# IX. CALENDRICS AND WRITING

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## 1. Introduction

Human societies seem inconceivable without an efficient communication between men. The essential transmission of cultural elements, though in some instances may be carried through by merely presenting examples and by imitation, usually requires verbal explanation. This culture-maintaining function of language is particularly important in the realm of abstract ideas. However, the effectiveness of "language" as a system of communication is limited by tight physical laws: space and time. Aside from modern technological advances, language is not able to span great distances of space and time. Both types of distances may indeed be bridged, step by step, through oral exchange, but on an extensive basis this is impeded by several obstacles. To mention only the most important of these: the relative unreliability of human memory, which actually has to fulfill the function of bridging over temporal and spatial distances. Thus, every message, which is passed on orally through intermediaries, runs the risk of being changed or of being partially or totally erased through forgetfulness.

1.1 World-wide evidence supports the assumption that in emergent civilizations a mechanism, still unknown in detail, was brought into play, which almost invariably led to the development of a record-keeping system. The growing needs for transmission of messages and for greater precision in their conveyance would have revealed the inadequacy of oral exchange, and thereby supplied the demand for a more functional system of message transmission. Whether the decisive impetus should be ascribed to the administrative or theological sphere may be difficult to determine, and may vary from culture to culture. However, there can be no denial that the existence of a written recording system influences all aspects of a culture; indeed, it engenders new ones through its mere existence. Consequently, it seems justifiable to look upon a writing system as an indicator of a civilization.

1.2 The origin of a writing system should not be interpreted as a sudden event (notwithstanding some contrary evidence of more recent times which as imitation of other systems being involved is atypical), but rather the product of a long and continuing process. Thus, long before the appearance of each writing system, graphic representation had become a matter of course. It includes the concrete two-or-three-dimensional representation of persons or events, the meaning of which is more or less clearly discernible to any observer, as well as the abstract ornament, whose significance is known only to the initiated. The transition from this manner of recording to narrative

pictography is rather hazy and at best is to be recognized in an intensified conventionalization. This tendency of narrative pictography to produce independent conventional signs offers the basis for the development of a true writing system.

2. Theoretical considerations:

2.1 The study of early writing systems and their predecessors in the stages of emerging civilization is an attractive project for archaeologists and students of writing. However, it is a difficult undertaking, fraught with dangerous pitfalls, for two main reasons.

1) In many areas, including Mesoamerica, there is a dearth of adequate source material for which the certain origin and dating can be determined. The solution of this should be the task of archaeological field work.

2) A methodological problem lies in the lack of an acceptable definition of what kinds of material can be regarded as "writing." Such a definition should be sufficiently clear and flexible to make reliable statements on any graphic systems found. This is important because an arbitrary classification including all graphic forms as a writing system (as is often the case) is not acceptable. Evidently, we have previously lacked manageable criteria to determine when we are dealing with a writing system or not. To avoid the vagueness contained in definitions proposed by Gelb (1954:21) and Diringer (1968:I:4), I (Prem 1967) have proposed:

A writing system is a code adapted to a visually readable information conveyer. Or to be more detailed, a writing system in a broader sense is any system for transmission of information through conventionally employed graphic symbols which are or can be made visible on a medium.

Through this definition, a graphic system, to qualify as a writing system, must contain three indispensable requirements:

| | |
|---|---|
| Function of the System: | Transmission of information (in verbal or non-verbally fixed form); |
| Methodological Solution: | Codification (creation of symbols which have a conventionally accepted meaning); |
| Technical Rendering: | Graphic (produced upon a medium and visually readable). |

This definition is very broad and encompasses all recording systems, beginning with mnemonic aids up to modern writing systems, including not only our alphabet, but musical notation, flags and flag signals, technical symbols, etc.

Within this wide field of varying writing systems, "true writing"

forms a special group, since it alone is able to record literally and render back a given verbal text.

All other systems, designated also as partial writing or notation, are not suitable for perfect text reproduction. Within the spheres for which they are tailored and in which they are used, they fulfill their task satisfactorily. The fluctuation between requirements and fulfillment is to be clearly recognized here.

The practical application of the definition provided above to archaeological material is not without problems. It is difficult to decide if undeciphered graphic forms had a message function and were able to fulfill this role. In other words, it has to be determined if a conventional agreement existed which could provide the necessary bridge between the graphic symbol and a retrieving of the contents. Simply put: if aside from the writer, there was a reader.

As soon as this question can be answered by demonstrating a certain internal regularity (a feature shared by all recording systems), one can speak of a writing system. The next question that is then raised is: How efficient was the system? Was it capable of reproducing literally a verbal text? Or was it limited only to noting down specific information of a narrow scope? The answer is not only of theoretical, classificatory interest, but is a precondition for every serious work of deciphering, which can only be begun after clearly ascertaining the manner of recording and the type of the system.

### 2.1.1 Partial Writing or Notations.

Partial writing systems (Barthel 1968) reproduce a given contents true to sense and with sufficient accuracy for its purpose. They may appear in many different forms. As narrative pictography they depict the events to be told. This may occur through naturalistic portrayal or in a stylized form, employing conventional abbreviations and signs (as an example, the halo in the European "biblia pauperum" or the "speech scrolls" in Mesoamerican codices).

As the degree of abstraction and the introduction of conventionalized formulas and representation increases, the representation loses its self-expression, and it becomes increasingly important to ascertain the meaning of the conventions utilized to ensure accurate understanding. One cannot speak of a real "reading" of a narrative pictography since by its nature it provides only reference points and a framework guiding the repetition of its content. Its purpose was a mnemonic support of oral tradition, not a word for word record. This means that for the examples of narrative pictography discovered by archaeologists, at best we may accurately interpret the skeleton of the original statement, while the complete contents must remain unknown.

It is clear that narrative pictography could not express satisfactorily certain contents, such as proper names or places, calendric dates, etc. For this purpose, "hieroglyphs" evolved out of the conventionally used symbols of the narrative pictograpy. This is an ideographic, and often phonetic as well, partial writing system, which had a limited range of applicability as well as expressive possibility since its initial function was merely supplementary to narrative pictography. Only if such a system subsequently was applied independently and improved to the extent that any verbal text in any field could be expressed literally with it can one speak of a true writing. Here, obviously, no abrupt change could have occurred, but rather there ensued a gradual transition with many intermediate forms. All known Mesoamerican writing systems probably remained in these transitional stages, with the only supposed exception being Maya writing.

2.2 Calendrics.

It has always been stated, and I personally can see no convincing argument against it, that the calendar had its origin in the cyclically transpiring changes observed in nature. Knowledge of the "year", its duration determined with varying degrees of accuracy, was likely quite early, at the latest with the appearance of an agricultural economy. Of course, this holds only for the solar-and the lunisolar-year, which rests upon the equation of the sun's year and multiples of lunar months. Nevertheless, "natural" time units are an adequate explanation neither for the division of the solar year into other units such as lunar months, nor for other time units, which cannot be correlated with natural phenomena such as the seven day week, the 60 day period of China, and the 260 days of the Tonalpohualli. Several attempts have been made to derive the length of the Tonalpohualli from natural time periods: from the length of pregnancy (length of pregnancy ca. 284 d.p.m., or about 265 to 270 d.p.c.), from the interval between the passage of the sun through the zenith, (critical discussion by Thompson, 1950:98-99); and the like, but none appear convincing. In current research the 260 day ritual calendar is more likely to be explained by the obviously already given length of both rounds permutated (numbers 1-13, 20 day signs). Any precursors or early forms of this peculiar calendar are unrecognizable. Thus, Thompson's statement that the Mesoamerican calendar "burst upon us full grown, like Pallas Athena springing from Zeus' head" (1950:5) still holds. In the archaeologically investigated past a calendar becomes tangible only by being fixed in writing. But since the development of a calendar in the form of the solar year or even the Tonalpohualli did not require a fixing in writing (as demonstrated by ethnographic findings), early phases of the calendar may remain forever unknown. In spite of this, it may be assumed that the mere existence of a calendar facilitated the formation of a writing system and through the latter, the calendar received new stimulation to further develop in complexity.

2.3 One methodological difficulty of this inquiry must still be dealt with As already mentioned, the scriptual and calendrical material available of

archaeological origin must be interpreted from its own inherent information, since contemporary ethnographic data cannot possibly be available. This means that for the investigation of such writing system, the basic language or at least its equivalent form will be unknown. A reading, without a bilingual, in the case of a purely ideographic system is problematic, but is hopeless or pure guesswork when dealing with a mixed phonetic-ideographic system. (Old World examples show that it is not even easy to determine if one is dealing with a more or less known (which one?) or completely unknown language.) The quite unsatisfactory interpretation "from itself" is often completed or supplemented by conclusions from other better known material. It goes without saying that when no assurance of space/time continuity exists between the two types of material, the door is opened for dangerous misinterpretation.

The same danger exists for the investigation of calenders fixed in writing. Even in a "non-readable" writing system, the mere presence of a calendar permits a relatively easy interpretation as soon as the numeral system is known, and as long as the available numerals do not appear also as quantitative entities of goods and such. However, the exact functioning of the system can only be uncovered after all or almost all of the calendric signs are readable. It would probably be impossible to resolve a totally unknown calendric system only from the number scheme contained by the calendric material. The question remains whether the fact alone that archaeologically recovered calendar signs do not seem to contradict a known calendar system, would allow one to draw conclusions for its resolution when a fully evidenced continuity is lacking. I doubt it, particularly since for the early period of a calendar the existence of parallel similar forms may be assumed, even if only one form finally survived.

The following table provides data for the attempt to explain the origin and existence of the Tonalpohualli and the eighteen month vague year from the occurrence of signs meshed with numerals. It shows how many signs can occur minimally and maximally with which numerical values.

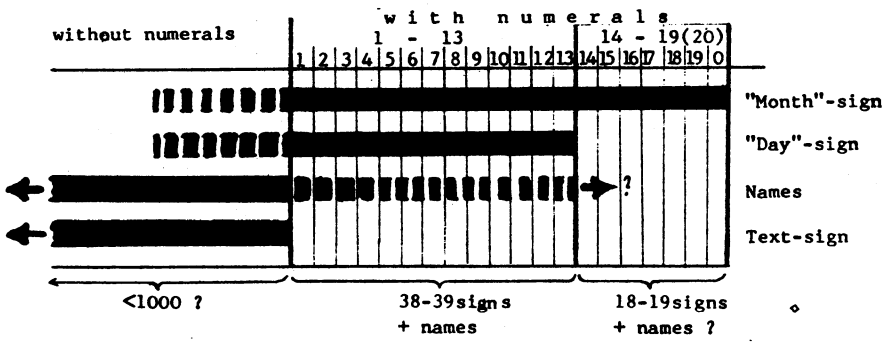


Table I

## 3. Inventory.

The known Mesoamerican writing of the Pre-Classic may be subdivided into two large groups:

1) Monte Alban writing in Oaxaca.

2) Intermediate writing systems (between Oaxaca and the Maya region) with two centers: "Olmec" or Isthmian (Southern Veracruz and Chiapa de Corzo Mayoid (Guatemala Highlands and Pacific Slope).

Since the discoveries which can unequivocally be dated as Preclassic are too sparse, it will be necessary to keep a broader frame of time for any work on available calendar and writing systems. However, projecting back any conclusions which are valid for later periods will be avoided when there is no assurance that they may be valid for earlier periods.

### 3.1. Monte Alban.

According to the chronology of Mesoamerica generally accepted at present, there can be no doubt that the inscriptions found in Monte Alban and assigned to Period 1 are the oldest which have been found in Mesoamerica to date. From this situation, however, it cannot be concluded that the origin of Mesoamerican writing must be found at this locality.

One can clearly classify the monuments with inscriptions of Monte Alban I into two separate groups:

1) The stelae, which carry only inscriptions without any pictorial representations. (The signs are arranged in vertical columns and the direction of reading is probably from top to bottom).

2) The representations of human figures known as the danzantes, which, if at all, present only short inscribed passages.

#### 3.1.1 Sign morphology

(The discussion that follows is based on a very small inventory of 30 signs, of which 26 are different, in addition to the number signs.) The signs are carved from the rock in low relief. They occupy a quadrilateral space, in which the relation of sides varies greatly. A small number of the signs (4) are inserted in cartouches and always stand above number signs. Another part of the signs (12) should be regarded as illustrative or representational. It includes heads of persons or animals (9=30%) and hands engaged in different actions (3). The rest of the signs, almost half of the total inventory, are either not clearly recognizable or must be classified, for the time being, as abstract and inexplicable since no contemporary, explicative, iconographic material is available as an aid to interpretation. The same holds true for the signs enclosed by cartouches, which Caso on

good grounds has designated as day signs. In spite of several attempts by Caso to correlate the latter with the day signs of the Tonalpohualli, he has met little success.

3.1.2 Sign repertory: The numeral signs take the form of horizontal bars and dots, with the dots always above the bars. The numeral signs never occur isolated, but are always beneath the non-numerical signs. A great part of the text signs (7=23%) of the stelae is associated with bar and dot numerals. A peculiarity is the occurrence of bars which are recognizable as fingers through the indication of fingernails. (They appear three times in Monte Alban I and once in Monte Alban II.) The fingers appear only singly or in pairs and never in combination with dots. Differing from Caso, I think it is not certain whether they likewise are to be interpreted as numbers. In the however small corpus of inscriptions, no sign occurs both with bar and dot numerals as well as with the "fingers". These finger signs are limited to Monte Alban I-II, and do not reappear later. The form of the normal bars is simple, without a medial channel and other decoration; the dots likewise are simple disks without decoration. The highest numeral value determined is 18. A vigesimal number system can therefore be suspected. There is no evidence of the writing of higher numbers, as would be found for example in the place-value system.

3.1.3 Text Signs: Even a superficial examination of the non-numerical signs on the stelae of Monte Alban I shows that here we are dealing with a writing system. The placement of the writing signs upon stone slabs placed so as to be easily visible makes it all the more likely that they had a communicative function; it does not matter here whether the message was directed at real persons or transcendental beings. The graphic character of the signs and their standardization which presupposes a code are evident.

Because of the brevity of the texts, repetitions of single signs occur relatively seldom (4 out of 30). This fact would support the assumption of a rather large repertory of signs, of which only a small, though perhaps a very important, portion appears on the preserved stelae. For the complete repertory of signs one may expect many more than the 26 given.

The combination at times of a non-numerical text sign with a numerical sign signifies that it expresses a contents which was consistent in itself and was conceivable in multiplication. From this observation and the admittedly quite vague estimate of the amount of total signs of the system, one may conclude that the individual signs most probably are of an ideographic character and at times express a concrete idea. This excludes the possibility of a complex phonetic writing system, but leaves the possibility of homonymic writing.

Assuming that the text signs linked to numerals have calendric significance, the highest of the numerical values, which exceeds 13 only in indi-

vidual cases and which always remains below 18, allows two kinds of interpretation:

1) The signs combined with numerals express time periods. The numeral signs count these time periods.

2) The numerals and non-numerical signs are members of independent, but established, series, which are permutable with each other. Both signs together name a time period.
In the first instance the number of different signs would be rather small.
In the second case the data of Table I would apply. Both interpretations are not mutually exclusive, but could, by all means, exist side by side.

Caso first interpreted all the signs combined with numerals as day signs of the Tonalpohualli (1928). Later, however, he interpreted at least some of them as month signs (1947).

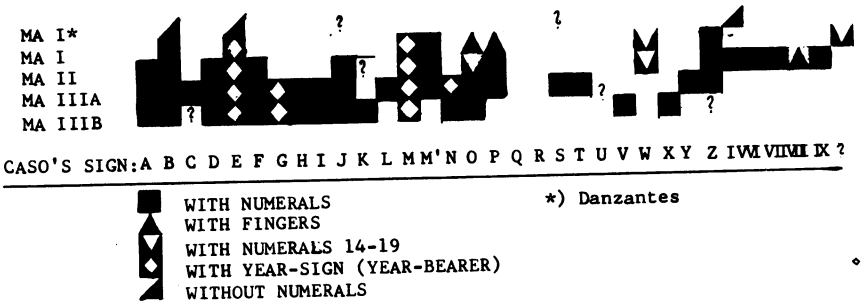


Table II

Table II tabulates with minor corrections of Caso's work, all these signs in relation to the period of their occurrence. Assuming that the universal Meso-american calendar did exist as far back as Monte Alban I, by following the considerations expressed in Table I, it would seem that the few signs which appear with numbers between 14 and 18 could conceivably be month signs. The other signs, which are engaged only with numbers, below 13, could equally well be either day or month signs of a Tonalpohualli. However, the complete inventory of 20 day signs and the necessary 18-19 month signs are not demonstrably present. As mentioned already, the available material is too meager to prove without doubt the presence of the Meso-american calendar.

Furthermore, it is clearly possible that some of the calendric signs are really period signs. In this connection it is to be noted that two of the three signs which appear in Monte Alban I and II with numbers over 13 do not reappear in later phases.

The so-called "glifo del ano" obviously represents a special situation among the signs. It always appears over only two different signs which are linked to numerals. Since the same sign appears fairly surely as the year bearer indicator sign in Monte Alban III, it would not be unlikely that it had a similar meaning in earlier phases, although the combination with only two different "day signs" requires caution in this matter.

Caso studied the signs which are not combined with numerals with little interest. Here there are few striking and recurrent forms; among them is however, one frequent sign which closes the inscriptions.

The form of the danzantes inscriptions is quite different from that on the stelae. The texts consist of only one or a few signs, and no time signs appear. The majority of signs appear only once, with the exception of the form called "tiradera" by Caso. In spite of this, there are undeniable parallels between the corpus on the stelae and the danzantes, which in isolated cases are also immediately apparent in the flow of the script.

While one can speak of the presence of texts on the stelae, although admittedly brief, the danzantes carry only meager information which probably represent personal names. If one wished to draw a parallel from a much later period, one could conclude that the presence of these signs represent abbreviated calendar names, lacking the usual combination with numerals.

Monte Alban II. The inscriptions are found almost exclusively on the numerous stone slabs (lápidas) dressing Montículo J. For many reasons, they are clearly differentiated from the passages of the preceding period. The signs are no longer carved in relief, but rather are formed by incised lines. The lines are somewhat less assured and animated.

The inscriptions are all arranged according to the same scheme. Approximately in the middle of the stone slab stands a sign which dominates the entire inscription; it is interpreted by Caso as "mountain or place," and from it a head hangs upside down. Several signs which have been interpreted as place-names appear atop of the respective "place signs." The interpretation "conquered place" has much in its favor.

The actual text is arranged in perpendicular columns of greatly varying length along both sides of the place-sign. As far as can be determined, it always contains a large number of calendric signs. Two of these, (one with the "year bearer indicator sign") are always situated on a prominent location outside the long text columns, preferably above or below the place-glyph. At the lowest point of the long columns, which need not always be present, however, stands a sign which Caso names "W" and which is one of the signs which can carry numerical values higher than 13. Only in one case is a long column ended instead by the sign "O" with coefficient 18; however, immediately above it appears the "W" sign inverted and with a superfix. On two additional

lápidas which are not available to me either in photographs or drawings, the "W" sign appears inverted, and once also combined with the "O" sign. Also in Monte Alban I, the sign "W" already appears once at the end of a text. This finding inclines me to be skeptical of Caso's interpretation that the signs associated with higher values than 13 (in Monte Alban II there are only two different ones) are month signs (the numerical coefficients indicating the position of a certain day in it), and I would prefer an interpretation as a count of elapsed time periods.

Besides that, there are not recognizable changes between the writing system in the texts of the lápidas versus that of Monte Alban I. Thus, the statements made in connection with the stelae retain their validity.

However, an innovation of Monte Alban II are the signs interpreted by Caso (1947) as toponymics. Correctly Caso states that of the place-name signs of the lápidas some hieroglyphs are:

> claramente representativos o pictográficos, pero la mayoría compuestos por muy variados elementos, en apariencia disímbolos, que sugieren la representación de nombres de lugar por un sistema fonético, semejante al que empleaban los aztecas para designar los nombres de las localidades. (1947:135)

Nevertheless, it appears to me that in spite of the manner in which the glyphs are composed, it does not necessarily follow that we are dealing with phonetic writing, since they could just as well be compounded ideograms. Only actual reading will clearly enable us to prove whether a sign was ideographically or phonetically employed. However, some signs are found with varying combination in several toponymics, particularly the "tiradera" and an elongated band, carrying an object. Other signs appear simultaneously in the "place signs" and the texts. Generally speaking the "place-name" signs have a much more vivid appearance than the text signs and already recall in several respects the writing signs of later periods and the Mixtec codices.

I do not dare to present any conjectures as to the content of these texts, of which two-thirds consist of calendric signs, often several appearing directly in sequence. Neither do I have an explanation for the special situation of the texts of Monte Alban II period, which is manifested in their structure and their monotonous repetition as well as in the fact that they are all derived from only a single and quite unusual building.

Between Monte Alban II and IIIA the writing undergoes a distinct shift which is expressed quite clearly both in the style and the flow of the writing signs (loss of clear, elegant forms and neglect of the clearly arranged order of signs), as well as in the inventory of signs. (See Table II). Only a few signs continue directly into the later period. It is remarkable that

in Monte Alban IIIA, and later on, no numeral signs over 13 occur. (Just as with a single exception, the signs which were combined with these higher numerals disappear too). Even the regularly followed arrangement of dots above bars is reversed, the earlier manner of writing appearing only in isolated instances. At the same time, the relative frequency of calendric signs in the inscriptions shows a strong decrease. Thus, one may assume that even the subject matter treated in the texts has changed.

It is too early to draw conclusions from these observations which could still be expanded, but the following appears to be clear: in Monte Alban I, a well-developed writing system appears without any known traces of its preceding forms. Standardization and tightening up of the order and form of the signs are so advanced that one can safely assume that it was a writing system capable of producing at least limited texts. Whether phonetic writing (following the akrophonic or homophonic principles) was employed is not discernible. This writing system is adopted without change in Monte Alban II, but evidently enriched with the writing of "place names" and altered in its application. Perhaps the composite "place names" on the lápidas of Montículo J, are phonetic writing. The strong emphasis on calendric statements during the first two phases is remarkable.

The writing system of Monte Alban I and II is clearly differentiated from that of Monte Alban IIIA and later periods. As the cause of this break, one could suggest a change of population and even perhaps language.

The calendar of Monte Alban I and II shows, without doubt, connections with that of Monte Alban IIIA and later. Whether they are identical, however, cannot be surely decided. (In this connection, the discontinuation of some signs and of the numerals above 13 are notable. Only two different signs appear in Monte Alban I and II with the "year-bearer indicator sign"). Possibly, the calendar which belonged to the writing system of Monte Alban I and II may have deviated as much as the writing did from the forms it took in later periods.

3.2. Intermediate writing systems:

The rather few texts which have been found and which I have designated as Intermediate writing systems are disseminated over an extensive area. However, strong internal similarities justify their inclusion in a single general configuration. The most striking characteristic of this Intermediate group is the presence of the Long Count. All these inscriptions have in common the employment of bar and dot numerals (dots positioned above), without period signs and arranged in columns. In the case of the Long Count dates of the "Olmec" group, specifically Stela C of Tres Zapotes, the Tuxtla Statuette and Stela 2 of Chiapa de Corzo, the day sign appears beneath the number series and with its coefficient prefixed vertically. In contrast, in the date from El Baúl,

which is to be placed in the Mayoid group, the day sign appears above the number column. The coefficient, also diverging is given in a horizontal position (the date of Abaj Takalik 2 = San Isidro Piedra Parada is too badly destroyed for a corresponding observation on it). All dates, excepting the Tuxtla Statuette, are incompletely preserved and must be reconstructed. In the case of the dates of Chiapas de Corzo and El Baúl, the day sign can be checked with the aid of the final position in the Long Count dates; in the case of the Tuxtla Statuette, the day sign coefficient can be checked. The same is true in the case of Tres Zapotes Stela C, if one reconstructs the first position of the Long Count date with "7". The unbroken Tonalpohualli-Long Count linkage is thereby demonstrated. Employing the zero point of the Maya Era and the Thompson correlation, the dates lie between 34 B.C. (Chiapa de Corzo) and A.D. 37 (El Baúl). The Tuxtla Statuette is about 125 years later.

Nowadays, there is agreement that these Long Count dates are contemporaneous. Much evidence seems to support an unbroken counting of the Long Count, particularly its inner structure. It may be pointed out here that the Long Count survived in later periods not only in the Mayan area (earliest date: Tikal Stela 29:A.D. 292), but also in the Intermediate area (Cerro de las Mesas, earliest date A.D. 467), in almost the same manner of writing and only with a change in the arrangement of the day sign coefficient.

Stela 10 of Kaminaljuyu, which does not show any Long Count information on the preserved parts, nevertheless carries calendric dates of the Tonalpohualli type.

With respect to the writing systems of the Intermediate area, only a few texts are adequately well-preserved: Stela 10 of Kaminaljuyu, a pottery fragment from Chiapa de Corzo and the rather quite late Tuxtla Statuette. Other inscriptions with textual passages such as Kaminaljuyu Alta I (Esperanza?), El Baúl Stela I, are too badly destroyed, or carry only a few unclear signs (La Venta Monument 13) to allow thorough study.

Given the scarcity of material, only a few statements can be made: the character of the writing system is without doubt; the inscriptions are not used as illustrations for a narrative pictography - thus are to be understood the numerous elaborate representations in bas-relief - but look completely independent. As far as can be discerned, the texts exhibit the external characteristics of Maya inscriptions: block-shaped signs as much as possible of equal size (relation of sides to each other 1:1 up to 1:$\sqrt{2}$, but not so in the case of the Tuxtla Statuette); signs incised in shallow lines, sometimes on raised blocks or panels; arrangement of the signs in vertical columns, two or more side by side; direction of reading from top to bottom (in the case of Kaminaljuyu Stela 10 and the Tuxtla Statuette surely not in horizontal pairs as in Maya writing).

The two writing centers mentioned above have to be treated separately in a discussion of the repertory of signs. Mayoid (Stela 10 of Kaminaljuyu)* abstract forms are in the majority; only a few head forms are recognizable; other representational signs are, as far as discernible, completely lacking. The flow of the script and even individual signs strongly recall signs in Maya writing, without always being able to find exact correspondences. A major difference from Maya writing is that only a few isolated affixes below the main signs can be recognized. Affixes before or after the main signs do not appear. Only isolated numeral signs appear dispersed in the text, and as a consequence it could hardly be of calendric content. A key to further delimiting of the contents of the inscription may lie in the elaborated pictorial representations of the monument, which have, however, suffered some degree of destruction, just as the textual parts. "Olmec" (potsherd fragment from Chiapa de Corzo, Tuxtla Statuette; Monument 13 from La Venta, which carries three or four glyph-like elements is best left out of this consideration.) The abstraction is stronger, and the lines run into much simpler forms than Mayoid or Maya signs. On the small fragment from Chiapa de Corzo no head forms and only one hand are recognizable. However, the 49 text blocks on the Tuxtla Statuette contain at least eight, frequently very elaborate, head forms, but still only one hand form. Three signs appear twice, and two appear three and five times respectively, although in some instances with varying affixes. Only once a clause of two signs is distinguishable. At least nine different affixes (above or below the main signs) which up to six times each are found on the Tuxtla Statuette. On the Chiapa de Corzo fragment, one affix appears twice. Many signs remotely recall Maya writing forms, and interestingly, some affixes, especially. Little can be said about the content of either text except that they are not likely to be calendric.

It is remarkable that the day sign on the Chiapa de Corzo Stela appears in an unusual form for this area. It is almost exactly the known form from Xochicalco of the day sign "acatl", equivalent to the Maya "ben". This reading, as was indicated, is confirmed by the last position in the Long Count date.

It is quite likely that the structure found in the Intermediate writing systems may have enabled them to reproduce quite accurately verbal tests. However, one can say little more, given the scarcity of available material.

### 3.3. Teotihuacan

At the moment one cannot say with certainty at what time in Teotihuacan those graphic forms which often are called "hieroglyphs" appeared. It is obvious that the form of these graphic elements, which are highly formalized and are

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* And a recently discovered monument from Chalchuapa [El Salvador] which is badly eroded [Sharer 1969].

inscribed in cartouche-like frames, suggests their designation as "hieroglyphic writing" (Coe 1962:114-115; more cautious Krickeberg 1956:406-407; Kubler 1962: 37; Graham 1964:245). But it has to be stated that in Teotihuacan there never occurred any configuration of these "signs"; they appear isolated as decoration of pottery and on murals. They lack any iconographic context and, moreover, they act as well integrated elements of an abstract decoration. The number of essentially different signs is very limited; as a clear distinction between them and purely decorative patterns has yet to be established, the corpus may only be estimated as containing slightly more than 10. Most common and therefore best studied is the "sign" which was called by Beyer (1921:63) "ojo de reptil". The thorough investigation by von Winning (1961:63) is based on 198 occurrences of this sign, but a lot of them do not stem from Teotihuacan. The various efforts made to detect the meaning of the "ojo de reptil" obtained different results and met with little lasting success. According to Seler (GA II:39, only Xochicalco) it represents the day "rain"; some years later (GA V:481) he explained it as "Geoffnete Bluthe", open blossom. Caso interpreted it (1928:62) as sign for the day "snake", later (1958-1959, based on evidence from Xochicalco) for the day "wind". Von Winning lists even further explanations (1961:124-125).

Regarding the other signs of Teotihuacan, which occur even more sparsely, the situation is worse, as the forced attempts by Caso (1958-1959) show. Only in some cases were the signs combined with bar and dot numerals. The bars and dots are decorated and in a horizontal position below the respective main sign. The highest numerical value is 12 (only once occurs a combination of two bars and four dots which Caso explains tentatively as denoting the two numbers 4 and 10 (1958-1959:52). This is the only evidence that could suggest the existence of a Tonalpohualli-like calendar system. It is obvious, however, that this is insufficient to provide an affirmative answer to Caso's question "Tenian los Teotihuacanos conocimiento del Tonalpohualli?" (1937) until the 20 days signs that are essential for the Tonalpohualli have been proved for Teotihuacan.

The famous Mixtec "year bearer indicator sign" occurs also in Teotihuacan, but I doubt that it had the same specific calendric meaning, for there is no evidence of four different (day) signs associated with it. Moreover the "year bearer indicator sign" occurs even without a numbered sign below it having purely decorative functions (Palacio de Quetzalmariposa), as in many other places of the Central Highland and even as far as at Chichen Itza.

Summing up, it can be stated that in Teotihuacan existed:

1) Bar and dot numerals up to the number 12,
2) Glyphlike forms which may have had a more or less conventionally accepted interpretation.

It should be noted, however, that it cannot be excluded that there was involved a process analoguous to the well known adoption of foreign characters as near

decorative elements void of meaning (Maya hieroglyphs on Ulua polychrome). Up to the moment there exists no evidence for further achievements in writing at Teotihuacan.

3.4. Questionable Examples:

I define as questionable the following types of examples:

1) Short sequences (not more than five signs) of certain writing signs found on small and easily movable objects, whose origin and dating has not been ascertained.

2) Short sequences of signs (not more than five) which are commonly described as "glyph-like", but which have not been demonstrated as members of any known writing system.

Examples of these are:

Ad 1) Jade plaque provenance unknown (Kelemen 1956, pl. 246a) with two glyphs, which according to Kelley (1966:745) resemble those of the Tuxtla Statuette. Analysis of this material is hindered by the diminutive inventory and the uncertain date and provenance.

Ad 2) Such divergent pieces as: the two cylinder seals from Tlatilco (Kelley 1966: fig. 1, 744; Franco 1959:fig. 1C) and the one from Chiapa de Corzo (Kelley 1966: fig. 2d,745). The seals include both completely abstract forms and recognizable facial representations. The great variation encountered and already observed by Kelley (1966:745), forces me to exercise great skepticism in assigning any of these signs to a writing system.

The incised graphic forms encountered on various celts* do not give the impression of a standardized writing system, but rather a self-sufficiency of form which derives from narrative picture writing. Of course, it remains possible that in this way they were carriers of some message, even if only in a limited sense. One should not exclude the possibility that such signs were part of a repertory of abbreviated graphic forms, which had freed themselves from narrative representations and were flowing toward a writing system. However, the lack of dating and knowledge of the provenance of these celts forbids any further speculation in this direction.

4. Summary:

In view of the great scarcity of written material available for the Preclassic outside of Oaxaca, it remains very daring to search for origin and dispersal routes, and since I am aware that all which I can say here may easily become obsolete through a single new find, I have no choice but to restrain myself in coming to any conclusions that may easily turn out to be premature.

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* mostly of jade, ascribed to "Olmec" origin.

The earliest writing material found comes without exception from Oaxaca. We do not know its earlier forms or precursors. At its first appearance, the writing system is already well-developed and has reached a high degree of perfection (compared to the accomplishments ever reached in Mesoamerica in this particular field). In spite of the little that we do know about the writing system in the first two phases of Monte Alban, there can be no doubt that, in its original form and accomplishment as we know it, it was never surpassed and even reached again in Oaxaca and its northern bordering regions (including metropolises as Teotihuacan). Only at one other site, at Xochicalco, can the inscriptions be considered as again reaching a culminating point (even if a more modest one) in the Mesoamerican development of writing systems north of the Isthmus.

A similar statement holds for the writing systems classified as Intermediate. It is true that the Long Count and the "Olmec" writing survived into the early Classic at Cerro de las Mesas and even at Kaminaljuyu where objects dating from the Esperanza phase carry hieroglyphs which are probably not to be considered Classic Maya writing. But not much later, even these areas sink down to the general writing level of non-Maya populations (one may only recall the Late Classic stelae of Cerro de las Mesas, the not easily classifiable monuments of Piedra Labrada and Tonala, and lastly the inscriptions of Santa Lucía Cozumalhuapa). The real successor of the Intermediate writing systems, in spite of the fact that the areas in which both appear, as far as we know, do not overlap even at their borders, is Maya writing, which is the only example from preColumbian America in which the decisive step from an imperfect notation system (partial writing system) was successfully taken toward a true writing system.

As far as conclusions may be drawn from the formation and dating of Mesoamerican writing finds, the development of a functional writing system and perhaps even of a Mesoamerican calendar, probably took place in the triangle (probably still to narrow) formed by Monte Alban, Tres Zapotes and Kaminaljuyu. (The longest side of this triangle of 44,000 $km^2$ surface is longer than the maximum distance between sites having Maya hieroglyphs.) Both writing systems (Monte Alban and Intermediate) seem to have had a common original base, but separated contintuation in their development. Without really knowing where the originating site should be located, I am nevertheless inclined to consider the area of "Olmec" style, since I can see in the rich content of its relief representations almost a form of narrative pictography.

I see no reason why such a development of a writing system could not have rested solely on an autochthonous Indian basis and for the need cited by many authors to look upon trans-pacific contacts to explain even this aspect of Mesoamerican civilization. For example, Robert Heine-Geldern has repeatedly seen the root of Mesoamerican writing in China, (e.g. 1968:8) without really ever being able to present any kind of evidence for his supposition (see the rebuttal by Phillips 1966:311).

As far as the calendar is concerned, I like to think of it as having a similar geographical area of development as the writing systems. However, I cannot add anything new to the extensive reflections presented by Thompson on this subject (1950:97-99). Neither do I see any need to explain the origin of the Mesoamerican calendar by bringing in the subject of transpacific contacts. The complicated attempts made by Graebner (1921:6-37) and his follower, Kirchhoff (1964, I:73-100) to show derivations from the Chinese list of 28 lunar mansions and its corresponding animals for a shorter, 12 day Tonalpohualli, represented by its own corresponding 12 animal day-signs are too forced and sought after to be convincing. I see no reason why such searches for origin should be made, since it is clear that the American aborigines were perfectly capable of developing early forms of writing systems - there is no doubt that this occurred in pre-Columbia North America - and of calendric inventions as the place-value system and the Long Count, for which there are no contemporaneous parallels in the Old World.

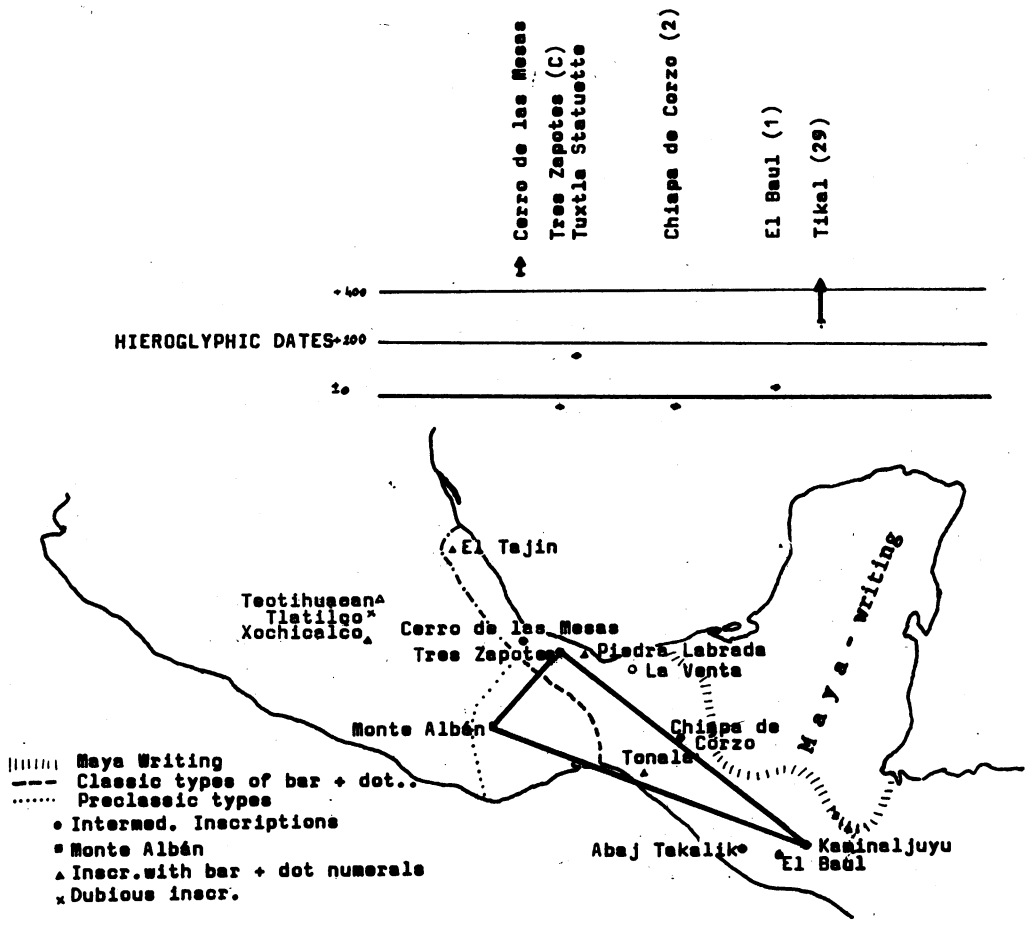
Due to the scarcity of material available, it was not possible to even give partially satisfactory answers on the questions raised concerning origin and dispersal routes of Mesoamerican calendar and writing systems. The purpose is rather to present the picture of frank disconcert in which the research on early Mesoamerican inscriptions and writing systems finds itself, and direct an urgent plea to archaeologists, to search for written material and make any such finds immediately available through publication. It is a sad state of things, when the already scarce material is even more decimated by restricting its availability for scientific research.

5. The role of calendar and writing in emerging civilizations can be considered in a mechanical way as a vague interaction. It is clear that in early civilizations there accumulated an amount of cultural data to be stored or transmitted. Parallel to the increase in these data, the necessity arose to have at hand suitable devices to handle them. The first step in doing so had to be to put these data into a certain order, i.e. to facilitate the processing.

This is the very point where codified calendrical systems and writing originated. The goal of every calendar is to note, order and store chronological data and make them accessible for record-keeping as well as prognostical purposes.

All data, calendrical as well as other ones, that were too ample to be kept in mind had to be set down by "writing". This required as a fundamental step to cut up the stream of information into manageable units. The order to be established here is a code that is suitable for non-verbal communication.

I feel that both the experience of putting into order and the opportunity to have something set down, animated and enabled civilizations to further development.


Cerro de las Mesas
Tres Zapotes (C)
Tuxtla Statuette
Chiapa de Corzo (2)
El Baul (1)
Tikal (29)
HIEROGLYPHIC DATES
El Tajin
Teotihuacan
Tlatilco
Xochicalco
Cerro de las Mesas
Tres Zapotes
Piedra Labrada
La Venta
Monte Albán
Chiapa de Corzo
Tonalá
Maya - writing
Abaj Takalik
Kaminaljuyu
El Baúl
Maya Writing
Classic types of bar + dot..
Preclassic types
Intermed. Inscriptions
Monte Albán
Inscr.with bar + dot numerals
Dubious inscr.

## Added Remarks by H. Prem

During the discussion there were mentioned further archaeological pieces that are not listed in the paper as they cannot be dated unequivocally pre-Classic times (the earspool flares from Pomona and Chichen Itza cenote), or are too badly eroded to be treated successfully (Alvarado stela).

With regard to the glyph-like signs at Teotihuacan two different opinions were expressed: the first one agreed with the corresponding part of the preceding paper. The second opinion accepted the signs as sufficient evidence for the existence of a writing system. Though there are stelae and sequences of signs, it was argued that writing in Teotihuacan might have been performed in the form of codices on perishable material of which no vestiges have been preserved. At present these views are incompatible; further research must determine which is correct. With respect to the calendar, the participants agreed that the origins of writing were probably closely related to the calendar, which seems to have developed first. Divination was mentioned by others as a motivation for the development of a calendric system.

Following a proposal in the distributed version of the paper, the participants agreed on the necessity of a general and thorough collection of all the dispersed data pertaining to writing in Mesoamerica outside the Classic Maya area.

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