

Reading Linear A before translating it



Abstract

The study deals with the graphic system by which Linear A is expressed. It discusses the main characteristics that distinguish it, with particular emphasis on the ideographic part.

It focuses on the signs and, after examining them, deals with the way they join together to form words. Through comparison with Linear B, it proposes the reading and the translation of a set of documents.

When faced with an indeciphered language, the first thing to do is to try to read it. For as much as Linear A has many symbols in common with Linear B, and as much as these symbols, which mainly concern goods, make it possible to guess the meaning of many records even before reading them, we must never confuse 'interpretation' with 'decipherment'. Only the latter, finding the grammatical links that distinguish words and bind them together, allows the identification of the language and the consistent translation of documents.

As regards Linear A, once one has made the right differences between ideograms, logograms and phonograms and once lists and words have been read correctly, the language emerges by itself allowing us to translate the texts, identifying the thread that binds to each other and getting a rational vision of the people who spoke it.

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The signs

The graphic system expressing Linear A is made up of five types of signs: pictograms, ideograms, logograms, phonograms and metrograms, to which ligatures and the dots, as the only diacritical tool, must be added.

The pictograms, “paint” the notion (e.g. the drawing of a man indicating the notion of man, the drawing of a vase indicating the notion of vase etc.). In the evolution of a writing system, pictograms represent primitive signs which still retain a highly figurative character. Only a few of them remain in Linear A (HOMO, VAS, PELLIS and some other), but they are actively used and may present variants, obtained either by the addition of other signs or dots or notches. The pictogram indicating man (HOMO), for example, appears twice on the same tablet (HT105), once in standard form (line 2) and again (line 3) modified with leg notches. Since the two symbols appear on the same tablet, written by the same scribe, there is no doubt that in the second case we are dealing with a variant with a different meaning.

The ideograms represent the graphic evolution of pictograms that, by assuming a stylised shape, continue to represent the notion in a symbolic and no longer figurative way. This is because the use of ancient pictograms is governed by an always respected law: the more they are used and the more they tend to stylise, losing the ancient pictographic form. In Linear A, ideograms are few, being limited to the notions of barley, wheat, oil, olive, wine, etc. They differ from logograms in that they are not used, except exceptionally¹, as syllabograms. They also have variants² and may appear in ligatures with other signs which, in the case of symbols such as barley and wheat, are often metrograms, i.e. measurement signs.

The logograms are phonetic signs that indicate a word in an abbreviated way by means of the sound of the initial syllable. They represent the first application of the acrophonic principle, a principle that played a key role in the phonetic evolution of the three major writing systems (Cuneiform, Egyptian and Aegean) which developed in the ancient Mediterranean area. This principle, which some say originated in Mesopotamia, others in Egypt, represented the first step towards phonetic writing, allowing scribes both to reduce the number of signs³ and to express grammatical notions more easily. Its application marked the transition from writings expressed by images to writings expressed by sounds. The signs were indeed associated with the phonetic value of the initial sound (of the syllable, in the case of syllabic writing), so that they could be used whenever they were needed to form a word. To give a practical example: the symbol indicating the woman took on the value of the initial sound w (wo in syllabic writings), so that it could be used both logographically to indicate the word woman, and phonetically whenever the sound w (wo) recurred in a word.

The application of this principle was a great achievement in the history of men. It started what was later defined “the victorious march of the alphabet”, but it generated, especially at the beginning, much confusion because it affected signs that were already in use, which came to acquire a double value, being used to indicate both a word and a sound, just as it happens in Linear A, and in Linear B itself, where the most part of the signs has both a phonetic and a logographic value. Those who will consult the indexes of GORILA 5 and the edition of DOCUMENTS by John Chadwick will be able to ascertain that it is not “a few signs” but it is the “majority of the

¹ See Pu-wo (HT14,2), where the ideogram that stands for wine applies to the sign ‘wo’. The term also occurs in Linear B and is translated *Púrrros* (from Purwos o Purswos), a man’s name .

² To remain within the symbol indicating VIN, (AB131), it has several variants , one of which, *82b (AB131b), has a different meaning (perhaps wine must).

³ It is a characteristic of ancient ideographic systems to present an increasing number of signs. Think, for example, of Chinese, which, being ideographic, requires thousands of signs to be expressed.

signs” that is used in the two writings with both logographic and phonetic value. They will also ascertain that in Linear B the logographic values that a sign takes on can be more than one. And this must not surprise because, being a logogram the abbreviation of a word by means of its initial syllable, in Linear B, as in Linear A and in all the other writings, words beginning with the same sound are certainly more than one. They will also be aware that even vowels are used as both logograms and phonograms, since, if it is true that the signs standing for U, and O are especially used on nodules and rondelles, the signs standing for E, I and A are largely attested as logograms in the accounting documents. The sign that stands for E (AB38) certainly indicates a substance of which, apart from the fact that the name had to begin with this vowel, we also know that it had to be quite voluminous because its quantities are always considerably higher than those of the commodities with which it appears recorded. The sign for the sound I (AB28), for its part, is largely attested as logogram. It recurs in ligatures of various types⁴. It also is one of the five transaction signs that I indicated more than thirty years ago in *Minos* 88⁵. The same is true for the sign which stands for A which occurs in ligatures and in front of various terms⁶.

The phonograms represent the phonetic backbone of the language. They are used to indicate proper nouns, common nouns, adjectives, verbs and morphological variations. In Linear A they have syllabic value but, as in Linear B, there is no shortage of double signs. One of these is the sign *mna*, which can be derived from the variation *u-mi-na-si* (HT28,1-2)/*u-mna-si* (HT15,1) and *]pi-mi-na-te* (APZa2,2)/*pi-mna-te* (116a,4) where the sign for *mna* is the symbol representing the moon, which, as is known, in Greek is *μήνη*⁷.

Like pictograms and logograms, phonograms also have variants and can be modified by means of the addition of dots and notches. In standardised editions of Linear A signs, these variants are ignored, but this is certainly wrong. Take, for example, the signs that, compared with Linear B, have the values of *we*, *ne*, *i*, which, modified with dots or notches, take the values of *si*, *ri* and *no* respectively. The variations of the sign *we* are the easiest to understand because the scribe is quite accurate in noticing them. To give some examples, it has no notches, and thus has the value of *we* in *da-we-da* (HT 10a,4; 85a,2; 93a,7; 122a,7), *a-we-su* (HT118, 3) and *we-ru-ma* (HT118,4) etc. On the other hand, it has notches and thus applies *ri* in *ma-ka-ri-te* (HT87,1-2 and 117a,1) and in *ka-ri- *63-i* (HT98a,4) etc. The sign for *i* is widely used logographically and is quite similar to the Linear B signs for *i* and *no*. However, comparing the contexts and the respective congruencies, it becomes clear that, used logographically, it "always"⁸ has the value of 'I' whereas, used phonetically, it can have both values, in which case only comparison with similar terms and the plausibility of the translation can help us to understand its value.

The same applies to the sign *ne*, which always retains this value when used logographically or in ligatures⁹ while, used phonetically, it may have either the value of *si* or the value of *ne*. It

⁴ See. HOMO+I (HT7a,1-2; HT11a,4; HT93a,5;etc.); *lpaGRA* (HT43,2; HT93a,3-4 e 5; HT120,4 e6, etc.), IFAR (HT34,5; HT37,1, etc.). It occurs on HTWa1022 ligatured with *66 (AB305) and on HT91,1 and 102,4 ligatured with KA.

⁵ See Enrica Patria "The Misunderstanding of Linear A", *Minos* 1988.

⁶ See ligatures ATI (HT94a,2; etc.), AVAS (HT39,5;etc.), AKA (HT38,2), A inscribed in VAS (MA10b,2) and the variations Aka-ru (HT2,1;etc.) / ka-ru ((HT97a,1), Apa-ra-jo (HT96a,1-2) /pa-ra-jo (HT155a,4), etc.

⁷ The variation i/e, ē is frequent in Linear A. See for instance: Ra-o-di-ki (PH2,1-2) = *Laodikē*; a-pa-ki (KNZb40) = *aparkhē*; te-ki (HT13,3, etc.) = *Thēkhē* (a proper name that on HT 85a,5 appears as te-ke); ta-ti (HT26a,2, etc.) / *Théstē*, Pa₃.ni(HT102,2) = *Phānēs*, ki-ri-tja (HT114a,1,etc.) / ki-re tja (HT85b,1-2,etc.), etc. Also the variation ia/e and ē is attested, cf. ja-du-ra (KN1b,1) *Ēdūlē*; ru-ja(KNWc26a) = *rōē*; a-ta IQI wa-ja (passim) / a-ta IQI wa-e (PKZa11a), etc. The variation i/u is probably the most common one, cf., for instance, pi-ta-ja (HT6a,2) = *phuteia*, ki-ri-tja = *kuritja*, si-ru = *sūlon*, tu-ma (HT94b,1) = *Tīmas*, su-pu (HT87a,4) = *sīpuis*, ti-ti-ku (HT35,1) = *thutikós*, a-ru-da-ra (HT28a,5) / *Aridēla*, etc.

⁸ At least up to now.

⁹ It appears in several ligatures, for instance, with the sign QI (ZA9,2,4,5) and the sign ME (HT23a,5, etc.) both indicating animals. In both these cases the sign retains the meaning it has in Linear B (*neós*, young). The same applies when it is ligatured with HOMO (HT72,1) and signs indicating men (cf. below), such as SE (HT42,1) and DI (KNZg21).

definitely has the value of *si* when is modified by a little stroke inside it (e.g. in the place-name *si-da*, which is followed by the transaction sign TE, on ARKH2,1 and in *a-si-da-to-i* ARKH2,2-3). But, unfortunately, the scribe, who knows its value, is not very precise and it is again the congruence of the context that can tell us the value it has. The study in identifying the value of these signs requires a careful work of comparison and observation, but fortunately there are other signs whose value can be established with relative ease. This is as regards the sign *37 (=A325) which occurs in the variation u-*37-*23 / u-de-*23, (*23=AB17) where, by recurring the variation in quite similar contexts, we can assume for *37 a value of *de*₂ or even of *do* since it is very similar to the sign having this value in Linear B. And the same is true for the sign *88 (AB301) to which we can give the value of *qi* on the basis of the variation sa-qe-ri (HT11b,4)/sa-*88-ri (ZA11b,1) and because it is similar to the same sign in Linear B. The sign *83 (A306) is very similar to the sign that in Linear B is worth *wo*. This sign, however, has a variant *79 (AB21^f). Since, from Linear B, both signs refer to the same notion of “sheep”, which in Greek is *οἶς*, I am led to believe that *79 is a variant of *83 having the value of *wo*₂ (perhaps *woi*). Among other signs whose value is unknown there is the sign *61 (AB24), which is erroneously read *ne*, while it is instead worth *jo*. This value can be deduced from the variation da-*61-ku(117a,8)/de-ju-ku (HT93a,6), which occurs in congruent positions being equivalent to the Greek name *Dēíochos*, and from all the other terms that, by giving it this value, acquire a sure meaning. Moreover, it is very frequent in final position¹⁰. Finally there are some signs that are quite similar and are easily confused. The sign *23 (AB17), for example, is easily confused with *62 (AB16)¹¹.

Standardising the signs of a language, before deciphering it, is a bad idea because it prevents one from seeing the variants, from understanding whether they represent signs with different values or are mere variations due to the preferences of the scribe. It also prevents one from seeing what modifications, if any, the scribe adopts to indicate the value of the signs. Among these modifications there are two of them that Linear A scholars seem to ignore entirely. The first concerns the size of the signs.

There is no doubt that the sign KA sometimes appears written smaller than the other signs and there is also no doubt that this happens when it has logographic value. This is evident on both sides of tablet HT 28 where, after the word A-si-ja =*Asía* (the name of a deity), KA is written smaller than the other signs. This also happens when it recurs together with the logogram ‘i’ (see IKA on HT91,1 and HT102,4). And it is also written smaller in front of du-ma-jo in HT29,6 where the scribe indicates to us that on the sixth line of this tablet a new list begins which is different from the previous ones and has the commodity KA as heading.

The same happens for KA.DI in ZA15b, on the first line, where not only KA is written smaller but is also divided from DI by a dot¹² and in ZA4a,8 where, as in the case of KA du-ma-jo, KA is written smaller than the other signs since the scribe is indicating to us that, in the eighth line of this tablet, a new list begins, which is different from the previous ones and has KA as commodity¹³. But the use of writing signs having a logographic value smaller than the other ones

¹⁰It recurs in the variation wo₂-tu-jo (HT7b,1; etc.) / wo₂-tjo (passim) and qe-tu-jo(HT12,3)/qa-tjo (passim). On the basis of which I have given the value of tjo (<twjio) to the sign *85 (AB118), because, in addition to qe-tu-jo, being a sign related to the transaction as Mycenaean qe-te-o, it also appears in other verbal adjectives such as pa-tjo(PA1,1; etc.), da-tjo (SYZg1) and e-tjo (ZA4a,7).

¹¹ See, for instance, GORILA, KH88,1 and CR(?)Zf1,11.

¹² The complete list is KA.DI VIN 3 where KA indicates a type of offering and DI indicates a type of men, with the result that the list means that the men DI must give (or have already given) three units of the KA offering of wine (for the logographic values of KA and DI see after).

¹³ KA DI occurs after a term that in my opinion is the verbal adjective e-tjon (the second sign is a variant of *85) which is followed by a high numeral that probably refers to the previous items (*etēon* verbal adj. from *īēmi*, one must send, see after).

concerns also other signs. To give just a few examples KI, in KIHOMO (KH7a,4), is written smaller than HOMO and also appears recorded in the first line of the same tablet in ligature with another sign that is no longer visible. The sign NI also appears written smaller on HT99b,1 where it is the commodity to which all record refers. And the sign QE appears written in a variant form and smaller than the other signs in HT9a,3 and 9b,4.

The second thing that scholars seem to forget are the points that, although the editions present many discrepancies, are not even considered when they are so obvious that an effort must be made to ignore them. Indeed points, besides inside the signs, appear at times next to them. In HT 17, for example, a dot appears after the first sign *ra* (and the same seems to happen in the first line of HT19). Another dot appears in HT26b after the ligature MU+KI in third line before the figure. In HT 129 there is a dot in second line before *tu* and another in the first line before *re*. On KH51 there is a dot in the first line in front of *ne*. On HT93a, in the second line, there is dot on the left of *we*. On HT 69,2 *ma-di* has a point between *ma* and *di* and , in the same way, *a-du* has a point between *a* and *du* in the first line of HT133. These are only few examples of the very many punctuation marks that are on the tablets receiving no consideration by scholars¹⁴. I understand that such meticulous annotations may seem excessive but I have had Chadwick as my teacher and he taught me that in the study of an indeciphered language two things are absolutely necessary: the first, to know the signs so as to be able to reproduce them as the scribe did and the second, the annotation of all the smallest details.

The metrograms, which are indicated by the abbreviation Lm plus the repertory number, indicate fractional quantities. They are often added to the symbols of the main commodities to change their quantity. The Minoan system of measurement involves the use of the maximum unit, which is modified by joining or inserting into the symbols the metrograms indicating fractions of the highest unit. Writings like the following one are common in Linear A: *Lm20GRA 62+Lm9+Lm20* (HT120 2-3). It means that of the Lm 20 fraction of the major unit, one must give 62 units + two other fractions indicated by Lm 9 and Lm 20 respectively. Neither more nor less as if we were to say " I got half a liter of wine, I'll give you a quarter, then another fifth and then another tenth. The use of the major unit, which probably is equivalent to 96 litres, refers to very high quantities and the symbols of the most commonly used commodities, such as wheat and barley (but also oil and the commodity denoted as *67 (A304)¹⁵, are often modified with fractions to reduce their quantities. On the value of fractions, however, it is very difficult to say a definitive word at least for two reasons: because their value can only be ascertained by correctly reading the lists in which they appear and because the scribe, who sometimes mistakes simple sums of whole numbers, is even more imprecise when it comes to fractions that he sometimes even forgets to record¹⁶. Two things are however certain 1) all fractions have 1 numerator¹⁷ and 2) that the scribe records them starting from the most high to the lowest one.

To the signs that form Linear A graphic system, we must then add the ligatures, which are the union of two (rarely three) signs. They can be defined "ideographic relicts" since, representing shorthand abbreviations, they are not words as we understand them and, consequently, cannot be read. This is especially true if they are formed by pictograms or ideograms. Indeed, depending on how they are made up of, they have different forms and meanings. Some of them retain a high degree of ideography. Ligatures such as VAS + a measurement sign (A659) or VAS + a logogram

¹⁴ On this topic you can compare the editions among them.

¹⁵ Probably *zéa*, a type of grain or also *zéřna*, ciperus.

¹⁶ This is the case of the tablet HT 12 that registers a debt. The final word is *da-no* which is equivalent to the Greek word *dános*, debt. The scribe correctly sums all the units that are in total 50, but he forgets to record the fraction Lm18.

¹⁷ Indeed also $\frac{3}{4}$ is indicated as $\frac{1}{2} + \frac{1}{4}$.

(A651, A660, etc.) have a high figurative input as it is not even conceivable the scribe would read them as acronyms. He certainly, by recording them in abbreviated form, recognized their meaning by looking at how they were written. There are various types of ligatures since they involve all five fundamental signs by which the Linear A graphic system is made up of¹⁸. Some of them are easily recognisable being written in a kind of tangle (monogram) with the signs recorded one on top of the other (those involving oil are almost all written in this way), but there are also ligatures written in both ways, i.e. in both a tangle and a plane writing. This is the case of the ligature *aOLE* which in PH2,1 is written in plane writing¹⁹. RUJA can also be written in both ways. It is a ligature formed by two signs that are both attested in both logographic and phonetic usage. In HT 7a,2 it is written in plane form²⁰ and in HT6a,3 it is written as a monogram. But IQI can also be written in both ways. This is the group that recurs in a-ta-IQI-wa-ja, which is the initial word of the formula with which votive dedications are opened. There is no doubt that this group must be divided into three words not only because i-QI appears more than once used alone, moreover written in ligature in KN2,2 and HTWa1022, but also because the final group wa-ja (which alternates with wa-e in PKZa11a) is replaced by de-ka in ZAZb3,2. Another ligature is undoubtedly the already mentioned KI HOMO (KH7a,4), where KI is written smaller than HOMO and also appears recorded in the first line of the same tablet ligatured with another sign that is no longer visible. Other examples of ligatures written in a plane form are MIQI (KHwC2004 etc.) and QIMI (KH74), NEKA (HTWa1014 etc.) and KANE (HTWa1027) which the scribe writes with the signs reversed. And there is also the ligature IKA where KA is written smaller and higher than I. Both I and KA are widely used as logograms. The sign I also recurs in other ligatures with HOMO, FAR and GRA (see note 4).²¹

By presenting Linear A strong ideographic component such as pictograms and ligatures, which are linked to the figurative and symbolic part of the writing, I have chosen to stick to the old definition of ideo-phonetic writing rather than the logo-syllabic one. Linear A is an evolving writing where pictographic, logographic, ideographic and syllabic elements coexist; a writing that still presents many figurative aspects in which the evolution towards phonetics has taken place but is not yet perfected.

However it needs to be emphasized that to the five basic types of signs and to the ligatures, one must add the dots, which are of the highest importance since they are the only diacritical tool the scribe uses. It is not easy to recognise them since they can be confused with cracks of clay, but, nevertheless, great care must be taken to them because they are of fundamental importance. The Linear A scribe uses them to modify the signs²². He also uses them to divide one list from another, as happens, for example, at the end of the first line of HT10a. Then he uses them to indicate the tens, as it happens in several tablets such as, for instance, HT120 and HT102.

For the dots shown faithfully, for the respect of the size of the signs and for the indication of spaces between the signs I follow the Raison-Pope edition (with its numeration) which I naturally supplement with the other editions including GORILA. Here, indeed, since this latter edition is the most followed by Linear A scholars, I have added to Raison Pope's numeration the GORILA one.

¹⁸ See The Ideophonetic System of Linear A at the site patriapugliese.com.

¹⁹ It is easily recognisable both because the sign that stands for OLE is an ideogram that is not used as a phonogram and because the tablet contains two lists of oil and *aOLE* of the first line correlates with OLE of the fourth.

²⁰ It is preceded by another logographic compound (HOMO+I) which occurs also elsewhere (See note 4).

²¹ IGRA is the notion that appears at the end of the tablet HT120 where, on line 6, it is not written pa-i-to but, for analogy with the preceding lists, there is written PA followed by IGRA, which is a frequent notion (See note 4). PA is a logogram indicating men both because this emerges by the comparison with the other contexts in which it appears and because it occurs ligatured with HOMO on TY2,3.

²² He uses them instead of small notches. Besides than *we*, *ne* and *i*, other signs also have dots that modify them. This is the case, for instance, of *188 which would appear to be the sign RO with a dot inscribed in the vertical line at the bottom, but which is in all probability a different sign.

For an easier reading, I must also add that the logograms are written in capital letters and that the translated terms are written in italics. All the terms translated in italics are present in ancient Greek vocabularies. You can easily find them even if I, for the sake of clarity, transcribe them in Latin characters.

The lists

But to read a language, it is not enough to know the signs which it is made up of, one must also understand how they join together to form the words. In this regard an answer can only come from accounting documents. Anyone wishing to make a systematic study on Linear A must begin with the economic lists for at least three reasons: a) because, being economic accounts, they record repetitive actions respecting compilation patterns that are homogeneously applied by all the scribes b) because they refer to commodities whose meaning we often know from Linear B c) because they contain repetitive terms that make them comparable with each other²³.

But the first comparison is obviously with Linear B and the first impression one gets is an impression of divergence. The signs of Linear B are far more standardised than those of Linear A, which have many variants. The lists themselves are compiled differently because the Linear B scribe uses a horizontal stroke to divide the tablet into lines, what is completely unknown, except very rarely, to his Linear A colleague. The lists recorded on the Linear B tablets are easier to identify than those of Linear A since they are arranged on different lines and, in cases of tablets containing several lists having a common heading, the scribes of Linear B highlight this heading or, if they consider it appropriate, repeat it in front of every list.

Not so the scribe of Linear A who, having no lines to respect, immediately begins filling in the tablet by starting from the top left, placing the lists one after the other and subdividing them sometimes by means of a space but never repeating the heading and common terms even in the case of a tablet containing several lists. An example may be clarifying. Take for example a tablet such as HT6a which contains two lists. The first list occupies lines 1-5 and the second lines 6-7. The first begins with the word *da-ta-ra*, has the transaction sign TE and concerns figs and several quantities of other commodities (*pi-ta-ja*, RUJA, *ma-dja*, *o-rja-di-jo* and *ka-pa-qe*. The second list begins with the word *da-qe-ra* and concerns only two substances *qe-pi-ta* and figs. Both the lists share in the heading the common word: *ka-pa*. The Linear A scribe does not repeat this word before the second list, nor does he emphasise it in any particular way. He records the lists one after the other, leaving a space between them. The Linear B scribe, on the other hand, having the lines to adhere to, has two chances: either repeat the word *ka-pa* also in front of the second list or stick to a tried-and-tested pattern that is quite common among Linear B recordings, by writing the entire tablet as follows:

Ka-pa . *da-ta-ra* .TE. NI 15, *pi-ta-ja* 24, RU+JA Lm23², *ma-dja* 10, *04-*58-di-jo 12, *ka-pa-qe* 5+Lm8
da-qe-ra . *qe-pi-ta* 22+Lm8, NI 15+ Lm9

thus making it clear that the word *ka-pa* refers to both lists.

But between Linear A and Linear B there are also convergent aspects. The first are represented by the signs indicating commodities, which are more or less the same in the two

²³ Beginning with the economic accounts does not mean neglecting the inscriptions but it does mean going in search of common terms that facilitate the understanding of the inscriptions, which, are fewer in number and do not offer the possibility of comparison as the accounting lists do.

writings. They are the ones that allow us to “interpret” the lists, to guess their meaning, although in an approximate way, even before having read them.

The second convergent aspect is even more important. It consists in the fact that the economic recordings consist in both systems of two parts: the heading and the items. The heading explains the motivation, the reason of the record itself, while the items represent the things listed, each of which is followed by its respective quantities. The heading is important because it contains different information by referring to the ‘where’, the ‘when’, the ‘who’ and the ‘how’ but the items are equally important because they represent the ‘what’ and, above all, the figures which are the ones that, as Chadwick has always pointed out, were the things that most interested the scribe.

Since records are divided into heading and items, Linear A terms can recur in either position. Cryptographically speaking we are faced with a binary system that offers only two possibilities of position: either the heading or the items. Everyone knows the immense possibilities of a binary system. It, in this case, allows us:

- 1) to identify the lists;
- 2) to compare them with each other;
- 3) to identify the role of the terms constituting the lists;
- 4) to give us the proof that our identification are correct.

1) Identifying the lists.

In The Ideophonetic System of Linear A, I described the structural models of lists, by applying the cryptographic method Chadwick taught me. Only in one thing did I deviate from his suggestions. I did not adopt the terminology a, b, c, which he used but I preferred to use the terminology x, y, k to describe the list patterns with five structural formulae. However, I made it clear that only two of them are the fundamental ones since the others are mere expansions of them, due to the fact that the scribe, facing more complex transactions, uses more terms to explain them. Indeed, giving the value of y to the terms indicating commodities²⁴, the value of x to the terms that have to do with them, the value of z to the eventual transaction signs and the value of k to the figures, we can ascertain the absolute homogeneity of the compilation patterns of the Minoan recordings. They contain, in fact, lists in which or in the heading there is a y commodity (possibly explained by the addition of another term), that, with the possible presence of a transaction sign, is followed by a different number of x terms, each followed by the respective k quantity. Or, conversely, in the heading there is an x term (sometimes more) which (with the possible presence of a transaction sign) is followed by a different number of y commodities, each followed by its k quantity. All the lists recorded on Linear A tablets respect these basic patterns, with the exception of two tablets that do not contain figures ((PH6 and MA1) and therefore do not contain lists.

Tablets containing a single list are few. HT21 is an example. It contains a list that consists of a term x followed by the transaction sign TE and by various y commodities. HT 9a, 13 and HT19 contain a single list of commodities and in HT 9a and 13 the total is also indicated. HT35 contains a list of commodities preceded by the transaction sign *41 (A326). HT 85 contains a single list referring to HOMO with indicated total. Most tablets contain two or more lists. HT 14, for example, contains two lists formed in the same way: two terms x are followed by various y commodities, the only difference being that the first list contains the transaction sign TE, which we do not know whether it also refers to the second list. Two list are on HT10a. Ku-ni-su is the

²⁴The meaning of which we know for the most part from Linear B.

heading of the first list. It is followed by two items (sa-ma and u-do-*23)²⁵. The logogram PA²⁶, which is divided by a point from the term that follows it, is the heading of the second list which has six items. Two lists are also on HT12, which ends with an x-term (da-no), which is followed by a high figure representing the total of all the figures contained on the tablet (50)²⁷. Other tablets containing two lists are: HT2, HT18, HT91, HT121, HT129 etc.

The length of the lists is of course crucial for the number of them recorded on a tablet. A long list may be arranged on both sides of a tablet (ZA5, ZA10, HT116 etc.) or may also continue on several tablets. There are tablets beginning with a term directly followed by a figure. They, being without heading, are clearly continuations of other tablets, perhaps lost, on which the heading was recorded. HT30, HT119, HT8a²⁸ HT8b²⁹ all contain lists that are continuations of other lists. The same applies to HT108, which, starting from the second line, after the horizontal line, contains a list which, beginning with the x term di-na-ro directly followed by a figure, is certainly the continuation of some other list. HT1 also belongs to this group because ki-ro cannot be considered a heading. The term indeed indicates a deficit which, by its very nature, can only refer to a specific term, usually the one preceding it. This is demonstrated by all the other lists where deficit is always specified to whom or what is referring, particularly by HT123a, where it refers to only one commodity, *90 (A308), and is accurately recorded by the scribe.

However, in the same way that the scribe may use several tablets to record particularly long lists, he may also place several lists on the same tablet, if they are short. It is wrong to think that Linear A tablets are "poor in content". They are, on the contrary, very, very dense. A fragment such as HT41a in two lines (3 and 4) contains no less than three lists. The first two are composed in the same way, i.e. a logogram indicating men (A305 and RE respectively) is followed by ten units of the commodity *67 (A304). The third list, in the fourth line, is formed by a term x (mi-da) followed by the logogram NI indicating figs which is followed in turn by another term x (pa-ja) with the corresponding figure³⁰.

We also have three lists on HT 32. The first is formed by the x term sara₂ (= *salía*, reserve, stock) which is preceded by the transaction sign *56 (AB39) and is followed by five commodities, each of which has its own quantity. The other two lists, contained on lines 3 and 4 respectively, are quite similar since they are both made up of one y commodity (SU and joOLE respectively) each followed by DI and RE, two terms indicating men, which are in turn followed by their respective quantities³¹. HT132 also contains three lists in two lines. The first two are quite similar as they contain an x term followed by a commodity with its figure. The first x term is a

²⁵ See the normalized copy of GORILA, since the tabular one changes the position of the terms.

²⁶ PA occurs also elsewhere (HT8a,2; 85b,2; ZA10a,2; etc.). On the basis of their occurrences both PA and ku-ni-su refer to men.

²⁷ The tablet refers to two types of debt (cf. The Ideophonetic System of Linear A). The final term is da-no = *dános*, which in Greek means debt. The whole number following *dános* represents the total of the two debts but the scribe forgot to record the fraction Lm18. (I have here given the value of *no* to the sign AB28, but also the value of *i* does not change the sense of the tablet since *daís* from *daíomai* means division, distribution, a term that can be adapted to its content).

²⁸ The first term of this tablet must be divided into je-di (a term indicating men) and kiOLE followed by the figure 10. After this figure a new record begins. It has the commodity PA₃ as heading, which is followed by a punctuation mark and by a list of terms indicating men, the first of which is the proper name ka-ra-ti = *Krāthis*. The same commodity recurs also on side b and in other records (see for instance HT103).

²⁹ This tablet presents on the third line a figure that refers to a term recorded on a previous lost tablet. Then a list follows referring to the commodity PA₃.

³⁰ The translation of this list is as follows: Mr *Midas* must give (or has already given) 2 units + Lm23² units of figs to *Baía*, a woman's name or, also, an epithet of the great goddess, meaning nurse, she who feeds.

³¹ The quantities of RE are considerably higher than those of DI.

man's name A-se ("Arsēs)³² which is followed by five units of the commodity A319. The second x term is Qa-re-to (*Kalétwr*)³³ followed by 27 units of WO, the logogram which stands for sheep. The third list has PA₃ (a type of grain) as y commodity. It is followed by a logogram indicating men (A305) which is in turn followed by a figure and probably by other terms, or perhaps other lists, that have been lost because the tablet is mutilated.

This is just to give you an idea of the density of the Minoan economic documents. They should be examined individually and one should never confuse tablets and lists, since the same tablet may contain many short lists (HT93a contains, for example, at least 10 of them) or the same tablet may contain only the continuation of a list that, being very long, was arranged by the scribe on several tablets.

2) Comparing the lists with each other and with Linear B.

Once the compilation patterns have been identified, it is possible to compare the lists among themselves and with Linear B. Four tablets HT27a, 89, 94a and 100 are all compiled in the same way since a heading, made up of a term x, is followed by two lists, the first of which contains the pictogram HOMO among the items. This list has the total and is followed by a second list that refers to various commodities such as barley, figs, wine, etc.³⁴

The contents of these tablets are very indicative because, presenting the first list the total and containing the pictogram HOMO, it helps us to identify the meaning of the other terms which, being in congruent position and being totalled with HOMO, must refer to the same notion.

However, it is the comparison with Linear B that bears most fruit since, once one has understood the way the scribe compiles his records, it is possible to rewrite them according to the Mycenaean way, i.e. by adopting the division into lines. In this way, not only do the lists become clearer but so do also the terms and the roles they play within them. An example is HT 102, which is a particularly difficult tablet because the scribe writes the tens as if they were dots. By adopting the division into lines it becomes:

Ka-pa	sara ₂	GRA976	
Ka-pa	pa ₃ -ni	paGRA	33[
Ka-pa	[I]HOMO	paGRA	33
Ka-pa	di-we-na	· ma-dja	3
Ka-pa	di-we-na	WI	10
Ka-pa	di-we-na	IKA	5
Ku-ro 106			

From which we can deduce: (a) that the dot after di-we-na is not a ten but a punctuation mark dividing di-we-na from the next term which is ma-dja (=mā-za) indicating, in Linear A as in Linear B, a type of flatbread³⁵; b) that the figure which follows the second item is complete

³² Also royal (A) SE, see after.

³³ Also *Kharitō* and *Kharítwn*.

³⁴ HT94a contains several lists of commodities and HT100 lacks the initial part. All four tablets certainly record distributions since among the terms of the first list there is also the pictogram indicating men with weapons (HOMO + HASTA), that is warriors.

³⁵ It also appears in ZA10b,2, where it is recorded with other types of flatbreads.

because the total is right and because what remains before HOMO fits well with the logogram I³⁶, c) that the tablet contains six lists, the last three of which are associated with the same name (di-we-na).

3) Identifying the role of the terms.

Once we have identified the way the records are compiled, we can focus on the elements that compose them and especially on the position they have within the lists.

This position, since the system provides only two options (heading or items), will itself be binary, i.e. a term may be placed or in the heading or among the items. Let us return, for example, to the already mentioned tablets HT27a, 89, 94a and 100. In the first list they record terms that are totalled together. Since among these terms the pictogram HOMO occurs, we can deduce, with reasonable certainty, that the other terms which recur in the same position also refer to the notion of man. Two very used logograms (RE and A305) recur among them. So, extending the reasoning to terms that recur in other tablets where RE and A305 are present, by comparing the respective contexts and respecting the congruity of the position, we can identify other terms that refer to the same notion of man. This is the case with the logograms TA, DI, PA, SE, RE, *35, KI, KU, DI, *87, *35+*87, MI, which *definitely* indicate³⁷ men.

The same reasoning applies to terms that occur in a similar position to the terms indicating commodities. In this case, indeed, it is not even necessary that the list has the total because we already have the endorsement which comes from Linear B where the same terms recur and their meaning is known. On these bases we can be certain that the logograms KA, SU, PA₃, PU, *81b, *90 indicate contents.

Then there are some terms that always appear in the heading, sometimes between two dots, which, basing on the comparison of their occurrences, turn out to be recurrent terms referring to the transaction. In this way, I indicated, about forty years ago, the five transaction signs I, TE, *41 (A326), *56 (AB39), *56b (A638), and in the same way it is evident that, besides ku-ro and ki-ro, also sara₂, ka-pa, a-du, ka-ru /a-ka-ru are terms pertaining the transaction. To these terms we must add the logogram TI and the verbal adjectives: qa-tjo (*thetéon*, passim), wo₂-tjo (*oísteon*, passim), pa-tjo (*spartéon*, HT43,1-2 etc.),]da-tjo (*datéon*, from *datéomai* SYZg1, etc.) and very probably e-tjo (*etéon*, ZA4a,7), which all indicate duty³⁸.

However, position is not enough to identify the role and the presumable meaning of the terms in the lists. Another parameter is needed: the context in which they recur. Indeed, one can infer from their position whether they are y-terms (indicating goods) or x-terms (terms having to do with goods), but it is on the basis of the comparison of the respective contexts that one can guess their role, which must naturally be congruent with the role of the other terms with which they occur in equivalent position. This is the only way we have to correctly identify the meaning of words and logograms. But unfortunately, these criteria have so far not been applied with the result that Linear A has been read as if it was Linear B. Consequently it has become illegible, non-existent words have been created and even commonly used logograms such as NI, TI, KA and RE have been confused and read as phonograms.

Take for example the logogram NI. It has long been established³⁹ that it is the logogram, i.e. the acrophonic abbreviation of the Cretan word for a type of wild fig (*nikúleon*). This logogram is

³⁶ The notion of HOMO+I and I+HOMO also recurs elsewhere (see note 4).

³⁷ It is clear that, being logograms, according to what happens in Linear B, they could refer to other notions other than that of HOMO. But this must be demonstrated and, at present, cannot be found for the previous signs.

³⁸ To them one must add qe-tu-jo (HT12,3) and wo₂-tu.io(HT7b,1; etc.)

³⁹ Neumann '62.

continually confused and read as phonogram. It is confused, to give a few examples, in the already mentioned HT41a, where the list on the fourth line must be read⁴⁰ *mida FIC pa-ja 2+Lm23*². It is also confused in HT93a where in lines 2-3 it is written *ki-di FIC* and not *ki-di-ni*, which is an inexistent word as it is shown by two things 1) *ki-di* also occurs on ZA14,1, preceded by the logogram ME (logogram of *mēlon*) which represents the term to which list refers; 2) HT93a contains many short lists concerning wheat but also figs (whose logogram occurs also in line 7). NI is also confused in the first line of ARKH5. *A-du-ni-ta-na* is a word that does not exist. It must be read *a-du FIC ta-na* since they exist *a-du*, which is very frequent term indicating a type of tax, FIC (figs) and *ta-na* which is a word indicating a class of men and recurs several times in the tablets including ZA10a,1 where it is followed by the transaction sign TE⁴¹.

NI is also confused on HT96a,1 where the transaction sign *41 (A326) is followed by the word *ti-ti-ku* (which also recurs in ZAZb3) followed by the logogram FIC. In this tablet where the scribe indicates the tens by means of dots, there are three lists, the first concerns figs, the second wheat and the third refers to the commodity *09 (A323). NI=Fic, just to give one last example(but there are still others to be made), is also confused in *ka-na-ni-ti* (KHWc2005) which must be read *ka-na*, which is the word recurring in the first line of HT23a (where it represents the heading), FIC and TI which is a widely used logogram with the meaning of “payment”.

When speaking about TI, it too often is read as a phonogram whereas it is a logogram. TI is in fact a sign that can have both logographic and phonetic value. When it has logographic value, it is always placed *after* the word to which it refers. The value that can be attributed to it is “payment” or something very similar. This emerges mainly from two tablets KN 1 and MA1. KN 1 contains on both sides a list referring to substance E. Side a of this tablet (*Ja-ku, TI, E 240*) has the following translation: Mr. *Alkōn* (Ja-ku) paid (TI) 240 units of the substance E. Side b (*Ja-du-ra, TI, E 105*) records that Mrs. *Ēdulē* (Jadura) paid (TI) 105 units of the same substance (E). Thus, by giving to TI a logographic value, not only does the list gain meaning but the reading is also confirmed by the fact that *Ja-ku* and perhaps, *[Ja]-du-ra* recur in other tablets (MA2b 2 and MA 2a,1 respectively). The tablet MA1 is even more conclusive. It has no figures and bears on side a the following record: X IDu-wi . KA₂. *qe-de-mi-nu*, which must be translated as follows: it has been certified (X)⁴² that the offering (KA₂, a variant of KA) for the sacred (I) *Dús*, an epithet of the Great Mother, (Du-wi dative of the theme in ωF) was successfully obtained (*kerdēménos*, p.pr.m from *kerdaínō*)⁴³. On side b it is written: AMA . KA₂. *qe-de-mi-nu*, which can be translated: for the royal (A) mother, (MA is the logogram of *máter*, epithet of the Great Goddess, see HT117a,1), the same offering (KA₂) was successfully obtained(*kerdēménos*).

On the c side of the tablet, as to confirm that it records a payment, the sign TI recurs.

But TI, with the meaning of paid, is also present in other lists. On HT117 (lines 7-9), in a list of contributors where it indicates that two of them *Kursános* (Ko-sa-no, line 7) and *Dēiochos* (Da-jo-ku, line 8) have already paid their dues⁴⁴. And it returns three more times in HT104 in lines 3-4 regarding three successive payments.

Another sign that, since it can have both logographic and phonetic value, is easily misunderstood is KA. It has many variants and has also the following characteristic: when it has logographic value,

⁴⁰ See note 30.

⁴¹ ARKH5 is a very damaged tablet. ADU FIC TANA 41[is the first list on it and refers to figs. It is followed by another list referring to wheat. On ZA10a *a-ta-na* in second line is correlated to *ta-na* in the first line. They both are followed by the transaction sign TE, which in second line seems to be ligatured with TI, by indicating in this way a payment already made.

⁴² This sign also appears in Linear B with the value of “it has been certified that ...”.

⁴³ For the use of I and A as logograms meaning respectively “sacred” and “royal”, see after.

⁴⁴ The list refers to *sa-ta*. Cf. Hsch *sáton · sitikón métron*.

the scribe often writes it smaller than the other signs

Cryptographic analysis gives it the meaning of offering or, rather, basket for offerings. It is the logogram of ka-na which on HT 23a appears written in full, followed by a list of commodities. It also appears in the ligature HOMO+KA which means “bearers of offering baskets” and is equivalent to the Greek kanēphóros, a term that also recurs on HT115a,5 in the abbreviated form KA po-ru = KA phoroi i.e. kanēphóroi. It returns also in IKA which is a ligature made up of the logogram I plus the logogram KA, which recurs in two tablets, HT 91 and HT102.

HT91 is damaged at the end and contains two lists. IKA appears at the beginning of the first list which occupies lines 1-4. It is followed by the transaction sign *41 (A326) which elsewhere (HT35) is associated with the word ti-ti-ku, *thutikón*, which in Greek is an adjective meaning sacrificial, concerning sacrifice. The meaning of the list is thus clear, indicating a sacred (I) offering (KA)⁴⁵ for some religious ceremony (transaction sign A326). The ligature IKA indicates a basket for sacred offerings, hence sacred offerings. It is followed in HT23a by a list of various substances including wheat, olives, figs, three types of perfumed oils and, with the highest quantities, the substance E.

The second is an already mentioned tablet: HT102. It too contains two lists and IKA is the last word in the second list which begins in the third line with the word di-we-na. Unfortunately, the reading of this word is not certain because the central sign (*we*) is damaged and the other time it recurs (HT93a,1-2), although not damaged, it seems to have a dot on the left. The rounded form, however, suggests the value of *we* rather than *ri*. Since -na is a suffix indicating belonging to and the term di-we also occurs in Linear B with the meaning of Zeus, the list could mean that the three commodities that follow it are reserved for this deity. They are: 1) mǎ-za (ma-dja), a barley flatbread, 2) WI, indicating a product that once (HT25b,2) is associated with the word *théros* (te-ro), which in Greek means harvest, ripe grain, and 3) IKA, i. e. sacred offerings. The first word on the tablet, the one constituting the heading and referring to both lists, is ka-pa, (*karpē*, from karpóō= to collect) and the first word of the first list is sa-ra₂, reserve (*sarja=salía*, Doric form of *thalía*). The record must refer to a very important event because the reserve is very high, amounting to 976 units of grain (i.e. 976 multiplied by 96 litres (the Minoan unit for arid is roughly equivalent to this figure) to which other quantities from other contributors must be added.

Even TE, which is the most used of the transaction signs, the first to be identified, is confused and treated as a phonogram. This happens several times, all it takes is for the scribe to shift its position a little for its role to be unrecognised. This is particularly evident on one tablet, KH10, which in lines 3-4 contains the following list: I pa-sa-ja . qa-tjo . A-ki-pi-e TE GRA 90, with the following translation: *Alkibiē* must give (qa-tjo = *thetéon*), as a tax (TE) 90 units of wheat (GRA) to the sacred (I) Psai⁴⁶, where the term is read a-ki-pi-e-te and not a-ki-pi-e plus the transaction sign TE.

But even RE, which is very frequent in isolated use, is continuously confused when it appears together with other signs. It certainly indicates a type of men since it recurs in congruent position with HOMO. It appears also in the following compounds:

Na-daRE (HT117a,5) = RE of *Néda*, a nymph;

Ne-daRE (HT17,3) = RE of *Náda* (the same nymph as above with the a/e variation);

Te-jaRE (HT117a,5) = RE of *Theía*, a goddess;

Pa-jaRE (HT8b,5 etc) = RE of *Baía*, the nurse, an epithet of Demeter;

DARE (passim) = RE of *Dā*, the name of the Great Goddess;

MARE (HT55a,1) = RE of MA(*mátēr* epithet of the Great Mother);

⁴⁵ The logogram I is ligatured and prefixed to many terms. For its value as “sacred”, see after (p.13).

⁴⁶ Pa-sa-ja, a deity also in Linear B.

RARE (HT117a) = RE of *Rã, Réa*, a goddess;

A-ra-na RE (HT1,4) = RE of the royal (A) *Rēnē*, a nymph.

These, being all names of deities, suggest that RE has the meaning of attendant, priest or something like that.

RE and a few other signs (SE, DI, SA, MI) in Linear A retain an agglutinative value, joining to the other signs and forming words while maintaining their logographic value. The existence of words formed by the union of logographic and phonetic signs not only should not surprise but had to be presupposed in a writing system as the Linear A one. They are determined by the application of the acrophonic principle and the progressive phonetization of the written systems. They characterize the transition from figurative to phonetic scriptures and are present, although in different times and ways, in Cuneiform, Egyptian and Linear B itself⁴⁷.

However Pa-jaRE, Te-jaRE and Ara-naRE become in Linear B the proper names Pa-ja-ro, Te-ja-ro and A-ra-na-ro. It is then likely that they come from Linear A and that their etymology is just the preceding one. They are theophoric names formed by the name of a deity (*Baía, Theá, Rēnē*) plus a logogram meaning servant, attendant or something like that.

But there are two signs that are particularly interesting because they, as well as logographic and phonetic value, are also used with a determinative value. They are AB28 and AB08, that is, the signs whose phonetic value corresponds to 'I' and 'A'.

'I' is largely used both as logogram and transaction sign. Used as logogram, it appears before DA which is equivalent to *Dã*, the Minoan goddess, before Psaia (KH10,3. Pa-se-ja is a deity also in Linear B) and before Duwi (*Dúwi*, MA1a,1.), another deity. Occurs after HOMO and before commodities such as wheat. It is also ligatured with FAR (see note 4). By comparing the occurrences in which it appears, it becomes logical to attribute the value of a determinative sign having the meaning of "sacred", considering it the acrophonic abbreviation of the Greek adjective *iarós*.

'A' is in turn a kind of determinative that is premised to the terms to which it refers. Since it represents the double axe it is in my opinion the logogram of the word *aξίνē* (see Hsch: *aξίνē · o dístomos pélekus*). It indicates the Palace and therefore has the meaning of royal. It can be placed before two terms pertaining to the transaction, respectively DU and ka-ru. DU (HT10b,7) means *dós*, donation and ADU means donation (*dós*) to the Palace (A), which, as it is easy to understand, is a type of tax (the second most common tax after TE). Ka-ru (HT97a,1) means *kairós*, right measure, agreed measure. When it is preceded by A means that the measure was agreed with the palace. There are also other variations that involve A (see, for instance pa-ra-jo (HT115a,4) / Apa-ra-jo (HT961-2)). Pa-ra-jo is a term which refers to men. I have traduced it with *palaiói*, old men. When the term has A prefixed means that the old men are noble because they have to do with the Palace⁴⁸. But A can also be premised to goods of various types, in which case, as it happens for example in the case of AOLE, it means oil reserved for the Palace, then, of first quality.

Three words are regularly used in Minoan documents. They are ku-ro, ki-ro and sara₂.

Ku-ro. As it is known, it is the word that means total. It is the equivalent of the Greek word *kūros* = verify, confirm from the verb *kurów* = to check. Then ku-ro can be translated "verified total" or, simply, "verified". Po-to stand for *phórtos* which in classical vocabularies is traduced "set of goods" and po-to ku-ro means set of goods which have been verified (*kūros*).

⁴⁷ See readings such as KU LANA (and not ku-ma, Of 37, 38, 40, etc.) or KU LANA PA (and not ku-ma-pa, Of26, 28,31,etc), in which logograms coexist with each other in forming words. Reading them, it becomes logical to ask ourselves how many such formations also exist in Linear A, which is not only more ancient but also more ideographic than B as the numerical computation of ideograms and ligatures clearly show.

⁴⁸ The same happens also with the term Asi-da-to-i (ARKH2,2-3), which is made up of the determinative sign A plus the plural dative *sundétois* from *súndetos* = royal relatives, who receive 12 units of wine.

Ki-ro stands for deficit. The Minoan people had three words for deficit. They are ki-ro=*khēros*, devoid, not having, which is the most used; ki-ra-ja=*khreía* lack, lack of, need; and ki-ra= it is necessary from *khrául*. Ki ra-ja occurs on HT85b. The initial word of this tablet is not ki-ki-ra-ja since the scribe writes the first ki higher than the second and also interposes a space and a point between them. The first KI is a logogram, which is the heading of tablet and refers to men since the side 'a' of the tablet records a list of men. It is the same as KI HOMO⁴⁹ on KH7a,4⁵⁰. Ki-ra occurs on HT 103. In the second line of this tablet a record begins which has the substance PA₃ as commodity. The tablet unfortunately is damaged but, by checking the figures, in line 2-3, it seems that DAku-se-jo has to give 6 and half units of the substance PA₃. But in lines 4-5 it is recorded that he gave only one unit of it, therefore, another five and a half units are necessary (ki-ra=*khreí*).

Sa-ra₂ appears in more than one tablet. I have searched for a long time for its meaning, but since *sállw* is the Doric form of *thállw* which means to flourish, to prosper and since *thalía* means abundance, prosperity, I am now convinced that sa-ra₂ is *salía* and has the meaning of surplus, reserve, stock.

d) Proving that our deductions are right

A binary system has laws to respect. In our case they are two: the law of the reciprocity and the law of the congruence. They cover all the terms in the lists that, given the two positions a) of the heading and b) of the items, resorting to the position 'a', they must maintain a role that is congruent with the role of the terms recurring in the same position and mutual with the terms in position 'b'. Conversely, if they recur in position 'b' they must maintain a congruent role with the terms that recur in the same position and mutual with the terms in position 'a'. Transaction signs are naturally excluded since they have their own characteristics, always recurring in the heading, possibly between two points.

If all congruencies and all reciprocities are respected, we can be certain that our deductions are correct. In the Minoan lists, these laws are always respected, so much so that, even if we have damaged tablets, we can deduce from the remaining terms the type to which they belong. If x-terms remain, it is certain that there must have been y-terms in the heading and vice versa.

The position of the terms within the lists is crucial because, once identified and compared to the contexts in which the terms appear, it also indicates the role and, consequently, the meaning they have.

The Language

Already from the analysis conducted so far, Greek clearly emerges as the language of Linear A. It emerges also from the proper names of which the following ones are only an example:

Ka-ra-ti HT8a,2 = *Krāthis*

Ka-qa (PK1,1) = *Kábēs*

Da-jo-ku (HT117a,8)/De-ju-ku (HT93a,6)=*Dēíochos*

RA-o-di-ki (PH2,1-2)=*Laodíkē*

A-ra-tu (ZA7a,1-2)=*Arētos*

⁴⁹ KI occurs before HOMO and on HT118 is referred to pigs. Since it is ligatured also with other animals (HT24b,1 etc.), it can be the logogram of *kíron*, castrated (Hsch).

⁵⁰ Also qa-ti, which occurs in the same tablet before KI HOMO is a term that refers to a deficit. It is *khātis*, the dorian form for *khētōs* and means lack, lack of. It occurs also in HT12,1, where it is followed by DA= *daís*, part, portion and by the transaction term TE.

Tu-ju-ma (HT117a,3-4)=*Thúumas*
 A-ri-pa (PE2)=*Arísbas*
 A-na-nu (HT159)=*Ananos*
 Ta-ri-na (HT10b,1-2)=(*Tēlínēs*)
 Mu-ru (HT3,4)=*Mólos*
 Da-tu ((HT123a,&)=*Daítos*
 We-ru-ma HT118,4)=*Erúmas*
 A-we-su (HT118,3)=*Aúsōn*
 A-ra-u-da (KH51-2)=*Ērúndas*

And the Greek also emerges from the reading of the tablets, which acquire a meaning that is homogeneous and also in line with what we would expect from documents referring to economic accounts.

Take for example a tablet such as PH2 which contains two lists of oil. The first concerns the perfumed oil of type A. The second, in line 4, concerns simple oil. The ligature expressing the perfumed oil (*aOLE*) is written in plane form (A+OLE) and the word that follows it (some editions report a point before it) has the second sign illegible, perhaps *wo* or, more unlikely *me* or *qi*. The numeral 1 follows which would therefore be the figure of the first item of the first list, but it hardly is. It is rather the point that the scribe, here as elsewhere⁵¹, writes with a vertical segment. The other figures are indeed high and it would be strange if there were such a digit gap. However, even considering the figure 1, the meaning of the tablet does not change since it contains the Greek names of three persons of whom *Laodíkē* (Ra-o-di-ki) and *Philwtios* (Pi-ru-qi-ju) must respectively give 60 units of *aOLE* while *Sébēs* (sa-pa₃) must give 60 units of simple oil.

HT 28a is another tablet that records offerings to a deity. The heading consists of the word A-si-ja KA meaning offerings (KA) to *Asía*, the goddess daughter of Oceanus and Thetis.

The first contributor is *lāōn* (la-wo₂), who offers five units of spiced wheat (*qeGRA*) and several quantities of different perfumed oils. Then a reserve (sa-rja= *salía*) of perfumed oil, figs and wine follows. Other contributors follow. The *kanēphóroi* (HOMO +KA = bearers of KA offerings) are the first and offer six units of wine. Then the name of a woman occurs. She is A-ru-da-ra, who, according to the Minoan variation i/u, is equivalent to the Greek name *Aridéla*, about which Hesichius writes: *Aridélan · tēn Ariádnēn · Krñtes*. Another female name follows. It is Itaja, which occurs also in Linear B. Side 'b' of the tablet records another list referring to the same goddess *Asía*. The heading of this side further specifies the reason for the offering and the type of the feast since the word *ūmnēsis* = prayer song recurs⁵². The indication of a reserve is also present on this side. Three contributors follow. The first is *polía* (pu-ra₂, a class of men, since Hesichius writes that *polía* is the equivalent of *ghñras*= old age). The second contributor is *lāōn*, who is, presumably, the same as the side a. The last contributor is a woman, whose name is Wi-di-na= Greek *Ydnē*.

But, dealing with tablets concerning offerings to the gods, we cannot forget HT117a, which contains two lists divided by a horizontal line. The first list refers to a religious festival. The heading is MA ka-ri-te . ki-ro . u-mi-na-si which has the following translation: thanks (*ka-ri-te*=*khárites*, nominative plural of *kháris*) to MA(*máter*, epithet of the Great Mother), song of praise (u-mi-na-si= *ūmnēsis*), all are indebted (ki-ro= *khēroi*) of one offering each: *Isos* (U-su), *Mítus* (Mi-tu),

⁵¹ See, for instance, ZA10a after the substance Aku-mi-na (cumin of the type A, i.e. of the best quality).

⁵² U-mi-na-si, the graphic anaptixsis is expressed by the vowel i. This is other times. See, for instance: ki-ra(HT103,5) = *khreí*; ki-ra-ja (HT 85b,1) = *khreía*; pi-mna-te (HT116a,4)/ jpi-mi-na-te (APZa2,2); mi-nu-te (HT86a,5,etc.)/*mnoítēs*, ku-ni-su (HT10a,1) / *Knwsós* etc.

kálamos (Ku-ra mu), *Márōn* (Maru), *Kábarnoi*, (ku-pa₃ -nu, priests of Demeter⁵³), Thóumas (Tu-ju-ma), "Idmē (U-di-mi, female form of "Idmōn). The RE of *Rã*, the RE of *Theás* and the RE of *Náda* are included (*merítai* nom m pl. from *meritēs*).

Thus, Greek emerges from both nouns and various grammatical forms. A number of typical Linear A features also emerges (see note 7 and 57), consisting of the vowel variation *i/u*, the prevalence of the sound *a* over *e* and *ē* (rarely, as in the Doric dialect, also over *o*) the resolution of the graphic anaptypsis by the vowel *i* and the variation of the sound *i* with *e* and *ē*.

Otherwise, the rules applied are the same as for Linear B, which, being derived from Linear A justifies their presence in this writing as well. However, the following variation:

IDA (PKZa18, etc)
IDAmā-te (ARZF1)
DAmā-te (KYZa2)

is in my opinion the clearest possible. It means sacred (I) *Dã* (DA) *Mátēr* (ma-te). Frankly, I cannot understand why so much intelligence is wasted on something that is so obvious. The fact that IDA exists proves that the words IDA and ma-te are independent. The fact that IDAmā-te and DAmā-te exist proves that I and DA are independent. 'I' means sacred and is a determinative which is very used also as a transaction sign having the same meaning. It occurs both alone and prefixed or ligatured with other signs. IDA also recurs in the inscriptions and can be none other than the name of the Great Mother. IDAmā-te also seems to appear in the dative form⁵⁴. The inscription appears on an axe, which, as is known, was the symbol of the great mother. DA is a term that the classical vocabularies translate *Dã*, the name by which the Dorians called their mother goddess in ancient invocations. *Mátēr* is the Doric form of *mētēr*. Where is the difficulty?⁵⁵

The word DA also returns in a lot of compounds, all with Greek translations, such as:

- DAsi-tjo (HT85a,3-4 etc.) = *Dã sitíon*= DA wheat;
- DAqe-ra (HT6a,6 etc.)= *Dã thérās*= DA of hunting;
- DAku-na (HT103,4) = *Dã guné*= DA young bride;
- DAku-se-jo (HT103.4-5 etc.) = *Dã khúseōs*<(*khúsejōs*) = DA of wealth or metal smelting;
- DAna-si (HT126a,1) = *Dã nēsis*= DA of weaving;
- DAta-ra (HT6a,1) = *Dã thēlē*= DA prosperity;
- DAwe-da (HT10a,4etc)= *Dã udēs*= DA of the family(Hsch);
- DAminu (HT117a,8) = *Dã sménos*= DA behave;
- .DAu-pu₃ (HT120,3-4) = *Dã ópion*= opium;

⁵³ See Hsch: *kábarnoi* · *iereís Dēmetros*

⁵⁴ See PH15,1]ma-te-re followed by a variant of the symbol for wheat.

⁵⁵ As well as in *Da mater* which is a typically Doric expression, Doric elements also appear in other aspects of Linear A. They are: typical Doric terms such as, for instance, *khātis*, *kirōn*, *mnoítes*, *pástas* (see pa-ta DA du-pu₂-re[, on HTZb160, which can be translated *pástas Dã Lábrus*], that is the owner (*pástas*) is *Dã lábrus* (Du-pu₂ -re), an appellative of *Dã* indicating her power), and *náas* = snake (see I na-ja re-ta I na-ja pa-qa in the dedicational inscriptions, which, in my opinion, is sacred (I) snake (na-ja=náas) *Létē* (ra-ta) and sacred (I) snake (*náas*) *Phēbē* (pa-qa), referring to the two deities *Létē* and *Phēbē*, who in the Pelasgian myth of Creation were two female snakes oversawing night and day. Perhaps the same as the great goddess has in her hands. Another Doric element is the prevalence of the vowel a. I tried to point it out time by time but other examples are: *dá-mos* for *dēmos*, *pá-ma* for *phēmē*, *kúra* for *kūrē*, *nāsis* for *nēsis*, ta-ri-na for *Tēlínēs*, ku-na for *guné*, ta-ra for *thēlē* etc, etc. And, in addition to other morphological characteristics (see for example the variation s/th in *thalía* / *salía*), I see Doric elements also in the social organization of the Minoans, where they exist, brotherhoods, age divisions and belonging to groups or clans that are not in Mycenaean society (on this topic, see The Ideophonetic system of Linear A).

-DAdu-ma-ta(HT95a,1)= *Dã dōmata*= the houses of DA;
 -Dana-tu DA(ARKH6,1)= *Dã nēstós*= DA spinning.

They are theophoric names in which the Great Mother DA (Dã) appears without the sacred appellative (I). Since they are in the same position as the terms referring to men, they are the names of various colleges and brotherhoods dedicated to the Great Mother. This is clearly demonstrated by contexts in which these terms appear as people contributing, together with individuals or other types of people, to the payment of tributes and the organisation of religious festivals.

Consider, for example, tablet HT85, which contains only one list. It concerns men because the pictogram HOMO appears in the heading and the total at the end is verified (*ku-ro=kūros*). The heading consists of the term ADU followed by the transaction sign *56b and the pictogram HOMO. Since *56b is the doubling of another transaction sign (*56), which has the phonetic value of PI, there is enough agreement that it should be read PIPI. Both PI and PIPI appear in contexts where HOMO or related terms are present and, consequently, one can assume that they also have to do with men, being PI the logogram and PIPI the word which stands for Greek word *pémpsis*, procession, parade. ADU is a logographic compound consisting of A, which is the symbol of royalty, followed by DU *dós* which is a type of tax (the second most important after TE). The term means donation to the Palace. The heading ADU PIPI HOMO thus indicates that the tablet reports a tribute (DU=*dós*) of men (HOMO) due to the palace (A) for a parade (*pémpsis*). The brotherhood *DAudēs* (Dawe-da) has to give 12 of these men, *Phánēs* (man's name Pa₃. ni) 12, *u-do*-*23 (a class of men) 6, the brotherhood *DAsitíon* 24, *ku*-*101-ni 5, *Thēkhēs* (te-ke, man's name) 3, the attendant (RE) of Dã (DARE)⁵⁶ 4, for a validated total (*kūros*) of 66 men.

But the Greek language is also attested by other documents. Two of them attest the aorist *nēēse* from *nēéō*⁵⁷ to fill. They are:

- 1) HTZb 159: A-na-nu nejase[*Ánanos nēēse* =Ananos (man) filled[.
- 2) PEZb3: A-ka-ra ki-ta-na ne-ja-se HOMO+za = *Ekálē*, belonging (-na) to the family of *Skúthēs* (Ki-ta)⁵⁸, *nēēse*=filled. The trade mark of the clan follows.

Ta-ta for *ethēthē* (passive aorist of *títhemi* without the *e* augment, as it happens also in Mycenaean) emerges from the translation of the following list contained on lines 3-4 of the tablet n.7 from Khania:

i-ja pa-me ta-ta qa-ti kiHOMO 4, Lm23HORD Lm19.

the translation of which is: for the response (*íá*=voice) of the oracle (*phámēs*) has been confirmed (*ethēthē*⁵⁹) a lack (*khātis*) of 4 KImen and a Lm19 of a Lm23 part of an unit of barley (*phámēs* and *khātis* are Dorian forms of *phēmēs* and *khētis*).

De-ka= *édōka* (aorist first person) from *dídōmi* (root de/do), Linear B do-ke, third person, without the *e* augment) appears in an inscription on a vase (ZAZb3) in the group a-ta IQI de-ka alternating with a-ta IQI wa-ja by which the religious formula on libation tables is often opened. De-ka refers to an offering of 32 units of pi-re-na ti-ti-ku = *purēna thutikón*⁶⁰ i.e. grape for sacrifice (*purén* means grape and it is a masculine accusative as the adjective *thutikós* = sacrificial). The offering is addressed to DI who is a deity invoked with various epithets, perhaps the same divinity

⁵⁶ The proper name *Dārēs* / *Dáros* also exists in Greek, but I prefer to read the two logograms independently as on HT117a,5.

⁵⁷ The variation *ja/e* is also attested elsewhere (wa-ja/wa-e, ja-du-ra/ *édúle*, ko-ja/ko-e etc.). In both cases the inscriptions are on vessels and the meaning of “filling” is particularly apt.

⁵⁸ This name recurs also on HT 123a,1, where it is followed by the transaction sign ‘I’, on HT29,4 and on TYZb,4,1),

⁵⁹ Ta-ta = *ethēthē*, without temporal vowel, like de-ka = *édōka* and like it happens in Linear B.

⁶⁰ The variation i/u is common in Linear A. See note 7.

as *di-we* on HT102.

Kerdēménos and *i-pi-na-mi-na* are two examples of present participle. The first occurs on both the sides of MA1 and means *kerdeménos* from *kerdaíno*. It fits very well with the content of the record, which not having figures, certifies an action occurred and verified, as it is demonstrated by the sign X placed at the beginning of the tablet. Ipi-na-mi-na recurs in the second part of the dedicatory formula which is made up of three words. It is the second word and alternates with Ipi-na-ma which means sacred (I) *pneŭma* (pi-na-ma⁶¹) "sacred nod" and refers to the deity and Ipi-na-mi-na from *pnéw* means "things that are consented with the sacred nod"⁶².

Conclusions

1) There is a misunderstanding behind the indecipherability of Linear A. It has been considered an unknown language expressed through a known writing. But it is the exact opposite. It is the writing system that had to be understood since it is different from the Linear B one. The rules applied to Linear B -whereby when a sign appears in groups with other signs, it has phonetic value and when it appears isolated it has logographic value- do not apply to Linear A. There are in this writing words that are made up of logographic elements combined with phonetic elements. There are also signs that, like I and A, have the value of determinatives, and there are many ligatures, sometimes written in a plane form, that are the key-compounds for understanding the Linear A writing system. They retain a high degree of ideography and help us to correctly identify the phonetic part of the writing and understand how words must be read. Persisting in reading Linear A as if it were Linear B has made it 'illegible' and consequently 'indecipherable'. Non-existent words have been created and the rules governing word formation have been confused with those of Linear B. We should have expected the graphical system of Linear A to be different from that of Linear B, not only because Linear A is older than Linear B, but also because it, unlike Cuneiform and Egyptian writing, has no more than a thousand years of history behind it, but only a few hundred years starting from Hieroglyphic. The existence of words made up of the union of phonetic and logographic signs should have been foreseen, because it is the natural consequence of the acrophonic principle and because compounds of this type exist, although in different times and ways, in most ancient ideophonetic systems, including Linear B.

2) The language of Linear A is Greek. Many have already said this but there is no consensus among them. The same goes for all those who see Luvian, or Semitic or other languages in Linear A. They propose non-homogeneous solutions while supporting the same idea. This is a further proof that the problem with Linear A is in its reading, in decoding the graphic system by which it is expressed. Only by reading the words correctly, only by consistently identifying the rules governing word formation, is it possible to identify the language and translate documents in a consistent and consequential way. Let me give one last example: at the beginning of the tablet HT44a the word *i-qa-tjo* occurs. If we are not able to read it correctly, by separating the term I from the term *qa-tjo*, not only have we created a non-existent word -which is the least- but we will never be able to understand the values of I and *qa-tjo* which are widely used in tablets, being both fundamental to understand the value and meaning of many other terms.

3) It is a Greek with Dorian inflections that can be identified in a combination of morphological and nominal aspects⁶³. My hypothesis is that the first ancestors of the Dorians settled already very

⁶¹ The anaptyctic nexus is solved here with the vowel *i*, as it happens also elsewhere.

⁶² As in Linear B the thematic vowel is missing.

⁶³ See note 55.

early in Crete. They established the flourishing civilisation of Palaces by imposing their thalassocracy and intertwining trade with other Mediterranean peoples. They then had to succumb to the forces of nature and the conquest of the Mycenaeans. Many of them fled or were taken as prisoners to the mainland. My hypothesis is supported both by the words of Homer, who in the nineteenth book of *Odyssey* sees the presence of the Dorians in Crete already at the time of the Trojan War, and by a paper⁶⁴ by John Chadwick who, recognising many Dorian elements in Linear B, thought of the presence of peoples speaking Dorian among the lower classes of the population, what is in line with my idea of a conquered people.

Enrica Patria

⁶⁴ *Who were the Dorians?* La Parola del Passato, 31, 103-117.