

Multiple Sequence Alignment of Libation Formulae suggest Linear A is Minoan-Greek

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Abstract

Here, we align multiple texts of various Libation formulae in Linear A. The alignment delineates words, and highlights synonymous syllables, of the Libation formulae. Remarkably, two vessels and their contents are specified and verify the proto-Greek origin of Linear A. The two vessels are: (1) “receptacle of grain” SU-TE-DA-KE (σιτοδόκος) followed by its content “grains” SE-TO-I-JA (σιτος,-οο) and (2) “receptacle of oil” I-RI-DE-KA (ελαιοδόκος) followed by its content “olive oil” A-RE-PI (ἄλειφαρ, oil) RE-NA (ἔλαιον, olive). We hypothesize that *301 is pronounced RI, and translate I-RI-WA-E (ἐλαιώω) into “olive-oil”, and I-RI-TI (ἄλείατα) into “wheat-meal”, both common in libation.

Furthermore, the multiple sequence alignment juxtaposes the Goddess, I-DA-A (θεά or δεά in Tyrrhenian) and I-DA-MI (δαίμων) with JA-SA-SA-RA-ME, the Ashera poles (אשרת) and with JA-SA-RA-A-NA-NE, a luxuriant tree (רענן). In turn, the labrys inscription I-DA-MA-TE could refer to the God mother (θεά μήτηρ), Demeter (Δημήτηρ).

Finally, we hypothesize that KA-NA-SI is derived from the noun “empty” (κενός), and the verb “to pour” (Εγκανασσειν). Interestingly, KA-NA-SI is aligned with the proto-Semitic synonymous translation “I emptied” RU-KA-NA-TI (ריקנתי) and RU-KA-JA-SI (ריקיתי).

As such, we conclude Minoan is mainly a proto-Greek language, yet permeated with proto-Semitic influence.

Introduction

Linear A was used to write the Minoan language spoken in Crete from approximately 1800 to 1450 BCE. Linear A has never been fully deciphered, except for numerals, and ideograms. Despite several attempts to decipher Linear A, the Minoan language remains partially deciphered to this date.

Linear B however, was deciphered by Michael Ventris and John Chadwick¹. Linear B is a syllabic script and was used to write Mycenaean Greek, an early form of Greek. Presumably, Linear B evolved from Linear A, and they are likely to share related syllabaries.

Several decipherments of Linear A have been attempted. Notably, the blogger Brian Colless² has developed the notion of proto-Semitic origin, based on scholars such as Cyrus Gordon³. In 2001, Jan Best published an article in support of this view⁴.

On the other hand, Vladimir I. Georgiev holds that Linear A contains Greek linguistic elements, and later that the Linear A corpus also includes some Hittite-Luwian elements. Gregory Nagy has supported this notion of Linear A bearing Greek-like and Indo-European elements.⁵ This belief is also supported by Richard Vallance Janke⁶ and Rita Roberts⁷ who classify Linear A as proto-Greek, the immediate predecessor of ancient Greek.

In opposition to these views, Leonard Palmer has theorized that Linear A could be related to Luwian⁸. Margalit Finkelberg, has suggested a high degree of correspondence with Lycian.⁹ Hubert La Marle has proposed that Linear A belongs to an Indo-Iranian language family¹⁰. Giulio M. Facchetti has linked Linear A to the Tyrrhenian language family, which comprises Etruscan, Rhaetic, and Lemnian¹¹. The same perspective is held by Raymond Brown and S. Yatsemirsky who have suggested a link with Etruscan^{12,13}.

These attempts, however lack validation beyond any reasonable doubt, and do not rely on substantiating evidence like the “Rosetta” stone famously used by Champollion to decipher the

¹ Ventris, Michael, Chadwick, John (1953). "Evidence for Greek Dialect in the Mycenaean Archives". *The Journal of Hellenic Studies*. 73: 84–103.

² <http://cryptcracker.blogspot.com/2016/09/semitic-crete.html>

³ Rendsburg, Gary A. (2001). "Cyrus H. Gordon (1908-2001): A Giant among Scholars". *The Jewish Quarterly Review*. 92 (1/2): 137–143

⁴ Dietrich, Manfred; Loretz, Oswald (2001). In *Memoriam: Cyrus H. Gordon*. Münster: Ugarit-Verlag.

⁵ Nagy, Gregory (1963). "Greek-Like Elements in Linear A". *Greek, Roman, and Byzantine Studies*. Harvard University Press (4): 181–211.

⁶ <https://linearbknossosmycenae.com/category/linear-a/>

⁷ <https://linearbknossosmycenae.com/category/partners/rita-roberts-blog/>

⁸ Palmer, Leonard Robert (1958). "Luvian and Linear A". *Transactions of the Philological Society*. 57 (1): 75–100.

⁹ Finkelberg, Margalit (2001). "The Language of Linear A: Greek, Semitic, or Anatolian?". In Drews, Robert (ed.). *Greater Anatolia and the Indo-Hittite Language Family*. *Journal of Indo-European Studies Monograph Series*. 38. p. 81-105.

¹⁰ La Marle, Hubert. *Linéaire A, la première écriture syllabique de Crète*. Paris: Geuthner, 4 Volumes, 1997–1999, 2006;

¹¹ Facchetti, Giulio M.; Negri, Mario (2003). *Creta Minoica: Sulle tracce delle più antiche scritture d'Europa* (in Italian). Firenze: L.S. Olschki.

¹² Yatsemirsky, Sergei A. (2011). *Tentative Comparative Description of Minoan, Etruscan and Related Languages* (in Russian). Moscow:

¹³ Brown, Raymond A. (1985). *Evidence for pre-Greek speech on Crete from Greek alphabetic sources*. Amsterdam: Adolf M. Hakkert.

Egyptian hieroglyphs. In addition, earlier attempts have not been founded on side-by-side juxtaposition of ideograms and phonograms - “□” and “TI-RI-PO” (τρίπος) for tripod – notably used by Ventris and Chadwick to decipher Linear B.

In this study, we apply multiple sequence alignment, a tool often used in bioinformatics, to align the known libation formulae in Linear A. The alignment highlights synonymous inscriptions, and delineates individual words. Remarkably, Linear A and B share identical spelling of some words, such as “oil” A-RE-PI (αλειφαρ), and “olive” RE-NA (ἔλαιον). In addition, Linear A and B use different spellings for other words, such as “olive-oil” (ἐλαιόω), spelled I-RI-WA and E-RA-WA respectively. Finally, the proximity of receptacles and their content also attest to our decipherment. For example, the “receptive of oil” I-RI-DE-KA (ελαιοδόκος), precedes the content “olive oil” A-RE-PI RE-NA (αλειφαρ ἔλαιον). Likewise, the “receptive of grain” SU-TE-DA-KE (σιτοδόκος) precedes the content “of grains” SE-TO-I-JA (σιτος,-oo +JA plural suffix). As such, Minoan is mostly a proto-Greek language with some proto-Semitic influence.















Methodology

Sources. All Linear A texts described in this article were downloaded from the website of John Younger (<http://www.people.ku.edu/~jyounger/LinearA/>). The transcribed texts are based on the texts presented in Recueil des inscriptions en Linéaire A (GORILA) by Jean-Pierre Olivier and Louis Godart. The Linear A text version used herein were downloaded throughout the Covid-19 pandemic, and correspond to the texts available between March 2020 and April 2021.

Multiple sequence alignment. To align multiple Libation formulae, the following transcriptions were used: IO Za 2, TL Za 1, IO Za 6, IO Za 8, PK Za 12, PK Za 11, KO Za 1, PK Za 8, SY Za 1, PK Za 18, PL Zf 1, PR Za 1, KN Za 10, SY Za 3, IO Za 9, PS Za 2.2, IO Za 7, AP Za 1, KN Zc 7, PK Za 15, AP Za 2, VRY Za 1, SY Za 4, SY Za 2, and ZA Zb 3. The alignment was performed manually. The multiplicity of text is expected to facilitate sequence alignment. In turn, multiple sequence alignment delineates words and highlights synonyms.

*Phoneme assignment to undeciphered signs *301, *321, and *79.* Undeciphered signs of the libation formula include *301, *321, and *79. The undeciphered signs were visually inspected, and compared with Linear B signs.

Results

Assignment of phoneme to undeciphered signs. The undeciphered Linear A sign *301 () shares some resemblance with the Linear B sign for RI () , and both exhibit two legs, and a head. In addition, the undeciphered sign *301 () also shares resemblance with Linear B signs E () , DE () , JE () , and AI () . While the latter B signs, share significant resemblance with their A values, the B sign for RI () , shares little or no resemblance with the assigned A sign for RI () . However, the currently assigned A sign for RI () does share similarity with B signs () and () , currently assigned with the phonemes AI2 and AI3. On this basis, we suggest that the undeciphered Linear A sign *301 () corresponds to the Linear B sign RI () .

Linear A sign *79 has been assigned to the phoneme WO2, as suggested by Melena¹⁴. Linear A sign *307 remain unassigned. Linear A sign *321 looks like a labrys, and currently remains unassigned.

Multiple sequence alignment. The Libation Formulae appear on various inscribed objects, many dedicated at sanctuaries. The formulae follow a fairly strict sequence with some changes. Shown in Table 1, is the multiple sequence alignment of the Libation formulae, and their translation.

Table 1. Multiple sequence alignment of Linear A libation formulae.

		τα/τινῶ	ἔλαιου	σῆν	τοῦτο	ἄν	ῥυζός	εἶς	ἄσπερον	ὄν	κενός	ἐπίνω	σιπῶν
		The/A	olive oil	zecepracle	this	and	wheat	unto	Asherim pole	which	I empty	upon	the slio
VRY Za 1	Serpentine square LT*												
SY Za 3	Serpentine round LT*	A-TA-	I-RI-WA-JA									I-PI-NA-MA	SI-RU-TE
IO Za 8	Serpentine round LT*		JA-NA-TI-RI-WA-JA										
IO Za 6	Alabastrer cup, petals	TA-NA-	I-RI-U-TI-NU	*I-NA-TA-	I-ZU-		DI-SI-KA						
TL Za 1	Marble ladie	A-TA-	I-RI-WA-JA	G-SU-QA-RE									
IO Za 2	Square LT*	A-TA-	I-RI-WA-JA	JA-DI-RI-	TU								
PK Za 11	Serpentine square LT*	A-	I-RI-WA-E	A-DI-KI-	TE-TE								
PK Za 12	Serpentine round LT*	A-TA-	I-RI-WA-JA	A-DI-KI-	TE-								
PL Zf 1	Silver pin		TA	WI-TE-JA-MU	U-QE-TI								
PR Za 1	Poros limestone box	TA-NA-	SU-TE-DA-KE	SE-TO-I-JA									
KW Za 10	Limestone square LT*		I-RI-WA-MU-TI										
PS Za 2	Serpentine 3 cup LT*	TA-NA-	I-RI-TI										
IO Za 7	Serpentine square LT*	A-TA-	I-RI-WA-JA										
PK Za 8	Stone LT		NU	PA3-E	JA-DI-KI-	TE-TE-	*307	PU2-RE	TU-ME-I	JA-SA-			
PK Za 15	Serpentine round LT*												
KO Za 1	Stone base	A-TA-	I-RI-WA-JA	TU-RU-SA*									
SY Za 1	Round pedestaled LT*	JA-TA-	I-RI-WA-JA										
PK Za 18	Serpentine square LT*												
PK Za 17	Serpentine square LT*												
KW Zc 7	Cup												
SY Za 4	Serpentine round LT*	A-TA-	I-RI-WA-JA	JA-I-NWA-2A									
AP Za 2	Serpentine round jar												
SY Za 2	Serpentine square LT*	A-TA-	I-RI-WA-JA										
ZA Zb 3	Pithos	A-TA-	I-RI-DE-KA	A-RE-PI-	RE-NA	*TI-TI-KU*VINA32*	DI-DI-KI	A-SE	A-SA-MU-NE				

*LT libation table

The libation formula starts with either the indefinite article “a” TA-NA (τινά), or the definite article “the” A-TA (τα) in the plural neuter nominative declination. The alternate spelling, JA-TA (αῦτη) could correspond to the demonstrative article “this”, in the nominative declination, either single (οὗτος m., αῦτη f.) or plural (οὗτοι m., αῦται f.)¹⁵.

Then, follows the ingredients of the libation poured, namely “olive-oil” I-RI-WA-JA (ἔλαιον+JA or ἔλαιου), or “grain” SE-TO-I-JA (σιτος+JA or σῖτου)(PR Za 1). The JA suffix is the plural nominative form of the nouns. Spelling of the content varies, and olive-oil is also written as I-RI-WA-E (PK Za 11) and I-RI-U-JA (AP Za 1). Notably, the word for olive oil in Linear A I-RI-WA, resembles that of Linear B, E-RA-WA. In one instance, “sage-scented olive oil” PA-E (PK Za 8) is named, where PA is a shorthand form of PA-KO-WE used in Linear B. Decryption of the logogram *301 as RI (or LI), elegantly sheds light on two key ingredients in libations, namely olive-oil and wheat meal. The former is clearly associated with the Libation formula as attested by the logogram OLE in SY Za 2. The decryption is further attested by the juxtaposition of E-RI-WA-JA with A-RE-PI-RE-NA another form of writing “olive oil”, namely “oil” A-RE-PI (ἄλειφαρ) “olive” RE-NA (ελαιον) (ZA Zb 3). Both of these nouns are identical with Linear B spellings.

Another libation includes “wheat meal” I-RI-TI (ἀλείατα) (PS Za 2). Spelling of “wheat meal” varies greatly, and includes I-RI-U-TI (IO Za 6) and RA-TE-U-TI (IO Za 2). Both of these libations, with olive-oil and grains, were known to the ancient Greeks, and this formula could be

¹⁴ Melena J., "Mycenaean Writing," in A Companion to Linear B: Mycenaean Greek Texts and Their World, vol. 3, edited by Yves Duhoux and Anna Morpurgo Davies, 1-186. Peeters: Louvain and Walpole MA, 2014.

¹⁵ Alternatively, the indefinite article, “a” could correspond to the single accusative declination, male TA-NU (τινά), female TA-NA (τινά), or neuter A-TA (τι) respectively. Possibly, the definite article “the” corresponds to the single accusative declination male TA-NU (τόν), female TA-NA (τήν), or neuter A-TA (τό) respectively.

the oldest known evidence for such practices. Also here, decryption of the logogram *301 as RI is attested by the superposition of the middle word “wheat meal” (ἀλείατα) of the formula TA-NA-RA-TE-U-TI-NU (IO Za 2) with TA-NA-I-*301-U-TI-NU (IO Za 6) corresponding to “a wheat meal which” (τινά ἀλείατα ον). TA-NA-RA-TE-U-TI-NU, is a repetition, and consists of two words¹⁶. Finally, the libation ingredients WI-TE-JA-MU (PL Zf 1.1)¹⁷ and MU-TI (PL Zf 1.1)¹⁸ were not deciphered.

Then comes the libation vessel, which is very often derived from the word for “**receptacle**” DI-KI (δοχή or δεχάς). Notably, specific vessels are named, such as the “**receptacle of grain**” SU-TE-DA-KE (σιτοδόκος)(PR Za 1) and the “**receptacle of oil**” I-RI-DE-KA (ελαιοδόκος)(ZA Zb 3). These vessel names are formed by combining grain (σιτο) and receptacle (δοχή) into “receptive of grain” SU-TE-DA-KE (σιτοδόκος), as well as olive-oil (ελαιον) and receptacle (δεχάς) into “receptive of oil” I-RI-DE-KA (ελαιοδόκος). Remarkably, the “receptive of grain” SU-TE-DA-KE (σιτοδόκος) precedes the content “of grains” SE-TO-I-JA (σιτος,-oo +JA plural suffix). Likewise, the “receptive of oil” I-RI-DE-KA (ελαιοδόκος), precedes the content “olive oil” A-RE-PI RE-NA (αλειφαρ ἔλαιον). The decipherment of these specific vessels relies on juxtaposition with their contents, and provide credibility beyond any reasonable doubt.

Most often, the libation vessel is not specified, and a general noun is provided for a hollow “**receptacle**” DI-KI (δοχή or δεχάς). The spelling variations of this vessel are numerous, and at least 3 different variants are found: JA-DI-KI-TU (IO Za 2), A-DI-KI-TE-TE (PK Za 11), JA-DI-KI-TE-TE (PK Za 15). We suggest, the variants could correspond to the same vessel with different demonstrative articles. The single TU syllable, in the vessel name, corresponds to the feminine single nominative demonstrative article, “**this**” (αὕτη). The double TE syllable, in the vessel name, TE-TE corresponds to the neuter single nominative demonstrative article, “**this**” (τοῦτο). Thus, the receptacle DI-KI is also neuter and feminine, in Linear A, perhaps giving rise to multiple spelling of the receptacle δοχή and δεχάς.

As such, the vessel noun, A-DI-KI-TE could therefore correspond to a “small hand-held vessel about the size of a disk”. This suggestion is attested by the finding that only handheld libation tables are inscribed with this vessel noun DI-KI (IO Za 2, PK Za 11, PK Za 12, PK Za 8, PK Za 15, possibly on PK Za 18), but never mentioned on other vessels such as stone pedestals (SY Za 1), bases (KO Za 1), pins (PL Zf 1), cups (IO Za 6), jars (AP Za 2), pithos (SY Za 2), and ladles (TL Za 1).

Finally, the vessel name DI-KI also corresponds to the receptacle noun forming the “grain receptacle” SU-TE-DA-KE (σιτοδόκος)(PR Za 1), and the oil receptacle I-RI-DE-KA (ελαιοδόκος)(ZA Zb 3). Interestingly, DI-KI is also found in page tablets as DI-KI-SE (δεχάς) (HT 87 and HT 117), and perhaps refer to the libation table (i.e. phiale) itself.

Temporarily, yet unconvincingly, A-DI-KI-TE-TE could also simply mean “pure” (αθικτος , כתיט¹⁹), for “intact” or “contained” olive-oil. Likewise, A-DI-KI-TE-TE could correspond

¹⁶ Wrongly, TA-NA-RA-TE-U-TI-NU translates into “**give (us)**” TA-NA (תנה), “**our bread**” RA-TE-U-TI-NU (αρος with the Semitic suffix -תינו)

¹⁷ An uneducated guess is MU-TI translates into μοῖτος -ό, Sicilian for χάρις, thanks, favour, (μοῖτον ἀντι μοῖτου like-for-like)

¹⁸ An uneducated guess is WI-TE-JA-MU could be derived from blood (αἷμα) and could correspond to “containing blood” (υφαίμων)

¹⁹ Leviticus 24, 2 “צו אַת בְּנֵי יִשְׂרָאֵל יִקְחוּ אֵלֶיךָ שֶׁמֶן זֵית זָךְ כִּתִּית לְמִאֹר לְהַעֲלֹת נֵר תָּמִיד”

to “receive”, an imperative conjugation of the verb δέχομαι, (i.e. ἔδεκτο “of things as the object, take, accept, receive, etc). The latter two translations are unlikely, for several reasons. First, the libation formula do no seem to contain any verbs in their first half. Second, A-DI-KI-TE seems to correlate with the vessel type. Third, if A-DI-KI-TE is a verb, then it fragments the libation ingredient.

Another libation formula mentions the disk-shaped tray, DI-SI-KA (δίσκος)(IO Za 6), in the sentence I-NA-TA-I-ZU-DI-SI-KA, which translates into “**inside this tray**” (εντος ὄς δίσκος). Notably, this disk-shaped vessel, δίσκος, refers directly to the round alabaster cup, that is the Libation table itself (IO Za 6).

The “**libation vessel**”, KI-TE (κυτος, plural κυτου) is also named U-QE-TI (PL Zf 1.1). This vessel could correspond to a bowl for pouring liquids in Hebrew, Kiton (קִיתוֹן).

Another vessel name mentioned in the libation formula is O-SU-QA-RE and refers to “**the shovel**” (ἡ σκαλίσ), or the ladle on which the Libation formula is inscribed. This vessel name is also referred to as SU-KI-RI-TA (PH Wa 32) and A-SI-KI-RA (KH 20) in page tablets. The name O-SU-QA-RE is reminiscent of the Es’kar (אשכר) libation presented by the kings of the sea-isles, and named in Psalms 72, 10²⁰. Another libation vessel variant is TI-TI-KU (ZA Zb 3), and corresponds to the inscription found on a pithos fragment JA-TI-TU-KU / JA-TI-TU-KU (LA Zb 1 bis), and could be a bowl measure for wine. No Greek namesake was identified for these vessels, however if the prefixes TI (τη), and JA-TI (αὔτη) are just articles, then TI-KU stems from “**case**” (θηκη).

Lastly, an additional libation vessel name is TU-RU-SA (KO Za 1). This vessel is also referred to as A-TU-RI-SI-TI (KN Zb 5) which corresponds to a “**tall handle-less vase**”. The noun TU-RU-SA is likely the unaltered form, while A-TU-RI-SI-TI contains the demonstrative form with prefix A-, and the suffix -TI (αὔτη). It has been speculated that TU-RI-SI is the triple measure of one KI-RA²¹. Tentatively, TU-RU-SA could simply correspond to “crop” (θερος, -το). Less possibly, if TU-RU-SA is a “bunch of grapes”, from Greek βοτρυς or “wine” from Hebrew tiros’ (תירוש), then TU-RU-SA may become “grapes” or “wine”.

Sometimes, the libation formula includes additional crops, such as “**wheat**” PU-RE (πυρος)²² as well as “**barley**” RA-RE (ὄλυραι) or “**wheat meal**” RA-RE (ἄλευρα) (KN Zc 7, HT Zb 160, PK Za 15, KO Za 1, and PK Za 8). As indicated in the formula, the wheat and barley are preceded by DU which corresponds to “**this**” (ὄδε), the demonstrative article in singular masculine declination. Notably, in one case, the wheat libation is shredded, and “shredded wheat meal” is given, as indicated by the adjective “**shredded**” TU-ME-I (τομαῖος)(PK Za 8). In another case, the libation includes “**wine**” A-ZU-RA (ἄζωρος)(KN Zc 7) and JA-I-NWA-ZA (οἶνος, ἴν)(Sy ZA 4).

Then, the divinity is invoked, namely the “**Ashera pole**” JA-SA-SA-RA-MA (IO Za 2, TL Za 1, IO Za 6, PL Zf 1, KN Za 10, IO Za 9, PS Za 2.2) which is composed of two words JA-SA, and

²⁰ Psalms 72, 10 “מַלְכֵי תַרְשִׁישׁ וְאַיִים, מִנְחָה יְשִׁיבוּ; מַלְכֵי שֶׁבַע וְסָבָא, אֲשֶׁפֶר יִקְרִיבוּ.”

²¹ <http://www.people.ku.edu/~jyounger/LinearA/>

²² Temptingly, DU-PU-RE could describe the material of which the phiale is composed of. In line with this thought, DA-PI-TE-RI (DA+πετρος)(PK Za 11), DU-PU-RE (DA+πωρεία), and DU-PU2-RE (DA+πωρεία), record that the libation vessels are made “of stone”. In the former case, DA-PI-TE-RI A-KO-A-NE (PK Za 11) translates into “that” A-KO-A-NE (εκείνου) “stone” DA-PI-TE-RI (DA+πετρος).

SA-RA-ME. The word JA-SA (or JA-S) is simply “**unto**” (εἰς)²³. The word SA-RA-MA (or A-SA-RA-MA) corresponds to the “divinity” name, and refers to the Ashera or Asherim poles which is feminine in singular (אשרה), and masculine in plural (אשרים). This deciphering is further corroborated by the fact that JA-SA-SA-RA-MA is aligned with the synonymous deity JA-SA-RA-A-NA-NE (KN Zc 7) transliterated into “**unto**” (εἰς) “**luxuriant tree**” (עץ רענן), that is an Ashera Pole. The name Ra’anane (רענן) appears in the bible, and is associated with a stone libation altar (מצבה) under a tree, in the Biblical verse: “And they set up for themselves stone altars and Asherah poles, on every high hill and under every luxuriant tree”²⁴. In this context, the divinity name JA-SA-RA-A-NA-NE is synonymous to JA-SA-SA-RA-MA, the Ashera tree pole (pl. Asherim tree poles). Following this logic, JA-SA-RA-A-NA-NE is a synonymous invocation of the divinity JA-SA-SA-RA-MA, which are both derived from Semitic deities represented as tree poles, namely אשרה and רענן.

Speculatively, this finding is corroborated by the alignment of SA-RA-MA with ideogram *321 that is shaped like the labrys, the double edged ax (IO Za 7). If so, then ideogram *321 differs from logogram *321. As depicted on the Hagia Triada sarcophagus fresco, the labrys caps the Ashera poles (Figure 1), and *321 could be an ideogram of SA-RA-MA.

Other times, the divinity is not named, and a “**Goddess**” I-DA-A is invoked, such as in I-DA-A (θεά) (KO Za 1), I-DA (θεά, or δεά in Tyrrhen.) (PK Za 18), and in the synonym I-DA-MI (δαίμων) (SY Za 1). Alternatively, the libation formula I-DA-A invokes a “heavenly god” (δῖος), or the “sitting-place of Gods” (ἔδος), and possibly the labrys itself which carries a similarly sounding inscription I-DA-MA-TE (AR Zf 1). I-DA-MA-TE has been proposed earlier to correspond with an epithet of Demeter (Δημήτηρ), the God mother (δεά μήτηρ).

Then, follows the action “**which I emptied**” with several spelling variations U-NA-KA-NA-SI (IO Za 2, TL Za 1, KO Za 1, PK Za 8), U-NA-RU-KA-NA-TI (PK Za 11), U-NA-RU-KA-JA-SI (PK Za 12) or TA-NU-NI-KI-NA (PL Zf 1). The action is composed of two words. The first word, U-NA “which” (ov), combines with the next word, KA-NA-SI “I emptied” (κενός or εκκενουν), conjugated in the first person, to form the action “which I emptied”. In the multiple sequence alignment, KA-NA-SI is synonymous with RU-KA-NA-TI derived from the Hebrew verb “to empty” Roken (רוקן), also declined in the first person of the singular, meaning and RU-KA-NA-TI which literally means, “I emptied” Rukanati (רוקנתי). Thus, the two aligned variants are synonymous, although one is proto-Greek, and the other is proto-Semitic. Other variants include “which” U-NA (ov) “I empty” RU-KA-JA-SI (רוקייתי), and “the” TA-N (τόν) “which” U-NI (ov) “empty” KI-NA (κενός). Such double vernaculars are found in many languages inheriting foreign loanword for synonymous vocabulary. For example, in Spanish, the word ‘scorpion’ has two synonymous names, alacran (Arabic العقرب) from Arabic, and escorpion (Latin Scorpiones) from Latin. Here too, KA-NA-SI is proto-Greek, and RU-KA-NA-TI is proto-Semitic. Alternatively, KA-NA-SI could correspond to the to the proto-Greek form of “I inaugurate” (εγκανασσειν).

Then comes I-PI-NA-MA (IO Za 2, TL Za 1, KO Za 1, PK Za 8, AP Za 2, VRY Za 1) which is “**upon**” (ἐπένεο) or the synonymous variant A-PA-DU-PA (PK Za 12) which stands for “**from here before**” (απο δω προ) or “**in front of**” (απέναντι από)]. Finally, the synonymous variant “in the face of” I-PI-NA-MA (פנימה) is also of Semitic origin for “in front of him/her” I-PI-NA-

²³ An uneducated guess proposes JA-SA is a tree (עץ)

²⁴ Kings II, 17, 10 “וַיִּצְבּוּ לָהֶם מִצְבּוֹת וְאֲשֵׁרִים עַל כָּל גְּבֻעָה גְבוּעָה וְתַחַת כָּל עֵץ רֵעֵנָן”

MI-NA (ופני מינה). Often, the words ‘empty’ and ‘face’ appear hand-in-hand in the Bible, as seen in the verse “They shall not see my face empty handed”²⁵, related to seeing the Lord’s face. Therefore, the words U-NA-KA-NA-SI stand for “I emptied”, and I-PI-NA-MA for “before the face”

[I tilt (ἐπινεύω) the preserved corner is "perforated" (PM II 440), this implies that the hole is drilled all the way through (but see IO Za 2). If all corners were perforated, perhaps the table was suspended, and could be tilted. ἐπ·ενίημι (ao. 2 inf. ἐπενεῖναι), introduire en outre ἐπινέω heap up or load with]

Then comes, SI-RU-TE, (σιρωτόν), a silo for holding wine or vinegar, into which the libation is poured, similar to the silo depicted on the Hagia Triada sarcophagus²⁶ (Figure 1).

The formula ending in I-NA-JA PA-QA is currently unsolved.

²⁵ Exodus 23, 15 וְלֹא-יֵרָאוּ פָנַי, רִיקִם 15.

²⁶ It is unlikely that SI-RU-TE means "I served" SHIRET (שירת) or a servitude SHIRUTE (שירות). Also unlikely, SI-LU-TE could mean "I prayed" SILUTI (צלותי) or a prayer SILUTA (צלוא, λυτή). Finally, it is unlikely that SI-LU-TE could be "I sang" SHARTI (שרתי), or songs SHIROT (שירות).



Figure 1. Hagia Triada Sarcophagus. Shown are Minoan libations, similar to those described in the formulae. On the top left, the libation is emptied from one vessel into another positioned between two Asherim poles, topped by labrys. On the bottom right, libations are emptied onto a libation table before a luxuriant tree, and an Ashera pole.

In the following paragraphs are tentative translations of all Libation Formulae, and deciphering of linear A sequences are provided.

IO Za 2 (HM 3557) (GORILA V: 18-19), square Libation Table.

1.: A-TA-I-RI-WA-JA • JA-DI-KI-TU • JA-SA-SA-RA[-ME • U-NA-KA-NA-]SI [•] I-PI-NA-MA •

τα ἔλαιου δοχή αὕτη εἰς ἄשרα ον κενός ἐπινάω
The olive oils of this vessel unto Ashera pole which I empty upon

2.: SI-RU-TE • TA-NA-RA-TE-U-TI-NU • I-•-•[

σιρωτόν τινά ἀλείατα ον
the silo The wheat-meal which

TL Za 1 (HM 1545) (GORILA IV: 58-59), marble ladle.

a: A-TA-I-RI-WA-JA • O-SU-QA-RE •

τα ἔλαιου σκαλῖς
The olive oils shovel (ladle)

b: JA-SA-SA-RA-ME • U-NA-KA-NA-[SI

εἰς ἄשרα ον κενός
unto Ashera pole which I empty

c: I-PI]-NA-MA SI-RU-[TE

ἐπινάω σιρωτόν
upon the silo

IO Za 6 (HM 3785) (GORILA V: 24-27), stone cup with petaliform rim, of orange-yellow alabaster with white veins.

TA-NA-I-RI-U-TI-NU • I-NA-TA-I-ZU-DI-SI-KA • JA-SA-SA-RA-ME •

τινά ἀλείατα εντος ὅς δίσκος εἰς ἄשרα
A wheat meals in this disk unto Ashera pole

PK Za 12 (HM 942) (GORILA IV: 35-38), round Libation Table, serpentine

a1: A-TA-I-RI-WA-JA • A-DI-KI-TE-[

τα ἔλαιου δοχή
The olive oils of this vessel

a2: -QA

b:]SI-[JA-SA-SA-]RA-ME[

εἰς ἄשרα
unto Ashera pole

c:]A-[2?]-NE • U-NA-RU-KA[1?]JA-SI •

ον ροκיתי
which I empty

d1: A-PA-DU-PA-[3?]JA[2?]JA-

απο δω προ
from here before

d2: -PA-

PK Za 11 (HM 1341) (GORILA IV: 32-34), square Libation Table, serpentine

a: A-TA-I-RI-WA-E • A-DI-KI-TE-TE-[•

τα ἔλαιου δοχή ταῦτα
The olive oils of this vessel

b: •]-RE • PI-TE-RI • A-KO-A-NE • A-

πετρος εκεινου εἰς
of? stone that unto

c: SA-SA-RA-ME • U-NA-RU-KA-NA-TI •

ἄשרα ον ροκיתי
Ashera pole which I empty

d: I-PI-NA-MI-NA[] SI-RU-[•] • I-NA-JA-PA-QA

ἐπινάω σιρωτόν
upon the silo

KO Za 1 (HM 2627) (GORILA IV: 18-20), stone base

A-TA-I-RI-WA-JA•TU-RU-SA•DU-PU-RE-I-DA-A•U-NA-KA-NA-SI•I-PI-NA-MA•SI-RU-TE
τα ἔλαιου θερος ὄδε πυρος θεα ον κενός ἐπινάω σιρωτόν
The olive oils crop this wheat Goddess which I empty upon the silo

PK Za 8 (HM 618) (GORILA IV: 24-27), stone libation table

a:]-NU • PA3-E • JA-DI-KI-TE-TE- DU -PU2-RE • TU-ME-I

τινά PA δοχή ταῦτα ὄδε πυρος
A sage-scented-oils of this vessel this wheat

b: JA-SA-[] U-NA-KA-NA-SI[]

εις אֲשֵׁרָא ον κενός
unto Ashera pole which I empty

c: I-PI-[

ἐπι
upon

PL Zf 1 (HM 498) (GORILA IV: 161, 162), silver pin

]TA•WI-TE-JA-MU• U-QE-TI• JA-SA-SA-RA-ME• TA-NU-NI-KI-NA•I-[PI-NA-MA]

τα υφαίμων? κυτος εις אֲשֵׁרָא τινά ον κενός ἐπινάω
The blood-containing? receptacle unto Ashera pole (a?) which I empty upon

PR Za 1 (HM 2444) (GORILA IV: 46-49) Poros limestone box

a: TA-NA-SU-TE-DA-KE

τινά σιτοδόκος
A grain-receptacle

b: SE-TO-I-JA

σιτο
grains

c: A-SA-SA-RA-ME

εις אֲשֵׁרָא
unto Ashera pole

KN Za 10 (HM 2100) (GORILA IV: 8-9), square Libation Table, limestone

a:]-TA-NU-MU-TI • JA-SA-SA-RA-MA-

τινά μοῖτος εις אֲשֵׁרָא
A favour unto Ashera pole

b: -NA • DA-WA-[•]-DU-WA-TO • I-JA[

ον
which I give?

AP Za 2 (HM 2479+2480) (GORILA IV: 4-5), cylindrical jar, serpentine

1:]NA-SI • I-PI-NA-MA [•••••]I-KU-PA3-NA-TU-NA-TE [

κενός ἐπινάω
empty upon

2:]PI-MI-NA-TE • I-NA-JA-RE-TA[•••]-QA •

PK Za 15 (Ayios Nikolaos Mus. 2469) (GORILA IV: 41), circular Libation Table, serpentine

]• JA-DI-KI-TE-TE-DU-PU2-RE[

δοχή ταῦτα ὄδε πυρος

of this vessel this wheat

VRY Za 1 (Rethymnon Mus. 685) (GORILA IV: 61), square serpentine Libation Table.

a:]I-PI-NA-MA

ἐπινάω
upon

b: SI-RU-TE • [

σιρωτόν
the silo

SY Za 3 (HM 3757) (GORILA V: 66-67; ArchEph 2008, 198-9, 205-7), circular Libation Table, serpentine (

A-TA-I-RI-WA-[JA -- -- ca. 8 -- --]•-•-SE-KA-NA-SI[•]TE[-- -- ca. 10 -- --]SI-RU-TE

τα ἔλαιου
The olive oils

κενός
I empty

σιρωτόν
the silo

IO Za 9 (HM 3898) (GORILA V: 32-33), square Libation Table, marble.

.a (retrograde): JA-SA-SA[-RA-ME

εις Ἀשרים
unto Ashera pole

.b: • U-NA-KA[-NA-SI

ον κενός
which I empty

SY Za 1 (HM 3459) (GORILA V: 62-63; ArchEph 2008, 197-8, 201-3), circular, pedestalled Libation Table

]A-TA-I-RI-WA-JA • I-DA-MI • JA-•-[

τα ἔλαιου δαίμων
The olive oils Goddess

PK Za 18 (Ayios Nikolaos Mus. 7233) (GORILA IV: 44), Libation Table, serpentine

]TE • I-DA • JA-JA-[

θεα
Goddess

PK Za 17 (Ayios Nikolaos Mus. 7232) (GORILA IV: 43), square Libation Table, serpentine

]I-DA • [•][

θεα
Goddess

PS Za 2, serpentine offering table or kernos with 3 cup sinking

1 24??]-RE-I-KE

ריק
empty

2 TA-NA-I-RI-TI • [6?]-JA-TI • JA-SA-SA-RA-ME •

τινά ἀλείατα
A wheat meals

εις Ἀשרים
unto Ashera pole

IO Za 7 (HM 3784) (GORILA V: 28-29), square Libation Table, serpentine

A-TA-I-RI-WA-JA • JA-TI-•321 [

τα ἔλαιου αὕτη LAB?
The olive oils this Ashera pole (Labrys)

KN Zc 7 (HM 2629) (GORILA IV: 122-125), cup

A-KA-NU-ZA-TI • DU-RA-RE • A-ZU-RA • JA-SA-RA-A-NA-NE • WI-PI-[•]

κενός ὄδε ἄλευρα ἄζωρος εἰς יען
I empty this wheat-meal wine unto luxuriant tree

HT Zb 160

PA-TA-DA DU-PU2-RE[

PA? ταῦτα ὄδε πυρος

Sage-scented-oil? this wheat

The vessel, PA-TA-DA could refer to a drinking like cup, such as PATAXNON (πάταχνον).

SY Za 2 (HM 3429) (GORILA V: 64-65; ArchEph 2008, 197-198, 203-5), square Libation Table

a: A-TA-I-RI-WA-JA • JA-SU-MA-TU OLIV •

τα ἔλαιου εἰς ἡμ OLIV
The olive oils unto pole olive tree

b: U-NA-KA-NA-SI OLE

ον κενός OLE
which I empty oil

c: *vacat*

d: A-JA

ZA Zb 3 (HM --) (GORILA IV: 112-113), pithos, inscription below rim

1: VINa 32 DI-DI-KA-SE • A-SA-MU-NE • A-SE

VIN 32 εἰς
wine 32 I empty? Eshmun god? unto

.2: A-TA-I-RI-DE-KA • A-RE-PI-RE-NA • TI-TI-KU

τα ελαιοδόκος ἄλειφαρ ἔλαιον αὕτη θηκη
The receptive of oil oil olive this case

The majority of Libation formulae address the offering type given to the Goddess, and follow a similar sequence. Perhaps, this sequence was recited during libations, and perhaps it was a substitute for the recitation.

Measures. Remarkably, the Pim²⁷ weight described in the Bible, is reminiscent of the Linear A inscription found on two clay spindle-whorls²⁸, PI-MI-TA-TI-RA2 (TRO Zg 1), and [DU/PI]-MI-TA-TI-RA2 (TRO Zg 2) in Troy (Figure 2). The weight of one Pim unit is translated as 2/3 of a shekel, corresponding to approximately 7.5 grams. The weight of the clay spindle-whorls has not been published. Here we suggest that, PI-MI-TA-TI-RA2 is “Pim of Troy” (πίμ-ΤΑ Τροία)]. This suggestion may easily be corroborated, if the spindle-whorls weight equals a Pim, corresponding to 7.5 grams, or any multiple thereof (say “three” τρία Pim).

²⁷ Samuel I, 13, 21. The charge was one **pim** for plows, mattocks, three pronged forks, and axes, or for setting the goads. והיתה הפצירה פים למחרשת ולאיתים ולשלש קלשון ולהקרדמים ולהציב הדרבן

²⁸ Brown E.L., (1997) Linear A on Trojan Spindlewhorls, Luvian-Based FANAX at Cnossus. Schmeling G., and Mikalson J.D. Editors. Qui miscuit utile dulci: Festschrift Essays for Paul Lachlan MacKendrick. Wauconda, IL: Bolchazy-Carducci. p. 51-68.



Figure 2. Pim weight and Linear A spindle-whorls. Shown on the left, is a Pim weight with Phoenician inscription for PIM (𐤏 𐤋 𐤍) of unknown provenance. Shown on the right, are two “spindle-whorls” with Linear A inscriptions PI-MI-TA-TI-RA2 unearthed in Troy. The spindle-whorls could indeed not be spindle-whorls at all, but weight measures, Pim.

Discussion.

Our decipherment of the libation formula suggests that Linear A scripture was a proto-Greek language, with some proto-Semitic influences.

Remarkably, the decipherment is attested by several indicators. First, the libation vessels SU-TE-DA-KE (σιτοδόκος)(PR Za 1) and I-RI-DE-KA (ελαιοδόκος)(ZA Zb 3), are followed by their contents, “grains” SE-TO-I-JA (σιτος,-οο gen.)(PR Za 1), and “olive oil” A-RE-PI (ἄλειφαρ, oil), and RE-NA (ἔλαιον/ἔλαιος olive)(ZA Zb 3) respectively. Also, SE-TO-I-JA (σιτος,-οο) refers to grains, and describes the type of offering. Interestingly, SE-TO (Σιτώ)²⁹ is the Greek epithet of Demeter, I-DA-MA-TE later invoked as JA-A-SA-SA-RA-ME. As depicted on the Hagia Triada sarcophagus fresco (Figure 1), the I-DA-MA-TE labrys caps the Ashera poles, and *321 could well be an ideogram of SA-RA-MA.

The libation formula contains several parallels to the pouring of oil unto a stone altar described in the Bible³⁰: “And Jacob awoke in the morning, and took the stone he put under his head, and placed it as an altar, and poured oil on it”. The story continues with Jacob promising to tithe all of his belonging, in exchange for Gods protection: “And this stone I have set up as a pillar will be God’s house, and of all that You give me I will surely give You a tenth”. The stone is said to be a sanctuary, “house of God”³¹ (I-DA-A ἔδος), and remarkably the verse records the Hebrew formula “Aser Aasarenu”, distantly reminiscent of JA-SA-SA-RA.

The Ashera pole and its sacred stones are also known from the Bible. Exodus 34:13 states: "Break down their altars, smash their sacred stones and cut down their Asherim [Asherah poles]." The Israelites were commanded to get rid of the idolatry, which included libations onto sacred stones, placed between Ashera poles. Here, we showed that the Ashera poles are mentioned in the formula inscribed on these libation stone. In addition, the Ashera poles, and libation stones are depicted on the Hagia Triada sarcophagus (Figure 1). In the Hagia Triada sarcophagus, the Ashera poles are topped by labrys, double bitted axes. The Labrys may also have been used to cut down the poles into holy firewood.

29 Henry George Liddell. Robert Scott. A Greek-English Lexicon. revised and augmented throughout by. Sir Henry Stuart Jones. with the assistance of Roderick McKenzie. Oxford. Clarendon Press. 1940.

30 Genesis 28, 18. וַיִּשָׁבֵם יַעֲקֹב בַּבֹּקֶר וַיִּקַּח אֶת הָאֶבֶן אֲשֶׁר שָׁם מִרְאשֵׁיתוֹ וַיִּשָׂם אֹתָהּ מִצֵּבָה וַיִּצַק שָׁמֶן עַל רֹאשָׁהּ.

31 Genesis 28, 20. וַהֲאֶבֶן הַזֶּה אֵיזֶאת אֲשֶׁר שָׁמַתִּי מִצֵּבָה יְהִיָּה בֵּית אֱלֹהִים וְכָל אֲשֶׁר תִּתֵּן לִי עֲשֶׂה אֲעֲשֶׂרנָּו לָךְ.

The labrys (πέλεκυς), could correspond to the double edged sword (להט החרב המתהפכת), that guard the entrance of the garden of Eden³². Alongside the labrys, cherubs are mentioned, just as depicted on the Hagia Triada sarcophagus (Figure 1). The labrys placed on top of a pole could have served as an early lightning-rod, as attested by the modern Greek word for lightning (ἀστροπελέκι), associated with rain, and symbolizing fertility, and being favored by the God. The labrys could imitate a tree, positioned on a hill-top, that was naturally more likely to be hit by lightning.

Due to the unique geographical location of Crete, we hypothesize that the Minoan civilization was a melting pot, which was influenced, both by proto-Greek (i.e. Minoan and early Myceneans), and by proto-Semitic (i.e. early west Semites and Phoenicians) populations. Specifically, we assume Minoan was a language mixture based mainly on Greek grammar and vocabulary with some proto-Semitic verbs and deities. In addition, we hypothesize that the syllabary used for Linear A and B is identical.

Other divinities include the Phoenician god “Eshmun” A-SA-MU-NE (𐎠 𐎢 W 𐎠) (ZA Zb 3), Ashera's consort associated with the Asclepius staff (also a pole). Notably, in this context the name Eshmun is associated with olive oil (שמן).

We hypothesize that the liquid consonants, L and R are interchangeable in Linear A. This hypothesis is supported by the peculiar lack of any letter for the sound L, and by earlier suggestions that “total” KU-RO (no Greek likeness) should be read as KU-LO (כולו) in Linear B. The interchangeable nature of the L and R sounds is attested in several Hebrew synonyms, for example “chain” sharsheret (שרשרת) and shalsholet (שלושלת), “fell” nashal (נשל) and nashar (נשר), “stone-pit” garin (גרעין) and galin (גלעין), “tree(-grove)” ashera (אשרה) and eshel (אשל), whisper lachash (לחש) and rachash (רחש).

Unlike ancient Greek, the sentences do not seem to follow the subject verb object (SVO) structure, and the spelling of Linear A varies somehow over time, and location. Possibly, spoken Minoan was somewhat different from its written form, and over the centuries, as the language evolved, so did the written versions, until Linear B was adopted. This evolution could help explain the variations of the libation formula.

The Minoan culture was named by Evans after king Minos, who in Greek mythology inhabited Crete. However, Minoan also sounds quite like Manoah (מנוח)³³, the father of the biblical judge Samson, who both interacted much with the philistines, who were related to the Cretans as we shall see below. Manoah could be the Hebrew cognate name of Minos, which was adapted into Greek language using the consonant suffix “s”, common to male names. The consonant suffix is common in transliteration of Hebrew names into Greek, such as Isaia -> Isaias, Mose -> Moses, and Jeremia-> Jeremias.

The Cherethites and Pelethites (כרתתי ופלתי) were people living in the land of the Philistines according to the Bible³⁴. The Pelethites (פלתתי) are likely identical to the ancient Philistines (פלשתתי), the former name being a linguistic corruption of the latter³⁵. The Pelethites are also

³² Genesis, 3, 24. וַיִּגְרֹשׁ, אֶת-הָאָדָם; וַיִּשְׁכֵּן מִקְדָּם לְגֹ-עֵדֶן אֶת-הַפְּרִיבִים, וְאֵת לֶהֱט הַחֶרֶב הַמֵּתֶהֱפֶכֶת, לְשֹׁמֵר, אֶת-דֶּרֶךְ עֵץ הַחַיִּים.

³³ Judges, Chapter 13-14

³⁴ 1 Samuel 30:14. אֲנַחְנוּ פִּשְׁטֵנוּ נִגְבַּ הַכְּרִיתִי, וְעַל-אֲשֶׁר לִיהוּדָה--וְעַל-נֶגֶב כָּלֵב; וְאֶת-צֹקְלָג, שָׁרְפָנוּ בְּאֵשׁ.

³⁵ The Jewish Encyclopedia. New York. Funk & Wagnalls

described as an oversea people that came from the island of Caphtor (כפתר)³⁶. Similarly, the Cherethite (כרתתי) could be an oversea people that came from the island of Crete³⁷. Another link between the Cherethites and Pelethites of Philistine, and the island of Crete is attested by city names, such as Ekron (עקרון) and Heraklion (Ηράκλειο); Askalon (אשקלון) and Skalani (Σκαλάνι), Gaza (עזה) and Gazi (Γάζι), Ziklag (צקלג) and Tsikalaria (Τσικαλαριά), and so on. Also the fact that Linear A artifacts were found in Tel Haror, Israel attests to the link between Cherethites and Crete.

The Cherethites and Pelethites language has not been identified, yet it was spoken among king David's elite guards seemingly without communication barriers³⁸. Thus, their language could have been mutually intelligible with ancient Hebrew, giving rise to our hypothesis that the Cherethite and Minoan languages although fundamentally proto-Greek, also contained a proto-Semitic substratum.

³⁶ Amos 9:7. וְאָרְם מִקִּיר, וְפִלְשִׁתִּים מִצָּרִים, וְכַפְתֹּר מִכְּפֹתוֹר, וְאָרְם מִקִּיר. The exact identity of Caphtor island is debated, and based on the name alone, it seems to correspond to Cyprus (כפתור-<כפרת)

³⁷ The Cherethites sound like Crete.

³⁸ 2 Samuel 8:18