

An Electronic Corpus for Linear A: Introduction to a Database Project

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1. Introduction

All research concerning Linear A writing is faced with a twofold problem: the scarcity of the written material at our disposal,¹ and the exiguity of the scientific data that has been derived from such material. Although this is a discouraging scenario towards a successful study of the script, several attempts at interpretation have nonetheless surfaced during the past century: the Minoan script, nevertheless, remains undeciphered and seemingly impenetrable.

The small number of documents in our possession is certainly an obstacle to an attempt to interpret the language of Linear A, since it does not permit the construction of any significantly testable theory. Improvements in our knowledge could, however, also be provided by internal analyses of the structure of the Linear A writing. Unfortunately, very little scientific study has yet been devoted to such a goal, and there seems to be little hope at present for any innovative analysis in this field.

This paper will introduce an alternative method for investigating the inner structure of the Minoan script by means of an electronic database. There is no intent here to purposely promote and pursue any interpretation of the language recorded by the Linear A writing system. Instead, the aim of the paper is to present a computerized device which may constitute a useful contribution to the study of the script in itself.

In order to offer full explanation of the methodological choices applied in the conception of this database, together with the possibilities it provides for further research, a brief introductory overview of the extant corpora of Linear A is presented first. Secondly, the key questions involved in the approaches to Linear A study are outlined. Finally, the project for the electronic corpus of Linear A is introduced, providing full details concerning the foundations, aims, methods, and opportunities for research.

¹ The data reported in GORILA refer to a total of 1,427 documents and 7,147 signs (GORILA, vol. 5: XV). Yves Duhoux commented: "Tout le corpus LA tient en une dizaine de pages dactylographiées" (1989: 91).

2. The corpora of Linear A and their methodological approaches

In his 1989 article Yves Duhoux remarked that, in order to achieve the greatest knowledge of an unknown script, it is necessary to possess two important tools of research: an adequate number of texts, and most importantly a critical edition of the corpus.² The redaction of a corpus is a crucial element in the processes of study of a writing system, since its aim is to present the reference point and to provide a reliable scientific tool for further research on that script.

Various editions of Linear A documents have been published throughout the century since their discovery. Leaving aside the ambitious but unaccomplished project of Sir Arthur Evans,³ the first scientific publication of the corpus has the signature of Giovanni Pugliese Carratelli (1945). Shortly after that date, however, the situation of Minoan scripts changed significantly, since new Linear A documents were found and Linear B was successfully deciphered. As a result, Carratelli's corpus needed to be updated and reorganized. New editions of the texts, therefore, appeared starting from the early 1960ies, each one proposing different perspectives for approaching the script.

2.1 Giovanni Pugliese Carratelli: 1945

Despite being outdated, the corpus published by Giovanni Pugliese Carratelli in 1945 still has validity, because of its remarkable scientific and methodological qualities. In it, the first catalogue of the Minoan signs was created, codified as the "L, Lc, Lm" system. It allowed each sign to be identified by a code, consisting of a number and an alphabetical distinction among syllabic and ideographic (L), composed (Lc), and metrical (Lm) characters.⁴

The corpus presents each Linear A document with a drawing and a photograph.

2.2 William C. Brice: 1961

William Brice is the author of *Inscriptions in the Minoan Linear Script of Class A*, created with the aim of providing "a definitive edition of the inscriptions in the Linear Script A."⁵ Brice intended to offer a comprehensive synthesis between the earliest work of Carratelli and Arthur Evans' *Scripta Minoa* project.⁶

2 Duhoux 1989, 61.

3 Evans' original plan for the *Scripta Minoa* project was articulated in three volumes: the first, published by Evans, dealt with the pictographic script and the early linear writing on Crete (Evans, A.J. 1909. *Scripta Minoa*, London. See p. X for the overview of the project); the volume originally intended as the third, publishing the Linear B documents from Knossos, was completed by J.L. Myres (Evans, A.J. and J.L. Myres. 1952. *Scripta Minoa II*, London). The volume planned to be second, however, concerning Linear A documents, and therefore of the greatest interest to this study, was never produced.

4 Carratelli 1945, 464-489.

5 Brice 1961, IV.

6 Brice 1961, III and IV.

The publication of the Linear A corpus occupies the third section of the work, and includes thirty plates with photographs of the Linear A texts, together with their transcriptions in normalized characters.

Special interest lies in some of the tables provided in the text, particularly the table of concordance between Carratelli's "L" signary and the "AB" system applied in Scripta Minoa II's for Linear B signs.⁷

2.3 Jacques Raison and Maurice Pope: 1971, 1977, 1980, 1994.

In more recent times, Jacques Raison and Maurice Pope published the Linear A corpus following an innovative concept. In it, the authors catalogued the Minoan signs as *transnumérés*, meaning that a number has been assigned to each sign (*numérotation*). Despite the *numérotation*, however, the classes of signs representing numerals and fractions have been indicated with capital letters.

In the first edition, Raison and Pope presented only a drawing of each document's text, in the attempt to reproduce "[...] des fac-similés des signes, conformes autant que possible au dessin de ceux-ci dans les occurrences correspondantes [...]".⁸ Together with it, the corpus provided the numeric transcription of each text, as well as references for occurrences of its signs elsewhere within the corpus. In the new editions of the corpus (1980, 1994), however, only the *transnumérés* texts were presented, without pictures or drawings of the tablets.

2.4 Louis Godart and Jean-Pierre Olivier: 1976-1985

The *Récueil des Inscriptions en Linéaire A* edited by Godart and Olivier between 1976 and 1985, and familiarly known as GORILA, is the collection of Minoan texts taken in major consideration at present. It fulfils the need to put some order in the jungle of editions and catalogues of signs, and to create the ultimate research tool.

Articulated in five volumes, GORILA provides the entire available Linear A corpus, together with photographs, drawings, normalised and tabular transcription of each text. The fifth volume offers tables of concordances, tables of signs, and an index of occurrence of the characters.

One of the most revolutionary features offered by GORILA is the entirely new classification of the signs (the *Tableau des signes standardisés du linéaire A*),⁹ in which the Linear A characters have been integrated within the canonical classification of the Linear B signary. Thanks to this integration, for the first time Linear A and B signs could be organized within a single system: the *transnumération AB*,¹⁰ superseding the old "L, Lc, Lm" system. In order to avoid any confusion with their new system, Godart and Olivier provided an "*arithmo-sémiographique*" concordance

7 Brice 1961, 30-33.

8 Raison and Pope 1971, XXII.

9 Godart and Olivier 1985, XXII-XXVII.

10 Karetsou, Godart, and Olivier, 1985, 114.

chart, thus collating all the concordances of the various nomenclatures (mostly numeric) for each.

2.5 Carlo Consani and Mario Negri: 1999

The most recent publication of the Linear A corpus is the one redacted by Carlo Consani and Mario Negri. It originated in the desire to offer an alternative to the GORILA approach. According to the two authors, not only is GORILA considered too specialistic a publication,¹¹ but it is also based on a complete set of results of analyses.¹²

Convinced that Linear A can be read through the phonetic values of Linear B,¹³ Negri and Consani present the Linear A corpus in full phonetic transcription. Next to each transcription, they also provide two different interpretations of the text: one explains the textual organization of the document and its eventual categorization (as a religious, administrative, etc., document); the other offers the translation of the text itself, wherever possible.¹⁴

Despite their criticisms of GORILA, Negri and Consani's catalogue of the Linear A signs follows Godart and Olivier's system. The numerals and fractions are considered strongly related to the Linear B ones, yet not fully understandable.¹⁵

No photographs of the documents are provided.

2.6 Corpora and methods: a matter of choice

Among the corpora discussed here briefly, only three have imposed their authority in the field: Carratelli's, Raison and Pope's, and GORILA. Although the latter is perceived as the most authoritative work for any scientific analysis on Linear A, Carratelli's and Raison and Pope's corpora have not been completely supplanted and their methods are still preferred by certain scholars.¹⁶

There are thus currently three corpora, which apply three different methodologies and provide three different approaches to the same script. Choosing the right approach among them is not always an easy task, particularly if this will eventually strongly affect the research. In fact, discrepancies in the information among the corpora are not uncommon, and may create additional confusion.

11 Consani and Negri 1999, 11.

12 Concerning, for example, the number of signs believed to be common to Linear A and B ("da poco più di dieci [according to Olivier and Godart] a più di trenta segni [according to Negri]." See Consani and Negri 1999, 12).

13 Consani and Negri 1999, 12; Negri 1996.

14 Consani and Negri 1999, 12-13.

15 Consani and Negri 1999, 22-23.

16 For example: it is renown how Duhoux has expressed his preference to the Raison and Pope's corpus, and Consani and Negri (as previously mentioned) were inspired by their disagreement with the methodologies of GORILA to publish their new corpus.

What is the basis common to the mentioned discrepancies? Where do the corpora differ from each other? How could such differences be avoided?

To answer similar questions it is important to examine the issues at the very core of the Linear A script, a small but determinant number of key problems that, far from being easily resolved, still require a clear methodological choice.

3. Key points for an internal analysis of Linear A

No investigation of Linear A is able to avoid certain questions related both to the script itself and to the scientific sources taken into consideration. An explicit declaration about these problems must be considered as fundamental, to clarify the methodological approach followed. The key problems of Linear A can be articulated as follows:¹⁷

1. What kind of relationship between Linear A and Linear B should be imagined, and which one does the corpus assume?
2. How can ideograms be safely identified in Linear A (if at all)? What is their role?
3. Is it possible to single out sequences of signs and, if so, on what criteria?
4. What is the role of fractional signs? How can they be identified and explained clearly?

Before detailing premises of the electronic corpus of Linear A, it is important to consider how the authors of previous corpora have handled these key questions: in fact, none of the extant corpora of Linear A documents have discussed explicitly the four points listed above. Nevertheless, these points should represent the methodological starting points for any investigation on the Minoan script. The choice, therefore, of one corpus instead of another implies the adherence to the ideas and methods there expressed.

3.1 The relationship between Linear A and Linear B: “homography: homophony”?

The question surrounding the relationship between Linear A and Linear B is perhaps the hardest problem to solve, as well as the one that has predominantly influenced the debate on Linear A and greatly affected the research. The homography of a certain number of signs¹⁸ in the two scripts has suggested their close relationship.

¹⁷ The order in which the key points are presented is not to be intended as hierarchical: their importance is equal.

¹⁸ There is no general agreement on the precise number of signs shared by Linear A and B. However, according to Godart and Olivier, “[...] si 75% des signes simples sont communs aux deux systèmes, en fait plus de 90% de la masse totale des signes simples du linéaire A ont leur équivalent graphique en linéaire B.” (1985. GORILA, vol. 5, XVII).

Since Linear A is the older of the two writings, it has been viewed as the *ancestor* of the more recent Linear B. Nevertheless, the degree of this kinship is uncertain. Since the decipherment of Linear B, investigation on Linear A has been based on the similarities between the two writings, utilizing a methodology reasoning *from the known to the unknown*. Such comparative analysis, however, has so far provided only general information concerning the Minoan script: the scarcity of documents and the shortness of the texts fail to offer adequate support for any kind of theory. Moreover, the information retrieved from the comparative approach concerns the more external features of Linear A script, leaving most of the structural problems of the script still unsolved.¹⁹

The apparent homography of the characters, therefore, may not prove anything and should not be blindly accepted before adequate analyses. Such an assumption is based on the lack of data to prove the contrary. Shifting back from Linear B to Linear A:

1. There is no consensus about the number of common signs;
2. The roles of ideograms, punctuation marks, and other syntactic features still remain obscure;
3. Most importantly, the structure of the sequences/words remains obscure.

Application of the Linear B phonetic values to Linear A characters is an assumption that cannot currently be adequately corroborated. In this regard, no attempt to use Linear B as the phonetic template for the other Minoan linear script has yet provided satisfactory results: not only is there no certainty whether Linear A can be read successfully with the Linear B values, but in the cases where Linear B values seemed to have shed some light on the reading, the results have hardly been understandable. In absence of any actual proof, therefore, the suggestions about the transferability of the Linear B values must remain speculative.

Since there is a lack of consensus on what kind of relationship ties the two writing systems together, and on what data from B can be securely applied to A, it may be best to abandon this approach and to start studying Linear A as a script by itself, independent from Linear B, and in need of an internal analysis. Setting aside the comparisons with Linear B would not mean neglecting the results (or hints of results) achieved to date, but rather viewing them as provisional and waiting to be counter-proved.

¹⁹ See, for example, not only the disagreement on the characters shared by both Linear A and B, but also the problem in attributing phonetic values to the characters, as well as to the sign groups (some toponyms and anthroponyms in Linear A seem to be read and understood easily through the Linear B values, thus providing some information about the characters involved. See Olivier 1975, and Schoep 2002).

3.2 The identification of the ideograms: how secure is it?

Ideograms belong to the class of signs whose *ductus* seems to portray the object meant: they express their meaning by *pictorializing* it.

The study of Linear B characters has revealed the existence of different kinds of signs with different functions, among which a number of ideograms.²⁰ Since some of the Mycenaean ideogrammatic signs show strong resemblances with a few Linear A characters, scholars have assumed the presence of ideograms in Linear A as well. Once again, however, the transfer “B > A” is not justified: in an undeciphered, and barely known writing system, how can the existence of ideograms be proven convincingly and how can they be identified with certainty? More importantly, how can their function be determined?

Other ancient scripts such as Egyptian for example (but also the early alphabetic systems)²¹ demonstrate that the function of ideograms can be double: they can express either a single phoneme, or an entire word or concept. In a script which is fully known, and whose dynamics have been clarified and studied, both the identification of ideograms, and the recognition of their function are not difficult. This is clearly not the case of the Linear A script.

Since no internal mechanism of the writing is known, nor even the actual function of the signs, when and how can ideograms be identified? On what basis it is possible to distinguish when a character is used for its phonetic value and when it is not, within the Linear A set of signs?

Given the difficulties of distinguish between syllabograms and ideograms, the question of the identification and division of the word-sequences becomes an almost insurmountable problem.

3.3 The division of sign groups as word/sequences

The division of autonomous sequences of signs in Linear A is questionable in the majority of the cases,²² particularly in the cases where not even Linear B is able to provide guidance. The mechanism of individuating a sequence in Linear A rests on the assumption discussed (and discouraged) above, i.e. that Linear A can be read with Linear B values. Again based on parallels with Linear B, when dealing with the Linear A administrative lists,²³ a specific structure of the text is expected to appear: a succession of signs followed by a numeral. Since the administrative lists seem to be mostly economic accounts, the succession of signs inscribed in them should represent names, either of traded/exchanged objects, or toponyms and anthroponyms

20 Ventris and Chadwick 1973, 48-53.

21 Naveh 1982, 175-186.

22 Some of the alleged sign-groups have been thoroughly studied, like the famous 98-22 (Raison and Pope's *numérotation*), often transliterated as *ku-ro*. Analyses of its position in the tablets and in contexts have provided interesting results, but are not final.

23 Administrative tablets constitute the largest part of the corpus in Linear A.

of those involved in the exchange. Although no firm reading has yet been suggested for Linear A,²⁴ these successions of signs are nevertheless perceived as words.

But can sequences of Linear A characters really be identified? What divisor sign enables a sequence to be isolated from the text?

In Linear B, the presence of word-dividers is ascertained, and includes a vertical stroke (which plays the role of a punctuation mark) and enclitic conjunctions.²⁵

In Linear A, the small dots often present in the texts, though in a much more discontinuous and uneven way than in Linear B, have been regarded as some sort of punctuation marks, able to separate different sequences.

In fact, there is no clarity concerning the actual role of the dot in Linear A, and in this regard the administrative tablets do not provide any substantial help with their essential syntax. Yet a small dot is in itself only a small dot. The specificity of the role of word-divider is rather arbitrarily assigned and may not be applicable.

Furthermore, dots or strokes are simple to draw: for this reason, they are not uncommonly found in different scripts, with completely different meanings. For example, the presence of a small stroke under an ideogram in Egyptian hieroglyphic writing had a functional value, since it indicated whether the sign was to be read using its phonetic or ideogrammatic value.²⁶ Every assumption about the actual function of the Linear A dot must be regarded as tentative, unless in presence of provable material.

The question concerning the *how to divide a sequence in Linear A* remains unsolved. In the absence of any other indication of word division, however, and having questioned the interpretation of the dot in that role, it appears evident that we are unable to single out a sequence, except for the numerals which constitute the only clearly identifiable class of signs.

The extant corpora have differed about whether they have acknowledged the division of sequences and through which method they have attempted to isolate them. This problem illustrates clearly the different views and methods of investigation of the various Linear A corpora: they can, in fact, present interestingly different representations even of the same document, in accordance with their diverse ideas of the script's internal mechanisms.

Tablet HT 89A provides a clear example. In the numeric transcription of the tablet, Jacques Raison and Maurice Pope - convinced that Linear A is "en général plus mal écrit, plus mal ponctué"²⁷ - not only divide the sequences with commas (Figure 1, line 1) whenever in the original a small dot is present, but they also indicate a double-spaced area of unknown origin (Figure 1, line 4), but clearly supplying a division between *words*.

24 The word *reading* is in any case questionably used when dealing with Linear A.

25 Ventris and Chadwick 1973, 47-48.

26 Gardiner 1950, 34.

27 Raison and Pope 1971, XVII.

.1	52-31-58 , 56b , 66	23
.2	558	22 95 - 100a-76 24
.3	125	13 74 - 53 5
.4	98 - 22	87
.5	71	2JE 60 2E 82a 1

Figure 1: The numeric transcription of the tablet HT 89 as published in the Raison and Pope corpus.

The drawing of the same HT 89 published in Carratelli's corpus is more detailed and differs from the interpretative transcription by Raison and Pope. Although the two dots in the first line of the document may (or may not) justify the commas noted in Raison and Pope (Figure 2, top of the tablet), nevertheless no double spaces are visible in correspondence of the fourth line. Consequently, Carratelli's drawing suggests a transcription such as 98-22 **87**, where the bold 87 stands for a numeral: no double spaces are indicated.

In fact, Raison and Pope admitted that in Linear A "les séparations de 'mots' n'y sont pas toujours marquées. Quand elles existent, elles consistent soit en petites barres verticales, soit en points, qui se confondent facilement avec le chiffre de l'unité ou de la dizaine et les accidents du support [...]"²⁸ There is thus no well-established evidence of dividers; even the strokes and the dots appear to be a frail certainty.

Evidently, except in presence of unquestionable evidence, dividing the sequences is in many ways an act of interpretation of non-apparent meanings. Moreover, as in the example above, some corpora divide sequences where there is no small dot: Raison and Pope frequently include the double spaces between signs, representing an interpretative way to analyze the text for which they provide no explanation.



Figure 2: The tablet HT 89 as drawn in the Carratelli's corpus.

²⁸ Raison and Pope 1971, XVII.

Returning to the same question, it is possible to articulate the problem more clearly: if it is not possible to infer the presence of an actual sequence in the absence of a clear word-divider, and if certain corpora proceed to the division of sequences without explaining the methodological basis, how can one corpus be favored over another as a basis for further research?

3.4 The fractional signs

Similar to the question of the identification of ideograms, the metrical signs perceived as fractional are also problematic. They certainly display a high level of complexity.²⁹ Very little is known about their function and their mechanism within the mathematical features of the script: it is even possible to doubt (at least hypothetically) whether they exclusively indicated numerical data (fractions) or also had other functions (ideograms?).

Nonetheless, due to the nature of the Linear A tablets, the special attention to complex mathematical characters is not surprising. In administrative accounting lists, if stenography might be a common writing practice for names, commodities, and places, without affecting the account, it is however essential that the mathematics be as precise as possible.

Suppositions even about this regard can only be speculative, however, without further data.

3.5 A short comment

These key points constitute the theoretical basis for the format of the electronic corpus of Linear A, and explain the choices made in its construction.

4. The Database

4.1 Project's background

The project to create an electronic corpus and database of Linear A was initiated in 2005 by a team composed of an Aegean archaeologist, an epigrapher and historian, and a computer programmer at the University of Palermo (Italy). This project has taken inspiration from the work conducted in the 1970's by David Packard,³⁰ whose innovative line of research unfortunately failed to raise the interest it indeed deserved. Packard proposed the use of computer technology to estimate the statistical plausibility of the transfer of Linear B phonetic values to Linear A. Although the results of his work do not directly concern this project, the method applied there illustrates the importance of avoiding *a priori* assumptions

29 For further information the articles by E.L. Bennett, and those by D.A. Was are to be recommended.

30 Packard 1974, but also 1968. His study aimed to combine the Linear B phonetic values and computer technology in order "to determine whether the evidence supporting the use of the Linear B phonetic values in Linear A has any statistical significance" (Packard 1974, 73).

about mechanisms or values when studying Linear A or any similarly unknown and problematic script.

4.2 Aims of the project

The goal of the project is chiefly to create an electronic database of the corpus of documents in Linear A, in order to provide an adequate tool of research for internal investigations of the script.

Each text is first typed in the computer into a database program, and then it is flanked by the picture of the document itself and its drawing.³¹ At the moment, the signs have been assigned to their numeric transcription as seen in the Raison and Pope corpus.

In accordance with the principles described above, nothing has been or will be assumed. Therefore, no normalized text is provided, nor is any phonetic transcription attempted. No differentiations between classes of signs are indicated, except numerals, which are temporarily codified according to the Roman system (I, II, III, etc), and fractional signs, which are recorded, again following Raison and Pope, through capital letters (J, D, etc).

To date, all the texts from Haghia Triada have been entered into the electronic database. The potentialities and possibilities of the database are currently being tested and improved, in the effort to determine the most useful combination of ancient texts and modern science.

4.3 Methodological parameters applied in the database

The choice of the *numérotation* system used by Raison and Pope is not intended to endorse their methodology and the aims. Several considerations influenced this decision to present the corpus through the *index transnuméré*. First, a purely numeric code has the advantage of providing the most aseptic possible classification, avoiding the over-exploited connections with Linear B characters.³²

Secondly, the numeric transcription of the texts allows the homogenization of the characters, because it imposes no distinction between alleged classes of signs: each is represented by a number. Obviously the *numérotation* provided by Raison and Pope was not casual, but rationally organized: a specific set of numbers was assigned to each class of signs, thus providing subtle markers to distinguish the supposed classes. These distinctions are disregarded in the electronic database which presents a numeric transcription of signs and numerals, with no inference about any other function of the characters or classification of them.

31 This initial phase of the redaction of the electronic corpus uses the pictures and drawings provided by GORILA and Carratelli respectively.

32 The catalogue provided by GORILA does not serve the purpose of this electronic database, since it provides an integrated catalogue of the characters thus showing the interrelations between Linear A and B signs (the AB system).

Finally, practical reasons supported the initial adoption of the Raison and Pope's *numérotation*: it supplied an extant, usable numeric transcription, the need for which had already been determined, in order to begin the statistical tests within the database. An independent solution may be substituted to distance the electronic database from that of Raison and Pope.³³

The position of the electronic database on other questions, namely the division of the sequences, the fractional signs, and the variants of the characters, can now be outlined.

1. Unlike Raison and Pope, no divisions between sequences will be indicated in the electronic database, except in cases of clear *natural stops*, such as the numerals.
2. The fractional signs have been left in the same form as they are represented in the Raison and Pope's corpus (i.e., in capital letters). Although some doubts about the functions of the fractional signs have already been raised among the project team, this solution has been provisionally adopted.
3. No specific position has yet been taken concerning the variants of the signs.³⁴

The project team reiterate that these choices do not imply an adherence to the methodological choices of the two scholars.

To sum up, therefore, two types of signs that have been purposely distinguished in the electronic database: the numerals and the rest.³⁵

4.4 Why the computer? Opportunities available with an electronic corpus of Linear A

“[...] l'étude se fait de façon entièrement mécanique, selon des règles explicites ne tolérant pas la moindre exception [...]”³⁶

A computer-based corpus will advance in the research on Linear A texts and writing structure because it will enable interactive *operation* within the texts and

³³ An entirely new numeric table of correspondence for the Linear A signs has been suggested: this, however, could create problems of nomenclature because of its similarities to a system already in use. The most practical solution might be the adoption of a numeric code that would be easy to “translate” into the currently accepted codifications.

³⁴ It seems premature to present a scheme of signs variants as if they had been identified clearly, since this will be a complicated matter inherently involving a level of interpretation. Once again, the statistical analysis of the occurrences and positions of signs may be helpful to determine which characters are meaningful variants.

³⁵ It is hoped that the statistical analysis (through the study of recurrences and sign-positions) of this skeletal distinction—the numerals and the rest—will enable a more rigorous delineation of the roles (and functions) of the signs. Ideally, in a subsequent stage of research, this would provide the opportunity to individuate and identify other types of signs, including ideograms, variants, etc.

³⁶ Duhoux 1979, 66.

investigation on the inner structure of the script. These advantages can be further articulated.

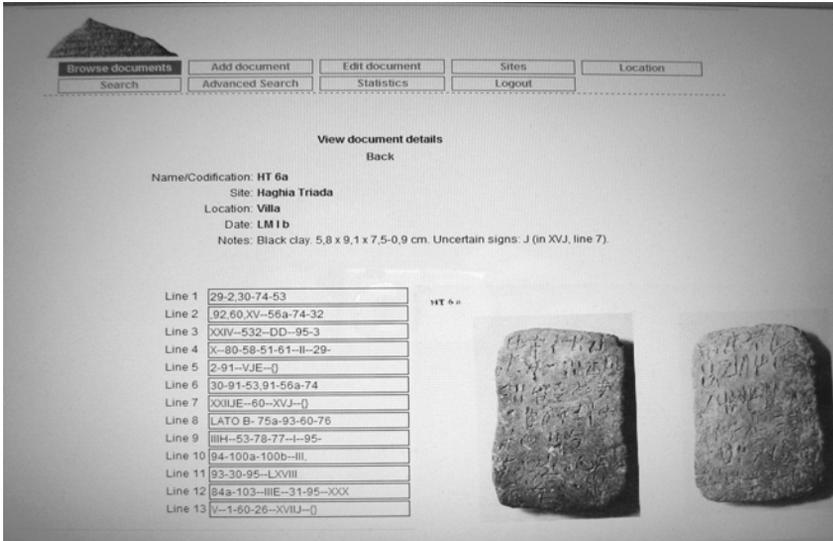


Figure 3: a typical document record in the electronic database: on the top section, the general information of the document; on the lower section of the page, the numerical transcription (left) and the photograph (right).³⁷

For several decades, attention in Linear A studies has been concentrated on the interpretation of the language behind the script.³⁸ Preliminary work for an internal analysis of the writing, however, have been provided by the important contributions of Yves Duhoux,³⁹ who has initiated a less speculative test on the general characteristics of the linguistic structures of Linear A. It is precisely to facilitate this line of research that the electronic database is intended as a tool for an internal analysis of the Minoan linear script.

The corpora published on paper, or the already existing online projects by John Younger for Linear A,⁴⁰ and by the PASP for the scripts of Cyprus,⁴¹ provide non-interactive visualizations of the documents. As a consequence, it is impossible, or at least rather difficult to operate with and within the documents.

37 Although the database temporarily offers pictures of the documents from GORILA, original photographs and scanner prototypes are planned for further stages of the project.

38 Oddo, E. 2004. The Enigma of Linear A: History of Studies. Unpublished thesis.

39 For example, *Le linéaire A: problèmes de déchiffrement* (1989), *Pre-Hellenic Language(s) of Crete* (1998), and most importantly *Une analyse linguistique du linéaire A* (1979).

40 <http://people.ku.edu/~jyounger/LinearA/>. (01.14.2008)

41 <http://paspserver.class.utexas.edu/cyprus/>. (01.14.2008)

An electronic corpus, on the contrary, enables more active forms of research by allowing individual research questions to be tested in an interactive way. For example the program can be directed to highlight the presence or absence of a certain sign within any sequence of any currently published Linear A document. With this tool, a large number of operations become possible and rapid: rapid verifications of the occurrence(s) of signs in specific contexts, purposely selected; study of the occurrences of signs in specific positions; mapping of the frequency of signs.⁴² Furthermore, the numeric visualization constitutes a fresher way to approach the characters, simplifying the research and reducing a priori assumptions.

The electronic database will provide virtually endless opportunities for innovative lines of research, certainly beyond the initial suggestions of Packard's contribution. With accurate statistical investigation, the database could be used to individuate those strings of signs that constitute the basic elements of the word, to which affixes were added. Duhoux's investigations into whether Linear A was an inflected or an agglutinating language, could be tested conveniently with this electronic corpus.

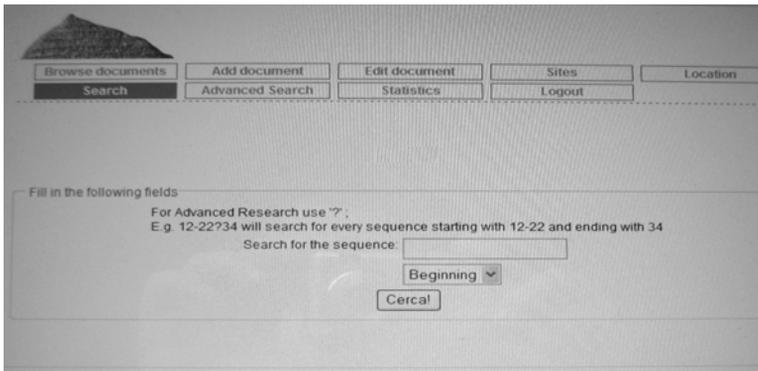


Figure 4: The type of research page on the database.

5. Conclusion

The electronic database is intended to be an innovative and valid scientific tool, able to grant a quick and practical consultation of the whole Minoan corpus, and to allow every sort of statistical research within it. Despite its minimalist approach, and its current status as a work-in-progress, the database offers an opportunity to conduct new interesting analyses on the internal structure of Linear A.

⁴² The analysis conducted by Yves Duhoux and reported in his article of 1979 constitutes a good example of this kind of research studying the possibility of delineating the morphology of Linear A.

Two prohibitions have been employed in the conception of the database:

- do not transcribe Linear A and
- do not take anything for granted.

Name/Codification	I	144
HT 1	∅	90
HT 2	II	52
HT 3	X	46
HT 4	III	39
HT 5	42	34
HT 8b	V	31
HT 11b	60	31
HT 13	IV	29
HT 13	VI	21
HT 14	∅∅	20
HT 15	XX	20
HT 16	82a	20
HT 23a	J	19
HT 26a	67	18
HT 30	98-22	18
HT 35	92	18
HT 41a	XXX	14
HT 48b	31-58	14
HT 50b	VIII	13
HT 85b	515	13
HT 88	XV	12
HT 93a	103-22	12
HT 96a	49	12
	516	11

Figure 5: Statistical data of signs occurrence as tested on the Haghia Triada documents. The first column left indicates the name of the document; the two right columns show the sign (or signs group) numeric reference (left) and the occurrence (right) in the rest of the corpus.⁴³

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⁴³ In an early phase of the tests conducted through the database, every sign in the Haghia Triada tablets was included with no distinction. Therefore in Figure 5 the statistical occurrence of lacunae (∅), numerals (following the Roman system), and fractional signs (capital letters) are also shown.

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Bibliography

- Bennet, E.L. 1980. Linear A fractional retraction. *Kadmos* 19: 12-23.
- Brice, W. C. 1961. *Inscriptions in the Minoan linear script of class A*. Oxford.
- Duhoux, Yves. 1989. Le linéaire A: problèmes de déchiffrement. In: Duhoux, Yves, Thomas G. Palaima and John Bennet, eds. *Problems in Decipherment*. Bibliothèque des cahiers de l'Institut de Linguistique de Louvain 49. Peeters, Louvain-La-Neuve, Belgium, pp. 59-119.
- Duhoux, Yves. 1998. Pre-Hellenic Language(s) of Crete. *Journal of Indo-European Studies* 26: 1-39.
- Consani, C. and M. Negri. 1999. *Testi minoici trascritti con interpretazione e glossario*. Incunabula Graeca 100, CNR - Istituto per gli Studi Micenei ed Egeo-Anatolici, Roma.
- Duhoux, Yves. 1979. Une analyse linguistique du linéaire A. *Bibliothèque des Cahiers de l'Institut linguistique de Louvain* 14: *Etudes Minoennes I*, pp. 65-129.
- Evans, A.J. 1909. *Scripta Minoa*. London.
- Evans, A.J. and L. Myres. 1952. *Scripta Minoa II*. London.
- Facchetti, G. M. 1999. Statistical Data and Morphematic Elements in Linear A. *Kadmos* 38: 1-11.
- Gardiner, A.H. 1950. *Egyptian grammar; being an introduction to the study of hieroglyphs*. Oxford.
- Godart, L. 1976. La scrittura lineare A. *Parola del Passato* 31 (166): 30-47.
- Godart, L. 1979. Le linéaire A et son environnement. *SMEA* 20: 27-42.
- Godart, L. 1984. Du linéaire A au linéaire B. In: *Aux origines de l'Hellénisme. La Crète et la Grèce. Hommage à Henri van Effenterre*. Paris, pp. 121-8.
- Godart, L., and Olivier, J. P. 1976-1985. *Recueil des Inscriptions en Linéaire A (GORILA)*. voll. 1-5, Paris.
- Karetsou, A., Godart, L., and Olivier, J. P. 1985. Inscriptions en linéaire A du sanctuaire de sommet minoen du mont Iouktas. *Kadmos* 24: 89-147.
- Naveh, J. 1982. *Early history of the alphabet : an introduction to West Semitic epigraphy and palaeography*. Leiden.

- Negri, M. 1996. Si può leggere la Lineare A? In: Consani, C. ed. *Κρήτη τις γαί'εστι* - Studi e Ricerche intorno ai testi minoici, Quaderni Linguistici e Filologici VIII, Il Calamo, pp. 29-37.
- Negri, M. 1996. A proposito di una recente opera sui testi e le scritture cretesi. In: Consani, C. ed. *Κρήτη τις γαί'εστι* - Studi e Ricerche intorno ai testi minoici, Quaderni Linguistici e Filologici VIII, Il Calamo, pp. 39-53.
- Olivier, J.P. 1975. 'Lire' le linéaire A? In: *Le monde grec. Hommages à Claire Préaux*, Brussel, pp. 441-449.
- Olivier, J.P. 1996. Les écritures crétoises : sept points à considerer. In: De Miro, L. Godart, A. Sacconi eds., *Atti e Memorie del II Congresso internazionale di Micenologia*, vol. I, Roma: 101-109.
- Packard, D.W. 1968. Contextual and statistical analysis of Linear A. In: *Atti e Memorie del I Congresso di Micenologia*. Roma, pp. 389-394.
- Packard, D.W. 1974. *Minoan Linear A*. Berkeley: University of California Press.
- Pope, M. 1964. *Aegean writing and Linear A*. Studies in Mediterranean Archaeology, Lund.
- Pugliese Carratelli, G. 1945. Le iscrizioni preelleniche di Haghia Triada in Creta e della Grecia peninsulare. *Monumenti Antichi* 40: 422-610.
- Raison, J. and M. Pope. 1980. *Corpus transnuméré du linéaire A*. Bibliothèque des Cahiers de l'Institut de Linguistique de Louvain 18. Cabay, Louvain-La-Neuve.
- Schoep, I. 2002. *The Administration of Neopalatial Crete. A Critical Assessment of the Linear A Tablets and their Role in the Administrative Process*. Salamanca: Ediciones Universidad de Salamanca, Suplementos a MINOS 17.
- Ventris, M. and J. Chadwick. 1973. *Documents in Mycenaean Greek*. Cambridge.
- Was, D.A. 1975. Numerical Fractions in the Minoan Linear Script A. V. Olive Oil and Related Commodities. *Kadmos* 13: 95-116.
- Was, D.A. 1973. Numerical Fractions in the Minoan Linear Script A. III. The Measurement of Liquids. *Kadmos* 12(1): 28-59.
- Was, D.A. 1973. Numerical Fractions in the Minoan Linear Script A. IV. The Measurement by Weight. *Kadmos* 12: 134-148.
- Was, D.A. 1972. Numerical Fractions in the Minoan Linear Script A. II. The Measurement of Dry Commodities and Their Use in the Payment of Minoan Labour. *Kadmos* 11(1): 1-21.
- Was, D.A. 1971. Numerical Fractions in the Minoan Linear Script A. *Kadmos* 10(1): 35-51.

Younger, J. *Linear A Texts in phonetic transcription*. <http://people.ku.edu/~jyounger/LinearA/> (01.14.2008).