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THE MINOAN SCRIPTS: FACT AND THEORY

ALICE E. KOBER

THE basic distinction between fact and theory is clear enough: a fact is a reality, an actuality, something that exists; a theory states that something might be, or could be, or should be. Like most simple statements, the foregoing has implications that are far from simple. In dealing with the past we are concerned, not with something that exists, but with something that has existed. Our facts are limited to those things for the past which still exist; everything else is theory, which may range all the way from practical certainty to utter impossibility, depending on its relationship to known facts.

Before judging a theory, we must therefore know what the facts are. In the case of an unknown script, our basic "facts" are obviously the inscribed documents themselves. It is notorious that the Minoan inscriptions have never been accessible to scholars as a whole. This means that our basic information is at best second-hand, and liable to all the distortions that may occur in mechanical or manual reproduction.

Our knowledge of a Minoan inscription may be based on any of the following kinds of reproduction, singly or in combination: a cast; a photograph of the original, of a cast, or of another photograph; a "faithful" transcription, made from the original, a cast, or some kind of a photograph; a "normalized" transcription, made from the original, or from any of the aforementioned types of reproduction.¹

The term "Minoan scripts" requires definition. As it is used in this article, it includes six different systems of writing, all similar to one another but with certain specific variations which serve to distinguish them: the Pictographic class; the class represented by the Phaistos Disk; Linear Class A; Linear Class B; the Mainland scripts; the Cypro-Minoan scripts. In addition, signs have been found on artifacts of Minoan provenience: on wall-blocks, pottery, ingots, inlays, etc. The signs on these usually occur alone, rarely in pairs, sometimes as composites of two or more signs, and seem to be craftsmen's or ownership marks. They do not, in themselves, constitute a script system, but have apparently been borrowed from other systems.

A brief summary of each of the Minoan scripts follows, showing what information is available, where it requires supplementation or correction, and what theories and conjectures arise from it.²

¹ The number of casts is so small as to be negligible; about 25 are known to the author, almost all of published inscriptions. The number of photographs has recently been much increased by the publication of the Hagia Triada inscriptions, but the published reproductions of the most important class, Linear B, are still for the most part in the form of transcriptions.

² The bibliography of the field is tremendous, and it can serve no useful purpose to attempt to list all of it. Necessary references will be given where they are pertinent. The following list of abbreviations includes the most important collections of reproductions:

A Linear Class A.
AAA *Acta Academiae Aboensis Humaniora.*

Altkr J. Sundwall, "Altkretische Urkundenstudien," in *AAA*, x: 2, 1936.
Ant Crét G. Maraghiannis, *Antiquités crétoises, 3^{me} Série*, 1915.
B Linear Class B.
CM J. F. Daniel, "Prolegomena to the Cypro-Minoan Script," in *AJA*, 1941, pp. 249-282.
Cret D. Levi, "Le Cretule di H. Triada," in *Annuario*, viii-ix, 1929, pp. 71-156.
EM F. Chapouthier, *Les Ecritures minoennes au palais de Mallia*, Tome II, *Etudes Crétoises* (Paris, Geuthner, 1930).

THE PICTOGRAPHIC SCRIPT

This is the earliest³ of the Minoan scripts. The inscriptions are engraved on seal-stones or scratched on clay.

The seal-stones are further subdivided⁴ into an earlier group on soft stone, like steatite, and a later, on harder stone like jasper, amethyst, carnelian, etc. While the engraving on the earlier type seems somewhat more crude, there is no essential difference in the signs used and therefore this distinction has no bearing on the script. The seal-stones are of many types, ranging all the way from those with a single inscribed surface to an eight-sided seal, still unpublished, on display at the Ashmolean Museum, Oxford. Sometimes all the faces are inscribed, sometimes some are inscribed and others have decorative designs.

The inscriptions on these seals are often as decorative as the designs. The signs are on the whole beautifully made, and it is easy to recognize in many of them both the objects which they portray and the later linear signs evolved from them, but the groupings seem to be arranged from the artistic rather than the phonetic point of view. Similar groups of signs reappear with considerable frequency, but the order of the signs is not constant, and it is sometimes difficult to decide what it should be (fig. 1).⁵ The situation is further complicated by the use of small crosses, chevrons, grids, stars, and other markings which may simply be there to fill blank spaces or may have a phonetic significance as well. There is often no indication of the direction in which an inscription is to be read. Indeed, it is sometimes hard to tell which side is up since signs may be written sideways or upside-down if they fill the space better that way. It is a reasonable assumption that these formulae contain the names and/or titles of officials.

Inscribed seals have been found in many places in Crete, and even outside it, often ap-

- | | | | |
|---------------------|--|-----------------------|---|
| <i>EM, H; EM, L</i> | Inscriptions from the above, for classes <i>P</i> and <i>A.</i> , respectively. | | kult in den Hagia Triada Urkunden," <i>AAA</i> , xiv: 10, 1943. |
| <i>HT</i> | G. Pugliese-Carratelli, "Le Iscrizioni preelleniche di Hagia Triada e della Grecia peninsulare," in <i>Mon Ant.</i> , 1945, pp. 421-610. | <i>SM</i> | A. J. Evans, <i>Scripta Minor</i> , i, 1909. |
| | | <i>SM, P</i> | Inscriptions from the above. |
| | | <i>WB, I, II, III</i> | J. Sundwall, "Weitere Bemerkungen zu den Hagia Triada Täfelchen I, II, III," <i>AAA</i> , xiv: 11; xv: 2; 4, 1944-1945. |
| <i>Inscr I</i> | B. Hrozný, "Kretas und Vorgriechenlands Inschriften, Geschichte und Kultur," in <i>Arch. Orient. Prag.</i> , 1943, pp. 1-117. | | |
| <i>Inscr II</i> | <i>Idem</i> , "Les Inscriptions cretoises II," <i>ibid.</i> , 1946, pp. 158-302. | | |
| <i>M</i> | The Mainland inscriptions, exclusive of Pylos. | | |
| <i>MK</i> | J. Sundwall, "Minoische Kulturverzeichnisse aus Hagia Triada," in <i>AAA</i> , xiv: 4, 1942. | | |
| <i>M. Rechn</i> | <i>Idem</i> , "Minoische Rechnungsurkunden," in <i>SocFenComHumLit</i> , iv: 4, 1932. | | |
| <i>P</i> | The Pictographic Script. | | |
| <i>PD</i> | The Phaistos Disk. | | |
| <i>Py</i> | The Pylos inscriptions. | | |
| <i>PM</i> | A. J. Evans, <i>The Palace of Minos at Knossos</i> , i-iv, 1921-1935. | | |
| <i>SB</i> | J. Sundwall, "Über Schilf- und Baum- | | |

³ Evans mentions an earlier system, which he calls Primitive Linear (*SM*, pp. 115-118, figs. 48-52). While the signs are sometimes strikingly alphabetic, they have no particular resemblance to those in any of the Minoan scripts. The best-known example, often called the Phaistos Whorl (*SM*, fig. 52) has an inscription very similar to that on a spindle whorl from Troy (cf. Schliemann, *Ilios*, p. 694, #1524 and later #1996). Since other Trojan whorls have similar inscriptions, it is possible that the Phaistos Whorl was an importation. In any event, there is not enough evidence to set up a Primitive Linear class.

⁴ Cf. *SM*, p. 139.

⁵ Evans reads the formula "silphium, musical instrument, template." Note that the signs of the second example are in a different order. Greater variations, both in the order and the position of signs occur in other formulae.

parently in the possession of private individuals. It is hard to determine how widespread their use was in Minoan Crete. A deposit was found at the palace at Knossos containing some inscribed seals or their impressions,⁶ and isolated examples were found in the excavations of Zakro, Mallia and elsewhere. Information on this point is not clear, but it would seem that most of the seals actually excavated have purely pictorial designs; the provenience of the inscribed seals is often uncertain. The publication of the inscribed seals is incomplete.⁷

Many pictographic inscriptions take the form of graffiti on clay, which is the normal form for Minoan inscriptions. There are clay sealings (i.e., lumps of clay with the surfaces

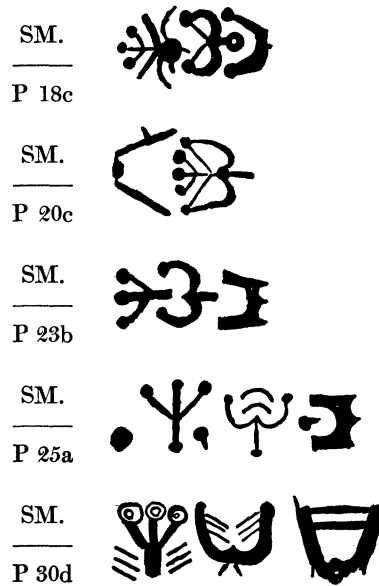


FIG. 1. AN EXAMPLE OF A RECURRING FORMULA ON SEAL-STONES.

flattened by the pressure of the fingers), on which writing and seal-impressions are often found together; clay labels, inscribed on one or both sides; four-sided clay bars;⁸ and tablets, whose shape is much like that of a page in a book, but considerably smaller, and with rounded corners. Only three such tablets have been published, and on each the writing parallels the long axis.⁹

About 100 of these inscriptions on clay were found at Knossos and Mallia.¹⁰ The Mallia

⁶ Cf. *PM*, i, pp. 271 ff.

⁷ *SM* has photographs and transcriptions of 60; *PM*, i, fig. 207 repeats some of these and adds a few others; Bossert, *Altikreta*, fig. 252 has photographs of a few casts in the University of Berlin Museum (originals unpublished); *EM* contains photographs and transcriptions of four seals or seal-impressions from Mallia (H, 1-4), and another seal with one inscribed face was published by Chapouthier, "A traverse trois gemmes prismatiques" in *Mélanges G. Glotz*, I, fig. 3 c. How many still remain unpublished cannot be determined.

⁸ *SM*, P 119 is a three-sided bar, with the same sign

(cf. *EM*, H 5 for a similar sign) on each of the surfaces; it seems to be an ideogram.

⁹ *SM*, P 120-122. One is from Knossos, the other from Phaistos. The third, according to Evans, is from Crete, but of uncertain provenience. It is opisthographic; on one side there is a snake-like sign and what looks like the ground-plan of a building; the signs on the other side show only a slight similarity to *P* signs, and their arrangement and grouping give an entirely alien impression.

¹⁰ Approximately 70 from Knossos and 30 from Mallia (cf. photographs and transcriptions in *SM* and *EM*, resp.). *EM*, H 32-33 are incised on vases.

signs are occasionally quite different, and often slightly different, from those of Knossos inscriptions. The signs on the seals in general and on inscribed clay from Knossos are, on the other hand, identical, if due allowance is made for the elaborate engraving on the seals, and the simplification of the hand-written signs on clay.

No adequate sign list exists for the Pictographic script. Evans' list and discussion of the signs¹¹ is complete only for what he published in *SM*, in 1909. It must be collated with the list of Mallia signs,¹² and signs from other inscriptions must be added. What has been learned from other Minoan scripts shows that it is desirable to divide the signs into three categories: phonetic (i.e. signs used in words); ideographic (i.e., signs which appear alone, sometimes followed by numbers, in which case they seem to represent commodities of various kinds); numeral-adjunct (i.e., signs occurring after, or in place of numbers, some perhaps representing fractions, others perhaps measures, like our "bushel," "quart," "foot," etc.). This has not been done. The lists are quite out-of-date. Signs that belong together are listed separately,¹³ and a certain number of purely pictorial representations, especially of animals, should be removed from the sign list, as well as signs appearing only on the Phaistos Whorl, or in other inscriptions which may not belong to this class.

No vocabulary lists have as yet been published for any Minoan script. In attempting to construct one for the Pictographic script we are confronted with almost insuperable difficulties. It is impossible to determine the direction of reading from the position of the signs, since they are found sideways and upside-down as often as right-side-up, both on seal-stones and on clay. Evans pointed out that a small "x,"¹⁴ often found in both types at the beginning of inscriptions, or even of separate words, indicates the beginning. He called the sign "initial x." When numerals occur, they follow the words if we read from "initial x." This may be considered confirmation of the theory, in spite of the fact that other Minoan scripts regularly mark the end, not the beginning, of a word.¹⁵

From the placing of "initial x" we may therefore conclude that most Mallia inscriptions read from right to left, while those from Knossos read in either direction and are sometimes boustrophedon.¹⁶ This marker is not, however, always present, and in many cases, even when it is present, we cannot be sure of the direction of writing, because we cannot always be sure when an inscription is right-side-up (fig. 2).¹⁷

¹¹ *SM*, pp. 181-231 and figs. 102-103; *PM*, i, pp. 271-285 and fig. 214.

¹² *EM*, pp. 30 ff., and especially fig. 12.

¹³ For example, Sundwall points out, *WB*, II, p. 29, that Evans' signs no. 24 "mallet" and no. 25 "ring-handled instrument" (which occurs only once) are probably the same sign, and equivalent to a similar sign in *A*.

¹⁴ Cf. *SM*, p. 251.

¹⁵ This marker, regularly used in *A*, *B*, *M*, and *Py*, is a short vertical line, placed as we place a period, at the bottom of the line of writing.

¹⁶ Cf. *SM*, pp. 250-256.

¹⁷ Fig. 2 is a normalized transcription of two clay bars, based on *SM*, fig. 96, where the adjacent sides are shown in perspective, and on the photographs and transcriptions of the individual sides, which are listed by Evans as P 103, *a*, *d* and P 100, *a*, *d*. These bars have been chosen because they are the only four-sided

bars for which the relationship of two adjacent sides is certain.

SM, P 100 *a* will serve as an illustration of the difficulty of determining when an inscription is right-side-up. It contains two words, each accompanied by numbers. Beginning with "initial x" right under the perforation hole, we have the word "mountains, mallet" and the number 6,400 (six "diamonds" and 4 long "strokes"); then comes a dividing line, with "initial x" inscribed on it, followed by the word "sepia, ship, angular S" and the number 1,400 (the last two strokes are not certain). According to Evans, this reads from right to left, probably because in that position the "ship" is right-side-up; but the "mallet" and "sepia" are then upside-down; the "mountains" and "angular S" are on their sides in any case. If we think the inscription reads from left to right, the "ship" would be upside-down. In this case the words are not affected by the direction of reading, because "initial x" shows

The numerical system, according to Evans,¹⁸ was a decimal system, using short vertical or curved strokes for units, dots for tens, long slanting strokes for hundreds and diamond-shaped signs for thousands.¹⁹ Since no additions complete with sums have yet been found in *P*, the correctness of this theory cannot be proven, but it seems to be the only logical explanation of observed facts.

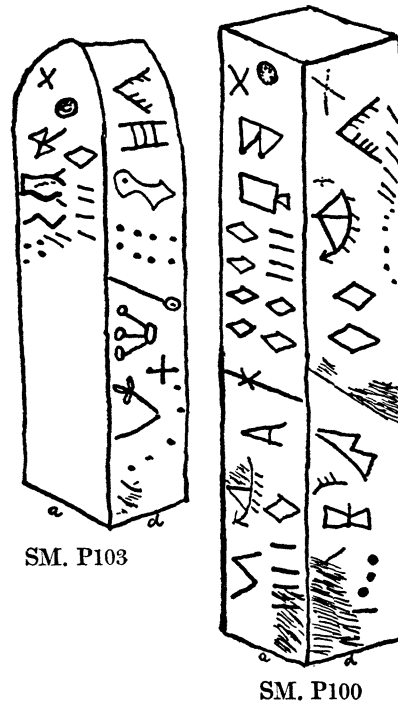


FIG. 2. FOUR-SIDED CLAY BARS OF THE PICTOGRAPHIC CLASS.

where we should begin. It is easy to understand, however, that when "initial x" is missing (as it is in P 103, *d*), and there are no numbers, it would be impossible to decide whether the first word read "mountains, mallet" or "mallet, mountains," and the same thing is true for the second word. Cases where no decision is possible happen often enough to throw any vocabulary list into confusion.

The fact that these bars are perforated, apparently in order to attach them to some object with string, causes another problem. It was apparently easier to turn the bar along the axis of the perforation than to turn it along the long axis. As a result, adjacent sides often read in opposite directions. P 100, *d* certainly reads from right to left, and P 100, *a* with equal certainty reads from left to right. This means that being able to establish the direction of reading for one side of a bar is no help in determining the direction on the other faces. It is possible that careful study will show that bars were turned back and forth according to some rule, but before we can investigate this, we must know some facts we do not as yet have at our disposal. We must, for example, know which face of a four-sided

bar was the first. Evans, in transcribing, seems to have established an arbitrary rule of his own by beginning with one of the perforated sides of a bar, and then turned it counter-clockwise on its long axis, copying the inscription on each face in turn. It is certain, however, that he turned the inscription upside-down whenever he decided it was necessary. When one end of a bar is broken in a peculiar way, or is curved, it is possible to determine when he did this; but for rectangular bars like P 100 there is no way of telling when it happened. If we were told which end of each side was the perforation end, we could reconstruct the bar, and perhaps find out how the bar was meant to be turned by the reader. This in turn would fix the spelling of the words on the bar, and so give the basis for a vocabulary list.

¹⁸ *SM*, pp. 256-259 and fig. 115; *PM*, i, fig. 211.

¹⁹ Fig. 2 shows that numbers might be written in various ways. Apparently the scribe's chief purpose was to keep a numeral as close as possible to the word with which it was connected. On P 103, *a* the number is 1,640. It begins on a line parallel with the word and then curves down beside it, although the rest of the

It will be obvious from what has been said that, although for almost forty years *P* has been the only class of Minoan inscriptions published with anything approximating entirety, very little has been done with it. This is partly because Evans' very thorough discussions in *SM* give the impression that little remains to be done, and partly because the examination of the vocabulary, which is the first step in any further investigation, is impossible until the correct order of the signs is determined.

While the position of signs has not yet been standardized, their shape has been. When signs cannot be recognized, the fault lies more often with the surface condition of the inscription, or the inadequacy of the sign lists, than with the handwriting, which is astonishingly facile and remarkably legible, when we consider how difficult it must have been to scratch tiny signs on the small writing surface presented by the awkwardly shaped sealings and clay bars.

It has been said that the seal-stones seem to contain the names and titles of officials. The inscriptions on clay seem to be summaries or inventories of various kinds. The book-keeping, if we may call it that, does not seem to be completely standardized, but the items are carefully separated, on the whole, and the first impression of confusion disappears after the documents have been studied a short time.

THE PHAISTOS DISK

For many years after its discovery, the Phaistos Disk was a favorite subject for articles²⁰ and was "translated" several times. As a matter of fact, very little can be done with it at present.

It is a disk of fine clay, inscribed on both sides. The inscription is arranged in a spiral, which apparently reads from right to left and from the outside in. It was probably a document of some importance, since a preliminary draft was necessary if the scribe wanted to be sure of fitting the contents into the space. One side begins with four dots placed on a vertical line, the other side with five dots, similarly placed. The dots may indicate that what we have was the fourth and fifth in a series of similar inscriptions. The signs seem to have been pressed into the clay with dies. The clarity of detail suggests that they were made of metal. The Disk is, therefore, actually an early example of printing. As in the Pictographic script, the signs occur in various positions. Forty-five different signs are found; how many there were in the script to which it belongs cannot even be conjectured.

Parallels for some of its unique features can be found in other Minoan scripts,²¹ but only

side is blank, and the number could have been written beside the word. On *P* 100, *a* the number is written in two lines beside the first word and the arrangement is boustrophedon; the number with the second word is written on a line parallel to it and in the same direction. On *P* 100, *d* the numeral is 2,660, according to Evans; the "diamonds" (2,000) are written beside the word, the rest on a line parallel to the word and in the same direction. While the arrangement is, at first glance, haphazard, a little study of the inscriptions will show that it causes little confusion.

The number accompanying the second word in *P* 100, *d* is not clear because the tablet is injured, but it seems to end in a "cross"; a "cross" also comes after numbers on the second line of *SM*, *P* 121. This seems to be one of the numeral-adjunct signs, and reappears

with the same function in *A* (cf. *HT*, fig. 60, no. 19 and commentary).

²⁰ The Disk was found at Phaistos in July, 1901, by Pernier, in a context that suggested contemporaneity with *A*. It was first published by him in *Ausonia*, 1908, pp. 255-302; and later in *Il Palazzo di Festós*, I, pp. 419 ff. (bibliography of the subject till 1935, the date of publication, is given on p. 424).

²¹ No other example of printing has been found, but the existence of seal-impressions indicates that the technique was not unfamiliar to the Cretans. Three *A* inscriptions have a spiral form. One is on a gold ring which comes from the Mavro Spelio cemetery near Kairatos (Forsdyke, *BSA*, xxviii, p. 269 and fig. 37; Evans, *London Times*, July 8, 1927, p. 13. col. 5; *PM*, ii, p. 557 and fig. 352; *HT*, p. 585 fig. 240 and discus-

one other inscription from Minoan Crete has signs which resemble those of the Disk. This is the inscription on the Arkalochori Axe,²² which is arranged in three vertical columns and uses ten different signs fifteen times. It must be noted, however, that the signs are similar, not identical.

Another inscription is often tentatively assigned to the same class,²³ but without as much justification. This inscription was found on a stone block near Mallia, and consists of thirteen different signs used sixteen times. These signs almost certainly belong to the Pictographic script; much of their unusual appearance is due to the fact that they were incised with great care. When Chapouthier reported its discovery, he stated that traces of a cavity were found at one end of the stone, and that the inscription was perpendicular to the plane of this cavity. If, as he suggested, the cavity indicated that the stone was part of a libation table, the inscription must have read from the top down, and since the signs are then placed sideways, it actually read from right to left. This is not unexpected, since Pictographic inscriptions from Mallia also read from right to left, but it must be pointed out that the evidence for reading the inscription in that direction is based on the conjecture that the stone had to stand in a certain position. Normally, when a Minoan inscription reads from the top down (and several of the sealstones do) the signs are placed below one another, each in an upright position. In any event, the resemblance between the signs of this inscription and those of the Phaistos Disk is very slight.

Of all the Minoan scripts that of the Phaistos Disk is least likely to furnish the clue for decipherment unless more inscriptions of this type are found.

LINEAR CLASS A

These inscriptions fall into two general categories, religious and secular. This is the only one of the Minoan scripts found regularly on objects which must have had a religious function, like libation tables and votive ladles, etc.²⁴ What is more, in several cases words which occur on one of these objects seem to reappear, sometimes in a slightly different form, on others. One of these groups is given in fig. 3.²⁵ The signs used in these inscriptions are, with

sion s.v. Cn. 13). The other two are ink-written cups from Knossos where the inscriptions read, apparently, from the inside out, and have the form of concentric circles rather than of spirals (*PM*, i, pp. 613-616 and figs. 450-452; *HT*, pp. 293 f., figs. 237-238 and discussion s.v. Cn. 6, 7). The transcriptions in *PM* and *HT* differ in some details. The "boxing in" of words can also be found in *P* (cf. fig. 2) and in *B*.

²² Cf. Marinatos, *AA*, 1935, cols. 252-253 and fig. 6.

²³ Cf. Chapouthier, *CRAI*, 1937, pp. 277 f.; *BCH*, 1932, pp. 104-108; Marinatos, *AA*, 1937, cols. 229 f.; *HT*, pp. 460 f.

²⁴ The inscriptions discussed above, in connection with the *PD*, may have had a religious content. Many of the signs on the stone block from Mallia could be classed as *A* as well as *P* because they are common to both scripts.

²⁵ The first inscription is on a rectangular bead seal of the Pictographic class; the others are *A*, and are designated by the abbreviations used in *HT*, *Catalogue of Inscriptions*, which furnishes a much simpler

means of identifying inscriptions than has been available hitherto.

The *A* words are certainly related. The *P* inscription has three signs in common with the first of these, but the order of the signs is wrong. All the *A* words read from left to right. If the cross at the beginning of the *P* inscription is "initial x," it also reads from left to right. The word is apparently continued on the second line. The "double-axe" may be a separate word, since it is set off by crosses. To get the same reading we have in *Pc* 4, we would have to read *P* 41, *b* from right to left, and from the bottom up, i.e., last line first. There is no denying, however, that the same doubled sign occurs.

Pc 4 is inscribed in a steatite cup from Palaikastro; *Ps* 2 on the Psychro (Dikte) libation table; *Tl* 1 on a votive ladle from Trullos (Arkhanes); *Pc* 8 on a libation table from Palaikastro; and *Cn* 10 on one from Knossos. The inscription on the last runs along two edges of the table; the corner comes between the penultimate and last signs.

a few exceptions,²⁶ the same as those found on secular clay tablets, but the words are different. This is to be expected, since cult terms may differ quite radically from those used in every-day transactions.²⁷

Inscriptions of Linear A have been found at several sites, and on a variety of objects, but the greatest number come from Hagia Triada, where over 150 clay tablets, and 30 disks and

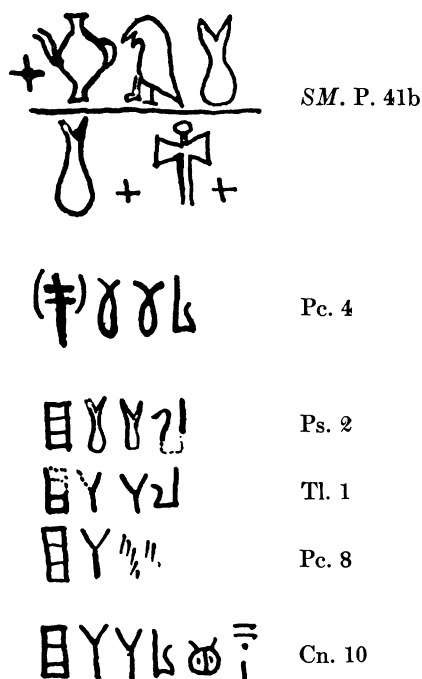


FIG. 3. A PICTOGRAPHIC INSCRIPTION AND FIVE SIMILAR LINEAR CLASS A WORDS OF RELIGIOUS CONNOTATION.

labels, as well as numerous sealings countermarked with *A* signs have been found.²⁸ The clay tablets vary in size and dimensions, but all are “page” tablets, and are often opisthographic. Unlike the *P* tablets, where the line of writing is parallel to the long axis, the writing on *A* tablets is parallel to the short axis. The direction of writing is left to right.

These tablets leave one with the strong impression that the scribes were not experts in the art of writing. Signs are frequently misshapen; the tablets are rarely ruled with guide

²⁶ The signs are not all identical; for example, *Tl* 1 contains a word, not illustrated here, which uses the regular “throne” sign of *B*, but facing in the opposite direction. It occurs only in this inscription. The sign usually called the “throne” sign in *A* faces in the same direction as that of *B*, but is made in a different way. Variations in the signs of *A* inscriptions are to be expected, because they are not homogeneous either geographically or chronologically, except for those from Hagia Triada.

²⁷ The distinction between “religious” and “secular” inscriptions would hold true even if we assume with Sundwall (cf. especially *MK* and *SB*, *passim*) that the Hagia Triada tablets record transactions connected

with cult business. Such transactions would still be secular in nature, and unlike inscriptions on actual cult objects.

²⁸ The latest publication of the countermarks, labels and disks from Hagia Triada is by Levi, *Cret. Sundwall*, in a series of five articles (*MK*, *SB*, *WB*, *I*, *II*, *III*) has transcribed and discussed in considerable detail the most important of the clay tablets from the site, and Pugliese-Carratelli in *HT* has made all the tablets available in the form of photographs and transcriptions, and has added a list of all other published *A* inscriptions, often supplemented by excellent transcriptions.

lines, and it is often difficult to tell to which line certain signs or words belong; and the contents are so badly arranged that they must be rewritten before they can be studied. It is the general rule rather than the exception to find words begun on one line and finished on the next; even numbers are divided between lines. Clay labels and bars of *P* are better arranged and more legibly written. It is hard to say whether this lack of skill is characteristic of the entire class, or peculiar to Hagia Triada, because so few tablets have been found at other sites, and these are, for the most part, in poor condition. On the whole, however, the others make a better impression.

Numerals are based on a decimal system, as in *P*, but the signs are different. Units are

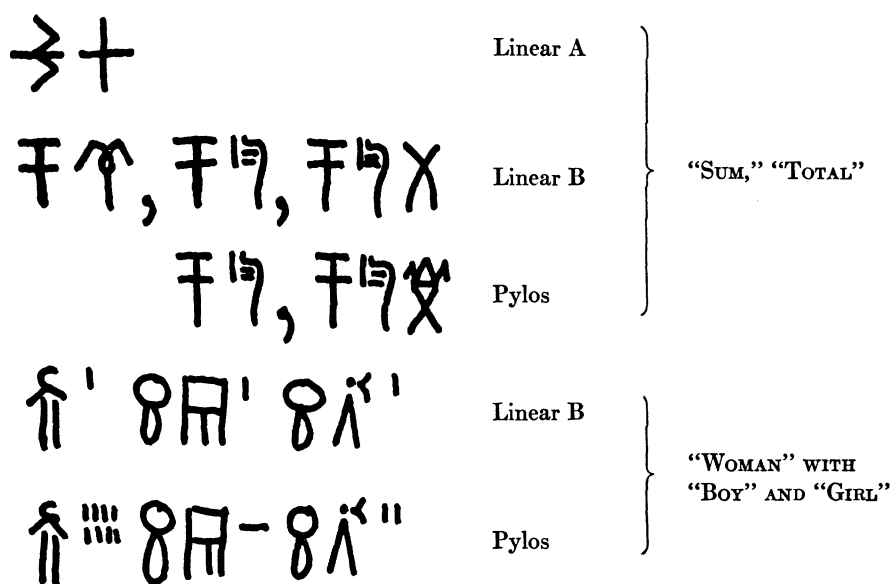


FIG. 4. MINOAN WORDS WITH PLAUSIBLE MEANINGS.

represented by short vertical strokes, tens by short horizontal strokes, and hundreds by circles. A good many tablets contain a list of items, each followed by a number, and end with a sum. Several of these additions are complete, and confirm what has been said about the numerical system.²⁹

The word which regularly precedes the sum is spelled "flying bird, cross" (cf. fig. 4) and must mean "sum" or "total." It is the only word of this class whose meaning is practically certain.

Before the war only a small fraction of the linear A inscriptions had been published. Since then, thanks to the publications of Sundwall and Pugliese-Carratelli (see above, note 28), this is the most completely published of all the scripts. At least one photograph and often two transcriptions by different scholars are now available for the majority of the inscriptions.

The sign lists in *HT* may well serve as a model for future publications. There is a complete

²⁹ *HT* 117, *a*, contains a list of ten words, each followed by a single vertical stroke at the top of the line of writing, which signifies the number 1. The total, pre-

ceded by the "flying bird, cross" consists of a single horizontal stroke, which signifies the number 10. This addition proves a decimal system was used.

list of all the signs used in *A*, with references to the inscriptions in which they appear, and separate lists of signs used phonetically, of signs used as numeral-adjuncts, and of the compound signs used ideographically. While some changes may prove necessary, these lists provide a sound foundation for future work, especially if we add to them the list of ideograms given by Sundwall in *WB, I*, figs. 7–14, and his discussions in various works since 1915, and Sir John Myres' comparative lists of *A* and *B*, given below as figs. 6 and 7 (cf. note 37).

No vocabulary lists have been published,³⁰ but much of the vocabulary has been discussed in the works already mentioned, and a great deal of the preliminary analysis of the inscriptions, words, and use of signs has been completed.

LINEAR CLASS B

All the inscriptions of this class come from Knossos, and date from the last phase of the palace there; they are, with very few exceptions,³¹ on clay tablets.

These tablets may be divided according to their shape, into two groups: the "page" type, where, as in *A*, the line of writing is parallel to the short axis, and a new type, also rectangular with rounded corners, but about three times as long as it is wide, on which the line of writing is parallel to the long axis. Most tablets have guide lines on which the writing is done, and the direction of writing is regularly from left to right. The "page" tablets are sometimes very large, but only rarely opisthographic.³²

The new type usually contains two lines of writing, though tablets with a single line, or with three lines, are found. The shape has a particular significance because it is, to some extent, a confirmation of the claim the Cretans still made in classical times that "Phoenician writing" meant not "writing of the Phoenicians," but "writing on palm-leaves," and referred to their invention of writing.³³

Palm-leaves can be used as a writing material; palm-leaf books still exist to-day in India. In the example shown to the author by Professor Franklin Edgerton of Yale, the palm-leaf

³⁰ A vocabulary list of *A* will form part of the discussion of that class in *Scripta Minoa, II*. It is to be hoped that Sir John Myres, who undertook and completed the tremendous task of preparing all the material from Knossos for publication, will soon have the satisfaction of seeing his work in print. The importance of this publication cannot be overestimated. The vocabulary will be based on the order of signs given in figs. 6 and 7. The author wishes to take this opportunity to thank Sir John Myres for his kindness and generosity, shown not only by his permission to reprint these tables, but also by his suggestions and comments on a preliminary draft of this article. While the opinions expressed are the author's own, and may, indeed, at times differ from Sir John's, many could not have been formulated without the evidence put at her disposal by him; footnotes 21 and 31 owe their present form to his suggestions, and many statements are the result of discussions with him on troublesome points.

³¹ About 1,800 *B* inscriptions are extant; of these

about 10 are not on tablets. There are a few graffiti on sealings (cf. *PM*, iv, figs. 603–604); a few bars; a L.M. III bowl with a painted inscription (cf. *PM*, iv, fig. 722); and one quite illegible graffito from the wall of the Palace (*SM*, fig. 27), destroyed by weathering soon after it was copied.

³² The "Man" and "Woman" tablets (*PM*, iv, figs. 686, 689) are among the largest; another (*ibid.*, fig. 687), also with many entries, is opisthographic. Other examples occur among the unpublished tablets.

³³ The painted inscriptions found by Keramopoulos, actually on the Cadmeia of Thebes, point in the same direction.

The various classical references to the Cretan claim have been quoted time and again. The two most apposite here are: Pliny, *N.H.* 13. 69: in palmarum foliis primo scriptatum . . . Suid. s.v. Φοινίκη γράμματα: Λυδοὶ καὶ Ἴωνες τὰ γράμματα ἀπὸ τοῦ Φοίνικος τοῦ Ἀγλήγορος εὐρόντος ἔλαβον. τούτοις δὲ ἀντιλέγουσι Κρήτες ὡς εὐρεθῆναι ἀπὸ τοῦ γράφειν ἐν φοινίκων πετάλοις.

pages were bound between wooden covers. The pages had all been cut to the same size, about 3×12 in., with straight parallel edges and rounded corners. The writing was parallel to the long axis. The resemblance to the long, narrow Knossian tablets is striking.

It is obvious that the Cretans must have used some perishable material for the bulk of their records. *B* inscriptions number less than 1,800. This is a large number, but not when translated into the equivalent number of pieces of paper or cards in a filing cabinet. Eighteen hundred recorded transactions dealing with grain, saffron, and other vegetable products, with livestock of assorted kinds, human beings of various types, tools, weapons, chariots, vessels of different shapes and material, storehouses, etc., could not possibly be the total number for a palace like that at Knossos, whose size, political importance and probable religious connections are self-evident. Every inscription carries proof in itself that we are dealing with a bureaucracy so elaborate that 1,800 records could be only a small fraction of those actually written.

Some conclusions to which we are driven by the form of writing employed also indicate that clay could not have been the only writing material known and used.

Two cups from Knossos, for example, have ink-written inscriptions (cf. note 21); writing on clay does not require ink, and one can hardly assume that ink was invented so that inscriptions might be written inside cups.

Then too, the handwriting of this class is extraordinarily facile. Any faults we might find with it are the results of writing too much, not too little. The tablets were found in various sections of the palace, where, apparently, there were "offices" devoted to some specialized activity. Since tablets from any given deposit are often in several "hands," it would seem that several scribes were connected with each "office," and therefore that a considerable number of scribes was employed. They could not have acquired the proficiency they display from 1,800, or even 18,000 short records.

Scratching signs on clay is difficult; and these signs are often so small that the finest pen-point is needed to transcribe them exactly. Yet they are quite legible, if we can use that term of a script whose individual signs have no known phonetic value. The cuneiform systems, where signs are formed by means of wedges *pressed* into the clay, seem to have been invented because it is so hard to scratch small signs on this medium. The numerous seal-impressions, and the printing on the *PD*, prove that the Cretans were familiar with a similar technique. In spite of this, they clung to their graffiti. The reason must be that they were used to writing in this way. Writing on a palm-leaf requires much the same technique. These various considerations permit us to label the long, narrow tablets the "palm-leaf" type.

All *B* tablets, "page" and "palm-leaf," have a tidy, well-arranged appearance. Many "page" tablets have their entries, consisting of a word, ideogram, number, and numeral-adjunct signs, neatly arrayed in columns with a sum at the bottom. The "palm-leaf" tablets seldom contain additions. Their contents resemble receipts, requisitions or summaries, and can be classified according to their format. Each type follows a standard pattern that is instantly recognizable.

Words are never carried from one line to the next, and numbers are always on the same line as the entry they accompany. If the space left on a line is not large enough to accommodate an entire group, everything is put on the following line. There are a few instances of erasures, substitutions, and the crowding in of inadvertently omitted signs, but these are exceptional.

Over 200 inscriptions of this class have been published, largely in the form of transcrip-

tions.³⁴ More *A* inscriptions are now available, but they are neither as homogeneous, nor as well-arranged, and, as the following discussion will show, the careful arrangement of the *B* inscriptions has played an important part in our understanding of this class.

No vocabulary list has as yet been published, and most scholars work from lists of their own, based largely on transcriptions and words mentioned casually and entirely out of context by those who have had access to unpublished material. Many words, it is true, occur more than once, and often in similar contexts. Because of the formal arrangement of inscriptions, fragmentary words appearing in certain positions on tablets of certain types can be restored with almost complete assurance of correctness.³⁵ It is, however, quite unsafe to formulate theories based on words whose very existence cannot as yet be verified.³⁶

Many different sign lists have been published for this class; each scholar, in trying to create a more satisfactory one, has added to the confusion by making up his own. This is a great disadvantage from the practical point of view, because it makes it impossible to cite signs or words in a printed text by means of numbers universally accepted as the designations of certain signs. Use of a standard list would have another advantage. As understand-

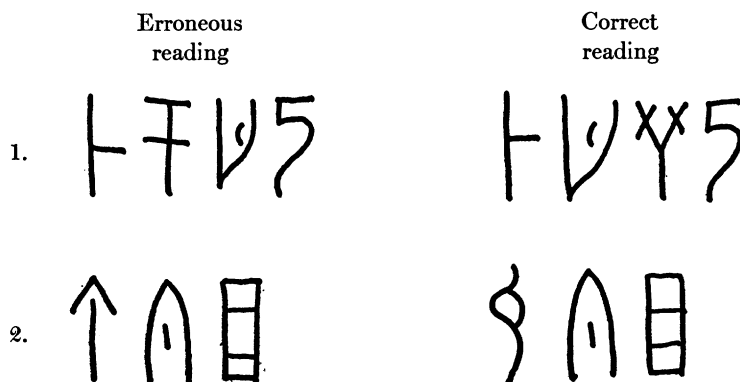


FIG. 5. ERRONEOUS READINGS CORRECTED.

ing of the script advances, corrections and emendations can be made in the standard list, with the certainty that the point at issue will be clearly understood by everyone. The many lists now in use, each with its own order of signs, tends to conceal the fact that there is no agreement whatever on the number of signs, the very existence of some of them, the standard form for each sign and its chief variations, the use of the signs (whether phonetic, ideographic or numeral-adjunct), etc. Perhaps worst of all, it makes the construction of a standard vocabulary impossible, because a vocabulary must be built on a standard "alphabetical" order, and when phonetic values of signs are undetermined, a rigid arbitrary order must be followed.

³⁴ Most of our information comes from transcriptions and a few photographs in *PM* (especially vol. iv), *MRechn.* and *Altkr.*; Hrozný has recently collected 139 of these in *Inscr.* I and II. The most important collections of photographs are in *AntCrét.*, pls. xxxviii and xxxix and *BSA.*, vi, pl. opp. p. 18.

³⁵ The restoration of the "Adze" tablets is based on this fact (cf. *AJA.*, 1944, pp. 64-75).

³⁶ A list of some errors in Evans' transcriptions has

been given in *AJA.*, 1944, p. 68, note 8. The author has also been guilty of making at least the two errors corrected in fig. 5. The first occurs in *AJA.*, 1944, p. 73 #10. It was a typographical error. The second is in *AJA.*, 1946, fig. 2, second word, and is due to the use of a photograph which gave a misleading impression. While the error is to be deplored, it serves the very useful purpose of proving that even photographs are not always reliable.



















































































































































AB	A	B	AB	A	B	AB	A	B	AB	A	B
I	 33	 58	19	 34	 53	38	 12	 13	54	 38	 16
2	 19	 25	20	 8	 7	39	 91	 33			 18
3	 19	 44	21	 29	 8	40	 42	 34	55	 26	 50
4	 13	 44	22	 35	 62			 30	56	 25	 50
5	 13a	 43	23	 9	 26	41	 41	 32	57	 24	 24
6	 17	 82	24	 49	 63	42	 43	 78			 36
7	 59	 84	25	 16	 54			 51	58	 47	 41
8	 63	 17	26	 32	 61	43	 25 cf 75	 19	59	 48	 42
9	 23	 18a	27	 67	 46	44	 44	 28	60	 46	 55
	 58	 18b	28	 20	 45	45	 28	 52			 40
10	 2	 45	29	 69	 45	46	 27	 46	61	 39	 56
11	 1	 37	30	 22	 47	47	 51	 29	62	 57	 97
12	 3	 9	31	 31	 23a	48	 24	 49	63	 41	 67
13	 4	 3	32	 76	 23b	49	 29	 21	64	 83	 48
14	 6	 5	33	 76	 39	50	 50	 64	65	 31	 94
15	 75	 38	34	 76	 35	51	 45	 60	66	 52	 94
16	 5	 10	35	 15	 10	52	 52	 27	67	 55	 94
17	 11	 14	36	 14	 14	53	 37	 22	68	 99	 81
18	 7	 11	37	 9	 11			 15	69	 73	 116

FIG. 6. LINEAR SIGNS AB COMMON TO SCRIPT A AND SCRIPT B AND THEIR RESPECTIVE EQUIVALENTS (A AND B) WITH EVANS' NUMERATION. (Reproduced by the kind permission of Sir John Myres)

PECULIAR TO SCRIPT A				PECULIAR TO SCRIPT B			
	40		75		114		73
	53 cf. B52		77		115		74
	56		78		116		75
	58		79		117		75
	59		80		118		76
	60 cf. B51		81		119		77
	61		81		120		78
	62		82		121		79
	63		83				80
	64		84				83
	65		85				84 cf. B8
	66 cf. B56		86				85
	67		87				86
	68 cf. 93		88 cf. B76				87
	70		88				88
	71		89				a
	71		90				b
	72		91				c
	73		92 cf. 103				90
	74		93				90
			95				91
			96				91
			97				92
			98				92
			99				93
			100				93
			101				94
			102				94a
			103 cf. 92				94b
			104				94c
			105				94d
			105a				94e
			106				94f
			107				95
			108				96
			109				97
			110				98
			111				99
			112				100
			113				101
							102
							103
							104
							105
							106
							107
							108
							109
							110
							111
							112
							113
							114
							115

FIG 7. LINEAR SIGNS PECULIAR TO SCRIPT A AND TO SCRIPT B, WITH EVANS' NUMERATION.
(Reproduced by the kind permission of Sir John Myres)

Figs. 6 and 7 are reproductions of the sign lists to be published by Sir John L. Myres in *JHS*, lxvi, to which the reader is referred for the commentary and general discussion.³⁷ They are based on all the known inscriptions and have the great advantage of being comparative lists of *A* and *B*. The order of the signs given here is that on which the vocabulary lists of *A* and *B* will be based in *Scripta Minoa*, II and III.

The numerical system of *B* seems to be identical with that of *A*,³⁸ but the numeral-adjunct signs are fewer, and often quite different. Here too a few complete additions confirm the theoretical values assigned to the numerical signs, and the same reasoning which indicated that "flying bird, cross" in *A* means "sum," leads us to suppose that three words, which may be related, have this meaning in *B* (fig. 4). These words appear in lists which deal with different objects, and the change in spelling may be the result of inflection for gender or number.³⁹

A very plausible meaning has been suggested for two other words, which are regularly found in a context of the following type: "Woman" ideogram, number; Word 1, number; Word 2, number. The theory is that these two words, because of the context in which they appear, mean "boy" and "girl."⁴⁰ Scholars have adopted this theory, but do not agree on which means "boy" and which "girl" (cf. fig. 4).

A study of *B* inscriptions makes it almost impossible to avoid the conclusion that the language there recorded was highly inflected. The various, but similar, forms of the words for "sum" and for "girl" and "boy" point in this direction, and so do the words which occur in similar contexts, but with different terminations, in the "Chariot" tablets,⁴¹ which are of the "palm-leaf" type, but unique in several respects, the most important being that they alone of all the *B* inscriptions seem to contain complete sentences.

The problem is to decide first, whether a variation in the spelling of two similar words is due to inflection or is merely coincidental, and second, if it is due to inflection, what kind of inflection. Great care must be exercised at this stage in our knowledge, to make sure that the contexts of the words concerned justify the assumption that we are dealing with inflection.

It has already been said that most of the "page" tablets contain lists or words, accompanied by ideograms, numbers, etc. It is immediately apparent that in certain lists a given sign, or a small number of signs, constantly occur at the ends of words, and in other lists, another sign, or small number of signs, recur as terminations. Comparison of these lists will show that a certain type of word which has the form ABCD in one kind of list, will have the form ABCE in another, where different terminations predominate. What is more, for these same words, a form ABX will reappear in specific positions on certain "palm-leaf" tablets, which, as has already been said, seem to contain inscriptions set down according to various rigid patterns.⁴² This change of form is so regular in the case of certain words, that it can be predicted, and since these words appear to be nouns, and seem to be inflected ac-

³⁷ The author is profoundly grateful to Sir John Myres and to the *Journal of Hellenic Studies* for permission to reproduce these tables in this country at such an early date.

Fig. 6 lists the signs common to *A* and *B*. A few signs peculiar to one or the other class are inserted because their shape or apparent origin made it desirable not to separate them from others of their group. Such signs are repeated in Fig. 7, in which signs peculiar to either class are listed in the order originally as-

signed them by Evans.

³⁸ Cf. *PM*, iv, pp. 691-693 and fig. 676.

³⁹ These are discussed, so far as published material is concerned, in *AJA*, 1944, pp. 66-67.

⁴⁰ Cf. Cowley, "A Note on Minoan Writing," in *Essays in Aegean Archaeology*, pp. 6-7 and *PM*, iv, pp. 708-709.

⁴¹ Cf. *AJA*, 1945, pp. 143-151.

⁴² Cf. *AJA*, 1946, pp. 268-276.

according to the same rule, the author is tempted to call them the "First Declension" of *B*. Fig. 8 gives six sample "paradigms."⁴³

It has hitherto been impossible to identify any verbs. It is quite possible that verbs occur

	A	B	C	D	E	F
Case I	𐀓𐀖𐀗𐀘	𐀓𐀖𐀗𐀘	𐀓𐀖𐀗𐀘	𐀓𐀖𐀗	𐀓𐀖	𐀓𐀖
II	𐀓𐀖𐀗𐀘	𐀓𐀖𐀗𐀘	𐀓𐀖𐀗𐀘	𐀓𐀖𐀗	𐀓𐀖	𐀓𐀖
III	𐀓𐀖𐀗	𐀓𐀖𐀗	𐀓𐀖𐀗	𐀓𐀖	𐀓𐀖	𐀓𐀖

FIG. 8. NOUN PARADIGMS?

in the introductory statements preceding lists of items on "page" tablets. They should also occur on the "Chariot" tablets, which, as has already been said, give every appearance of containing complete sentences. The four words in fig. 9 occur in published "Chariot"

	A	B
I	𐀓𐀖𐀗𐀘	
II	𐀓𐀖𐀗𐀘	𐀓𐀖𐀗𐀘
III	𐀓𐀖𐀗𐀘	

FIG. 9. VERBAL FORMS?

tablets.⁴⁴ They may possibly be verbs because of the following considerations. First, they usually occur at, or very close to, the end of a sentence, a position assumed more often than not by the verb in a highly inflected language. Second, they are unusually long,⁴⁵ and verbs

⁴³ Types A and B have been discussed in detail in the article mentioned in note 41. The others (C-F) have been added because the "cases" occur in the same contexts and often in the same inscriptions as A and B. E does not follow quite the same pattern; the "cases" take the forms ABCD, ABCE, ABC. All the forms mentioned, with the exception of E III and F II, have been published, although they do not all occur in published inscriptions. Types A and B are represented by a good many different words, the others belong to

rarer types, although the words listed occur frequently.

⁴⁴ All occur in "Chariot" tables transcribed in *PM*, iv: column A, I in fig. 764 f; II, figs. 764 b and e; III, fig. 767 a; column B, II in fig. 766 c.

⁴⁵ The average *B* word has 3 or 4 signs; 2 and 5 sign words are found less often. There are only 24 words in all *B* with six signs, and only 6 with seven signs, and some of these are compounds made up of two known words, for which the word-divider may have been omitted.

are often long in inflected languages because they may be inflected simultaneously for person, number, gender, tense, mood, etc. The word in column B of fig. 9 occurs only once but is used in exactly the same way as the others, and in exactly the same position on a "Chariot" tablet, and has the same termination as one (the most usual) form of the word in column A. It is not certain these words are verbal, but it seems highly likely.

Fig. 10 shows how the information in fig. 8 may be interpreted to explain the phonetic relationships of eight of the signs involved in the "inflectional" variations of the "First Declension."⁴⁶

Everything that has been said above about inflection is extremely tentative. There is enough evidence to make it necessary to investigate the inflection theory thoroughly, and











Consonant	Vowel 1	Vowel 2
1		
2		
3		
4		
5		

FIG. 10. BEGINNING OF A TENTATIVE PHONETIC PATTERN.

⁴⁶ The assumptions on which fig. 10 is based are the following: (1) *B* is a simple syllabary each of whose phonetic signs represents a consonant-vowel combination, with the possibility that either may be zero, that is, that pure consonant or vowel signs are possible. This assumption has not been proven, nor is it provable at present. It may, indeed, be entirely erroneous. It is used by the author whenever it is necessary, in following out an argument, to see what would be implied in terms of a syllabary, because the number of phonetic signs in *B* closely approximates those of the Cypriote syllabary, which is of the type described. An assumption that the phonetic values of *B* signs are connected with those of signs of the Cypriote syllabary is neither necessary nor desirable at this stage (cf. below, p. 100) and no implication to this effect is intended. When some *type* of syllabary must be postulated, it seems only sensible to postulate a type which is simple and at the same time agrees with the few facts at our disposal; other types require either too many signs (for example, the cuneiform) or too few

(like Sanskrit).

(2) The second assumption is that the stem of each of the five words includes the initial consonant of the penultimate signs of "cases" I and II, and of the final signs of "case" III.

(3) The third assumption is that all the words in the first five columns (the sixth must be ignored because it does not follow the pattern exactly) belong to the same "declension" and that the vowel following the last consonant of the stem is the same for all of them in "cases" I and II, and changes to another vowel, which is the same for all, in "case" III.

Since all three assumptions are unprovable, fig. 10 has no validity. If, however, an inflection pattern can be restored for *B* and a reasonably complete phonetic pattern can be constructed on the basis of this inflection pattern, using assumptions similar to those above, and we find that the phonetic relationships are mutually confirmatory, the validity of the original assumptions might be proven by this very fact. At this stage, no such proof is possible.

without prejudice. If it is right, more evidence will appear; if more evidence is not found, it is wrong.

B at present seems to offer the best chance for ultimate decipherment.

THE MAINLAND SCRIPTS

Our information about these inscriptions is so limited that it is impossible to decide whether all belong to the same script system. They fall into two categories: inscriptions painted on the necks and shoulders of stirrup vases found at Thebes, Tiryns, Eleusis, etc., and clay tablets found at Pylos.

The inscriptions painted on pottery are quite inconsiderable in number.⁴⁷ They contain both words and signs that are entirely unique. A few of the words resemble, or are identical with, words in *B* or *Py*, and the three groups of scripts have many signs in common. There is not enough evidence to determine whether the differences are decisive, or are outweighed by the similarities.

We are told that approximately 600 inscriptions were found at Pylos. Of these seven have been published as photographs.⁴⁸ The published inscriptions include both the "page" and the "palm-leaf" types. They share with *B* some words, including those for "boy" and "girl" and "sum" (cf. fig. 4), and a few others.⁴⁹

They are strikingly similar to *B* in the forms of the signs used, and in writing technique, but there are noticeable differences as well.

On the whole, it is safe to say that these scripts from the mainland, which are some two centuries later in date, are derived from *B*. Whether the languages are the same, or even similar, still remains to be seen.

THE CYPRO-MINOAN SCRIPT

This system has an importance all out of proportion to the material available. The actual inscriptions are very few in number: five inscribed terra-cotta balls from Enkomi;⁵⁰ some inscribed seals, and a few short inscriptions on pottery.⁵¹ All discussions of this script and

⁴⁷ *Inscr.*, I, pp. 1-10, has transcriptions, translations and commentary on 40. *PM*, iv, pp. 737 ff. has transcriptions, a few drawings, a sign list, and a general discussion; *HT* has some excellent photographs and transcriptions which differ in certain details from those of Evans and those of Hrozný which are based on Evans'; *HT*, fig. 63 gives a list of the signs used.

⁴⁸ Blegen and Kourouniotis, "Excavations in Pylos, 1939," in *AJA*, 1939, pp. 564-570, figs. 9-11 (four photographs); *ILN*, July 3, 1939, p. 930 (three photographs). An eighth has recently appeared in a pamphlet on the work of the American School of Classical Studies at Athens.

⁴⁹ Cf. Sundwall, "Knossisches in Pylos," *AAA*, xiii: 8, 1940.

⁵⁰ Photographs, transcription and translation (based on the Cypriote) by Persson, "Some Inscribed Terra-cotta Balls from Enkomi," in *Symbolae Philologicae O.A. Danielsson*, pp. 169-173. Photographs of three and transcriptions of all five in *PM*, iv, figs. 742-743.

⁵¹ Transcriptions of two cylinder seals in *PM*, *l.c.* note 50; transcriptions and discussion of the seals

and inscribed pottery in *CM*, pp. 268-278 and figs. 12-16.

Daniel, in *CM*, has done four things. His tables and discussion in the main part of the text analyze, on the basis of sign-lists and inscriptions available up to 1941, the relationships in form between Cypriote, Cypro-Minoan, *P*, *A*, *B*, and the Mainland scripts. Appendix I comprises the *editio princeps* of the inscribed pottery found at the Bamboula site, Kourion. Appendix II contains the essential bibliography of the subject, and a list of all signs that might be considered Cypro-Minoan.

A very important contribution to the study of signs on pottery is made, and one which makes it necessary to revise all work done hitherto on pottery marks in connection with the Minoan scripts. In the first place, the position of the sign (or signs) on a vessel, the way it was made (painted, incised, impressed, etc.), and the state of the clay when it was made are taken into consideration. Then the evidence for dating and provenience is analyzed, from the archaeological data afforded by the site where it was found, and from

all the sign lists for it include the many single signs found on the handles or bottoms of vases, which, like similar signs on wall-blocks, ingots, and other artifacts, are craftsmen's or ownership marks, and as such cannot be considered an integral part of any script system. Some useful facts might be learned if we were in a position to study all pottery marks, or all wall-marks, found in Minoan territory, or of Minoan provenience, but they have been published in such a scattered and desultory fashion that no conclusions of any kind are possible.⁵²

Cypro-Minoan is one of the latest of the Minoan scripts. It seems to be roughly contemporary with the Mainland scripts, but has an added importance because of the hope that it may prove to be a link between classical Cypriote, which can be read, and one or more of the Minoan scripts.

At present, it is an unsatisfactory link, because the extant remains are so few. Even when the pottery marks are included in the sign list, the number of signs identical with Cypriote on the one hand, and all the Minoan scripts on the other is disappointingly small.

In spite of this, intrepid scholars have attempted to decipher Minoan by assigning Cypriote values to the signs on the basis of real or fancied similarities in form. All these attempts have been unsuccessful, and this is hardly surprising when we consider the facts.⁵³

In the first place, the Cypriote syllabary itself has not been completely established. While, theoretically, it requires only 65 signs, the local syllabaries sometimes use widely differing signs for the same sounds, and, in several cases, the same sign has different values in different localities. Equations are made, not by using the localized versions of Cypriote separately, but by using all the variants together, which means that at least 120 signs, not 65, are considered.

The sign lists for the various Minoan scripts have also not yet been established. Here too, equations are made by using all the signs of all the scripts, phonetic, ideographic, numeral-adjunct, and sometimes non-existent. The number of different signs is well over 300.

In spite of the large number of signs therefore available, identities in form are quite rare, and most of these are for simple signs, like the "cross." To say that the number of actual identities is as large as 15 is to exaggerate; we may double that number if we use what, by some use of the imagination, can be called similar signs. It requires a very small knowledge

the examination of the vessel itself, as well as from the sign. As a result of this method, inscriptions usually grouped together as Cypro-Minoan are divided into six classes, only the first of which is certainly Cypro-Minoan.

All inscribed artifacts should be dealt with in a similar fashion, before conclusions are based on the data they seemingly reveal. It goes without saying that only a specialist can make the proper distinctions.

⁵² The problem of finding out what evidence exists for any of the Minoan scripts is two-fold: determining what has actually been found; and discovering how much has been published, and where. There is a real need for some central bureau to which all finds can be reported and where a record of what has been published can be kept.

Brief references to pottery which might bear Minoan signs are found scattered through dozens of works.

The only extensive publication of such marks, aside from that in *CM* for Cyprus, is of the marks from Melos (Hogarth, *BSA*, iv, pp. 1-48 and Edgar and Evans, *Excavations at Phylakopi*, pp. 177 ff.) and from Egypt (Petrie, *Illahun, Kahun and Gurob*, pl. 15). Neither of these can be used for comparison with *CM* because the information given is not detailed enough.

In the same way, the wall-signs from Mallia are discussed in *EM*, pp. 90 ff., and those from Phaistos several times by Pernier, the latest publication in *Il Palazzo di Festós*, pp. 400 ff. Those of Knossos have never been completely published, although references to them are scattered through *PM* and Evans' earlier excavation reports in *BSA*.

⁵³ For comments on the uselessness of this method, cf. *Inscr*, I, p. 8, and Sundwall, "Methodische Bemerkungen zur Entzifferung minoische Schriftdenkmäler," *Eranos*, xlv, 1947, p. 3.

of elementary arithmetic to realize that when we say 30/120 of Cypriote is equal to, or similar to, 30/300 of Minoan, we are saying very little.

What has been said of Cypriote is even more true of most of the other syllabaries and alphabets which have been used in order to find phonetic values for Minoan. It is possible, even probable, that a relationship will eventually be established between one or more of the Minoan scripts and one of these other script systems, but it will have to be done on some sounder foundation than guess-work based on incomplete sign lists and identities, real or imagined, in the forms of a small fraction of the signs involved.

This brief survey should show that much still remains to be done. More than half of the most important inscriptions remain unpublished; the text of the published inscriptions has not been established; sign lists are often inadequate, incorrect, and out-of-date; no vocabulary lists have been published.

The question of the relation of the scripts to one another has not yet been settled, in spite of unanimous agreement that they are in some way derived from a common source. It is usually taken for granted that they all record the same language. It is impossible to examine all the scripts in this connection, because so many of them offer little evidence of any kind. It will perhaps clarify the situation if we examine the reasons for thinking that *A* and *B* record the same language.

The basic reason for this assumption seems to be that, since Minoan culture is, on the whole, quite homogeneous from the earliest to the latest period, the people connected with that culture necessarily spoke the same language. This is certainly not a valid argument. The culture of Europe, as least so far as physical evidences are concerned, has been homogeneous for many centuries, yet different languages continue to be used.

Another reason seems to be the argument that *similarity* of script implies *identity* of language. This argument is never, of course, explicitly stated, because the statement is, in itself, a refutation. The cuneiform scripts, or modern alphabets, are also basically similar, yet they record many different languages. As a matter of fact, actual *identity* of script does not necessarily imply even *similarity* of language. *A* and *B* are far from identical. Comparison of figs. 6 and 7 will show how very different they actually are. What is more, identical signs are often used in very different ways in the two scripts, while the signs peculiar to one or the other are in many cases those most frequently used, and, in *B* at least, used most often in terminations which show inflection. The *prima facie* evidence of the scripts themselves shows we are dealing with different languages.

Lists of identical words found in both scripts are sometimes cited as proof of the identity of the languages. The cogency of this argument depends entirely on the number of such instances which can be cited. Since standard word lists do not exist, it is difficult to state, with any degree of accuracy, the number of words involved. There are, however, in round numbers, about 700 different sign groups (some of course may be inflectional variants of one and the same word) in *B*, and about 400 in *A*, if we consider only published material. Of these, 15, *at most*,⁵⁴ are identical. This small number is certainly more likely to be the

⁵⁴ Const. Dem. Ktistopoulos, who has devoted much study to the relationship of the two Linear classes, lists ten such words, of which eight are certainly identical in spelling, in a paper delivered before the Academy of Athens on March 10, 1947, and privately issued, with

the English title "Some Remarks on the Minoan Language," and an English resume of the contents. The article itself is in Greek. The list mentioned is given on p. 18.

result of geographical and chronological propinquity and similarity of culture, than of identity in language.

A somewhat longer list, consisting perhaps of 50 pairs,⁵⁵ can be drawn up of words which have two or three consecutive signs in common. The most that can be said for such pairs is that their spelling is somewhat similar. No semantic connection can be demonstrated because their meanings are entirely unknown. The English words: gentian and gentile; convection and convention; hearse and heart, also have certain signs in common; and that is all that can be said for them. By the same process of reasoning, one can prove that English and Latin are identical, and indeed, make the proof much more convincing.

If any more cogent arguments than those given above exist to show that *A* and *B* record the same language, they are unknown to the author.

Two very telling arguments exist to disprove such identity. First, the word for "sum" is known with a fair degree of certainty in both scripts, and is different in each. Second, inflection of the type so noticeable in *B* does not seem to exist in *A*. It is seldom possible to find words in *A* which may have the same stem, and when one does (cf. fig. 3) the variations are of an entirely different type.

The only safe course at present is to proceed on the assumption that each of the scripts records a different language. As evidence accumulates, similarities will become self-evident, if they exist.

People often say, in connection with the Minoan scripts, that an unknown language written in an unknown script cannot be deciphered. They are putting the situation optimistically. We are dealing with three unknowns: language, script and *meaning*. A bilingual inscription is useful because it gives meaning to an otherwise meaningless combination of symbols. Those who deplore the fact that no Minoan bilingual has been found, forget that a bilingual is no guarantee of immediate decipherment. The Rosetta Stone was found in 1799. Champollion began his intensive work in 1814, but it was not till 1824, a quarter of a century after the Rosetta Stone was discovered, that he was able to publish convincing proof that he had found the clue to the decipherment of Egyptian.

Let us face the facts. An unknown language, written in an unknown script cannot be deciphered, bilingual or no bilingual. It is our task to find out what the language was, or what the phonetic values of the signs were, and so remove one of the unknowns. Forty years of attempts to decipher Minoan by guessing at one or the other, or both, have proved that such a procedure is useless. Minoan cannot be deciphered, because we do not know if "Minoan" existed. We have six Minoan scripts. We can try to decipher one of them, and then, by its help, perhaps decipher the others.

Linear Class B for many reasons affords the best starting-point. If, as seems probable, it was a highly inflected language, it should be possible to work out some of the inflection pattern. Once this is done, two possibilities exist. The inflection pattern may provide a clue to the language used, or, at any rate, to the language group. In that case we have a more or less known language written in an unknown script.

On the other hand, the inflection pattern will also furnish some information about the phonetic relationship of the signs, perhaps enough to show that some of the sign sequences resemble those of some script system now known. In that case, we would have an unknown language in a more or less known script.

The fact that the different scripts may record different languages is an advantage, not a disadvantage. It means that if we fail with *B* we can try one of the others. The people of

⁵⁵ Ktistopoulos, *loc. cit.*, note 54, lists about 30 such examples.

ancient Crete did not live in a vacuum, nor did they disappear suddenly and completely. They left traces of their languages behind. These traces are no good to us now, because we do not know enough about their scripts to use them intelligently.

The task before us is to analyze these scripts thoroughly, honestly, and without prejudice. Any discussion of the possibility of ultimate decipherment is premature. Decipherment must begin with the transliteration of the signs used in a given Minoan script. This means we must know what phonetic values are to be assigned to each symbol. Before that can be done, we must know which signs had phonetic values, and how often and in what juxtapositions these signs are used, and how many phonetic signs there are in a given script.

It will be obvious from what has been said above that we do not yet possess this information for a single one of the Minoan scripts, and, furthermore, that *A* and *B* are the only scripts for which there is a possibility of getting it in the near future. The type of syllabary used cannot be determined until we know how many signs were used phonetically in a given system.

When we have the facts, certain conclusions will be almost inevitable. Until we have them, no conclusions are possible.

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