A Comparative Linguistic Study about the Sumerian Influence on the Creation of the Aegean Scripts

Ioannis K. Kenanidis[1], Evangelos C. Papakitsos*[2]

[1]Hellenic Ministry of Culture, Education & Religious Affairs, Directorate of Primary Education of Kavala, Ethn. Antistasis 20, 65110 KAVALA, Greece.

[2]Department of Linguistics, National & Kapodistrian University of Athens, Hellenic Ministry of Culture, Education & Religious Affairs, Directorate of Secondary Education of Dyt. Attiki, Vas. Laskou 35, 19200 ELEFSINA, Greece.

*Corresponding Author:
Evangelos C. Papakitsos.
Email: papakitsev@sch.gr

Abstract: The Aegean scripts comprise five scripts, among them Linear-A, Linear-B and Cretan Hieroglyphic, that are encountered in the Aegean Sea area during the 2nd millennium BC. The Linear-B script conveys the Mycenaean Greek dialect in a very inaccurate manner, regarding the Greek phonology. It has been argued that the unsuitability of Linear-B to represent the Greek phonological system is due to the limited usage of this syllabary for keeping records or for keeping the recorded information classified. The authors argue herein that this is hardly the case. According to some linguistic approaches, Linear-B syllabary was devised from the previous Linear-A one, which had been originally invented for another language of the Aegean linguistic substratum (pre-Greek). Various studies attempt to connect the conveyed languages of Linear-A to Proto-Greek dialects, a pre-Greek Indo-European language, Luwian or Akkadian. Such attempts regard as well the language conveyed by the Cretan Hieroglyphic. Yet, the relation between the signs and their corresponding phonetic values of Linear-A and Cretan Hieroglyphic is ill-formed while for Linear-B it is well established. The Aegean scripts are compatible to the consonant-vowel syllabic pattern of the phonetic signs. Such a phonetic pattern is mainly akin to agglutinative languages, like Sumerian, considering some arguments based on the presented herein linguistic evidence.

Keywords: Aegean scripts, Minoan language, Sumerian language, Linear A, Linear B and Cretan Hieroglyphic.

INTRODUCTION

The Aegean Scripts include the three syllabaries that were used in the Aegean area during the 2nd millennium BC, namely the Cretan Hieroglyphic, Linear-A and Linear-B, plus – based on their resemblance – the two syllabaries of Cyprus, namely the Cypro-Minoan and the Cypriot Syllabary (for an overall introduction see [1]). For all of them but the last one, no traces of use have been found later than the 12th century BC, while the Cypriot Syllabary remained in use until the 3rd century BC [2][3].

The conventional classification of the Aegean scripts considers the Cretan Hieroglyphic as the earliest script found, being rather a syllabary because its signs are too many for an alphabet and too few for a logographic system [4]. Their language is unknown. Linear-A is considered as a direct descendant of the Cretan Hieroglyphic. It is assumed to convey the also unknown language(s) of the Minoans, while Linear-B conveys the conventionally known as Mycenaean Greek, which is the oldest known written form of Greek. The language of Cypro-Minoan remains unknown. The Cypriot Syllabary conveys the Arcado-Cypriot Greek, being considered as a derivative of the Cypro-Minoan, with some inscriptions found in the disputed "Eteocypriot" language [1].

The present study will be concentrated on the first three scripts by presenting some facts about their nature and contemporary status. The description will be arranged according to the conventional chronological order of their appearance, so far, focusing on the linguistic properties and the potentially conveyed languages.

CRETAN HIEROGLYPHIC

The Cretan Hieroglyphic is found on 360 objects mainly from Knossos and Malia [5][6], along with the similar scripts on Phaistos Disk, the Arkalochori Axe and the Malia Stone Block [7]. More than half of the inscriptions have been found on seals, being of decorative purposes, and the rest on archival material [8]. The first samples are dated to the end of the 3rd millennium BC [9]. The list of signs can be found in Godart and Olivier [10] and online [11].

Because of its nature, some attempts were made to relate them to the Egyptian Hieroglyphic, yet good knowledge of Egyptian Hieroglyphic has never helped even the least in deciphering any Aegean script. Some objects depicted by both Egyptian and Cretan Hieroglyphic signs, e.g. the "libation vessel", the "hand" sign or the "bee" sign [12], do not show any similarity of phonetic values. It is estimated that the syllabic signs have the phonetic patterns V or CV [1], but nothing is known about the origin of this system [8], yet, although, based on anthroponyms, the conveyed language on some items resembles Luwian [13].

LINEAR-A

Linear-A is found in 1427 inscriptions on clay tablets, roundels and seals, mainly of administrative nature [1]. They have been discovered in Crete, Kythera, Melos, Thera, Kea, Argos, Tiryns, Mycenae, Samothrace, Drama, Troy and Miletus. There are also a few inscriptions found outside the Aegean area. These were discovered in Amisos of Pontus, in Monte Morrone of Italy [14], in Margiana of Central Asia bearing signs of remarkable resemblance to those of Linear-A [15], in Tel Haror of Israel [16] and Tel Lachish of Israel [17].

The syllabic portion of the script consists of 75 signs [9]. Considering the similarity of the 62 of them to those of the Linear-B script, the assigned phonetic values are also of the V or CV syllabic pattern, although it is possible that some signs common in both scripts (Linear-A/B) may not have exactly the same phonetic value [18]. The standard editions of Linear-A corpus include the so called GORILA by Godart and Olivier [19], the one by Raison and Pope [20] and the one available online by Younger [21].

The proposals about the underlying language(s) of Linear-A include the Luwian [22][23][24], Semitic / Akkadian [22][25] and Pelasgian (/Proto-Ionic) as an Indo-European (IE) language closely related but not identical to Proto-Greek [7][26]. The difficulty to recognize the conveyed languages is that the script is not known (unless to the extent one might speculate from comparison to Linear-B and the Cypriot Syllabary) and some of the suggested languages are very poorly known, too.

As for the making of Linear-A, in Woudhuizen [22], after it is mentioned that Brown [24] "emphatically" argues that Linear-A signs are based on the acrophonic principle, there is a table presenting how acrophony could have been used for assigning the phonetic values of some Linear-A signs. According to this suggestion, for the same script (Linear-A), other phonetic signs originate from Luwian words, other from Semitic, other from pre-Greek and other from Egyptian ones. This is justified as a creation of a script being a

"multi-linguistic" affair. Here we must firstly note that there is no example of any script of "multilingual" origin in the ancient world. The fact that a script can be used for many languages (just like the cuneiform or the Latin alphabet) does not mean that it is also created from these languages. Even if a particular scribe knows all of these languages, the mnemonic patterns cannot be easily applied for such a large repertoire of signs.

LINEAR-B

Linear-B had been firstly discovered at the excavations of Knossos by Sir A.J. Evans, along with Linear-A tablets [27][28]. Corpora of Linear-B, besides Knossos [29][30], were discovered in Pylos [31], in Mycenae, Tiryns and Thebes later on [32], reaching a total of more than 4500 [33]. In the early 1950s, M. Ventris with the efforts of eminent scholars, like E.L. Bennett and A. Kober, and the assistance of J. Chadwick, finally revealed the underlying language of Linear-B, which was a syllabary for writing the oldest-known form of Greek (e.g., see the reprinted edition [34]), the Mycenaean Greek. The decipherment is almost complete, but there are still some dubious and unknown signs and many unexplained or dubious words [33][35]. However, there are thorough descriptions of Linear-B connected as well to other cultural aspects of the corresponding era (e.g., see [36]).

The better studied Linear-B is considered a derivative of Linear-A [18]. The syllabic portion consists of 90 signs [35]. It is clear that Linear-B script conveys the Mycenaean Greek dialect, but it is no less clear that any language can be written in any script. This script is not fitting to the phonotactic features of the Greek language at all. If Greeks used it, then Linear-B was very difficult and unpractical for them. It is well known [37] that the Mycenaean Greek dialect greatly suffers distortion when forced into Linear-B because, for example:

- there are too often useful consonants not represented at all;
- there is no distinction between voiced and unvoiced phonemes, with the strange exception of /d/;
- there is no distinction between aspirated and unaspirated;
- there is not even the distinction between /r/ and /l/ which is represented even by the most rudimentary scripts of the world. There are indeed scripts that do not distinguish between e.g. /k/ and /x/, /p/ and /b/, they may even disregard the difference between /ö/ and /u/, or between /a/ and /e/ etc., but still they distinguish between /r/ and /l/, if there is such a distinction in the language;
- diachronically in Greek, clusters of two or three consonants are not rare (e.g., /str-efo/ = to turn) and clusters of four consonants are not impossible (e.g., /e-kstr-atia/ = the campaign),

but Linear-B cannot show consonants not followed by vowels.

To deal with the above inadequacies, a complex system of writing rules had been devised. Using the word /sperma/ (= quantity of seed) as an example, some scholars [18] believe that the Cypriot Syllabary shows a better adaptation to the Greek language because it "over-spells" (i.e., *se-pe-re-ma*) whereas Linear-B "under-spells" (i.e., *pe-ma*). Over-spelling retained all the consonants (except nasals before stops) but inserted vowels that had to be omitted in reading. Comparatively, under-spelling omitted some consonants adjacent to other consonants. The reader had to guess which consonants are missing, which is not easy at all and constitutes a feature of major difficulty in deciphering, as well.

The observed incompatibility of Linear-B is attributed either to the limited usage of the script for merely keeping records by professionals of the courtier bureaucracy [18] or to the intentional restriction of the recorded information, being classified, from public access [38]. We shall take a closer look to those arguments.

Record Keeping

If we accept this very assumption, it is still odd because professionals, especially in the environment of the palaces, would have treated the language much better. Even if we suppose that they did not need to write the language accurately, then why did they distinguish between /t/ and /d/ (which distinction required 6 more signs), while at the same time ignoring differences like *k*/*g*/*gh*, *p*/*bh* or even *r*/*l*?

If we persist though that the Greeks had to use that syllabic script since 1450 BC because they could not find something better, we find that the neighboring Egyptians were already using a full set of signs representing accurately all single consonants and approximately the vowels of the Egyptian language since the 3rd millennium BC, within their hieroglyphic system. Although the Egyptian script used also bi-consonantal and tri-consonantal signs, the inventory of single consonant signs was used in almost all Egyptian words, and it was used alone, just like an alphabet, when the Egyptians recorded foreign words and phrases [4]. Yet the Greeks, far from inventing their own alphabet, they did not even borrow or imitate the Egyptian single consonant signs. Instead, they preferred using a syllabary so difficult to learn and so dreadfully inaccurate for their native language, like Linear-B, where many spelling errors, childish for a courtier bureaucrat, are encountered [35].

Many times in history a borrowed system of writing was adapted to suit a language other than the one it was originally created for. An old example of such an adaptation is the Persian Cuneiform, which, by using only 36 phonetic signs, expressed all the phonemes of the Old Persian language including 22 consonants, distinguishing even fine sound differences. It could even distinguish between short and long vowels when the scribe wanted so. There was even a sign to write /l/, which occurred only in non-Persian names. This is sharply contrasted to Linear-B with 90 phonetic signs and all the defects mentioned. A reasonable explanation is that the Persians themselves adjusted the cuneiform script to their own language. Such an adjustment is also visible in the Cypriot Syllabary. The Achaean scribes could have borrowed or devised 47 more signs to represent the bi-consonantal clusters of Greek [39], just like the Egyptians, which could allow them to represent virtually any consonantal cluster by two signs (CC+CV, CC+V). Even simpler, they could invent 3 more signs for /s/, /r/, and nasals, which are essential for word-endings.

Confidential Information

According to this argument, we have Greek scribes that invented a complicated system of rules for writing confidential information through a very inaccurate script. Thus, nobody but them, or the other officials of the court, could understand what exactly is recorded by the number 50 next to the non-understandable word. Then, between the word and the number, they inserted the icon of a sword (fortunately, because such insertions of sketches greatly facilitated the original decipherment of Linear-B). Someone has not to be an expert in cryptography to understand that by such sketches the whole idea of secrecy is immediately nullified. It is more probable that these sketches facilitated the understandability of the information for people unable to read the actual text.

There can be many reasons why a script is unsuitable for writing a particular language but still being adequate for limited use. Linear-B is not an exception to this [40]. We prefer herein, though, instead of claiming that very complex writing rules had been intentionally devised for whatever reason, to adopt what we perceive as the simplest possible explanation. We will concentrate on the origins of the creating language and of the people having spoken that language - who devised the Aegean syllabic scripts - mainly based on linguistic evidence and interpretation, regardless of the languages that these scripts had been used to convey. Anyway, until we find another Rosetta Stone, the only available data are the scripts themselves [9].

COMMENTARY

Every script in the world always conforms to the special features of the language it is initially devised for, and every script always is precise enough in phonemically representing the language it is created for. It is clear that the Aegean scripts are syllabic of the CV-type (consonant-vowel); i.e., all signs represent

syllables ending in a vowel only, with no consonant clusters. This means that the script was originally devised for a CV-type language, namely a language in which all consonants are followed by vowels. There are many such languages, a very well-known of them being the Japanese. When a script is devised for a CV-type language, it is naturally a CV-type syllabary, as it is actually the case with the Japanese kana syllabaries. A CV-type pure syllabary was never initially devised for any language other than a CV-type language. While today we know of many CV-type languages, all Greek dialects were (and remain) foreign to the CV pattern. Another linguistic direction is required [2]:

> "In contrast with mainland Greece, Cyprus and Crete in the 2nd millennium are both multilingual societies in which the different languages are written down. It is tempting to assume that this points to stronger links with the Near East than with Greece."

It is recognized by eminent Greek linguists that there was a linguistic substratum in the Aegean area (e.g., see [33][41]). Other proposals about an adstratum instead [42] do not change the essence of our argument. This substratum is not regarded as Indo-European (IE), based on the unknown etymology of plant-names and toponyms [33]. The Aegean scripts denote that a CV-type language was spoken by those who created them. None of the IE languages is of the CV-type. The mainland of Greece and of Anatolia was inhabited by people speaking IE languages. The existence of a Semitic language (e.g., Akkadian) is also very probable in Crete, but it is not of a CV-type either. All such proposals roughly correspond to all the different ethnic groups that may have inhabited Crete or retained merchant delegations there. None of them, though, spoke a CV-type language. Ancient Egyptian was not of the CV-type, if we judge from Coptic, from renderings of Ancient Egyptian in other languages and from the ancient Egyptian script itself. Egyptian was an Afro-Asiatic language, and those languages are generally not of the CV-type. Consequently [9]:

> "Without doubt, the Minoans at the beginning of the second millennium did not 're-invent' writing independently, even if they were well able to take their first steps in this direction without knowledge of the Mesopotamian or Egyptian systems. However, starting with ideas from elsewhere, they created an original and astonishingly uncomplicated system for recording the sounds of their language by means of signs."

So, the issue of identifying the language behind the Aegean scripts remains the same: all the languages around Aegean, which we know of hitherto, are incompatible to the CV-pattern. CV-type languages are usually agglutinative ones. Duhoux suggests that Linear-A is "agglutinative rather than conjugating",

because of the high number of affixes it contains (in 59% of the words) compared to Linear-B (12% respectively) [43]. What we seek is a non-IE agglutinative language of those times (3rd millennium BC) to fit with the "kana" pattern of Linear-A/B and their predecessor. Olivier states that [9]:

> "A priori, no language attested in the third or second millennium from the eastern Mediterranean or its surrounding areas can be excluded … the languages spoken by people from the coasts of Asia Minor or Syro-Palestine must be favoured. … Between 3000/2600 and 1450, the period of the birth and development of Cretan Hieroglyphic and Linear A, … the introduction of a language known to us from elsewhere is unlikely."

The nearby agglutinative language of the 3rd millennium BC, well-studied and recorded, is the Sumerian. Additionally, the only highly civilized people close enough, speaking an agglutinative language well known to have CV-type phonotactics, were the Sumerians (or the bilingual Akkadian scribes / scholars because of the "sprachbund" [44][45]). Thus, the present research had been directed towards a comparative study for discovering any relation between the Sumerian language and the Aegean scripts.

EVIDENCE

Firstly, we will concentrate on some aspects of linguistic taxonomy and methodology before we proceed to the direct evidence of the last subsection (*A Sample*).

A Protolinear Script

There is a suggestion that Linear-A constitutes a linearization of the Akkadian cuneiform signs [22]. However, it is normal for a script to evolve from pictorial signs (as the Sumerian pre-cuneiform and the Aegean writing signs too) into non-recognizable forms (as the late cuneiform), and rarely the reverse. It has been recognized that Linear-B is not simply a derivative of Linear-A, just as the creation of the Aegean scripts does not constitute a simple process of evolution, from the Cretan Hieroglyphics to Linear-B [27][35]. There are Aegean inscriptions found in various places (Tel Haror, Tel Lachish, Samothrace and Troy) that both Linear-A and B scripts have to be taken into account for their interpretation [46]. Although there are several different theories for explaining this necessity, there is also the possibility of a Protolinear script [47], which both Linear-A/B evolved from, for conveying different languages. In other words, the Protolinear could be the parent of Linear-A and Linear-B, while the Cretan Hieroglyphic could be regarded mainly, but not exclusively [8], as the decorative and ritual form of that system for use especially on seals [48].

The hypothesized Protolinear script consists of 120 syllabograms of the V and CV patterns, as they have been found in Linear-A/B scripts, one for each syllable of a dialect close to the Archaic Sumerian language. There are also a few signs of disyllabic nature. The signs are those that are common to both Linear-A and B scripts (62) and those that are exclusive to each syllabary. So, we have a script of simplified icons (signs) depicting items, where the phonetic value of each sign is related to the Archaic Sumerian word for the depicted item. Many of them are related to the associated signs of the Cretan Hieroglyphic, also to the Sumerian pictograms and sometimes to the cuneiform equivalents. A sample is presented in the next section, for the curious reader. One debatable feature of such a script would be the interpretation of the items depicted by the icons and another is the assignment of the phonetic value to each sign.

THE METHODOLOGY

We cannot recognize what an ancient sign depicted by simply looking at a modern hand copy of it in a list presenting a tentatively reconstructed syllabary and putting our imagination to work. To go to the pictorial origin, we have to see all forms of the letter in all related scripts, and observe carefully how objects are usually depicted in the Minoan art. We have to study, in addition, the logograms of Linear-A/B and the Cretan Hieroglyphic too, and also observe the tendencies of each script. When the hitherto unknown phonetic value of signs (e.g., /ru/, /to/) is discovered, then it is tested in the actual context of the signs and so confirms that it makes really good sense. It should be understood that the original script was pictographic as much as it was linear: every sign was a sketch readily recognizable by all as a common object, the whole name of which was instantly recalled by all speakers of the language of the nation that created the script. The comparative study was conducted in parallel including four factors:

- the depicted object and its sign of the Aegean script,
- the relation and similarity of the previous sign to equivalent Sumerian ones,
- the assigned phonetic value of the sign of the Aegean script,
- the similarity of the previous phonetic value to Sumerian words denoting the depicted object.

At least three factors should match in order to confirm the relation.

Following the above mentioned methodology, the entire set of Linear-A/B signs can be identified as monosyllabic (rarely disyllabic) Sumerian words naming the depicted objects, noting that in Sumerian language a closing consonant of a monosyllabic word (i.e., CV-C) was not pronounced unless it was followed by a vowel in the case of compounding or affixation. Thus, in all the following examples, the closing consonant is separated by a dash. This is a predominant rule of the Sumerian phonology that facilitated the process of creating the syllabary by using the rebus principle. The rebus principle is merely the use of a picture to stand not for the object depicted, but for the name of the depicted object, even in context where the sound of that name stands for something totally different than the object shown. There is an important rule that always goes together with this principle: the whole name of the depicted object is used and not a part of the name (unlike the acrophonic principle). The rebus principle had been invented by the Sumerians, according to Fischer [4], whose influence expanded to Nile, Iran, Indus Valley and maybe to the Balkans (as he suspects, and it is argued too herein, through the Aegean scripts). The phonology of the used words is of a dialect close to, but simpler than, the Archaic Sumerian (the reconstruction is explained, together with the transcription system, in [49]).

A Sample

Having the previous discussion in mind, we may proceed below to the presentation of some examples. It is a typical sample of 18 signs, among the most easily recognizable and readily interpretable ones. Provided the reader can recognize that every sign is quite close to a sketch of the depicted item, then this sample, comprising about 20% of the Linear-A and of the Linear-B syllabic repertoire, is statistically enough to prove that the Sumerian influence is not a coincidence and therefore the origins of the Aegean scripts can be of oriental origin. The study of the other Protolinear signs, not shown here, is analogous and verifiable. The numerals and the phonetic value of the signs correspond to the Linear-B taxonomy and, wherever applicable, the corresponding number of Linear-A in parenthesis.

Sign *37.

The syllable **ti** is represented by the sketches of an arrow, because the arrow is named /ti-l/ in Sumerian, common to both Linear-A/B and Cypriot Linear script, as well as in Cretan Hieroglyphic and in pre-cuneiform (Fig-1). It is probably the most representative sign in the process of the syllabic scripts evolution and the one which actually triggered the presented research. Quoting John DeFrancis [50]:

> "The symbol for **ti** 'life' is the picture of an arrow; it derives from the Sumerian ^{giš}**ti** 'arrow' but is transferred to the homonym ti(l) 'life' which is difficult to write pictorially (Falkenstein 1936, 33)".

That "ti", meaning "life", in "En-lil-ti" is the arrow sign (see ATU 221, Fig-1). This information was already in UNESCO's "History of Humanity" [51], as (since 1936) it is internationally accepted that the use of the arrow sign for the syllable **ti** shows the language of the ancient Mesopotamian Proto-literate texts to be

Sumerian. Therefore, the same sign can indicate quite unambiguously that the creating language of the Aegean scripts was also Sumerian. This simple discovery strangely has not yet acquired international recognition.
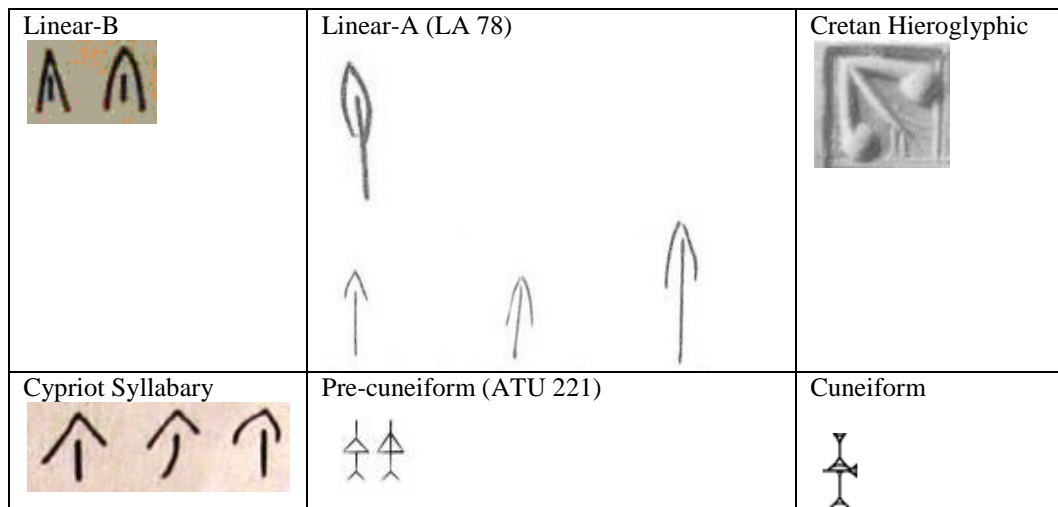

Fig-1. The sign forms for syllable **ti.**

Sign *20.

The (Mycenaean) syllable **zo** (IPA /$\widehat{dʒ}$o/, approximated by the Sumerian **šo**; see rule 5.0.38 in [49]) is represented by the sketches of a spear (Fig-2), named /šo-q/ in Archaic Sumerian, which in Cuneiform appears as "šuk-ur", the suffix "-ur" being a very common noun suffix analogous to a definite article. It differs from the arrow (Fig-1) in having the small horizontal line(s), denoting the tying of the lance-point to its shaft.
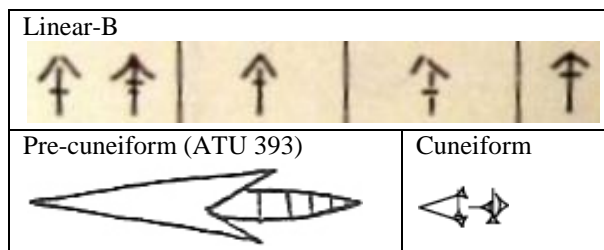
Fig-2. The sign forms for syllable **šo** (**zo**).

Sign *17.

The syllable **za** (IPA /$\widehat{dʒ}$a/), approximated by the Sumerian **ša**, is represented by the sketch of a Sumerian "šibir", which is translated as a sceptre, a mace, a club, or a shepherd's staff (Fig-3). The "šibir" was in fact "šeb-ir", from a more original form "šab-ır" (due to a common phonetic tendency), where "-ır" is the same suffix appearing as "-ur" in "šuk-ur" (Fig-2). So the original name of the mace/staff was /ša-b/, hence the phonetic value /ša/ in Protolinear.

Sign *3.

The syllable **pa** is represented by this sketch, being identical in both Cypriot Syllabary and early Cuneiform (Fig-4). It means "twig" in Sumerian.
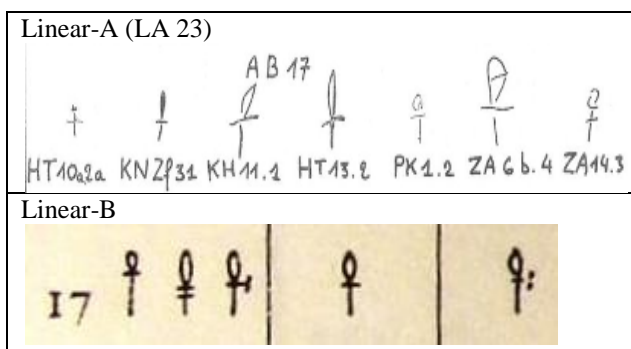

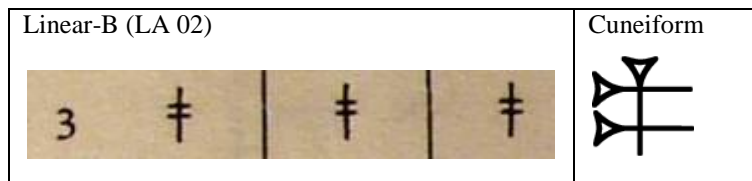**Fig-3.** The sign forms for syllable **ša** (**za**).

Fig-4. The sign forms for syllable **pa**.

Sign *8.

The syllable **a** is represented by the sketches of the double axe denoting the supreme deity of the Minoans (Fig-5). This visualization was obviously chosen to symbolize the power and the duality of the deity. In Cypriot Syllabary it seems that the sign was simplified to show the sides of the double axe instead of the edges. The supreme deity of the Sumerians was "An", whose worship was predominant in Sumer at the beginnings of the 3rd millennium BC. According to Roux [52], the primary religious symbols in the Halaf and Ubaid periods of Sumer were the double-axe and the bull-head, among others. We know of double edged swords, in front of which the Sumerians took their

oaths. Double edged swords have been also found in quantities, next to double axes that were offered to the deity at the Cretan places of worship. God An was always a supreme deity for Sumerians and Akkadians. The latter absorbed the Sumerian religion, calling the deity "Anu", /-u/ being the Akkadian suffix for the nominative case. The Sumerian cuneiform sign for "god" is mostly used for the syllable "an", or as a determinative for writing the names of all deities. However, in later times, it seems that most Sumerians, especially in cities other than Uruk (where An was the patron deity), preferred to worship other deities (like Enlil, Enki etc.) more than An.

Fig-5. The sign forms for syllable **a**.

Sign *1.

The syllable **da** is denoted by a sign also found in Cypriot Syllabary script as "ta", as well as in pre-cuneiform (Fig-6). The main beam or big straight branch of a trunk, which is depicted on the right, was named /da-l/ in Sumerian. This meaning is found as

"wr. ^{ĝeš}dal "crossbar, beam, dividing line" Akk. *gištallu*», in ETCSL: "dal = (cross)beam"; where "^{ĝeš}" (wood) is a classification element that it should have been pronounced once, judging from the Akkadian "*gištallu*".
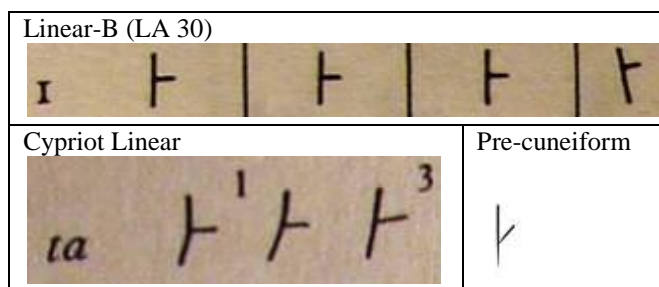

Fig-6. The sign forms for syllable **da**.

Sign *67.

The sign **ki** (**ci** according to our transcription system, "c" used for /c:/) is culturally among the most interesting ones (Fig-7). In Sumerian, the word "giŋ", written "giĝ$_4$" or "gin$_2$", denoted a cup used as weight or volume measurement-unit in their daily commercial transactions. It was the main **monetary unit** of the Sumerians; land was measured by "gin$_2$" of grain required to sow it, and silver (the main form of money in those times) was measured by the "gin$_2$" too.

In Aegean (and Cypro-Minoan) scripts this is a frequent phonetic sign, but also it has been repeatedly found in tablets of Linear-A (e.g., on HT 118, pointed by red arrows) followed by numbers of quantities. The Linear-A tablet, shown in Fig-7, lists four personal names or sources, each followed by a number denoting the quantity of goods plus their price measured in "gin$_2$" (or "ci-n" in our transliteration) - see TEXT in Fig-7. We translate the full text of the tablet as follows:

"Pigs at hand (i.e. pigs that we own): of Madu (*Madi* = the Akkadian genitive case in /–i/) 15 pigs, (we paid) 10 cin; Qaqaru (the Akkadian nominative in /–u/) 6 pigs (he brought), (we paid) 4 cin; Awesu (nominative as previously) 4 pigs (he brought), (we paid) 1 cin. Our own pigs (other than those we bought were) 10 (for these, of course, there is no mention of money paid). (The) total (of pigs that we currently own is) 30 (15 + 6 + 4 + 10 = 35; but meanwhile 5 pigs were consumed). (The) total (of money that we paid for acquiring pigs is) 15 cin (of silver)."

Moreover, a cup excavated in Kea (Photo of Fig-7) having this sign inscribed, shows that it was not just a cup: it was the actual "cin", the measuring and monetary unit of the Minoans.

Linear-B (LA 103)		HT 118	TEXT
			(jou – no -) madi 15, cin 10 qaqaru 6, cin 4 awesu 4, cin 1 weruma 10 culo 30, cin 15
Photo	Cypriot Linear {ki}		
Cup's inscription	Cuneiform		culo = "total" ("kul" in Semitic)

Fig-7. The sign forms for syllable **ki/ci**.

Sign *52.

The syllable **no** is represented by the sketches of a hand: palm and wrist (Fig-8). The "hand" is "šu" (pronounced /šo/) in late Sumerian, originating from the archaic version /ño/, through the application of a general phonological rule (see rule 5.0.30 in [49]).

Pre-cuneiform	Linear-B

Fig-8. The sign forms for syllable **no**.

Sign *5.

The syllable **to** was written by Linear-B sign *5 and the Cypriot Syllabary sign shown in Fig-9. This syllabic sign, clearly depicting an axe, proves that the sign "a" (Fig-5) did not represent an axe, but a deity. The axe in Archaic Sumerian was /to-n/ or, possibly, /to-m/, in Cuneiform appearing as "wr. ^{urud}tun$_3$; tun$_3$ "axe, adze" Akk. *Pāšu*". While other cuneiform signs were used for many different syllables, it is noteworthy that the cuneiform sign TUN$_3$ or DUN$_3$ was used only for the syllables "tun$_3$" or "du(n)".
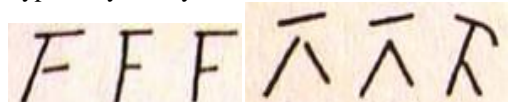
Linear-B (LA 39)
Cypriot Syllabary

Fig-9. The sign forms for syllable **to**.

Sign *9.

The syllable **se** is represented by the sketches of a deer-horn (Fig-10). The horn was named "si" (pronounced /se/) in Sumerian.
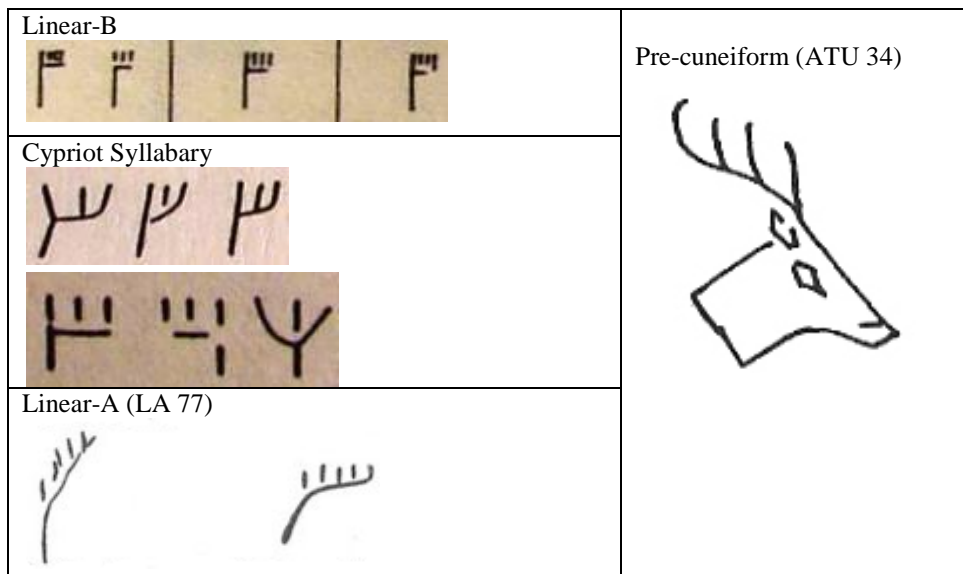

Fig-10. The sign forms for syllable **se**.

Sign *26.

The syllable **ru** is represented by sketches of a prop, appearing as "ur_2 / uru_8" in cuneiform Sumerian (Fig-11). Such a prop is visible in the ship-icon of Fig-11, behind the last rower on the right (pointed by a red arrow). Two of them are also visible in the middle of the seal (#262), in Cretan Hieroglyphic. In the famous wall-painting from Akrotiri of Thera, with the fleet of a few ships (National Archaeological Museum of Athens, Greece), the curious reader may count many such props on all the ships having a tent above the rowers.
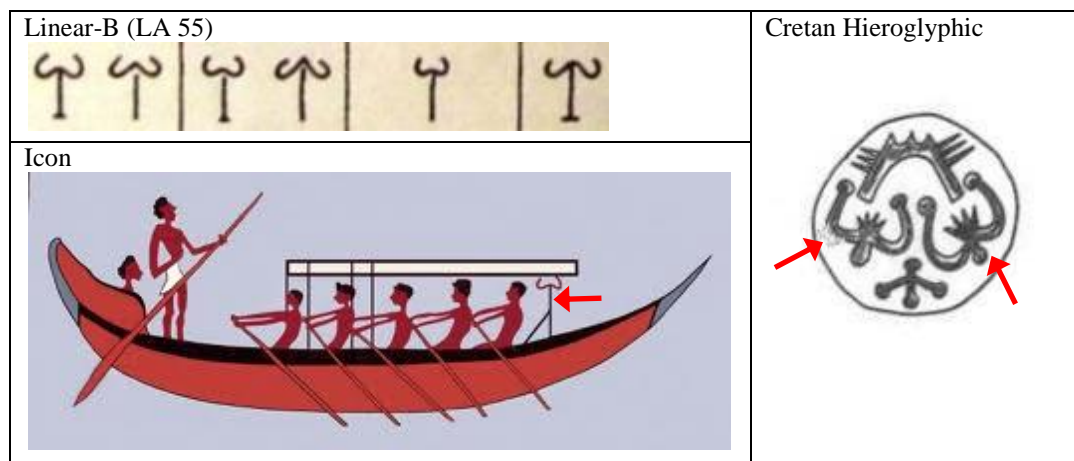

Fig-11. The sign forms for syllable **ru**.

Sign *78.

Used in Linear-B for **qe**, {q} being the velar plosive (Fig-12). It is essentially the same as the Sumerian pictogram for "earth, place", which was retained in the Cuneiform with the name "KI". Note that Sumerian {e} appears usually as {i} in the cuneiform (e.g., see [53]). "KI" was a very important cuneiform sign used for all syllables resembling /ke/ and also as a determinative for all toponyms, such as names of countries or cities.
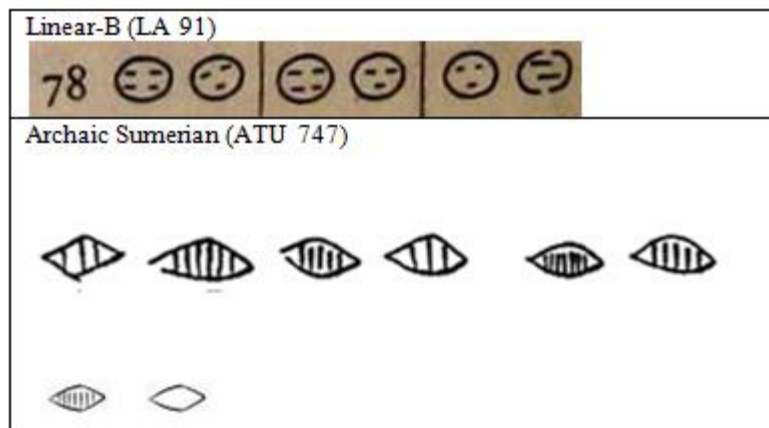
Fig-12. The sign forms for syllable **qe.**

Sign *43.

To the previous sign "hand" (Fig-8) compare the sign "arm" (Fig-13): Linear-B sign $\{a_3\}$ used for Achaean $\{ai\}$ (pronounced with a close or mid $\{a\}$) is represented by the sketch of a forearm. The arm or forearm is $\{á\}$, or $\{a_2\}$ (pronounced with a close $\{a\}$, I.P.A. /ɯ/) in cuneiform Sumerian, and the same sign has become $\{i\}$ in the Cypriot Syllabary.

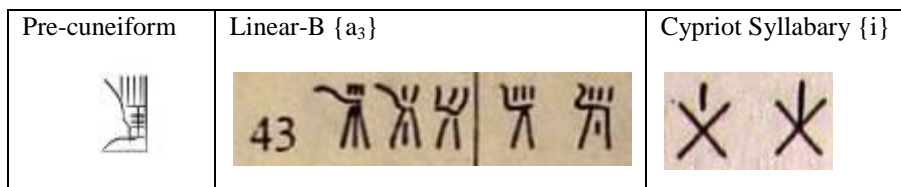| Pre-cuneiform	Linear-B $\{a_3\}$	Cypriot Syllabary $\{i\}$

Fig-13. The sign forms for the Achaean syllable *a3* (a close $\{a\}$).

Sign *38.

The Linear-B sign for the syllable **e** depicts a 3-storey building, religious or administrative (Fig-14), which is named /e-š/ in cuneiform Sumerian, much more important than the private house "wa" (Fig-15). The UoP dictionary gives "eš, wr. eš$_3$ "shrine; an establishment" Akk. *bītu*; *eššu*" ("*eššu*" is the Akkadian word borrowed from Sumerian).

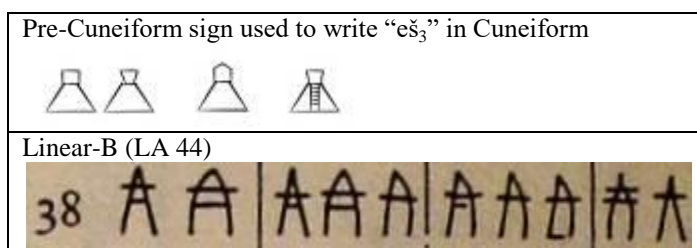| Pre-Cuneiform sign used to write "eš$_3$" in Cuneiform |
|---|
| |
| Linear-B (LA 44) |
| |

Fig-14. The sign forms for syllable **e.**

Sign *54.

The Linear-B sign for **wa** is the typical front view of a Sumerian house, called "wa" in Archaic Sumerian (Fig-15). The cuneiform of this sign has been named "E", but note that even in Babylonian (Akkadian) it was used as $\{à\}$ (or $\{$'a$_3\}$, the $\{$'$\}$ before the $\{a\}$ is supposed to be a glottal stop in Babylonian / Akkadian language). This means that even in Mesopotamian Sumerian the house was "wa" until late times, and only in late Assyrian times it came to be "E" because of ordinary phonological tendencies (discussed in [49], relevant rules 5.0.3 and possibly 5.0.11).
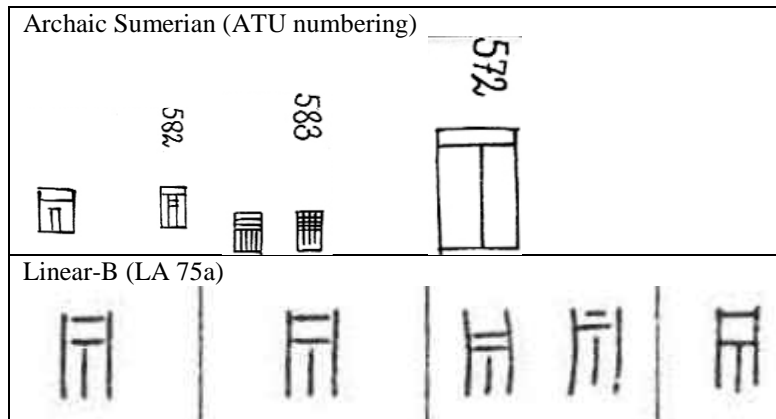
Fig-15. The sign forms for syllable **wa**.

Sign *30.

The Linear-B sign for **ni** (Fig-16) is very similar to the Linear-B "ideogram" for "fig trees". Without doubt, it depicted a tree, which was "ŋiθ" in Archaic Sumerian according to our research and it appears as "ĝiš" in the Cuneiform (where {ĝ} stands for {ŋ}: the velar nasal). As we shall see in the next subsection (Fig-17), there was another synonym Sumerian word for tree; "ŋiθ" or «ĝiš» meant all trees

that can grow in wild, or "wood, timber". Because the Protolinear sign was **ŋi** and not exactly "ni", we understand that the Achaean "ni" was in fact pronounced as /ñi/ (with palatalized nasal, just as the syllable "ni" is pronounced in Peloponnesian and many other Greek dialects until today). The same sign is possibly the origin of the Cypriot Syllabary "mi", since the change [ŋ → m] was common in the Mesopotamian sociolect "Emesal".
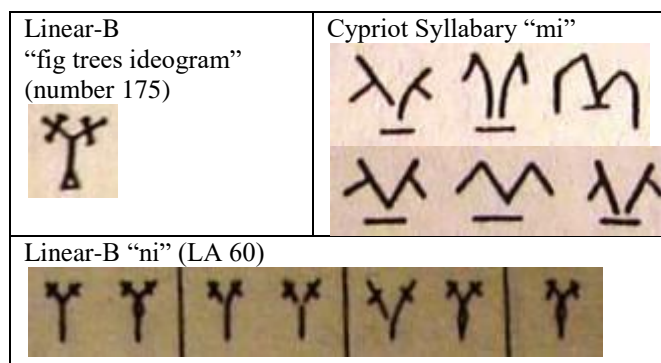

Fig-16. The sign forms for syllable **ŋi**.

Sign *29.

In Linear-B it has been named **pu₂**, and it is known to be used for "pu" with an aspirated {p} (Fig-17). It is very similar to the Linear-B "ideogram for olive trees", but in fact the sketch represented all fruit-bearing trees. The Sumerian word for "cultivated fruit bearing tree" (and also for orchard, since "orchard" means "cultivated fruit trees" and the plural number for things was usually not indicated), was "pu2" in cuneiform Sumerian. The dictionaries give: "wr. pu₂

"fruit orchard" Akk. ṣippatu" (UoP) and pu₂ = orchard (ETCSL).

Sign *57.

The sketch for syllable **ja** depicts a bundle of canes bound at the two ends (Fig-18). The bundle was called /ja/ in Archaic Sumerian, while in cuneiform it is encountered as /sa/, because of a conversion that has become generalized in some agglutinative languages (see rule 5.0.26 in [49]). Canes were very important economically, as construction material and fuel.
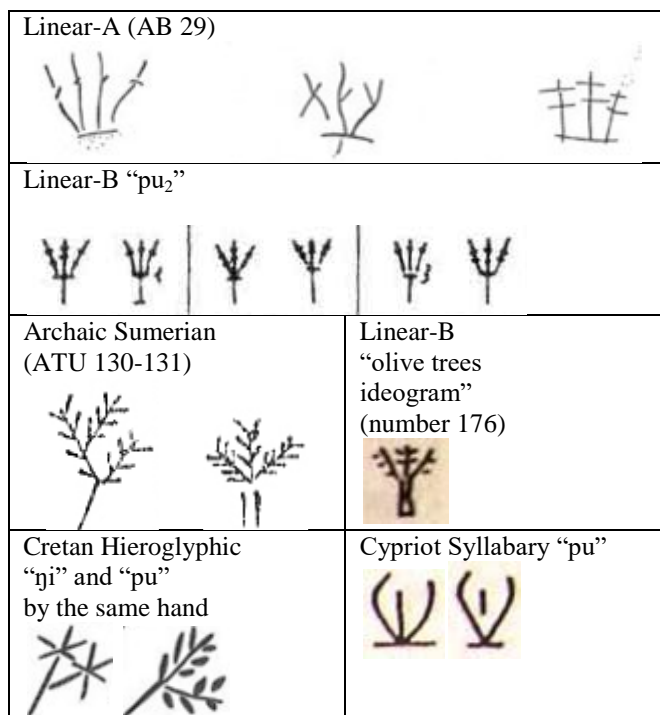
| Linear-A (AB 29) |
| Linear-B "pu₂" |
| Archaic Sumerian (ATU 130-131) | Linear-B "olive trees ideogram" (number 176) |
| Cretan Hieroglyphic "ŋi" and "pu" by the same hand | Cypriot Syllabary "pu" |

Fig-17. The sign forms for syllable **pu.**
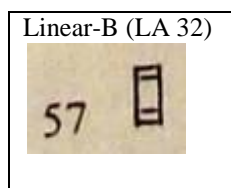

Linear-B (LA 32)

Fig-18. The sign for syllable **ja**.

DISCUSSION

Based on the very small number of different handwritings that are recognized on Linear-B tablets of Knossos and Pylos (111 of the so called "Hands"), Hooker [54] suggested the existence of a scribal guild, favored also by Finkelberg [46]. This is a reasonable explanation for the observed incongruity of Linear-B to the phonotactics of the Mycenaean Greek language, provided we deduce that the scribes were non-Greeks, and their script was originally devised from a non-Greek language. This can also explain why they did not even slightly enhance the script in order to represent the Greek language somewhat more precisely, for their own convenience, just as the Cypriot Greeks did with the Cypriot Syllabary. This could also be the reason why Linear-B was completely forgotten when the Achaean palaces declined, so the non-Greek scribes working there could not find employment. Then, no documented writing system was used in Greece for a period of about 350 years, after which the Greeks adopted a non-Greek script again: the Phoenician alphabet. Relevant to the previous situation is also the idea that Linear-B was constructed by acrophony. A piece of evidence that it did not is that there were signs representing double syllables (e.g., *cuo*, *due* in our transcription), which reveals that the whole name of the thing represented by each letter was used as the letter's phonetic value (rebus principle) and not just the beginning of the object's name. The makers of Linear-B did not even try to use a smaller depository of phonetic signs by writing *cu-wo*, *du-we* and so on (that would be a tendency towards making an alphabet), but they wanted a bigger number of phonetic signs as long as they could invent easily recognizable sketches of things with a well-known name for each one. For the makers of what later became Linear-B, it was no problem to recognize all the letters with their names; that is, the names of the things depicted by the sketches-letters. Thus, our deduction is also that there was a guild of bilingual scribes of the nation who invented the original Aegean scripts, based on their own mother tongue, which is hardly found on the surviving documents**.**

The notion of a scribal guild can be extended in the past, for the creation of Linear-A and the Cretan Hieroglyphics, as a minimalistic reasonable assumption (although many evidence regarding culture and religion indicate a much stronger oriental relationship that its

presentation is beyond the scope of this article). A relatively small number of Sumerian seals-makers and scribes could have been hired, from the communities of the Levant [55], in order to create the necessary infrastructure for the development of the contemporary commercial best practices. They were, after all, the original inventors of such practices with a long tradition and expertise at the end of the 3rd millennium BC. Even for the case of bilingual Akkadian scribes, the choice of the Sumerian language for devising the Aegean scripts would be a significant advantage, because monosyllabic words could be easily found in order to match common or culturally important objects for the signs of a syllabary. The creation of these scripts is a distinct trade-mark compared to the rest (Eastern Mediterranean) of that era, which is an ever-lasting desirable commercial asset. Once the Minoan authorities / society had decided to develop their commerce, both domestically and overseas, they would inevitably have to deal with the contemporary international best-practices (i.e., sealing of goods and keeping records). For example, about the usage of clay sealings [9]: "As in the Near East such objects generally served to secure the integrity of the contents of various types of container." About the usage of scripts, it is suggested that Linear-A conveys a Semitic language (as a lingua franca) written by Luwian scribes in order to adhere to international standards [22]. In this respect, generally and diachronically, there are only two options:

- to develop the required practices from scratch, which is usually a costly and slow trial-and-error process or
- to hire professionals, being experts in the required practices.

The latter option is mutually beneficial. The employer acquires the proper practices quickly and safely, while the employees assure their prosperity by having the monopoly of know-how. Who possessed such know-how at the end of the 3rd millennium BC?

Sumerians proved to be excellent traders and colonists throughout the entire Near East, even at the end of the Uruk period [56]. According to Kramer [57]:
"…by the third millennium BC, there is good reason to believe that Sumerian culture and civilization had penetrated, at least to some extent, as far East as India and as far West as the Mediterranean, as far South as Ancient Ethiopia and as far North as the Caspian".

Crete was known to Mesopotamia at least since the era of Sargon the Great, who lived approximately between the 24th and the 23rd centuries BC [58]. On the tablets of Mari (18th century BC) it is stated that "the hand of Sargon" had reached places beyond the "upper sea" (Mediterranean) as far as the island of copper (Cyprus) and Kaptara. The latter is regarded as the most

ancient reference to Crete, "Kaptara" being its Akkadian name [14]. The name for Mediterranean in Sumerian is "ab-ba igi-nim", found in many texts, e.g. in the inscription on the statue of Gudea (Period: Lagash II, ca. 2200-2100 BC): "a-ab-ba igi-nim-ta (from the Upper Sea = Mediterranean) a-ab-ba sig-ga-sze3" (to the Lower Sea = Persian Gulf). Even with some chronological inaccuracy, the previous period (24th to 18th centuries BC) adequately covers the creation time of the Aegean scripts. What could be the "hand" of Sargon the Great other than merchant stations and/or delegations, at least? Nevertheless, both linguistic and non-linguistic pieces of evidence, that will be presented shortly, indicate a longer and deeper Sumerian influence on the Aegean civilization of the 3rd and 2nd millennia BC.

CONCLUSION

In conclusion, the inadequacy of the Linear-A/B scripts to convey properly the phonology of the Mycenaean Greek, or the other languages proposed in Crete, is attributed herein to the origins of those syllabaries. Notably, considering the conveyed languages by Linear-A, all proposals are based on the comparative study of toponyms and anthroponyms or divinity names. Such a study, though, is not necessary when an Akkadian name is written in Akkadian cuneiform or a Luwian one in a relevant script. The Aegean scripts are acting like a distorting filter for the languages that they convey, making their identification even more difficult. Such a distortion is more or less always expected in the conveyance of words transmitted through a foreign writing system. Based on the previous linguistic evidence and conditions, it has been suggested that a very suitable candidate language as the base for creating the Aegean scripts could be the Sumerian. Being an agglutinative language, it both exhibits the matching syllabic pattern of the CV-type, and it can justify the phonetic values of the Linear-A/B and Cypro-Minoan signs as well, through the rebus principle. It is also suggested that the formation of each Aegean script could have been conducted in the late 3rd millennium BC by means of absorption from a parent script, named Protolinear, being created by a scribal guild of Sumerian linguistic origin.

ACKNOWLEDGEMENTS

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