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A COMPARISON OF THE ACCOUNT TABLETS OF SUSA IN THE PROTO-ELAMITE SCRIPT WITH THOSE OF HAGIA TRIADA IN LINEAR A

Genesis of this study. In an article of 1949[1], and three years later in the introductory remarks to Scripta Minoa I (page 1), the late Sir John Myres referred to the resemblances in both style and technique between the inscribed clay tablets of Minoan Crete and those of early Babylonia. He was impressed in particular by the common features of the account archives of Hagia Triada in Crete and the much earlier archaic Sumerian account texts from Uruk, and although there was no question of a direct borrowing of ideas, he considered that this technique of writing might have passed from Mesopotamia through north Syria to the Mediterranean, slowly and through various intermediary stages.

In his draft text for the Evans edition of the Linear A documents (W. C. Brice [ed.], Inscriptions in the Minoan Linear Script of Class A, Oxford, 1961; hereafter referred to as ILA), Myres dealt at length with the resemblances between the archives of Hagia Triada and those of early Uruk, but for reasons of economy this part of his text had to be condensed into two short paragraphs on page 1. While completing the edition, the present writer did not follow up Myres's suggestions in this regard, partly in order to economize effort, and partly because it seemed that any attempt to interpret the documents in the light of usages in other scripts might introduce prejudice into the main task of their plain analysis.

However, once the edition of the Linear A texts was completed, an examination of early Mesopotamian account tablets made it possible to confirm and elaborate Myres's opinion that they had certain features in common with those of early Crete. But it seemed that the points of comparison, though evident in the Uruk archives studied by Myres, were still more clear and specific in the account tablets of early Susa written in the so-called Proto-Elamite script,

[1] The geographical background of the Aegean Civilization, Archiv Orientální, 17 (1949), Nos. 3—4, pp. 196—204

datable to the period 2,900—2,600 B.C.[2] Chapouthier, in publishing the Mallia archives, had indeed already drawn attention to resemances between the Proto-Elamite and Minoan scripts[3], and Deimel had remarked in an article that the "double-axe" sign was common to both[4].

A talk on the resemblances between the Proto-Elamite script and Linear A was given on 8th December 1961 to a seminar organized by the Department of Greek in the University of Edinburgh, and copies of six mimeographed sheets drawn up for that occasion were circulated to various colleagues, in some cases together with a page of commentary dated 16th February 1962. Subsequently two relevant papers were published: a note in Kadmos, I, i (1962), pp. 42—48, "Some observations on the Linear A Inscriptions"; and a study of "The writing system of the Proto-Elamite account tablets of Susa" in the Bulletin of the John Rylands Library, Vol. 45, No. 1 (September 1962), pp. 15—39. Since both these articles are mentioned frequently in what follows, they will be referred to by the abbreviations Kad. in the first case, and Ryl. in the second.

1. *Writing Technique.* A first and obvious point of comparison between the archives of Hagia Triada and those of early Susa is in respect of the vehicle and technique of writing. In both cases clay tablets were inscribed before drying with a stylus which was employed to draw signs of often elaborate form, made up of combinations of straight and curved lines and punctuations. There are differences of detail. The Susan tablets, for instance, vary more markedly in dimension, though their average size is approximately the same as that of the examples from Hagia Triada. The Hagia Triada tablets are turned on a vertical axis, those from Susa usually on a vertical but sometimes on a horizontal line of rotation, in which case the connecting edge may also be inscribed. The totals were sometimes written at Susa with the tablet inverted, a practice unknown at Hagia Triada. Finally, the Susan scribes wrote from right to left across the wider dimension of the oblong face, those at Hagia Triada

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[2] Mém. Miss. archéologique de Perse (... en Iran), VI (1905), XVII (1923), XXVI (1935) (V. Scheil), XXXI (1949) (R. de Mecquenem). In this article the tablets are referred to by the volume number as above followed by the index number of the tablet in Arabic numerals.

[3] F. Chapouthier, Les Écritures minoennes au Palais de Mallia, etc. (Études Crétoises II, Paris, 1930), p. 9, fig. 6.

[4] A. Deimel, Ein unerklärtes Zeichen der Keilschrift, der proto-elamitischen und kretischen Schrift, Archiv Orientální, 17 (1949, ded. F. Hrozný), i, pp. 112—16

in the opposite direction across the narrower span[5]. But these differences, even in combination, are less significant than the consideration that the general medium and style of the Cretan archives can nowhere be matched so closely as in early Elam.

2. *Numerical system.* In both places, whole numbers appear to have been computed on a decimal basis; though the Proto-Elamite, unlike the Linear A script, had, according to the latest view, a separate sign for 300. The signs for 1 and 10 and the more common of the two signs for 100 in the Susan script closely resemble their equivalents at Hagia Triada. In both scripts, too, fractions were expressed by symbols indicating aliquot quantities, arranged cumulatively as necessary. In all these respects the system in use at Hagia Triada was more akin to the Proto-Elamite than to the archaic Sumerian, in which the fractions were more complex and the integers over 10 were computed on the sexagesimal principle.

3. *Signary.* Both scripts employ signs built up from lines and punctuations, of which only a very few are of pictorial form, the majority consisting of apparently abstract patterns. In some cases it would be possible to compare the appearances of particular signs: for instance, the "double-axe" sign 18 (Ryl. Fig. 1) with L 52' (ILA Table 1); the "water" sign 33 with L 58; or the "facade" sign 64 with L 75'. But at the present stage it would be safer to treat these cases as coincidental. Far more significant is a comparison of the size of the two signaries, each of which probably comprised between 100 and 200 distinct symbols.

4. *The use of ligatures.* Both scripts make use of the device of linking signs in certain cases. These ligatures are formed sometimes by joining two signs, sometimes by combining a sign and a numeral. One difference is that while in the case of Linear A the identification of the components of the ligatures is usually clear (ILA Table 3), the Susan signs are frequently varied by superimposing patterns of hatchings, chevrons and punctuations which cannot be easily recognized as separate symbols. The most usual purpose of these ligatures in both scripts is evidently to indicate different varieties, qualities or quantities of a general object or idea. An instance from Susa may be seen on XVII 43 (Fig. 2), where two species of the "sack" sign (Ryl. Fig. 1, no. 17) are enumerated and added together in the total; the common total of the two variants of sign 67 in

[5] In the transcriptions in Figs. 1 and 2 the signs are rearranged from left to right, for ease of comprehension and of comparison with the Hagia Triada transcriptions.

XVII 17 (Fig. 1) may be compared; while an instance from the Linear A archives, HT 116 (Fig. 2), shows in the third "commodity" column four ligatured varieties of the "sedge" ideogram (L 89) separately listed but totalled under the heading of the simple sign.

But there are other cases in both scripts where the purpose of the ligatures is less apparent. In Fig. 2, a comparison of three phrases, from XVII 30, 2 and 15, would indicate that at Susa the "tablet" and "gur" signs (nos. 1 and 5) can be written juxtaposed, in ligature, or separated by other signs; while XVII 5, 26 and 81 show signs 2 and 1 in the form 2 plus 1, 2 inside 1, and 2 plus the ligature just mentioned. It is not clear whether these are simply alternative modes of writing, or whether the different ways of combining signs convey different shades of meaning or emphasis. But in any case it is apparent, as with the similar instances in Linear A discussed in a recent paper by Grumach[6], that the signs involved cannot be interpreted phonetically and must be understood as logograms conveying whole ideas.

5. *The structure of the accounts.* The formulae used by the scribes of Hagia Triada are discussed and listed in ILA pp. 6—7[7]; those of the Susan archives in Ryl. pp. 29—32. It is now apparent that in each script the various formulae are based on the following principles. The simplest cases associate one or more ideas with a numeral. More usually the inscription consists of a heading, comprising one or more signs, which controls or refers to a succeeding list of subsidiary or secondary items. These items in turn may take the form of a single sign or of a group of signs (VI 217, Fig. 2, which carries no opening heading). In some cases, such as HT 116 (Fig. 2) and XVII 17 and 112 (Fig. 1), a "principal" heading (a sign-group) controls a list of "subsidiary" sign-groups, each of which is associated with one or more "tertiary" ideas, indicated by single signs and adjacent numerals.

The numerals are sometimes totalled, either at the foot of the "secondary" items (XVII 18, Fig. 1; cf. VI 217, Fig. 2, where however the sum is too large by three units), or with reference to each of the "tertiary" notions (XVII 112, Fig. 1; HT 116, Fig. 2).

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[6] E. Grumach, The question of ligatured signs in the Cretan Linear Scripts, Bull. John Rylands Lib., Vol. 45, No. 1 (Sept., 1962), pp. 50—51 and Fig. 1

[7] Though it may be remarked that, in the light of subsequent study, the author would now prefer to replace the word "name" with the non-committal phrase "sign-group", and would be less confident about the use of the terms "commodity" and "transaction sign".

The Susan scribes did not make use of any special formula with which to preface their totals, like the familiar "flying bird plus cross" of Hagia Triada (HT 116, Fig. 2). They sometimes stated the common feature, to which all the numerals referred, at the close of each item and again before the total, as on VI 358 and 220 (Ryl. Figs. 3, 4) and VI 353; but sometimes they only indicated this common feature, simply or in paraphrase, before or after the first item, and repeated it alone before the total (Ryl. p. 31 §§ 6, 7; cf. XVII 18 and VI 217 on Figs. 1 and 2).

A study of the application of these principles brings out an important general conclusion with regard to both scripts; namely, that particular signs may either stand singly or be included within groups, but in either case they fulfil the same function. In HT 115a, for example, the "hand" (L 100) and "corn" (L 42 in its ligatured form Lc 8) signs stand separately in the heading and refer to the whole succeeding list; but on the b side of the same tablet they are omitted from the heading since they only refer to certain specific items in the list, to which they are attached. In this case they are separated from their associated items by punctuation, but not always in HT 93, for example. The usage at Susa of sign 32, the triangle of punctuations, may be compared. In XVII 45 (Ryl. Fig. 5) it stands separately before the total; in the headings of XVII 153 and 490 (Ryl. Fig. 6) it refers to the succeeding lists; while in XVII 112 (Fig. 1) it is not found in the heading but in association with ten of the thirteen secondary items.

The different status of L 56 on HT 89 and HT 96a (Kad. p. 42 § 1), and of the "wings" sign (Ryl. Fig. 1, no. 53) on XVII 118 and XXVI 220 (Ryl. Figs. 5, 4) may be quoted among other instances in both scripts. It appears that in each of these archives a number of signs may stand alone, especially in headings or in "tertiary" positions, or may be fused within sign-groups. The more the behaviour of particular signs is examined in this light, the more the first apparent distinction between free-standing "ideographic" signs and those characteristic of sign-groups tends to vanish. An inspection of the Linear A vocabulary will confirm this impression in the case of that script. There is no rigid distinction between signs which stand separately and those used in groups. The difference is one of degree only, some signs being more frequently written in one fashion than the other[8]. It follows further that there can be no sure distinction

[8] Viewed in this light, several features of the now usual division of the Linear B signary into syllabic signs and ideograms appear doubtful. The "cat's head" and

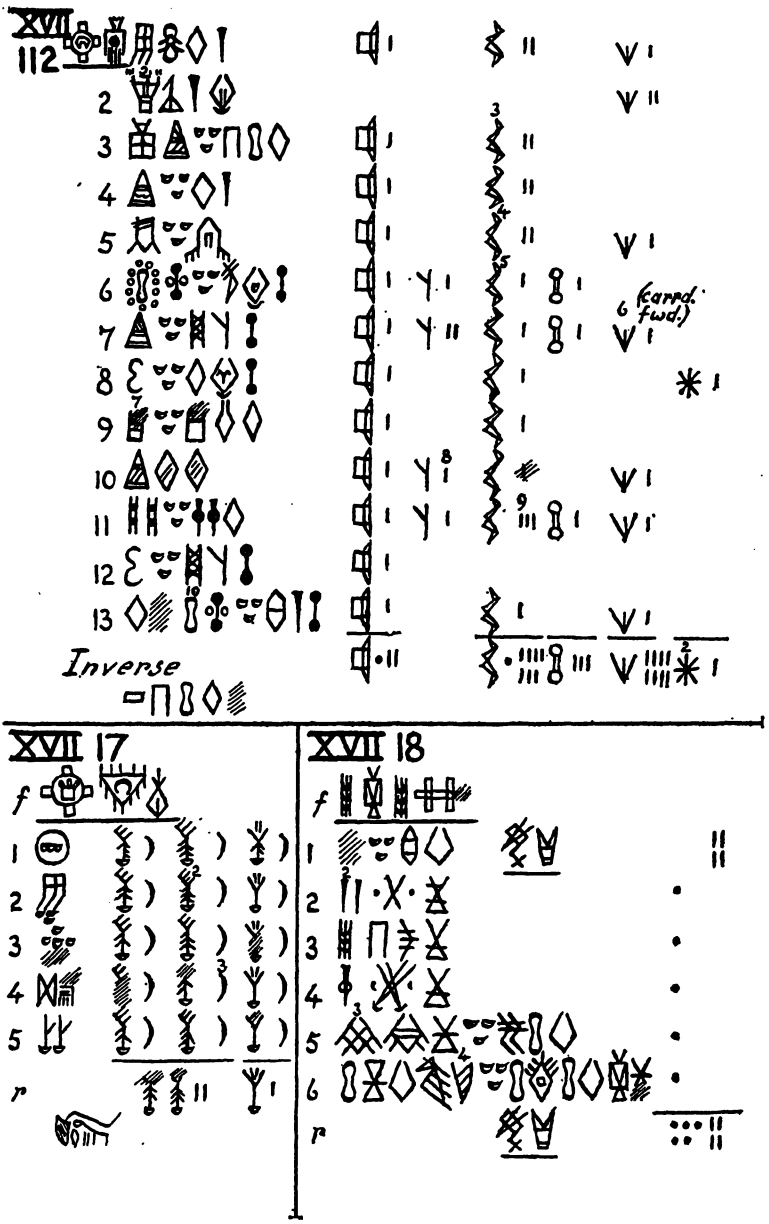

Fig. 1. Transcriptions of Proto-Elamite texts

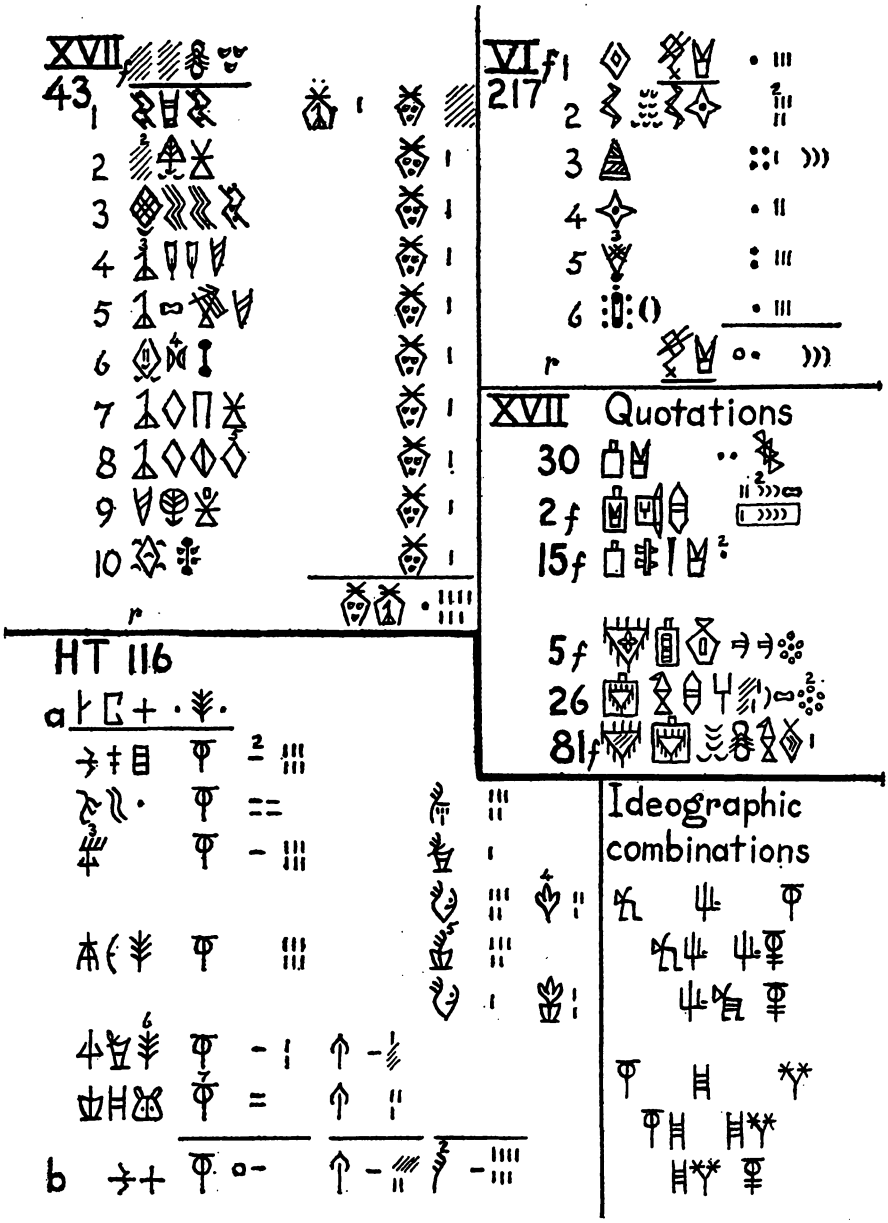

Fig. 2. Transcriptions of texts in the Proto-Elamite script (above) and Linear A (below)

between signs used ideographically and signs used phonetically. In both scripts the analysis of the formulae produces powerful evidence for regarding all the signs as being used everywhere in the same fashion, namely as ideograms.

6. *The arrangement of the signs.* Additional evidence that both scripts were of an essentially ideographic nature is provided by a study of the ways in which the signs are ordered.

a) Preference for particular positions in sign-groups. Instances in Linear A were noticed at the top of page 6 of ILA. The "double-axe" (L 52) and "hand" (L 100) signs are usually placed in the front of sign-groups, the "drop" (L 26) and "fig-tree" (L 60) signs at the end. Examples from Susa were remarked in Ryl. pp. 27 to 28 § 1. The "open cross" sign (no. 3) almost invariably stands at the head of inscriptions, as in XVII 17 and 112 (Fig. 1), while the "gur" sign (no. 5) is usually in a terminal position in sign-groups. It would be expected that individual signs in a syllabic script would occur more frequently in some positions than others; but not to the extent that is characteristic of these two scripts.

b) Clustering of particular signs in certain contexts. This feature was illustrated with regard to Linear A in Kad. p. 43 § 5. It is also very characteristic of the Proto-Elamite tablets. For instance, the "banner" sign (no. 22), rare in general, occurs several times on XVII 43 (Fig. 2) and on XVII 153 (Ryl. Fig. 6). The relative frequency of any particular sign would be fairly constant in a syllabic script; but not in an ideographic script, where certain concepts would need expression more frequently in some contexts than in others. One instance of how this might happen is observed with respect to the usage of the Susan sign no. 32 in § 5 above.

c) The occurrence in the same list of a sign alone and in combination with another sign or a sign-group (cf. Kad. p. 46 § 7). The case of L 8 in HT 119 may be compared with those of L 95 in HT 6 and L 29 in HT 11b. A parallel instance at Susa may be seen in the incidence of sign 63 in the first and sixth items on XVII 45 (Ryl. Fig. 5); and the context of the "open star" (sign 65) in items 2 and 4 of VI 217 may be compared on Fig. 2. In the light of a general study of these systems of writing, it may be suggested that the difference is similar to that between a sign

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"pig's head", syllables 80 and 85 of the Wingspread classification, reappear as ideograms 145 and 108; while several "syllabic" signs, for example 44, 59 and 61, which are certainly used ideographically, are absent from the catalogue of ideograms.

written alone and in ligature. In one instance the idea is conveyed simply, in the other it is qualified by association with one or more others.

d) Reduplication of signs. This is one further feature which would be expected to be much less common in a syllabic script than it is in both these archives. Examples from Linear A were described in Kad. pp. 43 and 46 § 5, and from the Proto-Elamite accounts in Ryl. p. 28 § 2. There are cases in items 3 and 4 of XVII 43, illustrated in Fig. 2. Such reduplication would be an extremely rare chance in purely syllabic writing; though Evans suggested that instances in Linear B might be 'Lallnamen'. In ideographic writing, however, and in scripts like the ancient Egyptian which employ both ideographic and phonetic characters, duplication of signs may be used to denote plurality or emphasis.

e) Inversion of pairs of signs. In view of their comparatively small size, this is such a common feature of both scripts that it calls for an explanation. Examples from Susa were noticed in Ryl. pp. 28—29 § 5, and from Hagia Triada in Kad. pp. 46—47 § 9. That adjacent signs should occur in either order would seem a remote possibility in syllabic usage; but in ideography the order of signs in a connected pair may be a matter of smaller relevance. At most it would alter the emphasis of what was expressed, while in phonetic writing it would change the entire meaning.

f) Palindromic arrangements and bracketing. Several palindromic triplets, that is, signs arranged in the order A-B-A, and one such group of five signs, were noticed in the Susan tablets in Ryl. p. 28 § 4. There is an example, one of common occurrence, in the heading of XVII 18 (Fig. 1), and another two in items 1 and 8 of XVII 43 (Fig. 2). The case in item 2 of VI 217 (Fig. 2) is of particular interest because the signs involved (39 and 53) are clearly used in an ideographic fashion in XVII 118 (Ryl. Fig. 5). Instances from Hagia Triada are the common group L 30-72-30, and that comprising L 98-55-98, which only occurs once. This feature is quite common in Linear B, and the Knossian tablet no. 894 opens with a palindrome of five signs. Such arrangements of course would be quite fortuitous in a system of syllabic writing, and so far as is known no calculation has been made of the frequency with which they might occur. But the experiment of breaking the words of a text of any language into syllables would indicate that they would be extremely rare. In an ideographic script, however, they could have a special function, to emphasize parts of a phrase by repetition.

By "bracketing" is understood a like phenomenon, where a sign-group which is not a true palindrome begins and ends with the same sign. Once more, such an arrangement would be purely accidental in a syllabic script, but might serve the purpose of stress in ideography. Two instances from the Proto-Elamite archives, in which the relevant sign is no. 32, were analysed in Ryl. p. 31 §§ 7, 8b. Examples of phrases beginning and ending with the "double-axe" sign can be seen in inscriptions II 18 and III 8 in Linear A, and commonly in Linear B, for example on the Knossos tablets nos. 894 (the palindrome mentioned above), 571 and 1541.

g) Kindred sign-groups with slight variations. This feature is of course a well-known characteristic of Minoan writing. It was discussed with regard to Linear A on the top half of page 6 of ILA, and the assumption that alternative prefixes, infixes and suffixes[9] in Linear B conveyed kindred sound-values was the fundamental step in the analysis of Linear B initiated by Alice E. Kober. The same feature is possibly even more marked in the Susan archives, and examples of alternative prefixes can be observed in Fig. 1 in XVII 18 (items 2 and 4) and XVII 112 (items 7 and 12). In these archives, fortunately, there occur certain sets of inscriptions, notably XXVI 29—45, where there can be little doubt about the explanation. In these cases a standard list of signs varies slightly from one instance to the next, in such a way as can only be explained if each sign is to be understood separately, as a logogram. This and other instances are discussed in Ryl. p. 29 § 6. If the feature concerned is to be explained in this way in the Proto-Elamite accounting script, it would seem reasonable, in view of the many other points of resemblance, to inquire whether it can be understood in a similar fashion when it is found in Crete.

Conclusion. The only satisfactory explanation of the various common features of the Proto-Elamite and Linear A scripts set out above would appear to be that both these systems of writing are essentially ideographic in principle. To borrow a term from the science of linguistics, they are "agglutinating" scripts, which express complex ideas by joining together separate symbols, each of which signifies not a sound but a whole idea. This interpretation of the mechanics of the scripts would apply not only to the ligatured

[9] The terms "prefix", "infix" and "suffix" are of course used here in the purely graphic sense. So long as the nature of the scripts remains unknown, these features cannot be assumed to have any linguistic significance.

combinations of signs, but also to the lists of signs, or sign-groups, in which no one symbol is physically subordinated to another.

There is nothing fundamentally new in these conclusions. With regard to the Proto-Elamite documents, as explained in the section entitled "Interpretations of the Texts" in Ryl. pp. 23—25, Scheil began by regarding them as completely ideographic, although he later conceded that some signs might have been used phonetically in certain cases. But the later studies by Contenau and de Mecquenem led them to an unambiguously ideographic interpretation of the texts.

In the case of the Linear A tablets, too, Grumach came early to the conclusion that the script they employed was basically ideographic, and to the present he has seen no reason to waver from this view. Evans also, although he left no analytical study of the entire corpus, was inclined to regard a larger proportion of the signary ideographically than is now customary, and Sundwall has for many years approached the problem in a similar way. Myres, however, considered that, except for the "commodity" and "transaction" signs, the script was a syllabary (ILA pp. 4—6), and in recent years several decipherments of the Hagia Triada tablets, based on this assumption, have been proposed. But although they are usually founded on a similar system of phonetic values, these decipherments have produced not only different interpretations but also interpretations in most instances in quite distinct languages. Further, none has advanced a satisfactory explanation of the ligatured signs which are so frequent in Linear A and must have an essential bearing on the nature of that script[6].

It is, of course, theoretically possible that in these modes of writing both ideographic and phonetic elements are present. But if so there is until now no apparent way of distinguishing them. In any case, since the scripts are basically ideographic, the phonetic elements can be rare only and of subordinate importance.

A script of this nature is to be expected in the lowlands of Iraq early in the third millennium B. C. But such a script in Crete nearly 1,500 years later would assuredly be an anachronism. There is no intention of suggesting a direct historic link between Susa and Hagia Triada. But it is suggested that ideographic writing may have been used in the third millennium over a wider area of the Near East than Elam, Babylonia and Egypt. The Aleppo cylinder[10], for example, would show that a form of it was probably employed

[10] A. H. Sayce, Proc. Soc. Bibl. Arch., 36 (1914), pp. 6—7

in Syria. At some stage it may have been introduced into Crete, and there continued in use for certain specific purposes, despite the evolution of more sophisticated forms of writing on phonetic lines in the regions whence it first spread. A parallel instance may well be provided by the early civilization of the Indus valley and nearby regions. In that case a script which made abundant use of ligatured signs, and which was almost certainly purely ideographic, continued in use for the limited purpose of writing short inscriptions on seals, and less frequently on other objects, until the middle of the second millennium B. C.