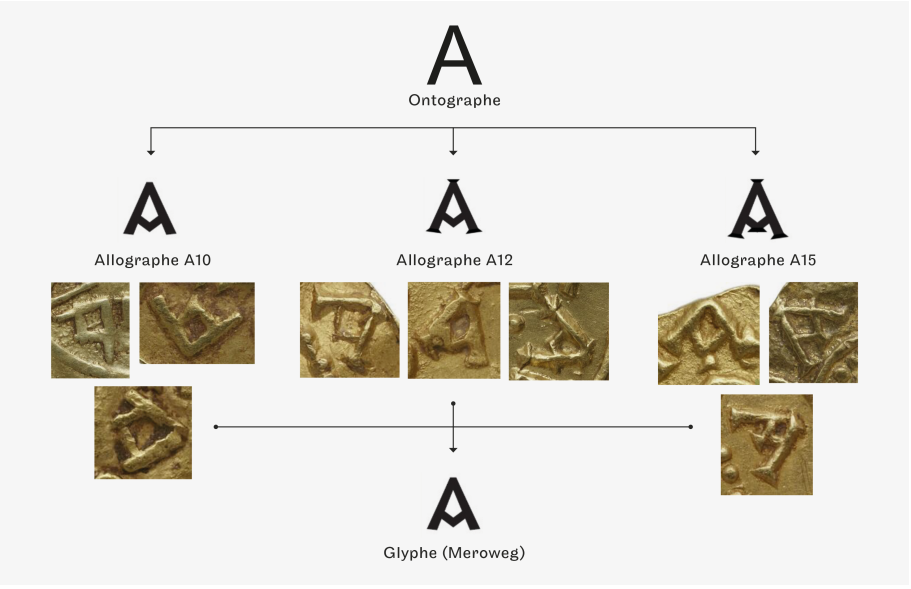


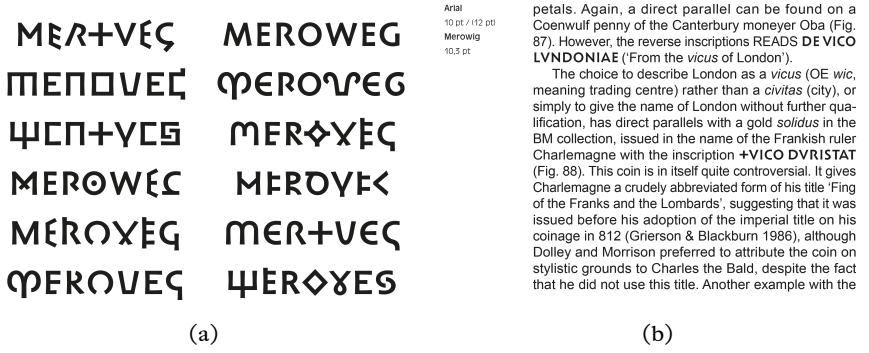
FIGURE 5. Merovingian ontograph and allographs <A>

it exists variant selectors (see Chinese, Emojis...) but their use and their implementation are too constraining and not adapted to the case of the monetary inscriptions. In the PIM project, the allographs share the same code as the concerned ontograph, and the viewing of the glyphs variants is done through the OpenType features in the font. From a technical point of view, the OT stylistic sets (SS01-SS20) were not used due to the limitation of only 20 variants for each glyph, which is not sufficient for numismatic. Instead, character variants (CV01- CV20) have been used, which allows the creation of 99 variants for one single glyph.

1.3. The PIM Typeface

The Meroweg typeface was deliberately designed without serifs-like details to accommodate various letter structures. Stems are slightly flared and heavy to produce a visible typographic contrast and to distinguish it from other typefaces, used to typeset the text around it.

In 2019, the PIM project was extended to support other collections of coins from Italy, Greece, Spain, North Africa, and the Middle East. The author has been tasked with designing typefaces for Phoenician, Cypriot, Archaic Greek, Etruscan, Umbrian, Oscan, Palaeohispanic, Lycian, Palaeo-Hebrew, Kharoshthi, and Nabatean writing systems. In the beginning, it was estimated that this typeface family would consist of



(a) (b)

FIGURE 6. (a) Meroweg variants. (b) Example of Meroweg in use. (Volk Leonovitch, 2014)

1066 glyphs for each allograph, however, so far 2440 glyphs have been designed, and this number is expected to grow even larger as the project proceeds. Even though the relationship between the early writing systems is rather complex, working on such a corpus is a great way to study and compare the evolution of the alphabets and exchanges between cultures.

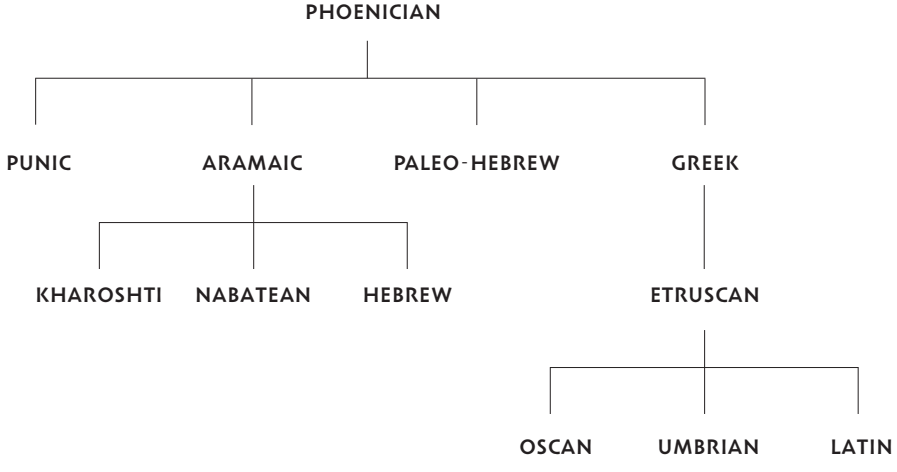


FIGURE 7. Family tree of the writing systems concerned in the PIM project

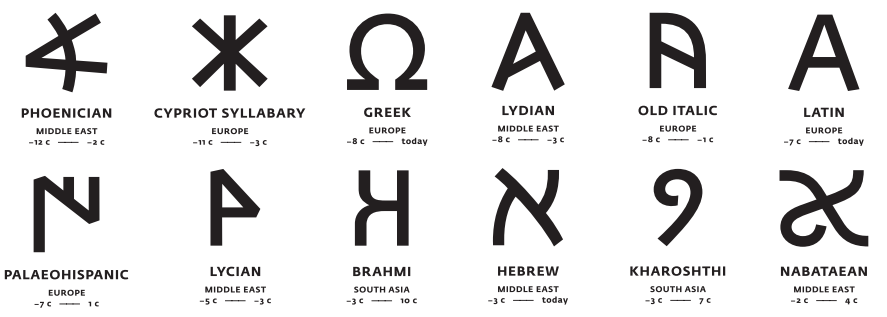


FIGURE 8. PIM writing systems, source: The Missing Scripts project, http://theworldswritingsystems.org/

Coins	Region	Unicode	Enc.	All.
Greek coins	Archaïc Greek	U+0370–03FF	28	130
	Old Italic (Ombrian, Oscan, and Etruscan)	U+10300–1032F	32	117
	Cypriot	U+10800–1083F	55	52
	Lycian and Lydian	U+10280–1029F	29	101
	Brahmi	U+11000–1107F	65	8
	Kharoshti	U+10A00–10A5F	66	173
Iberian and Punic coins	Palaeohispanic (Iberian corpus)	not yet encoded	59	178
	Phoenician-Punic (phenico-punic corpus)	U+10900–109AF	29	216
Phoenician, Levantine, Judean and Nabataean coins	Phoenician	U+10900–109AF	29	216
	Hebrew (Judean corpus)	U+0590–05FF	22	71
	Nabatean	U+10880–108AF	40	62

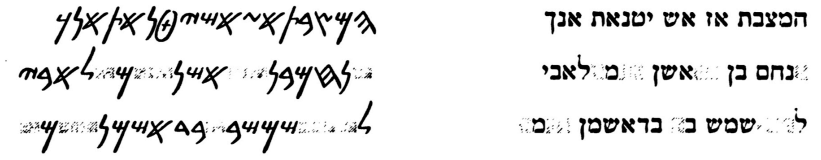
2. Overview of the Writing Systems

2.1. Phoenician

Integrating the legend in publications has always been a challenge for the numismatic researcher. Especially in the context of Phoenician which had greatly evolved over the centuries. For instance, in 1867 and through the initiative of Ernest Renan, the Académie des Inscriptions et Belles-Lettres commissioned the Imprimerie Nationale to engrave transcription characters to publish a study of all known Semitic inscriptions

76 CORPUS INSCRIPTIONUM SEMITICARUM.

Lege :



הכצבת אז אש יטנאת אנך

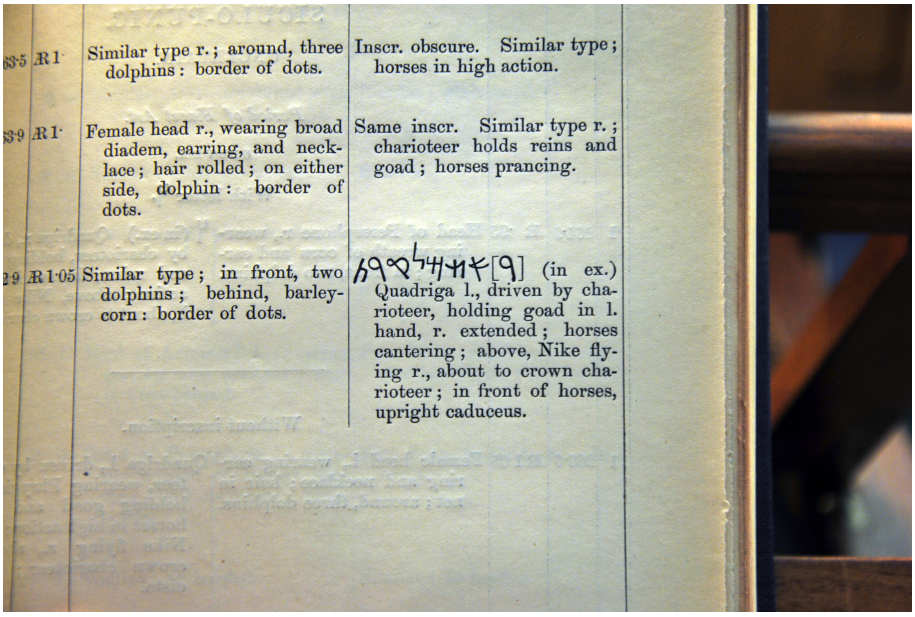
נחם בן אשן מלאבי

לשמש ב בראשמן מ

Cippus hic (est) quem erexi ego
. . nahemus, filius . . . . . , patri meo
. . . śemešo, filio Bodeśmuni . . . . . .

Lin. 1. Lineamentum a quo linea incipit a Pocockio additum esse, quo titulus facilius a reliquis sejungeretur, Gesenius putabat. Nos malumus, collato supra n° 44, legere אז הכצבת. Gesenius primum vocabulum מצבת et Schröder tamen legit : ברכשמש. Talem igitur tituli structuram fuisse liquet : « Monumentum hoc (est) quod erexi ego Menahemus, filius Bodeśmuni, ... patri meo Abd-śemešo, filio Bodeśmuni . . . . . » Quid? Menahemus duos

FIGURE 9. *Corpus Inscriptionum Semiticarum*, 1907



8·5	Æ 1·	Similar type r.; around, three dolphins: border of dots.	Inscr. obscure. Similar type; horses in high action.
8·9	Æ 1·	Female head r., wearing broad diadem, earring, and necklace; hair rolled; on either side, dolphin: border of dots.	Same inscr. Similar type r.; charioteer holds reins and goad; horses prancing.
2·9	Æ 1·05	Similar type; in front, two dolphins; behind, barley-corn: border of dots.	[illegible][9] (in ex.) Quadriga l., driven by charioteer, holding goad in l. hand, r. extended; horses cantering; above, Nike flying r., about to crown charioteer; in front of horses, upright caduceus.

FIGURE 10. *Catalogue of Greek Coins*, Sicily, The British Museum, 1876 (Courtesy of the British Library)

(Académie des Inscriptions et Belles-Lettres, 1907) entitled *Corpus Inscriptionum Semiticarum*. In the case of the PIM project, the coins from the Phoenician cities with usable legends—all of which are from the Bnf collection—are dated from the 5th to the 1st century BC. Visually close to the *Phénicien classique* engraved by the Imprimerie Nationale, the ontographs of the PIM Phoenician typeface are based on the inscription of the Eshmunazar II sarcophagus.

The legends on the coins produced in the Phoenician cities during the high period (either under Persian domination, or a little less in the Hellenistic period) display neat and easily recognizable letterforms. It is deduced that authority responsible for minting had paid attention to their production. The care given to the coins projected the political power of these cities and helped them expand their network (Fig. 11). With the appearance of bronze coins under the Hellenistic domination (Ptolemaic dynasty, then Seleucid), the inscription gradually deteriorated, since bronze coins became dominant and more difficult to mint. The domination of the Greeks from 331 BC (from Alexander the Great) enabled their language to become widely used by the elites and from the 2nd century, coins were gradually minted under the influence of the dominant culture, which was Hellenistic.

The bronze coin shown in Fig. 12. has been minted under Antiochos IV, a Seleucid ruler at the Hellenistic period around 175 to 164 BC, who issued an incredible amount of bronze coins in his territories and produced as much coins as all its predecessors. With regard to the Seleucid coins, much of the monetary finds in excavations are from Antiochos IV's period. The presence of Greek and Phoenician characters is visible on those coins (as the lamed, allograph number 7, samek 9, dalet 3, noun 9, and mem 19), which shows the evolution of culture, and the place of the Greek language during these periods. With the Greek domination, the elites gradually became Hellenized and coexistence of Greek and Phoenician inscriptions signified a mixed and multilingual society—even though the majority of the population was illiterate.

The variations of the Phoenician letterforms in the BnF collections are significant and for an alphabet of 22 letters, 160 variants have been identified. Therefore, all these allographs have been included in the PIM typeface with a standard of the ontographs, which is more consensual and easier to identify. Due to the heterogeneous qualities of the coins, the aim was to find a suitable representation based on the inscriptions, references, and more importantly, analysis and the descriptions provided by researchers at the BnF.

Since scholars will be the primary users of such typefaces, it was essential to conceive an accurate tool to facilitate their research. For instance, the PIM project has aided researchers to determine that the allograph 'aleph 20' (fig.14) was only represented on coins from Carthage that feature an elephant. It was concluded from such observations that

FIGURE 11. Phoenician silver shekel, 350–333 BCE, BnF

FIGURE 12. Phoenician bronze coin, 175–164 BCE, BnF

FIGURE 13. PIM Phoenician typeface showing the variants

FIGURE 14. Punic coin from Carthage and the allograph Aleph 20

FIGURE 15. Phoenician Mem variants

some allographs could be traced back to specific minting workshops. Cataloguing specific allographs also enables researchers to document the evolution of each letterform, and its geographical variations. This would enable numismatists to develop precise historical and geographical information from the study of letter variations, including the engraving workshop where the coin was minted. This approach to research, assisted by 'material turn' theories in which physical artifacts are considered meaningful embodiments of practices, seems to have regained momentum over the past decades in the humanities and social sciences.

Punic language, which was used mostly in North Africa, is related to a branch of Phoenician called Phoenician-Punic. In the PIM corpus, 88 allographs are in common with the Phoenician from a total of 241 allographs. For instance, a Punic silver coin, from 300 to 289 BC (fig. 16), has been studied in 1978 by G. K. Jenkins, in *Coins of Punic Sicily* in which two different reproductions of the inscription can be found: first, in the iconography section which is a real scale photography of the coin, and

FIGURE 16. Silver tetradrachm, Carthage, 300—289 BCE, BnF. Jenkins, *Coins of Punic Sicily*, 1978

second is the transcription in Jenkins' hand in the legends catalogue with a reference number (Jenkins, 1978, pp. 5–68). Presently, thanks to the new technology, it is possible to have a high-quality image of the coin and the transcription with a digital font. It is also possible to integrate the transcription in the text with the transliteration, and in this way, make it more readable. This also facilitates the creation of a list of the collection's inscriptions in order to be compared easily.

G.KENNETH JENKINS

COINS OF PUNIC SICILY *

Part 4 **

CARTHAGE SERIES 5-6

Introduction

As already stated in part 3 it seems clear from the evidence of hoards that Carthage series 5, Melqart head/horse head, should be roughly of the same phase as the Syracusan coins of Agathokles with Kore head/Nike and trophy, minted most probably after Agathokles' return from Africa and in fact between the years 305 and 295 B.C. For a summary of early third century hoards containing Carthage series 5 coins, see the table of hoards at the end of thisinstalment. It is evident enough that Carthage series 5 and the Agathokles «Nike» type tend to coincide. This conclusion is set off by a very slightly earlier hoard, Pachino 1957 (IGCH 2151), of the late fourth century, which contains neither the Agathokles Kore/Nike type nor the Melqart head/Horse head, but only the preceding phase of each mint — from Syracuse the quadriga tetradrachms of Agathokles and from Carthage series 3 Kore head/Horse head. On these general reckonings we may assume that Carthage series 5 should start about 300 B.C. There is no easy way of deciding howlong a series is involved; if it is accepted - as will presently be argued - that Carthage series 5 is to be envisaged as a parallel production by two separate mints , this will in any case tend to telescope the possible duration of the series. Provisionally we may think of a period of about a decade for the whole series, in which case it would come to an end byabout the time of Agathokles' death (289 B.C.). Third century hoards containing series 5 do not, apparently, include any Sicilian coins later than Agathokles. That in broad terms series 5 must be defined as twoparallel series seems virtually inevitable. In the first place we have a definition by legends. Series 5 a is the mint of the army signed 𐤌𐤌𐤇𐤍𐤕 or 'MMHNT or 'MHMHNT (People of the Camp). Series 5 b is the m i n t of the «quaestors» signed 𐤌𐤇𐤔𐤁𐤌 or MHSBM. The only complication is that a few issues from the mhsbm mint are signed 𐤌𐤇𐤔𐤁𐤉𐤋 or 'mmhnt instead but these as we shall see are clearly exceptional and in fact form an integral part of them hsbm mint series. The relative representation of the two series in hoards gives little indication as to the relation between the two series. In the Cefalü hoard there are five specimens of each; in the Megara Hyblaia

FIGURE 17. Reproduction of the Jenkins' article with the integration of the legends using the PIM typeface

2.2. Archaic Greek

Archaic Greek has been the subject of many studies and the entire variants were identified in *The Local Script of Archaic Greece* by Lilian Hamilton Jeffery (Fig. 19). Considering abondance of sources, two standards from different periods have been designed, allowing expansion of the use of the PIM typeface in other studies. The most recent letterforms are based on the 4 century BC and closer to the current form of Greek capitals (Jeffery, 1963). For the second standard, the characteristics of the letters are from 6th century BC (Kraay, 1966).

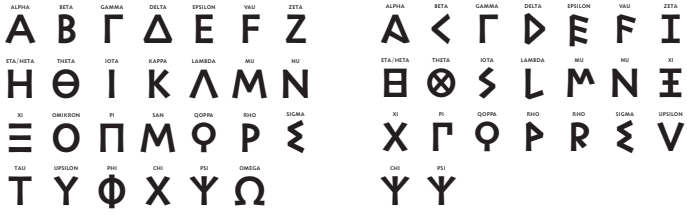


FIGURE 18. PIM Archaic Greek (left: 400 BCE—right: 600 BCE)

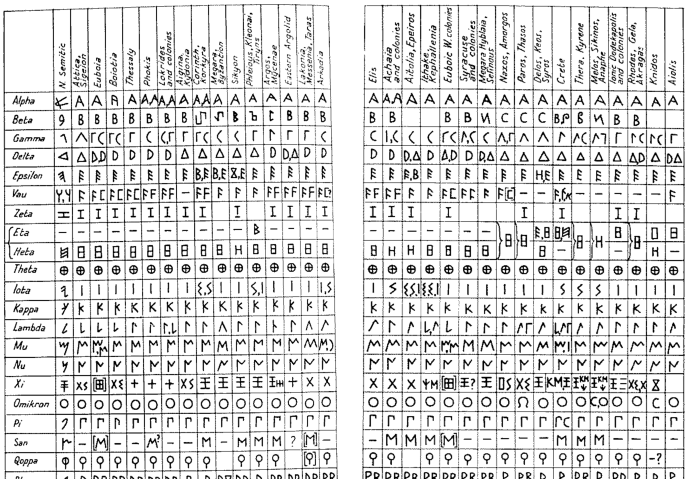


FIGURE 19. Jeffery, *The Local Scripts of Archaic Greece*, 1963

FIGURE 20. PIM Archaic Greek showing the variants

Comparing the same Greek coins from different periods and minting workshops, makes it possible to see the differences in the letterforms according to the period and the engravers, who were often illiterate. The coin shown on Fig. 20. depicts Heracles wearing a lion's skin and on the reverse side, there is an image of Zeus on a throne, and on his right, there is the inscription *Alexander* for *Alexander the Great*.

Mint workshop: **Ake/Ptolemais (Ἄκη), Phoenicia**
Period: **322 - 321 BCE**
Author: **Alexander III of Macedon**
Material: **Silver**

Mint workshop: **Perge (Πέργη), Pamphylia**
Period: **197 - 196 BCE**
Author: **Alexander III of Macedon**
Material: **Silver**

Legend:

ΑΛΕΞΑΝΔΡΟΥ

FIGURE 21. Greek silver coins, BnF

Mint workshop: Antioch on the Orontes Ἀντιόχεια ἡ ἐπὶ Ὀρόντου, Seleucia in Pieria Σελεύκεια ἐν Πιερίᾳ
Period: 175 - 164 BCE
Author: Antiochos IV
Material: Silver (16,70 g)

ΒΑΣΙΛΕΩΣ ΑΝΤΙΟΧΟΥ
ΘΕΟΥ ΕΠΙΦΑΝΟΥΣ
ΝΙΚΗΦΟΡΟΥ

[monnaie] du roi Antiochos dieu qui apparaît, qui apporte la victoire.
[currency] of king Antiochos god who appears, who brings victory.

FIGURE 22. Greek silver coin, 175—164 BCE, BnF

2.3. Etruscan, Oscan, and Umbrian

The Old Italic is a convention adopted for Unicode. It unifies a number of related historical alphabets from the Italian peninsula which were used for non-Indo-European languages. However, the unification of these alphabets into a single Old Italic script requires language-specific fonts because the glyphs most commonly used may differ depending on the language being represented (Everson, Jenkins, Judicibus, and Anderson, 2000). In the PIM project the main focus is on the Etruscan, the Oscan, and the Umbrian alphabets. Therefore, researchers will have access to different font files for each writing system.

FIGURE 23. Oscan caracters and their transcription using the PIM Oscan typeface.

FIGURE 24. PIM Etruscan, Neo-Etruscan, Oscan, Umbrian.

One of the features of working on monetary inscriptions is that sometimes, it is not possible to reconstitute the whole alphabet (Fig. 23). Further researches are required in order to find the appropriate ontograph and complete the typeface to make it suitable for subsequent research projects.

2.4. Paleo-Hebrew

Paleo Hebrew, also known as Proto-Hebrew, was the script that was used in the historic kingdoms of Israel and Judah (Yardeni, 2002). By comparing the letterforms of the Hebrew, the Paleo-Hebrew and its variants, with the Phoenician, it is possible to deduce the ductus and the traces order. For instance, with the letter Beth, the recurrence of a closed stroke on top, which is open in Hebrew, and a vertical stroke going down to finish almost horizontal can be noticed. In the letter Tsadi, there is a stroke that comes from the top to join in the middle of a long vertical stroke by a movement of up and down (Fig. 25). This kind of analysis is essential in this work in which the aim is not to make a faithful revival with the same shape, but to show the basic stroke which is more relevant.

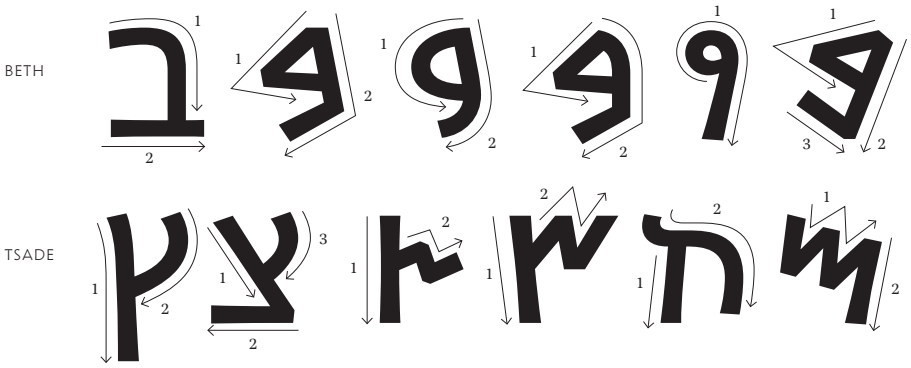


FIGURE 25. Traces order of Hebrew, Phoenician, and Paleo-Hebrew characters

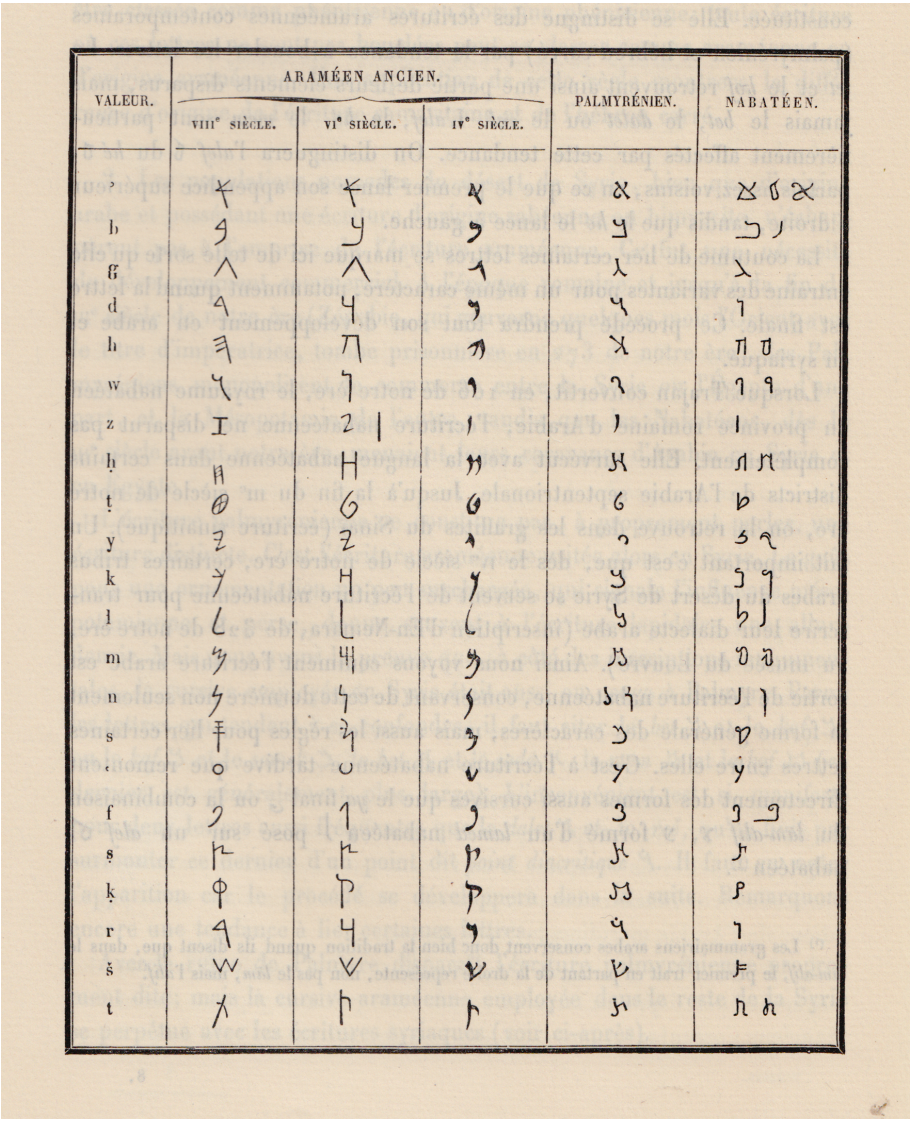
The coin in Fig. 27. is from Jerusalem and dated around AD 67-68 and the inscription above the chalice shows that it is the shekel of Israel in Paleo-Hebrew characters. On the reverse, in a border of dots, is written Holy Jerusalem around a branch carrying three pomegranates. A modern Hebrew was added as a complementary font to translate the Paleo-Hebrew inscriptions, which would allow the researcher to transcribe, in the right language, and the right sounds, without using the transliteration.

Figure 26. PIM Hebrew, Paleo-Hebrew, and Phoenician

FIGURE 27. Judean silver hemishekel, 67—68 AD, BnF

2.5. Nabatean

Some scholars have suggested that Syriac and Arabic writing systems are driven from the Nabatean script (Gruendler, 1993). As the script developed, a range of conjuncts and final forms were introduced. In the case of the PIM project, the letters found on the coins were isolated, however, if scholars require to introduce joined letters for epigraphic transcriptions, it would be possibile to extend the typeface in a more cursive direction. The typeface has been designed in accordance with the Phoenician, Syriac, and Arabic letters (Fossey, 1927). A few variants have been included from the sources that were attested to make it usable for other studies.



VALEUR.	ARAMÉEN ANCIEN. VIII^e SIÈCLE.	VI^e SIÈCLE.	IV^e SIÈCLE.	PALMYRÉNIEN.	NABATÉEN.
ʾ					
b					
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FIGURE 28. Imprimerie Nationale, *Notices sur les caractères étrangers anciens et modernes*, 1927

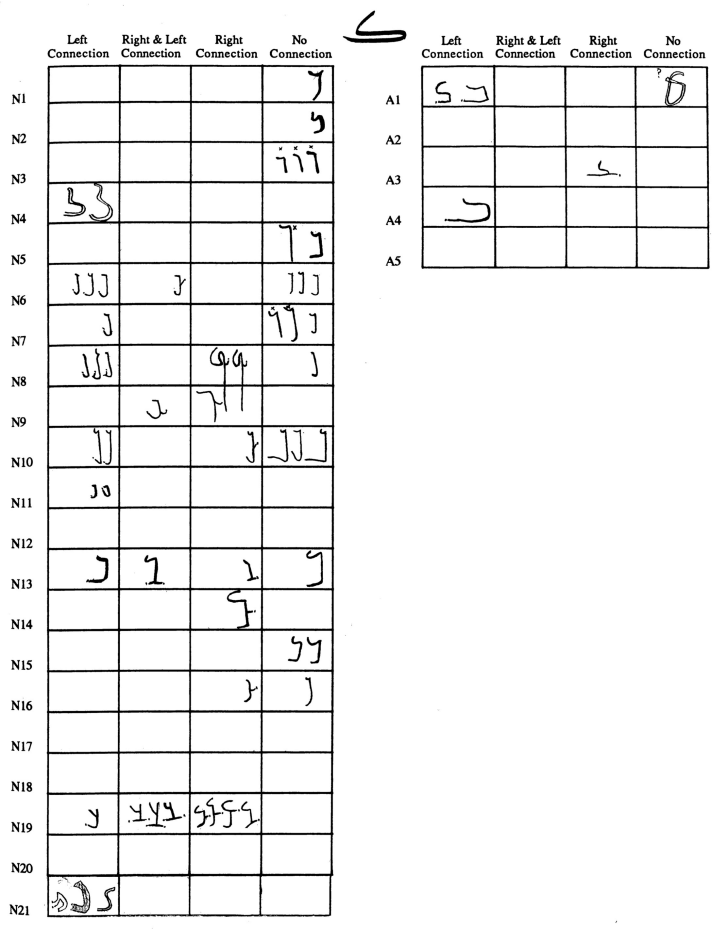


FIGURE 29. Gruendler, *The Development of the Arabic Scripts*, 1993

Fig. 30 shows a Nabatean bronze coin with the inscription which reads *Aretas* [Aretas 4, King of Nabatean], and *Shaqilat*, who was the second wife and co-ruler of Aretas IV, accompanied with their portraits on the reverse. At least 4 different degrees of transcription is possible for this inscription. The first is an 'imitative' or 'diplomatic' transcription by using the variants of the typeface. The second is a 'semantic transcription' by using the ontograph, which is a more conventional form of the script. Under a scholar, this could be written in the correct direction from right to left, but sometimes the transcription is written from left to right. Then there is the transliteration, with the use of roman characters, and lastly, there is the translation.

Semitic alphabet	*Phoenician*	*Nabatean*	*Syriac*	*Arabic*	*Letters*
Aleph	𐤀	𐢀𐢁𐢂𐢃𐢄𐢅	ܐ	ا	*ʾalif*
Final Aleph		𐢆		ـا	
Beth	𐤁	𐢇𐢈𐢉𐢊𐢋𐢌	ܒ	بـ	*bāʾ*
Final Beth		𐢍		ب	
Gimmel	𐤂	𐢎𐢏𐢐𐢑	ܓ	ج جـ	*jīm*
Daleth	𐤃	𐢒𐢓𐢔𐢕𐢖	ܕ	د	*dāl*
He	𐤄	𐢗𐢘𐢙	ܗ	هـ	*hāʾ*
Final He		𐢚		ـه	
Waw	𐤅	𐢛𐢜𐢝	ܘ	و	*wāw*
Zayin	𐤆	𐢞	ܙ	ز	*zāy / zayn*
Heth	𐤇	𐢟𐢠𐢡𐢢	ܚ	ح حـ	*ḥāʾ*
Teth	𐤈	𐢣𐢤𐢥𐢦	ܛ	ط	*ṭāʾ*
Yodh	𐤉	𐢧𐢨𐢩𐢪𐢫𐢬	ܝ	ي يـ	*yāʾ*
Final Yodh		𐢭𐢮		ي	
Kaph	𐤊	𐢯𐢰𐢱𐢲𐢳	ܟ	ك	*kāf*
Final Kaph		𐢴		ك	
Lamedh	𐤋	𐢵𐢶𐢷	ܠ	ل	*lām*
Final Lamedh		𐢸𐢹		ل	
Mem	𐤌	𐢺𐢻𐢼𐢽𐢾𐢿𐣀𐣁	ܡ	م	*mīm*
Final Mem		𐣂𐣃		م	
Nun	𐤍	𐣄𐣅𐣆	ܢ	ن	*nūn*
Final Nun		𐣇		ن	
Samek	𐤎	𐣈𐣉𐣊	ܣ	س سـ	*Simkath*
Ayin	𐤏	𐣋𐣌𐣍	ܥ	ع عـ	*ʿayn*
Pe	𐤐	𐣎𐣏𐣐	ܦ	ف ڤ	*fāʾ*
Sadhe	𐤑	𐣑𐣒	ܨ	ص صـ	*ṣād*
Qoph	𐤒	𐣓𐣔	ܩ	ق قـ	*qāf*
Resh	𐤓	𐣕𐣖𐣗	ܪ	ر ـر	*rāʾ*
Shin	𐤔	𐣘𐣙𐣚𐣛𐣜𐣝	ܫ	ش	*shīn*
Final Shin		𐣞𐣟𐣠		ـش	
Tav	𐤕	𐣡𐣢𐣣𐣤𐣥𐣦𐣧𐣨𐣩	ܬ	ت ث	*tāʾ/ thāʾ*

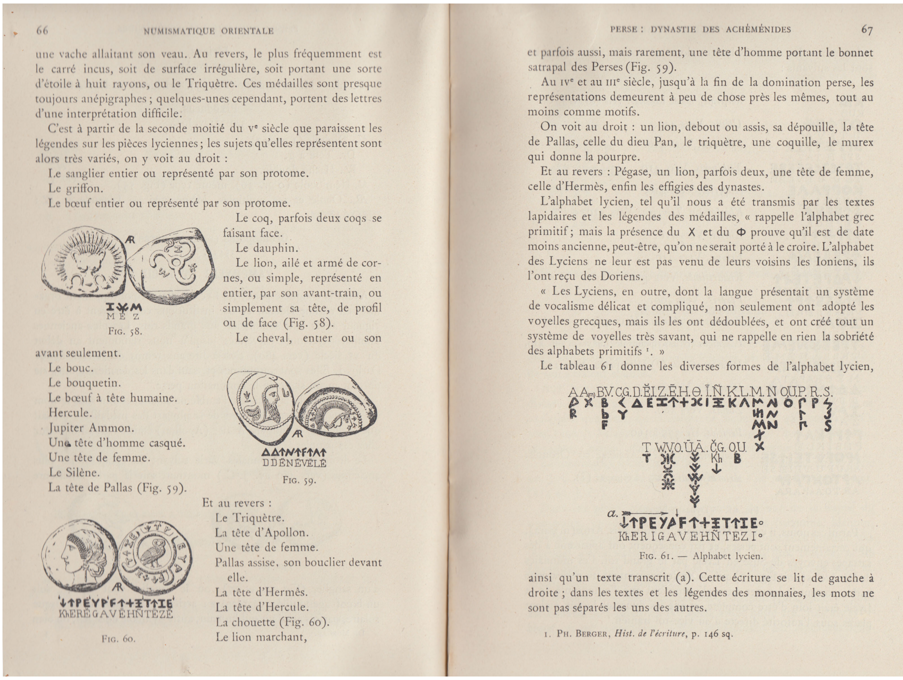
Figure 30. PIM Phoenician, PIM Nabatean, Noto Sans Syriac, and Adobe Arabic

Mint workshop: Nabatean, Arabia Petraea العربية البترائية
Period: 9 BCE - 40 AD
Author: Arétas IV (king of Nabatean)
Material: Bronze (5,36 g)

Figure 31. Nabatean bronze coin, 9 BCE—40 AD, BnF

2.6. Lycian

The Lycian was used to write an ancient Indo-European language of Western Anatolia. It is an alphabetical script, written from left-to-right, and is either derived from Greek or closely related to it. Before the Persian conquest, the Lycians were politically organized in a federal system, and even after their submission to the Persians, the institutions inside the federal system continued to be effective. The oldest Lycian coin seems to be from the 5th century BC, that is contemporary to Xerxès, son of Darius I. The Lycia symbol is a solar emblem represented by the triquetra which is seen on most of the reverse side of the coins (Morgan, 1926).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une vache allaitant son veau. Au revers, le plus fréquemment est le carré incus, soit de surface irrégulière, soit portant une sorte d'étoile à huit rayons, ou le Triquètre. Ces médailles sont presque toujours anépigraphes ; quelques-unes cependant, portent des lettres d'une interprétation difficile.

C'est à partir de la seconde moitié du v[e] siècle que paraissent les légendes sur les pièces lyciennes ; les sujets qu'elles représentent sont alors très variés, on y voit au droit :

Le sanglier entier ou représenté par son protome.
Le griffon.
Le bœuf entier ou représenté par son protome.
Le coq, parfois deux coqs se faisant face.
Le dauphin.
Le lion, ailé et armé de cornes, ou simple, représenté en entier, par son avant-train, ou simplement sa tête, de profil ou de face (Fig. 58).
Le cheval, entier ou son avant seulement.
Le bouc.
Le bouquetin.
Le bœuf à tête humaine.
Hercule.
Jupiter Ammon.
Une tête d'homme casqué.
Une tête de femme.
Le Silène.
La tête de Pallas (Fig. 59).

MEZ
Fig. 58.

DDĒNEVĒLĒ
Fig. 59.

Et au revers :
Le Triquètre.
La tête d'Apollon.
Une tête de femme.
Pallas assise, son bouclier devant elle.
La tête d'Hermês.
La tête d'Hercule.
La chouette (Fig. 60).
Le lion marchant,

KhERĒGAVĒHÑTĒZĒ
Fig. 60.

PERSE : DYNASTIE DES ACHÉMÉNIDES 67

et parfois aussi, mais rarement, une tête d'homme portant le bonnet satrapal des Perses (Fig. 59).

Au IV[e] et au III[e] siècle, jusqu'à la fin de la domination perse, les représentations demeurent à peu de chose près les mêmes, tout au moins comme motifs.

On voit au droit : un lion, debout ou assis, sa dépouille, la tête de Pallas, celle du dieu Pan, le triquètre, une coquille, le murex qui donne la pourpre.

Et au revers : Pégase, un lion, parfois deux, une tête de femme, celle d'Hermès, enfin les effigies des dynastes.

L'alphabet lycien, tel qu'il nous a été transmis par les textes lapidaires et les légendes des médailles, « rappelle l'alphabet grec primitif ; mais la présence du X et du Φ prouve qu'il est de date moins ancienne, peut-être, qu'on ne serait porté à le croire. L'alphabet des Lyciens ne leur est pas venu de leurs voisins les Ioniens, ils l'ont reçu des Doriens.

« Les Lyciens, en outre, dont la langue présentait un système de vocalisme délicat et compliqué, non seulement ont adopté les voyelles grecques, mais ils les ont dédoublées, et ont créé tout un système de voyelles très savant, qui ne rappelle en rien la sobriété des alphabets primitifs [1]. »

Le tableau 61 donne les diverses formes de l'alphabet lycien,

A. A(m). B.V. C.G. D. Ĕ. I. Z. Ē. H. Θ. Ī. Ñ. K. L. M. N. O.U. P. R. S.
T. W.V. O. Ū. Ā. Č.G. O.U.
a. KhERIGAVEHÑTEZI
Fig. 61. — Alphabet lycien.

ainsi qu'un texte transcrit (a). Cette écriture se lit de gauche à droite ; dans les textes et les légendes des monnaies, les mots ne sont pas séparés les uns des autres.

1. Ph. Berger, *Hist. de l'écriture*, p. 146 sq.

Figure 32. Morgan, *Manuel de Numismatique Orientale de l'Antiquité et du Moyen Âge*, 1926

Mint workshop: Lycia TPXMES *Likya*
Period: 410 BCE
Author: Taththivaibi
Material: Silver (9,64 g)

TΥXXEFΥEBET *Teϑϑiweibi*

Figure 33. Lycian silver stater, 410 BCE, BnF

a	𐊠𐊠𐊡𐊠𐊠𐊠𐊠𐊠	n	𐊭𐊮𐊯𐊰𐊱
e	𐊢𐊢𐊢𐊢𐊢𐊢𐊢𐊢𐊢𐊢𐊢	m̃	𐊫
b	𐊡𐊡𐊡𐊡𐊡𐊡𐊡	ñ	𐊬𐊬𐊬𐊬𐊬
β	𐊰𐊱𐊰	u	𐊪𐊪𐊪
g	𐊯𐊰𐊲𐊲𐊯𐊰𐊯	p	𐊩𐊩𐊩𐊩𐊩𐊩
d	𐊣𐊤	k	𐊫
i	𐊇𐊇𐊇𐊇𐊇𐊇𐊇𐊇	r	𐊵𐊵𐊵𐊵𐊵𐊵𐊵𐊵
w	𐊅𐊅𐊅𐊅𐊅𐊅𐊅	s	𐊴𐊴𐊴𐊴𐊴𐊴𐊴
z	𐊊𐊊	t	𐊮𐊮
θ	𐊫𐊫𐊫𐊫𐊫𐊫𐊫	τ	𐊱𐊱
j/y	𐊉	ã	𐊷𐊷𐊷𐊷𐊷𐊷𐊷𐊷𐊷𐊷
k	𐊘𐊘𐊘𐊘𐊘𐊘𐊘𐊘𐊘𐊘	ẽ	𐊸𐊸𐊸𐊸𐊸𐊸𐊸𐊸
q	𐊧𐊫𐊧	h	𐊭𐊫
l	𐊤𐊤𐊤	x	𐊹𐊹𐊹𐊹𐊹𐊹𐊹𐊹𐊹
m	𐊬𐊬𐊬𐊬𐊬𐊬𐊬𐊬		

Figure 34. PIM Lycian

2.7. Cypriot

The Cypriot syllabary was used to write the Cypriot dialect of Greek from about 800 to 200 BCE. Structurally, the Cypriot syllabary consisted of combinations of up to twelve initial consonants and five different vowels (Anderson and Everson, 1999). In our corpus, only the coins from Amathus, Idalium, Marium, Paphos, and Salamis, have legends using the Cypriot syllabary. The local minting in the Cyprus Island begins in the 4th century BC and stop after the conquest of the island by Ptolemy I Soter in 312 BCE (Morgan, 1926).

A	𐄀	MI	𐄐𐄑𐄒𐄓𐄔	SE	𐄕𐄖𐄗𐄘𐄙𐄚
E	𐄀𐄁𐄂𐄃𐄄	MO	𐄛𐄜𐄝𐄞𐄟	SI	𐄠𐄡𐄢𐄣𐄤𐄥𐄦𐄧𐄨𐄩
I	𐄅𐄆𐄇	MU	𐄈𐄉	SO	𐄪𐄫𐄬
O	𐄪𐄫𐄬𐄭	NA	𐄊	SU	𐄍𐄎
U	𐄔𐄕𐄖𐄗𐄘	NE	𐄋𐄌𐄋𐄋𐄌	TA	𐄏
JA	𐄀	NI	𐄌𐄌𐄌𐄌𐄌𐄌	TE	𐄐
JO	𐄁	NO	𐄍𐄎	TI	𐄑𐄒𐄑𐄒
KA	𐄃	NU	𐄎𐄎	TO	𐄓𐄓𐄓𐄓
KE	𐄄	PA	𐄏𐄏	TU	𐄔𐄔
KI	𐄅𐄅	PE	𐄐	WA	𐄕𐄖𐄗𐄘𐄙
KO	𐄆𐄆𐄆𐄀	PI	𐄛𐄜𐄝	WE	𐄞
KU	𐄇𐄇	PO	𐄟𐄠	WI	𐄡𐄢
LA	𐄈𐄉𐄊𐄋	PU	𐄌𐄍𐄎𐄏𐄐	WO	𐄑𐄑𐄑
LE	𐄀𐄁𐄂	RA	𐄐𐄑𐄒	XA	𐄓
LI	𐄃𐄃	RE	𐄔𐄕𐄔	XE	𐄖𐄖
LO	𐄘𐄘	RI	𐄗𐄗𐄗	ZA	𐄡𐄢
LU	𐄡𐄢	RO	𐄀𐄁	ZO	𐄣𐄣
MA	𐄇	RU	𐄓𐄓		
ME	𐄈𐄉	SA	𐄋𐄋		

FIGURE 35. PIM Cypriot

FIGURE 36. Cypriot silver coin, 450 BCE, BnF

3. Accessibility and Utilisation

3.1. License

The Open Font License[3] is used (SIL-OFL) and the publication of the fonts on a public repository (GitHub) will make it possible to easily supplement, correct, extend, and distribute the fonts.

3.2. The Composer

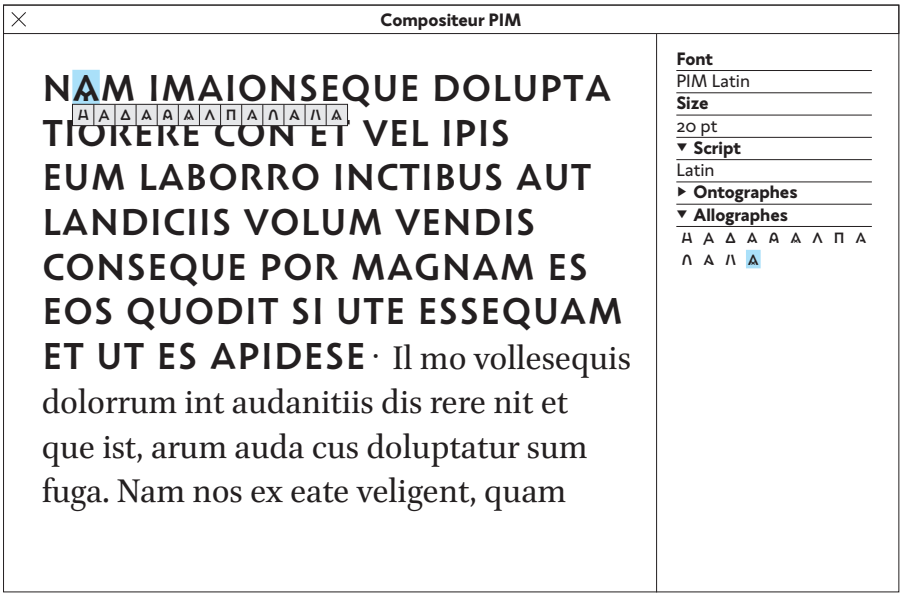
The digital humanities have profoundly changed the methods of research in the human sciences, both from the point of view of access to sources and their distribution by various means of publishing. New digital tools will assist researchers to explore, disseminate, and question the established knowledge; however, it is important to continually re-evaluate their efficiency and intuitiveness. Therefore, the PIM project continues with the development of the Alpha version of an online text editor by Sylvain Julé. This composer will make it possible to display, in an open and non-proprietary format, all the writing systems covered, facilitate their keyboard entry, and allow simplified visual access to the characters variants.

4. Conclusion

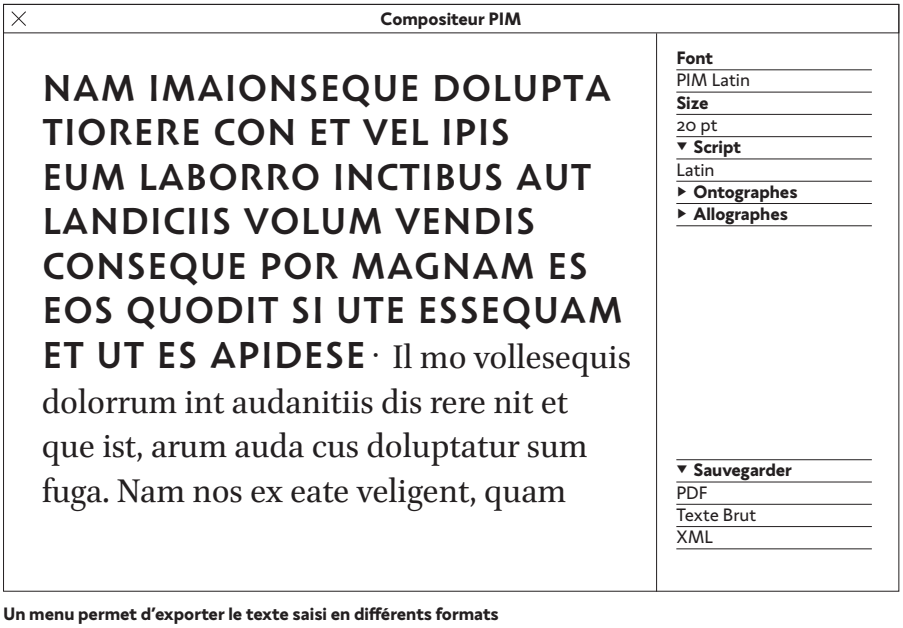
The PIM project with a particular focus on type design, has been a productive way to study the early writing systems and understand how through the large number and various letterforms they have influenced each other. The digital humanities, one the other hand, has brought new perspectives to type design and scholarly research, with the use of digital fonts and creation of online catalogues and composers. However, despite such technological progress, practices related to typographic and graphic representation in the benefit of research have changed very little.

Once the process of inventory and classification of the glyphs is concluded, and the question of previewing or printing the work comes up, researchers often settle for ordinary characters and typefaces roughly imitate the inscriptions. Digital technology, has the potential to provide easier access to all practices, but the outcomes are often unsatisfactory, both in terms of morphological accuracy and encoding, and in the context of digital articles which are likely to be indexed and shared digitally. Often fonts with incorrect encoding, images extracted from other

3. https://opensource.org/licenses/OFL-1.1



Un menu contextuel permet d'accéder rapidement aux allographes disponibles, pour chaque ontographe sélectionné. Le codepoint Unicode reste le même, c'est le glyphe qui change, via une fonction OpenType intégrée à la fonte.



Un menu permet d'exporter le texte saisi en différents formats

FIGURE 37. PIM composer, Thomas Huot-Marchand

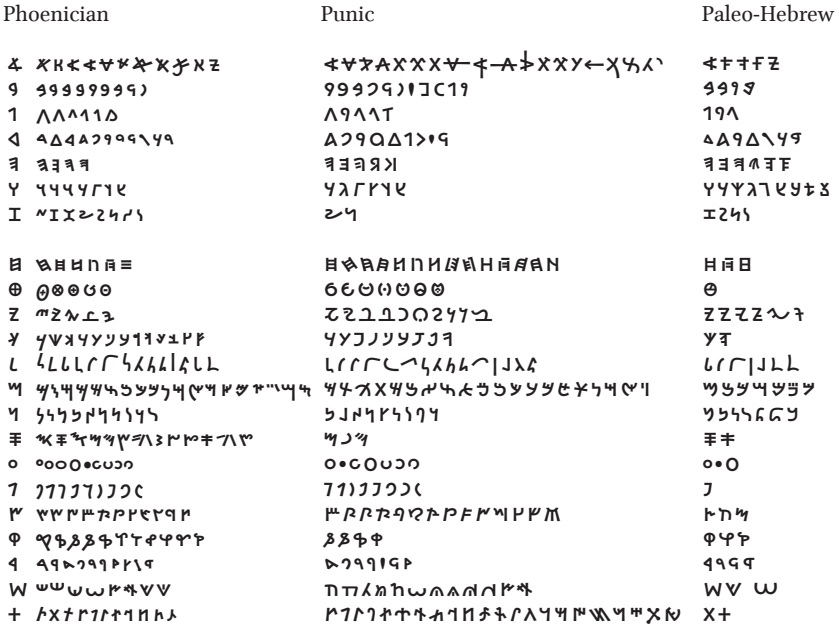


Figure 38. PIM family typeface

existing typefaces (sometimes obsolete) and inserted into the text, and more often the use of 'resembling' characters from other writing systems have been used in scholarly publications (Jimenes, 2013). The PIM project aims to demonstrate how designing typefaces for ancient writing systems to be used in scientific publication, digital or print, can aid scholars to conduct more effective and extensive research while contributing to reconsidering methods of access to knowledge.

Greek	Etruscan	Oscan	Umbrian	Latin	Hebrew	Nabatean
AAAA	AAAAA	NAAAAANNN	A	A	א	𐢀𐢁𐢂𐢃𐢄𐢅𐢆𐢇𐢈
BΡΡΒЪЬИCBB		B	B	B	ב	𐢉𐢊𐢋𐢌𐢍
ΓCCΛCΓ	>	>>		CG	ג	𐢎𐢏𐢐𐢑
ΔDD	D	RRRRR	Q	D	ד	𐢒𐢓𐢔𐢕
EEEBH	EEE	EE	EEE	E	ה	𐢖𐢗𐢘𐢙
FFC	FFI	IFF	IIV	FUVWY	ו	𐢚𐢛𐢜
ZI	I	I	‡	Z	ז	𐢝
HBBEDB				H		
IBH	BO	O	O		ח	𐢞𐢟𐢠𐢡
ΘOOO	OO				ט	𐢢𐢣𐢤𐢥
IEE	I	III	I	IJ	י	𐢦𐢧𐢨𐢩𐢪𐢫𐢬𐢭
KK	K	K	KKY	K	כך	𐢮𐢯𐢰𐢱𐢲𐢳
ΛLΓΙΛΓ	JJI	J	J	L	ל	𐢴𐢵𐢶𐢷
MMMM	MM	M	ΛM	M	מם	𐢸𐢹𐢺𐢻𐢼𐢽𐢾𐢿
NΝΝ	NИ	ИNИΝ	И	N	נן	𐣀𐣁𐣂
ΞΞXSΞ+ШΨMDKVX				Z	ס	𐣄𐣅𐣆
OΩCΘΦ				O	ע	𐣈𐣉𐣊
ΠΓΡΡC	ΊΠ	Π	Ί	P	פף	𐣌𐣍𐣎
MM	M		M		צץ	𐣐𐣑𐣒
Φ				Q	קק	𐣔
PRRÞDV	ΦΦ	ΦΦP	Φ	R	ר	𐣖𐣗𐣘
ξSΣS	SS	SS	SS	S	ש	𐣙𐣚𐣛𐣜𐣝𐣞𐣟𐣠
TT	T+	TT	+Γ+	T	ת	𐣡𐣢𐣣𐣤𐣥𐣦𐣧𐣨𐣩
YVΓΡ	V	V	V			
ΦΘΓΞH	ΦΘ					
XΥVSKΞH	V					
YΦSξXΘ↓ΓM						
Ω8ΩO						
	88	88	8			
			Φ			
			d			
		I·I·I				
		VVV				

FIGURE 38 (cont.). PIM family typeface

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