

Distance Numbers

Each night since first the world was made hath had
 A sequent day to laugh it down the skies.
 —JAMES THOMSON, *Why Are Your Songs All Wild?*

FUNCTION OF DISTANCE NUMBERS

VERY MANY hieroglyphic texts of the Initial Series Period carry several dates. The distances between these are expressed in terms of kins, uinals, tuns, katuns, etc., so that by the addition of these to the adjacent date or subtraction therefrom the positions in the LC of dates which do not end periods are established. Thereby the necessity of repeating the IS for every date is avoided; space is saved and the IS is not cheapened by frequent repetition. Usually these figures, which are known as distance numbers or secondary series, lie between the dates they connect, although there are exceptions to that procedure. Generally, then, a distance number follows the IS and leads to the next date. Another distance number carries the reckoning forward or backward to the next date, and so on to the end of the inscription. With the position of one date in the LC fixed by means of an IS or by a PE (p. 181), the positions of all other dates are established by the distance numbers. The functions of dates thus connected are discussed elsewhere (pp. 64, 259).

The inscription on the back of Piedras Negras 3 presents a clear example of the use of distance numbers (fig. 50,1). The text, so far as dates are concerned, reads as follows:

A	A1-A4,B7	9.12. 2. 0.16	5 Cib 14 Yaxkin (IS)
B	C1-C2a	12.10. 0	count forward to
C	C2b-D2a	(9.12.14.10.16)	1 Cib 14 Kankin
D	D4a-C5	1. 1.11.10	count forward to
E	D5-C6	(9.13.16. 4. 6)	4 Cimi 14 Uo
F	E1-F1	3. 8.15	count forward to
G	E2-F2	(9.13.19.13. 1)	11 Imix 14 Yax
H	F6-E7	4.19	count forward to
I	F7-F10	(9.14. 0. 0. 0)	6 Ahau 13 Muan, com- pletion of 14th katun

The inscription starts with an IS and ends with a PE, for 6 Ahau 13 Muan is stated to be the completion of the 14th katun. The four distance numbers lead to three intermediate CR dates and thence to the PE. All are quite straightforward and, as can be seen, together they bridge

the distance from the IS to the last date recorded on the back of the monument. That fact alone is proof that the various additions are correctly stated, but as a further check, let us reduce the various distance numbers to days, and find the remainders by dividing by 260 and 365 and then add as per tables. This is the same process as was followed in checking the IS (calculations given overleaf).

Thus this modern method of proving the four distance numbers, which certainly is not that used by the Maya, reveals the Maya calculations to be entirely without fault.

A preliminary check on any addition is to note the kin coefficient, which should indicate the right day sign. For example, the kin coefficient of Distance Number H is 19, and 19 added to Imix reaches Ahau. Should the day of Date I be Ik one would know that the distance number should be subtracted since Imix minus 19 is Ik. As a matter of fact most distance numbers are followed by a glyph which indicates whether the count is backward or forward. In the example cited all four distance numbers are followed by this glyph indicating a forward count (fig. 50,1, glyphs at C2a, C5b, F1, and E7). This glyph and the form with variant affixes which declares that a count is to be made to an earlier date are discussed below (p. 162).

There is no limit to the number of periods which may occur in a distance number. The longest so far reported occurs on the stone of Chiapa and reads 13.13.13.11.0.11.14. The text opens with 14 kins and 11 uinals and closes with 13 kinchiltuns. The tun glyph is omitted, but in such cases the omitted period is understood to have had a coefficient of 0 (p. 159). The shortest distance number is one day, recorded twice at Tikal.

Occasionally either the starting point or the terminal date of a distance number is suppressed. Although there is not at present complete substantiation, yet I am inclined to believe that Maya literary canons required that the terminal date be expressed. As we shall see (p. 164), there were special glyphs to indicate what kind of day the terminal point recorded.

In some texts, notably those from central and eastern Chiapas, distance numbers sometimes link a date not to that last given, but to the IS (Thompson, 1944c). That is to say, the distance numbers are not cumulative. An

Distance Number B	Distance Number D	Distance Number F	Distance Number H
$12 \times 360 = 4320$	$1 \times 7200 = 7200$	$3 \times 360 = 1080$	
$10 \times 20 = 200$	$1 \times 360 = 360$	$8 \times 20 = 160$	$4 \times 20 = 80$
$0 \times 1 = 0$	$11 \times 20 = 220$	$15 \times 1 = 15$	$19 \times 1 = 19$
Total days 4520	7790	1255	99
$4520 \div 260, \text{ remainder } 100$	$5 \text{ Cib} + 100$	$= 1 \text{ Cib}$	
$4520 \div 365, \text{ remainder } 140$	$14 \text{ Yaxkin} + 140$	$= 14 \text{ Kankin}$	
$7790 \div 260, \text{ remainder } 250$	$1 \text{ Cib} + 250 \text{ (or } -10)$	$= 4 \text{ Cimi}$	
$7790 \div 365, \text{ remainder } 125$	$14 \text{ Kankin} + 125$	$= 14 \text{ Uo}$	
$1255 \div 260, \text{ remainder } 215$	$4 \text{ Cimi} + 215$	$= 11 \text{ Imix}$	
$1255 \div 365, \text{ remainder } 160$	$14 \text{ Uo} + 160$	$= 14 \text{ Yax}$	
	$11 \text{ Imix} + 99$	$= 6 \text{ Ahau}$	
	$14 \text{ Yax} + 99$	$= 13 \text{ Muan}$	

example of this is supplied by Poco Uinik 3, the text of which reads:

A1-A8	9.18. 0. 0. 0	11 Ahau 18 Mac (IS)
A10-A11	1. 4. 7. 4	<i>subtract</i>
B11-B12	9.16.15.10.16	2 Cib 14 Ceh
C12-A13	8. 7. 2	<i>subtract from IS</i>
C15-B16	9.17.11.10.18	5 Etz'nab 16 Mol?
C16-B17	8. 3. 4	<i>subtract from IS</i>
C17-B18	9.17.11.14.16	5 Cib 14 Ceh
C20-B21	7.17. 0	<i>add to preceding date</i>
C21-A22	9.17.19.13.16	5 Cib 14 Ch'en
C22	4. 4	<i>Distance to IS</i>

One distance number is added to the preceding date; the rest are subtracted from the IS. This method is known elsewhere, but its prominence in the Jatate drainage represents a regional variation.

ARRANGEMENT OF PERIODS IN DISTANCE NUMBERS

Whereas the periods of an IS are arranged in descending order so that one reads in the order baktuns, katuns, tuns, uinals, kins, the periods of a distance number are in reverse order so that one reads first the kins and uinals and then the tuns, katuns, and baktuns if they are present. This arrangement is not followed in Dresden where, because of the general absence of period glyphs, its adoption would have caused much confusion. The three or four distance numbers in that codex which do have period glyphs retain the arrangement of the periods in descending order. There are a very few cases in the inscriptions of the Initial Series Period where the periods of the distance number are in descending order. Thus at P7-P8, west panel of Inscriptions, Palenque, a distance number 9.7.11.3.0 is written in that way, the 9 baktuns being at the start, the uinals and kins at the end. In this case the distance number is subtracted from the first of the two dates between which it lies:

O7	9.12. 3.6.6	7 Cimi 19 Ceh
P7-P8	9. 7.11.3.0	<i>subtract</i>
O10-P10	13. 4.12.3.6	1 Cimi 19 Pax

Apart from any other consideration, a count that is reckoned backward could under no circumstance be regarded as a somewhat unusual IS.

Another example of a reversed distance number occurs on the Foliated Cross, Palenque, at C3-D4. There the distance number is 1.14.14.0, 1 katun coming first, 0 kins last. This connects 1 Ahau 13 Mac with the end of 2 baktuns:

A1-A9	1.18. 5. 4.0	1 Ahau 13 Mac (IS)
C3-D4	1.14.14.0	
C7-D7		Forward to completion of 2 baktuns
C8-D8	2. 0. 0. 0.0	2 Ahau 3 Uayeb

There is a second reversed distance number in this same text at D15-D17, although there appears to be an error in the computation. Ixlu 2 also carries a distance number in reverse. This is somewhat damaged, and Morley (1937-38, 3:442) has reconstructed the dates in a manner which is not entirely satisfactory, but of the reversed position of the distance number there can be no doubt. Another reversed distance number occurs on Copan 4 (p. 178); Berlin (1945) calls attention to two more on the platform of the Temple of the Cross, Palenque.

The existence of these rare distance numbers arranged in descending order is of some importance, not as exceptions to a rule but for their linguistic evidence. Distance numbers in the books of Chilam Balam are written in descending order (e.g. *hunk'al haab catac canlahun pizi*, "a score of years with fourteen"); I know of none written in ascending order. Therefore, it would seem probable that the ascending order of the distance number does not correspond to a linguistic arrangement, as Whorf (1935, p. 372) maintained, but was primarily a device to differentiate the two kinds of counts, as Long (1935, p. 28) thought. It is very possible that in Maya speech one

could reverse the periods, saying "so many kins, so many uinals, so many tuns," etc., but the fact that for reasons of clarity (because of general absence of period glyphs) distance numbers are in descending order in Dresden, whereas they are normally arranged in ascending order in the inscriptions, clearly indicates that they do not reflect a rigid speech pattern.

SUPPRESSION OF KIN GLYPH

In the majority of distance numbers the kin glyph is suppressed, and its coefficient is attached to the uinal glyph. With few exceptions the kin coefficient is to the left of the uinal sign; that of the uinal itself is placed above that glyph (fig. 30,1,2). The few cases in which these positions are reversed, the uinal coefficient being to the left and the kin coefficient above, may be permissible departures from normal procedure, the larger perhaps placed above to save space where the glyph is squeezed into a half-block (fig. 50,1, Gl D4a, E1), but I am not at all sure that they should not be regarded as errors. The Maya took considerable pains to write with clarity and to conform to established rules, and for that reason it is hard to believe that they would countenance such sloppiness. It is as though one could express the difference between \$50.75 and \$20.50 either as \$30.25 or as \$25.30. License to reverse the coefficients introduces an element of ambiguity which is more than annoying to the modern epigrapher, and must have been equally detestable to the Maya reader of a thousand years ago.

In those cases in which the kin sign is not suppressed, special glyphs were used, and still other forms were utilized to express distance numbers of less than 20 days. These variant forms are discussed on pages 167-75.

SUPPRESSION OF OTHER PERIOD GLYPHS

In a few distance numbers a period glyph other than the kin is suppressed, together with its coefficient, if the coefficient is 0. Thus on Yaxchilan 12 there is a distance number of 10 tuns 0 uinals 6 kins which connects the CR dates 6 Ix 12 Yaxkin and 11 Ahau 8 Zec (fig. 30,3).

A1-B1	(9.15.10.17.14)	6 Ix 12 Yaxkin
A6	10. 0. 6	
C1-D1	9.16. 1. 0. 0	11 Ahau 8 Zec

The distance number is presented as a tun sign with a coefficient of 10 above and 6 to the left; the uinal sign and its coefficient of 0 have been omitted, and the kin coefficient has been attached to the left of the tun sign. This distance passage is irregular in another respect: the distance number introductory glyph (p. 160) has a lunar sign attached to it as a postfix, an arrangement,

which, so far as I am aware, occurs in no other text. Since the moon glyph under certain circumstances has the same value as the uinal sign, it is possible that its presence here in some way not at present obvious declares that the uinal glyph with its coefficient of 0 is suppressed or, what is more probable, serves as a substitute for it (fig. 51, 2, Gl B5).

On Copan J there is a distance number of 13.10.0.0. The 13 katuns occupy a separate glyph block, but the preceding glyph block is shared by 0 kins and 10 tuns, the uinal sign and its coefficient of zero being suppressed (fig. 30, 4).

So far as I am aware only in these two distance numbers and that of the stone of Chiapa (p. 315) are an intermediate period and its coefficient of 0 eliminated. In all other cases of suppression of periods and their zero coefficients, those thus treated are the lowest units in the series. Thus, on Copan U, there is a distance number of 1.10.0.0 which connects the dates 3 Caban 0 Pop and 6 Caban 10 Mol (Thompson, 1935a). This consists of a katun glyph with an eroded coefficient above, which for reasons of space cannot be greater than 5, and a clear coefficient of 10 to the left. Beneath the katun sign is the postfix indicative of a distance number, and the following glyph is the anterior date indicator which announces that the distance number is to be subtracted to reach the following date (fig. 30,5). The whole therefore reads:

A1-A2	9.18. 2. 5.17	3 Caban, Pop seated. Expiration of
		13 tuns
I1-J1	1.10. (0. 0)	Subtract
K1-L1	9.16.12. 5.17	6 Caban 10 Mol

The record of 0 uinals and 0 kins is completely suppressed. Morley (1937-38, 2:266) has called attention to a similar case on Seibal 7, where the distance number, too, is 1.10.0.0, and the uinal and kin signs are omitted together with their zero coefficients. The posterior date indicator is given. Another instance which Morley cites, that of a supposed distance number of 13.2.0 at A2 on Copan U, cannot be accepted, for the supposed coefficient of 2 is in fact the prefix "expiration," as noted in the transcription just made. Yet another example of a distance number, this time with tuns, uinals, and kins suppressed, occurs on Palenque, Tablet of 96 Glyphs. This consists merely of a katun sign with a coefficient of 1 (fig. 55,1, Gl H6). The presence of the distance number postfix, the distance number introductory glyph, and the posterior date indicator confirm that this is a distance number—vanguard and rear guard with a corporal's file in the middle!

Tila B supplies an example of baktuns, complete with distance number postfix, being employed as a distance

number. The remaining periods are suppressed. The whole reads:

A1-B5	10. 0.0.0.0	7 Ahau 18 Zip
A6-B6	10.(0.0.0.0)	Anterior date indicator
A7-B8	13. 0.0.0.0	4 Ahau 8 Cumku, 13 baktuns

Nonetheless, in most distance numbers all period glyphs with coefficients of 0, save that of the kin, are carved. The custom of omitting them was never general, and does not appear to have been in good taste at the height of the Initial Series Period; it is more frequent after 9.17.0.0.0, although Copan J was erected at 9.13.10.0.0. There are rare cases of omission of periods from IS (p. 179).

DISTANCE NUMBER POSTFIX

A good example of how one can overlook the obvious is supplied by the specialized postfix which usually occurs with the period glyphs of distance numbers. For some 50 years the period glyphs and their different uses in IS and distance numbers have been known, yet it has until now not been noted that the period glyph takes a special postfix (almost always beneath, but rarely to the right). This postfix usually consists of a pair of abbreviated scrolls or roughly U-shaped elements which flank one, two, or three dots usually arranged in a vertical or slightly diagonal line. There is considerable variation, however, in the arrangement of the design (fig. 30,1-5,7,8), and sometimes, particularly at Palenque, there are three or four circles or U-shaped elements (it is sometimes difficult to distinguish between an abbreviated scroll and a circle). In nearly all cases this distance number postfix replaces the normal pedestal support of some of the period glyphs, such as is found under the symbolic variants of the tun and katun (fig. 26,25,26,34,40), but in some examples both postfixes are present, the distance number postfix being placed below the normal support. It is accordingly probable that the examples which show several circles or abbreviated scrolls merely represent merging of elements, a matter already discussed (p. 41). That is to say, the two postfixes merge to form one. Examples of the postfix being to the right to avoid this are sometimes seen (fig. 55,1, G1 E1, F7, F8; see also fig. 26,27,42).

The distance number postfix is not always present in distance numbers and it may be omitted from one or more period glyphs of a distance number but be attached to the remaining glyphs of the series (fig. 53,1, E5-F6). As an aid in translating texts this postfix has scant value, but there are a few cases in which its presence throws a little light on style, and is of aid in deciding whether a passage should be read as an IS or as a distance number.

This same postfix is the distinguishing characteristic

of the anterior date indicator (p. 162), its presence as a postfix with the count glyph immediately following a distance number denoting that the distance number should be counted backward to reach the date which follows; placed with a CR date which precedes a distance number, the glyph indicates that it is the earlier of the two dates to be connected by the distance number, and its significance in such cases is that of anterior in time or a backward count. Such a meaning will hardly apply when it is attached to the periods of a distance number, since it is used with dates counted both forward and backward. It does, however, appear possible that it might have originated in a desire to show that the order of the periods of a distance number is to be read backward, starting with the lowest rather than the highest. The presence of this postfix in those irregular distance numbers which are arranged in descending order would appear to negate this surmise. Yet the fact that this postfix came to be almost an integral part of a distance number may have led to its inclusion, almost automatically, in those occasional distance numbers in descending order, although its significance of backward cannot have been lost because of its use in other glyphs.

DISTANCE NUMBER INTRODUCTORY GLYPH

Many, but by no means all, distance numbers are preceded by a glyph which to us has the function of announcing that a distance number is to follow, although there can be little doubt that to the Maya reader it corresponded to a definite expression or sentence. As is the case in so many, perhaps all, Maya glyphs there are both a symbolic form and a head outline; the former is much the commoner.

The symbolic form of this glyph consists of a central element, which vaguely resembles a simple swastika, with prefix and postfix attached (fig. 30,9-14). The prefix may be any one of the half-dozen or so which form the "count" group (p. 187); the postfix, another of the group, is always the same one—the eyes and hair of the death god or of the underworld. This rather resembles the number 7, but the hairs arranged as short lines between the two circles (the eyes) serve to differentiate it from the numerical coefficient except in the most weathered examples, and even then the context usually shows which glyph it should be.

The main element, the swastika sign, but with different prefixes and postfixes or lacking one or both of them, occurs with considerable frequency in various compounds: in a number of passages it has a numerical coefficient (highest known is 16), and in almost all cases the "Ben-Ich" prefix (fig. 30,20,21,24-28). It is one of the combination in the 9-16-9 group of glyphs, where the se-

quence runs 9 sky sign, 16 kins (?), 9 swastika, a puzzling formula, the meaning of which is unknown (fig. 30, 22,23).

The glyph, almost always with the "Ben-Ich" prefix, occurs over 80 times in the codices, particularly in Paris and Madrid (fig. 30,29-35). It is found, among other places, on the pages of Dresden and Madrid which record the ceremonies at the change of the year. That led Gates (1931, p. 151) to hazard the suggestion that the glyph might represent the year of 365 days, an opinion in which few would concur.

The main design, the kind of swastika, is rather like the Aztec glyph *Ilhuitl*, "day" or "festival," which occurs rather infrequently in the Mexican codices (fig. 30,36). It appears four times on Mendoza 19, where, as Long (1942) has shown, it indicates the four days (on which monthly festivals fell) of the year on which tribute was due. Long demonstrates that the interpreter's translation of these signs as 80 days is not strictly correct, since the glyphs do not imply four consecutive monthly festivals, but rather four quarterly festivals. This same glyph again appears four times on Mendoza 57. Here it represents four consecutive days, not four festivals. A parallel use of a single word (*kin*) to describe both day and festival is found in some Maya languages and dialects.

If the Maya glyph has the same value as the Aztec, it would mean, in conjunction with its prefix and postfix, something like "the count of days expired," but there are other possibilities. This swastika-like element suggests circular motion. There is a Maya expression *bukxoc* which is translated in the Motul dictionary as *contar generalmente o sumar la cuenta*; the latter definition certainly would appear to cover distance numbers, since they are addition (or subtraction). Under *buk* the Motul dictionary says "count to count years: *hun buk*, *ca buk*: one year, two years, etc." This specialized meaning would agree with the use of the glyph in the pages covering the new-year ceremonies in Dresden and Paris. The expression *bukxoc* occurs in various passages in the books of Chilam Balam. In Ixil there is a wheel showing the year bearers running anticlockwise from 1 Kan to 12 Cauac (Bowditch, 1910, fig. 62). The number 13 is written under 1 Kan, so that by allowing for the shift in numbers one can reckon the position of any year bearer in the round of 52 with comparative ease. The words "*bux xoc*" are in large letters beneath the wheel. Perez (1864, p. 394), who may have had this wheel before him when he wrote (1842), says that the wheel of the year bearers was called *bukxoc*. In Ixil there is a table giving the coefficient of the opening day of each uinal of a year, the numbers rising by 7, since 20 minus 13 equals 7. The heading above this table is *u bukxoc nohxibcabob uchi*

hump'el haab, "the reckoning of the ancients formerly for one year."

The word *buk* seems to convey the idea of turning over. As a verb it means to whip wax until it becomes spongy; *buklah luum* is to spade land for planting; *bukul* is to interweave or insert. The action of turning over does not seem at first sight to have much connection with adding because we count by summing vertical columns of figures. The Maya, on the other hand, appear to have done much of their summing of periods of time by counting around wheels or four-sided figures.

Nevertheless, I do not believe that this swastika element corresponds to *bukxoc*. I have summarized the case as an example of how easily one can sometimes find support for an idea in pairing words with glyphs. I think it is much more probable that the swastika sign corresponds to the word *hel*, "change, successor."

The Motul and Perez dictionaries give for this word, as a substantive, the meanings successor in office, replacement for something or somebody lacking or worn out, or quit, exchange, return payment; as a verb they list to move, to exchange, to put one in place of another, change one's clothes; as a past participle (*helan*) they give the extended meaning of different, as a thing different from what it used to be or different from another thing. *Helep* is to change in custom or nature, and, by extension, new year when the incoming officers take over their duties from those retiring; *helep akab* is past midnight; *helehel* is at times, and there are numerous other compounds.

In Chumayel there is mention of *canhel* or *cangel*, a word which Beltran translates as dragon. Ralph L. Roys (1933, pp. 67, 110) discusses at some length the *canhel*, which he concludes is a wind god or rather that there were four of them, and that the word could well be translated the four changing ones. He also notes that as the *canhel* was held in the hand by God, the word was presumably applied to the manikin scepter or something of that nature. The passage in question, as translated by Roys, reads: "Here was the first heaven where God the Father was set up, grasping in his hand his stone, grasping his *cangel*, grasping his wheel on which are hung the four angels of the winds." The angels of the winds are identified in the preceding paragraph as the red, white, black, and yellow Pauhtun, who are closely related to, if not identical with the Bacabs set at the four sides of the world to sustain the heavens. I would suppose that the *cangel* (i.e. *canhel*) was the wheel on which the four angels (*canhel*) hung. "The changing ones" is a reasonable interpretation since the one succeeded the other (*hel* can mean successor) in counterclockwise rotation as rulers of the years. Thus, there does seem to be a

definite association between *hel* and the rotating movement involved in this succession of deities with their changing world directions and numbers. The swastika sign could, accordingly, have the meaning of *hel*. As a distance number involves a rotation of rulers and perhaps was counted in a rotary manner, the use of the *hel* concept would not be out of place.

Hel or *helep* appears several times in the prophecies for the divisions of Katun 5 Ahau in Tizimin (Roys, 1949). The terms occur in contexts dealing with the end of one katun and the entry of its successor, and are linked to such paraphernalia of the changing katuns as the mat, the throne, the cup, the bowl, the rule, and the law: on page 10 we find the expression "when the katuns change with one another."

Because of the prominence of the swastika glyph (but with the "Ben-Ich" prefix) on the pages in the codices which deal with the new years and the accompanying change over from one set of rulers to another (p. 124) and its even greater prominence on the pages of Paris which record the sequence of the 13 katuns with their rulers, I feel fairly confident that the swastika element means *hel*, and that such a meaning would fit a count of days as well as the "successor" aspect of the new years and the new katuns. The symbol might also represent the four world directions and their rulers because of the rotary arrangement of the calendar and because of the apparent use of the word *canhel* for the four wind deities. Nevertheless, I do not think that this identification can be accepted as entirely proved (see also p. 202).

The head form of the distance number introductory glyph is not always identifiable save through its position at the start of a distance number, and because it retains the prefix and postfix of the symbolic form. However, on Copan T 11, there occurs a head form with the swastika-like symbol on the side of the head (fig. 30,16), and there are other possible examples which may indicate the subject matter of the date reached (fig. 30,17-19).

ANTERIOR AND POSTERIOR DATE INDICATORS

These glyphs indicate by means of their affixes whether the date with which they are associated is the earlier or later of the two dates connected by a distance number. They correspond roughly to our plus and minus signs.

The posterior date indicator consists of a main element, a prefix, and a postfix (fig. 30,42-47). The symbolic form of the main element is the jade symbol, which is used for the more usual variant of the day sign Muluc (fig. 8,4-7,10,11) and has the meaning of water. The head form, which is nearly as common as the symbolic form, is that of a strange creature I have shown to be without question a fish (Thompson, 1944). The animal

associated with the day Muluc is the *xoc* (p. 78), according to the Vienna dictionary a species of shark. The Perez dictionary lists *hkan xoc* as a species of shark, and this Gaumer (1917, pp. 32, 35) identifies as "pilot or caaing whale" and as "short-finned blackfish." Roys, who supplied these references, also points out that there is mention on page 2 and *passim* of Tizimin, part of section of prophecies for the tuns of a katun, of Chac uayab *xoc*, "the great or red demon shark or whale." For the year 1 IX there is a passage which he translates: "Chac uayab *xoc*. At that time the fire was set; it clings to the tail of the shark. When it is set, it clings to the sky, to the clouds; at that time it is beheld everywhere." He notes that this being seems to be connected with the Yucatec god of fishermen, said by Landa to be Ah Kaknexoi, but which he had previously reconstructed as Ah Kaknexoc, "fire-tailed shark or whale" (Roys, 1949). He concludes that *xoc* or *xococ* refers to an ill-defined group of large fish or whales. In the Pokomchi dictionary of Cahcoh shark is one of the meanings given for the word *xoc*. I have been unable to trace the word in other lowland tongues, but, as I have pointed out, the compilers of such dictionaries, being with few exceptions men of God, would hardly worry about obtaining the native equivalents of such denizens of the deep as whales, sharks, and mythical fish unless they contemplated a sermon on Jonah. Moreover, only a small part of the Maya lived near the coast or went down to the sea in ships.

In view of the association of the *xoc* with the day Muluc, I think there can be little reason to doubt that the fish here used as a head form is the *xoc*, and that the *xoc* was a mythological monster connected with water (p. 44). There is considerable variation in portraits of this *xoc* monster, as is the case with all creatures of imaginative zoology. The characteristic feature is supplied by what appears to be barbels which sweep upward before the forehead and curve down behind the mouth to form a sloping S-like design, but equally prominent is the finlike prolongation at the back of the top of the head, which probably represents the start of the dorsal fin. The gill opening is sometimes marked but generally blends with the barbels; serrated teeth are usually displayed. These features would militate against the identification of the creature as a whale were it not that mythology and zoology have but a nodding acquaintance.

The head of this fish is also that of the patron of the month *Zotz'* (fig. 22,17-22); in an abbreviated form it is used as the head form of the count prefix (fig. 5,24,34, 41,49,50), its corresponding symbolic form being the "comb," a conventionalized picture of the dorsal fin (fig. 5,14). A series of illustrations of fish are shown in figure 5,1-7; the replacement of the "comb" element by pic-

torial representations of fish is well illustrated by the IS introductory glyph (fig. 23,34-40).

Xoc is also the Yucatec word commonly used for counting. I have not encountered the word in other languages save Kekchi. In that language there is a verb *xococ*, "to collect, to bring together" (Wirsing, 1930), which is very probably the same. The final *oc* is a verbal termination. There seems not the slightest doubt that the picture of the *xoc*'s head is used here to represent the noun and verb *xoc*, "count" or "to count," a perfect example of rebus writing. The symbolic form (fig. 30,37-40,42-44), on the other hand, is ideographic, the symbol for water or rain representing the creature which inhabits water and in all probability gave rain to the earth. The meaning of count fits the use of this glyph perfectly.

The prefix of the posterior date indicator, which resembles Landa's glyph for the letter *i*, occurs in several combinations, where its meaning must correspond to "leading to," "forward to," "falling on," "ending," the interpretation Beyer (1937, p. 154) favored, or something very similar. It occurs most frequently in combinations which lie between distance numbers and period endings (figs. 31,45-48; 32,11), but in all cases these distance numbers lead forward, not backward, to the dates in question. There are, therefore, really good grounds for attaching to this prefix the meaning of "forward." I have no suggestion to offer as to the actual Maya word or words it represents. Nonetheless, terminations were attached to numbers in some, and perhaps all, Maya languages and dialects to differentiate a time count into the future or into the past. Thus we find *er* added to numbers in Kekchi and Pokomchi to denote a count into the future; *eh* to indicate a count into the past in the same languages. The termination *eh* appears to be used for a lapse of time in which time relationship to the present is not indicated, but with the addition of the number one, e.g. *hun cabeh*, "a period of two days"; *hun oxeh*, "a period of three days."

The prefix usually stands to the left of the main element, but quite frequently it is above it. Occasionally it becomes an infix of the main element, when that is the head form, serving as the headdress of the head in question, for the Maya saw nothing incongruous in supplying with headgear a somewhat anthropomorphized fish.

The postfix of the posterior date indicator is also a postfix of the anterior date indicator. It is the so-called torch or vulture symbol, which seems to be the same as Landa's glyph for the sound *ti*. *Ti*, however, is the Maya locative, which in practice corresponds not only to "at" and "in" but also to "with," "to," and "from." As we have already established the meaning of "count forward" for the main glyph and its prefix, the locative value

of *ti* fits extremely well, and the whole then reads "count forward to," the only doubtful part being the exact meaning of the prefix, but that at least must be something very similar to "forward."

The anterior date indicator has the same main element, the *xoc* monster or the precious water as the symbolic form. There is no prefix, but two postfixes. These may be placed one above the other, or merged in one line, below the main element; or one may be below, the other to the right (fig. 30,37-41). One of the two postfixes is the locative sign *ti*, which appears in the posterior date indicator; the other is the same as the postfix of periods of distance numbers, already discussed. As this glyph is used to denote that the CR date to which it is adjacent is the earlier of two dates joined by a distance number, and as it differs from the posterior date indicator only in the substitution of this postfix for the prefix of the latter, it stands to reason that this reversal in the direction of counting must be expressed by that substitution. The second postfix, therefore, indicates anteriority in time, and the whole glyph means "count backward to" or "count from the earlier date to," indicating the point of departure.

A short passage comprising Dates 22 and 23 of the Hieroglyphic Stairway, Copan (fig. 35,16), illustrates the usage of the various elements which compose a distance number. Translated as pure arithmetic, it would be transcribed

$$\begin{array}{r} (9.14.15.0.0) \quad 11 \text{ Ahau (18 Zac)} \\ \quad \quad \quad 11.14.6 \\ \hline (9.15.6.14.6) \quad 6 \text{ Cimi 4 Zec} \end{array}$$

Translated as the Maya wrote it, it would run something like this: "A change of time by addition [*hel?*], 6 kins, 14 uinals, 11 tuns in reverse order [*?* the postfixes]. The count is from the earlier date 11 Ahau [18 Zac], the count forward to 6 Cimi 4 Zec."

The presence or absence of the anterior and posterior date indicators appears to have depended on the decision of the priest-astronomer who prepared the drawings for the texts, and he was probably guided in his choice largely by problems of space. No doubt, too, individual taste played a part in the decision, for among the Maya priesthood, as among modern writers, there were probably devotees both of a polished style and of telegraphic journalese. Two citations are given below to texts in which these glyphs are particularly prominent.

The Tablet of the 96 Glyphs, Palenque (fig. 55,1), supplies five examples of posterior date indicators of the head form, at A6, C4, E2, G1, and G7. There are four examples of this glyph on the back of Piedras Negras 3: head forms at C2a and E7, symbolic forms at C5b and F1 (fig. 50,1).

At Palenque, but nowhere else save perhaps at Xcalumkin, an entirely different form of the anterior date indicator is used. This is a wriggly creature, perhaps a snake or an eel or even a tadpole, which is attached to the day sign from which the distance number is counted forward, or which is reached by subtracting the distance number from the other date. The best preserved and delineated example is on the Tablet of the 96 Glyphs, Palenque (fig. 30,48-51). The creature is to the left of the day 13 Ahau. The passage runs

H7-I1 (9.17.13.0.7) 7 Manik 0 Pax, Completion of
 first katun
 L1 7 (subtract)
 K2-K3 9.17.13.0.0 13 Ahau 13 Muan, 13 tuns

The nine examples of this sign so far discovered are listed elsewhere (Thompson, 1944, p. 21). In one case the prefix is attached to the tun sign, not the day sign, to which the distance number leads back (Inscriptions, west panel, H8). A tenth example may occur at Xcalumkin (fig. 4,26). See Addendum, page 296.

The presence of these directional indicators reflects the spoken word, but they are also of some value to the modern epigrapher in reconstructing damaged or defective texts, since they inform us which of two dates is the earlier. Thus, with a complete distance number, an anterior or posterior date indicator, and only one of the two CR dates, one can restore the missing or suppressed date with complete assurance. The front of Yaxchilan 25 opens with a distance number of 2.2.7.0, posterior date indicator, 3 Imix 14 Ch'en (fig. 49,1). Luckily, the under

With the posterior date indicator present, only the first reconstruction is permissible.

INDICATORS OF TUN AND OTHER DATES

In some cases distance numbers are followed, not by an anterior or posterior date indicator, but by other glyphs, the meanings of some of which are known.

Two of these glyphs, which are commonest at Palenque, have as one of their main elements the sign for which the meaning *cutal*, "the seating of," has been suggested. The postfixes attached to this main element differentiate this glyph (fig. 19,42-44,47-51) from the merged form, identified tentatively as the symbol for the seating of the tun (fig. 19,37-41).

In the first glyph the wing is attached as a postfix, as in the case of the merged form of the supposed glyph of the seating of the tun, but there is a second postfix. This generally consists of a decorated crescent, the horns of which touch the edge of the main element, and the affix tentatively named *ak* (p. 282). This postfix and the wing postfix can change positions. If the wing is to the right of the main element, the tripartite postfix is below; if the wing is below, the tripartite element is to the right (fig. 19,42-44). The identity of this glyph with the merged form of the supposed glyph of the seating of the tun, save for the addition of a postfix, suggests a very similar meaning. The glyph, however, is not directly associated with a CR date but immediately follows a distance number. It would appear that its meaning is something along the lines of "leading to the seating of a tun." I find the following examples:

Text	Site	Inscription	Initial Point	Distance Number	Terminal Point
A	Palenque	Inscr. (E.), A11	Suppressed	12.10.3?	9.5.0.0.0 11 Ahau 18 Zec
B	Palenque	Inscr. (E.), G6	Missing or suppressed	1.12?	9.6.13.0.0 9 Ahau 18 Muan
C	Palenque	Inscr. (E.), L3	Suppressed	9.14.12	9.8.0.0.0 5 Ahau 3 Ch'en
D	Palenque	Inscr. (E.), L10	Suppressed	1.8.10	9.8.13.0.0 5 Ahau 18 Zec
E	Palenque	Inscr. (E.), M12	Suppressed	10.2	9.9.0.0.0 3 Ahau 3 Zotz'
F	Palenque	Inscr. (E.), R10	Suppressed	17.13.12	9.10.0.0.0 1 Ahau 8 Kayab
G	Chinikiha	Throne, A2	Suppressed or missing	8.7.8	Suppressed or missing
H	Chinikiha	Throne, G1	9.9.2.8.4 3 Kan 17 Zac	3.2.9.16	Missing
I	Tortugero	1, A4, u.h.	1 Men 8 Cumku?	12.5	9.11.0.0.0 12 Ahau 8 Ceh

side of this lintel is excellently preserved, and shows clearly the date 5 Imix 4 Mac, but were it to have been completely destroyed, one could still restore this date, for the presence of the posterior date indicator at Nr shows that 2.2.7.0 has to be added to the first CR date to reach 3 Imix 14 Ch'en. Were this glyph lacking, and the under side of the lintel destroyed, one would be faced with two possibilities:

$$\begin{aligned} 5 \text{ Imix } 4 \text{ Mac} + 2.2.7.0 &= 3 \text{ Imix } 14 \text{ Ch'en} \\ 1 \text{ Imix } 4 \text{ Xul} - 2.2.7.0 &= 3 \text{ Imix } 14 \text{ Ch'en} \end{aligned}$$

It will be noted that in all the examples for Palenque the starting point of the count is either missing or omitted, but in every case the ending point is the seating of a tun. In the case of F the starting point is 9.9.2.4.8 5 Lamat 1 Mol, a date prominent at Palenque. The glyph in this example is not correctly drawn in Maudslay, for there it is shown with another element replacing the wing or tail, whereas this latter is discernible in the photograph. In the case of Date H there is doubt as to the accuracy of the reading. Here the glyph follows the

CR date which appears to be 3 or 1 Kan 16-18 Zac. The reconstruction would be:

D2-F1	3.2.9.16	
E2-F2	(9. 9.2.8. 4)	3 Kan 17 Zac
	(9.12.5.0. 0)	3 Ahau 3 Xul

Because of a break in the text, it is impossible to verify this reading.

Date I differs from the reading given by Morley and Blom (Blom and La Farge, 1926-27, p. 151). Unfortunately we must depend on an extremely poor drawing. The last four glyphs appear to record 12 Ahau 8 Ceh, 11 katuns completed, the last glyph probably being the hand which is scattering drops of water. The prefix of the month sign in B3b, l.h, appears to be that of Cumku since the nick in the lower part is very clear in the

distance numbers to indicate intervals of less than 20 days. The inverted Ahau over the regular kin sign is the symbol for east, sunrise. Ahau is the day of the sun, and the glyph is a picture, naturalistic or conventionalized, of the sun god. It is therefore fairly certain that the inverted Ahau has the meaning of sun, or perhaps sunrise. Possibly it was inverted to avoid any danger of confusion with the many glyphs of which the Ahau sign is a component. With its prefix of the "seating element," it would appear to have the meaning of *u cutal kin*, "the seating of the day," and, in that case, it should refer only to CR dates which do not mark the ends of tuns, thereby differentiating such dates from those which call for the use of the glyphs of "seating of the tun," or of "leading to the seating of the tun." I find the following examples:

Text	Site	Inscription	Initial Point	Distance Number	Terminal Point
A	Palenque	Fol. Cross, N7	9.12.11.12.10	8 Oc 3 Kayab	6.11. 6 Suppressed
B	Palenque	Inscr. (W), R8	9. 9.13. 0.17	7 Caban 15 Pop	2. 7. 6. 1 9.12. 0. 6.18 5 Etz'nab 6 Kankin
C	Palenque	Inscr. (W), T7	9.12.11. 5.18	6 Etz'nab 11 Yax	4. 1.10.18 Suppressed
D	Tikal	Temple 4, L2	9.15.16. 4.18	12 Etz'nab 11 Zac	13.10. 2 9.15. 2.12.16 5 Cib 14 Zotz'
E	Copan	HS, E, Ra	9. 7. 5. 0. 8	8 Lamat 6 Mac?	2. 9.16.17? 9. 9.14.17. 5 6 Chicchan 18 Kayab?

drawing. That would eliminate Yax, as preferred by Blom. The suggested reconstruction would be:

A1-A2	9.10.13. 0. 0	1 Ahau 3 Kankin tun 13, Count of tuns completed
B3a, u.h.	12. 5	
B3b	(9.10.19. 5.15)	1 Men 8 Cumku
A4a, u.h.		To the seating of the tun
B4	9.11. 0. 0. 0	12 Ahau 8 Ceh, 11 katuns completed

It will be noted from the components of Glyph Block B4 that the glyphs within the glyph block are to be read in the sequence a, u.h.; a, l.h.; b, u.h.; b, l.h.

These examples from Chinikiha and Tortugero are too defective to be used as evidence either for or against the suggested interpretation, but they are of interest in showing that the glyph in question is not confined to Palenque.

In the second form of the glyph the tail or wing is replaced by an entirely different element, and for the crescents and scroll postfix is substituted one composed of a small oval or pointed object flanked by scrolls. The main element is the same (fig. 19,47-51).

A glyph on Palenque, Foliated Cross, N7, seemingly represents the unmerged form of this glyph and, if that is so, supplies the clue as to its meaning (fig. 19,46). The main element is an inverted Ahau with a double postfix which is essentially the same as that just discussed. The inverted Ahau is an element which enters in a glyph which, together with its coefficient, is used in certain

The suppressed terminal point of A is 9.12.18.5.16 2 Cib 14 Mol, prominent at Palenque; that of C is 9.8.9.13.0 8 Ahau 13 Pop, which occurs elsewhere in this inscription and also on the hieroglyphic stairway at this same site. What may be a variant of this sign occurs at Palenque Sun, A14. The postfixes are those of the glyph under discussion; the central element may be a head variant. Text D has inverted Ahaus as one postfix, and the little head in the center can not now be seen. Nevertheless, I think the glyph may be accepted as "the seating of the day." The Copan example is somewhat damaged, but there appears never to have been a wing, and therefore the glyph is classifiable as of the second category. On Copan J there is another example, but this lacks both the wing and the element which replaces it in examples of "the seating of the day."

These few swallows hardly assure us that we may bask in the summer of certainty, but so far as they go, they confirm the suggested decipherments. It might be argued that such glyphs, if rightly deciphered, would be entirely redundant. Such a view would be fallacious, for the glyphs reflect the spoken word. Frequently in the books of Chilam Balam one finds expressions such as *hun Imix u kin*, "1 Imix, the day." Similarly in the texts of Yucatan the kin glyph usually follows the day sign, and precedes the month sign: "9 Lamat, the day, on 11th of Yax" (fig. 38,1-3). The statement that 9 Lamat is a day is quite unnecessary by modern standards of journalese Eng-

lish, but neither Shakespeare nor the Maya poets shaped their styles to reduce the charges of cable and telegraph companies. Fine concepts deserved fine words. Sentences reduced to the bare words necessary to convey their ideas may have their place in modern life, but they are seldom great literature. Time was the great mystery of Maya philosophy; resounding sentences were its due.

"FORWARD TO SUNRISE" GLYPH

There are quite a number of glyphs which lie between distance numbers and terminal dates. I would not venture to hazard interpretations of many of them at this moment but there is one which should be discussed because of the light it may throw on other problems.

The glyph in question is a compound, to which is attached the "forward" prefix we have already encountered in the posterior date indicator (fig. 31,45-48). The compound without the forward affix means day in general, and quite probably sunrise, or perhaps dawn, in particular (fig. 31,41-44). Its derivation and implications are explored on page 168. Beyer (1943a), who has discussed the glyph, believes that it means "ending day," because he gave that interpretation to the prefix, which we have found has a meaning analogous to "forward." He notes that the glyph with this prefix is confined to Piedras Negras, with one fairly certain example at nearby El Cayo, and lists 21 occurrences, of which 19 follow distance numbers which are counted forward. On Stela 22 and Lintel 4 the distance numbers are illegible; on Throne 1 the distance number was probably on a missing fragment, some glyphs intervening between it and the "forward to sunrise" glyph. The glyph on Stela 36 lacks the forward prefix. This text is rather irregular so far as Piedras Negras is concerned, for the distance number precedes the starting point, and that is not connected by a distance number with the preceding date. As the astronomers of Piedras Negras usually took care to connect all their dates with distance numbers, this variation may in some way, not now apparent, account for the absence of the forward prefix. On Altar 2 (twice) and perhaps on Lintel 3 *ii* is prefixed to the day sign of the terminal date. This locative prefix must here signify "on" or "at," the whole reading in the second case on Altar 2 "1 katun forward to sunrise on 2 Ahau 13 Zec." On Altar 1, Lintel 3, and the shell plaque the posterior date indicator precedes the glyph under discussion, introducing a repetitive statement which probably corresponds to a speech variation (see p. 296).

On Stela 37 the "forward to sunrise" glyph is not directly preceded by a distance number, although the count is forward. The text reads:

A1-D1	9.12. 0. 0. 0	10	Ahau 8 Yaxkin
C2-C3			Haab completed. Completion 12th katun
D4-D5	3. 6. 14		Anterior date indicator?
C6-D6	9.11.16.11. 6	5	Cimi 9 Pop
D10			Forward to sunrise
C11-D11	9.12. 0. 0. 0	10	Ahau 8 Yaxkin
C12-D12			Haab completed, 2 "Ben-Ich" katuns

Thus the reckoning is forward, but a second distance number, which would have been precisely the same as the first, was supplied mentally; the glyphs in D9-C10 may convey that information. Similarly, on Piedras Negras Thr 1 the distance number is suppressed, but from analogous cases it would seem that the presence of the glyph "count of 15 katuns" at M1 indicates a count forward through that PE.

It is possible, of course, that this "forward to sunrise" glyph could be substituted for the posterior date indicator, which it closely parallels in function, only on certain occasions, but if there exists any such regulation, I have failed to find it. The glyph occurs with some period endings, not with others; with some determinants and anniversaries, not with others. I believe its use depended on the caprice of the priest-astronomer who prepared the blueprints of the inscription. One could say "count forward to *n* day, *n* month," or "forward to sunrise [or day] of *n* day, *n* month." Such flexibility surely reflects the pattern of the language.

There appear to be a number of somewhat similar signs, notably that which Spinden (1924, p. 202) has called the sacred fire glyph. It would seem that this is probably the sky symbol, not that for fire. It is essentially the sky symbol set horizontally and doubled. A series of glyphs of which this sign is an element is shown in figure 31,52-72. It will be seen that all are basically the same except for a variable infix, and that in several cases (fig. 31,60,61) the identification of this symbol as that of sacred fire will not fit the context, whereas the text is not violated if the element is translated as sky (perhaps eastern sky). One cannot identify an element as "sky" in one glyph (Spinden's "Observation of the sun at the horizon") and as "fire" in another (his "new fire" or "sacred fire" glyph) unless one can show a reason for the transmutation.

In some Maya languages the term for light, brightness, and day is the same. Obviously, by brightness and light is to be understood not the direct rays of the sun, but the diffused light of day, since the term is not confined to days on which the sun is visible. Thus, I think it is fairly clear that light and brightness refer to the sky. Accordingly, this glyph which Spinden translates as new

fire in all likelihood means "light or bright sky," that is to say, "day," probably sunrise, but perhaps dawn with its fiery light. If that assumption is granted, the glyphic interchangeability of "bright sky" and "day" corresponds to their synonymous use in the spoken language. I further assume that the curls surrounded by dots represent fiery light, an identification already made in connection with the discussion of the pictun glyph (p. 147), for the Maya use a single word (in Yucatec and Kekchi *lem*) to describe the brightness of the lightning flash, of the full moon, and of the sun. The whole glyph would therefore correspond in a general way to the "count forward to" or "forward to sunrise" glyphs. It reflects a slight variation in the spoken word. Nevertheless, this as well as other interpretations offered in this section, must be treated as tentative; the last word on them has not been said.

USE OF LUNAR GLYPH IN DISTANCE NUMBERS

Mention has been made more than once of the use of the moon glyph with circular eye, Glyph E of the lunar series, to represent the number 20. In the lunar series Glyph E has the value of 20 days or nights; its coefficient is added to it to give the age of the moon. Thus 7E indicates a moon age of 27 days or nights. The glyph in question is used in contexts other than that of the lunar series with the value of 20.

In the divinatory almanacs of Dresden distance numbers between 20 and 39 days inclusive are expressed by the moon glyph to represent the number 20 and an attached coefficient of bars and dots to cover the balance. The coefficient may be in line with, but detached from, the moon glyph; in other cases it is above it, as with Glyph E of the lunar series, or to the right of it, as a postfix, in precisely the same way as the coefficient is usually attached to Glyph A of the lunar series (figs. 63,4; 64,4).

There are five known cases in the inscriptions of distance numbers of over 19 but under 40 days which are expressed by a lunar glyph with a value of 20, and a coefficient to represent the balance (fig. 4,16-18).

On Palenque Cross and Yaxchilan L 10, moon signs with coefficients of 0 and 4 respectively serve as distance numbers of 20 and 24 days (Beyer, 1938a). On Balakbal 5 the same sign with a coefficient of 11 is used to record a distance number of 31 days (Thompson, 1940b). Another example occurs on Piedras Negras L 3, where a distance number of 23 days is expressed by means of a moon glyph with a coefficient of 3; on Quirigua Alt O a distance number of 22 days is similarly expressed by a moon sign with coefficient of 2 (Thompson, 1945b).

Presumably the Maya would never have written a distance number of, for example, 385 days as 1 tun, moon sign with coefficient of 5, for this use of the moon sign appears to have been confined to distance numbers between 20 and 39 days inclusive. The associations of 20 with the moon signs have already been discussed.

FORMS FOR KIN USED IN DISTANCE NUMBERS

In the investigation of the period glyphs of the IS it was noted that there are at least five forms of the kin: the head of the old sun god, the head of a monkey, a beaked head which may represent the eagle, the head of a youthful person, perhaps the young sun god, and the four-petaled symbolic form. None of these is normally used in distance numbers.

The only two examples which I know of the use of IS types of kin glyphs are to be found in the two distance numbers of the Foliated Cross, Palenque. These are atypical, as already noted (p. 158), because the period glyphs are arranged in descending, not ascending, order. In one case the symbolic variant of the kin is employed; in the other, the head of the sun god. The arrangement of these two distance numbers as though they were IS may have led to the carving of kin forms of regular IS types. In a third distance number in reversed order (Palenque Inscriptions (W), P7-P8) the kin glyph is suppressed, and its coefficient of 0 is attached to the uinal glyph. Another possible exception to the rule of not employing normal kin glyphs in distance numbers can be discarded. In a drawing of the glyphs on the right side of Altar de Sacrificios 9, Morley (1937-38, 2:324) shows the kin of a distance number with the cartouche outline and tail of the normal four-petaled kin, although the center is left blank. This, however, is not a correct drawing, for the photograph from which it was made shows quite clearly the upper part of the shell variant of the kin.

There are five different glyphs which replace the IS forms of kin in distance numbers.

SHELL VARIANT

The form of the kin most generally used in distance numbers is an irregular design which has been identified by Beyer (1936a) and seemingly by Spinden (1924, fig. 8d) as a conventionalized shell (fig. 31,1-9). This form is the same as that of the so-called Glyph Z of the lunar series except that the latter is provided with legs (fig. 31,10,11), the attachment of which gives the whole glyph a certain resemblance to a turtle, but the central part does not resemble the design or the outline of the carapace of a turtle. Instead, it is very similar to Maya carvings of univalve shells of the conch type. Accordingly

Beyer's identification is more acceptable, although it is hard to explain the legs attached to Glyph Z unless one makes the somewhat farfetched supposition that they are the humanized legs of a hermit crab. In reversed position and with various affixes attached, this shell sign is the glyph for south on the monuments (fig. 41, 28, 30, 31, 34, 36), and almost surely has the same origin as Cib.

A fairly careful but not exhaustive examination of Maya inscriptions reveals some 45 examples of this glyph in distance numbers: it appears in descending order of numerical occurrence at Copan, Naranjo, Piedras Negras, Palenque, Pusilha, Yaxchilan, Seibal, Uxul, Tonina, Uaxactun, Altar de Sacrificios, and Quirigua. Frequency of examples with coefficients 0-19 are in ascending order: 6, 1, 1, 1?, 1, 1, 2, 3, 2, 1, 1, 3, 4, 1, 0, 2, 1, 10 (including two probables), 0, 4. The large number of examples with coefficients of 17 is noteworthy; the six examples with zero are somewhat high, but may reflect only the predominance of distance numbers in which the kin coefficient is 0. The first glyph of the sculptured panel on the west of the doorway to the sanctuary of the Temple of the Cross, Palenque, with coefficient of 10, might appear at first glance to be an example of this glyph. But there are a number of reasons for not accepting this as a kin glyph: It does not connect a pair of dates, for it stands at the head of a short inscription completely devoid of day signs; it has a "count" bracket to the left, and a suffix different from that found with any certain example of this glyph; the vertical lines joining the base of the loop to the base of the central element are missing, and there is an unusual circle in the bottom right corner. Finally, it should be noted that were this a distance number of 10 days, it would be the only known example of the use of this variant to record an interval of less than 20 days. As will appear later, the Maya usually employed special glyph forms for distance numbers of less than 20 days.

LONG-SNOUDED-ANIMAL VARIANT

The head form of the kin most generally used in distance numbers is that of some animal with a long snout (fig. 31, 22-29). In several cases the eye is replaced by a pair of crossed bones. The head, except for the crossed bones, seems to be the same as that which forms the main element of Glyph B of the lunar series, and rather closely resembles the head form of the day Oc. It lacks the infix on the cheek and usually does not have the pointed ear, the characteristics of the month Xul. There has been considerable divergence in guesses as to the identity of this creature, for the head has been variously recognized as that of a dog, a jaguar, an agouti, and a squirrel.

A search reveals twelve examples of this variant of the kin, all occurring in distance numbers:

1. Copan J (W) (Maudslay's Glyph 17). Coefficient 0.
2. Copan J (E) (Maudslay's Glyph 33). Coefficient 12.
3. Copan J (N) (Maudslay's Glyph 41). Coefficient 0.
4. Pestac 1, C6. Coefficient 15.
5. Palenque Sun, C14. Coefficient 16.
6. Palenque Inscriptions (E), G5. Coefficient 12.
7. Palenque Inscriptions (E), M6. Coefficient 14.
8. Palenque Inscriptions (W), G8. Coefficient 8.
9. Naranjo 32, X5. Coefficient 0.
10. Tikal 19, B19. Coefficient 19.
11. Copan HS, Step S11. Coefficient 0. This does not closely resemble the long-nosed animal, but has crosshatched spots which suggest the jaguar. However, as the related animal heads of Glyph B of the lunar series at Copan diverge considerably from the normal, I feel that this head probably belongs with the group of kin variants.
12. Quirigua H, S2. Coefficient damaged. Perhaps 0; might be 14.

Crossed bones replace the eye in Examples 1, 4, 5, 7, 9, and 12. In Examples 3, 6, and 10 the glyphs are too weathered to indicate whether that detail is present. In Example 8 the treelike central element of Kankin appears as an infix on the cheek. In this connection it is worth recalling that the head form for Kankin is that of some animal, conceivably a dog although the long thin snout is absent.

This kin variant takes one of two postfixes, the same pair as occur with the shell variant of the kin previously discussed. One is the "ak" affix; the other, *te* (2), is closely related (p. 284). See Addendum, page 296.

SKULL-WITH-QUINCUNX VARIANT

A second head form is exceptionally rare, there being but one known example of its use in a distance number (fig. 31, 33). This occurs on the Tablet of the 96 Glyphs, Palenque, with a coefficient of 7, and comprises the whole distance number, for there are no uinals or tuns. The head has death symbols and the quincunx sign as a headdress. This variant is discussed in detail on page 170.

SUN-AT-HORIZON VARIANT

The glyph which has been called sun at the horizon (fig. 31, 41-43) is used solely when the distance number is of only one day. Two examples occur at Tikal; a third on Naranjo 32. Morley (1937-38, pl. 16) illustrates in a drawing of the inscription on Ixkun 2 another example of this variant with a coefficient of 1, but the calculations do not indicate any addition or subtraction of one day. The photograph appears to show the supposed dot and upper crescent merging into a single element. It is accordingly doubtful that this glyph is a true parallel to the two examples from Tikal and the one from Naranjo.

A kin glyph with a coefficient of 1 is also found on Naranjo 35 at B11a. There is no doubt that this is a distance number of one day because of the dates it connects, but the glyph itself is weathered beyond identification.

Seler (1902-23, 1:731) first proposed the reading of "daybreak" for this glyph, because he considered that the kin element issues from between a cleavage of the sky and earth symbols. Spinden (1924, pp. 147-48) suggests the decipherment "observation of the sun at sunset," similarly recognizing the sky and earth elements; Beyer (1943a, p. 346) interprets the glyph as representing the sun in the day sky. He believes that it means merely day, considering that the Caban element represents not earth, but, like the upper element, sky.

INVERTED-AHAU-OVER-SERPENT-SEGMENT VARIANT

In several cases a distance number of less than 20 days is expressed by a coefficient attached to an inverted Ahau above what has been called the serpent-segment glyph. This serpent-segment element may be replaced by the bundle sign without affecting the meaning, or the inverted Ahau may be duplicated (fig. 31, 12-20). The Ahau element is inverted when used as an affix, and it has been shown that duplication of an affix does not alter the meaning (Beyer, 1934a, p. 101). One form of the glyph, that with a single inverted Ahau of considerable size, was identified first by Bowditch (1901d, p. 6). Many years later, Beyer (1935b, 1936i) identified two examples with the inverted Ahau duplicated and one with a single Ahau inverted over the "bundle" sign, and Morley (1937-38, 3: 223) adds two with a single Ahau to the list. The remaining identifications are mine (mainly in Thompson, 1944b). Inverted Ahau is a poor name for this variant, because sometimes the inverted Ahau is not the main element, but a prefix. This variant of the kin occurs in the following texts:

1. Quirigua C, I1, with coefficient of 8 (Morley, 1915, p. 72).
2. Piedras Negras 1, F3, with coefficient of 5 and *u* bracket prefix to left (Bowditch, 1901d, p. 6).
- 3,4. Piedras Negras L 3, L1 and U4, with coefficients of 2 and 3 respectively, but in the latter case, and probably the former, too, the serpent segment is replaced by a diamond-bundle element (Morley, 1937-38, 3:223).
5. Piedras Negras, Altar Support, B4a, with coefficient of 6. Element beneath is diamond bundle. The glyph is somewhat worn, leading Morley to suggest that it may be a winged kin, but the wing is clearly the diamond-bundle element, and the large circle of the mouth of the inverted Ahau is plainly visible.
6. Calakmul 89, D1, with coefficient of 2 and *u* bracket prefix above. Element beneath not identifiable (Morley, 1937-38, 3:223).
7. Yaxchilan L 10, E5a, u.h., with coefficient of 4 and *u* bracket

prefix above. Element beneath is diamond bundle (Beyer, 1935b).

8. Quirigua G, U'1a, with coefficient of 10. Element beneath is diamond bundle. The glyph is worn but there is a circle at the top of the large element which probably represents the mouth of the inverted Ahau. Above is what is almost certainly the *u* bracket. Since this occurs also in Examples 2, 6, and 7, the identification of the whole glyph may be accepted without much hesitation.
9. Naranjo 28, G8, with coefficient of 12 and what may be *u* bracket above. The element beneath appears to be the diamond bundle. The weathered central element might pass as the shell variant of the kin sign, but that variant never has a superfix nor are there any certain instances of its occurrence in distance numbers of less than 20 days.
10. Piedras Negras, Shell Plaque 1, H1, with a coefficient of 6. The Ahau element is duplicated (Beyer, 1936i).
11. Naranjo 29, F18, with coefficient of 3. Two partially defaced circles, forming a superfix, may be duplicated Ahau glyphs in inverted positions. There is a flame prefix to the left (Beyer, 1936i).
12. Naranjo 12, C8b, with coefficient of 4. The serpent segment is fairly clear, and above it are two small circles, presumably inverted Ahau signs.
13. Piedras Negras 8, B24, with coefficient of 3. The serpent segment is fairly clear, and above it are two inverted Ahau signs.
14. Piedras Negras 8, C1, with coefficient of 3. There are two circles above, and these presumably are inverted Ahau signs. To the left of the coefficient is an element which looks like a bar, but must surely be the *u* bracket in view of its presence with Examples 2, 6, 7, and probably 8.
15. Piedras Negras 8, L3. In poor condition. Coefficient may be 3, certainly not over 10. Two circles over main element presumably inverted Ahau faces.
16. Quirigua Alt O, U1a, with coefficient of 8 and *u* bracket above. Morley reads this as "end of Katun 6," but his drawing shows the lower part to resemble the "serpent segment" rather than the tun sign. In the photograph one can, I think, make out the mouth circle of the inverted Ahau. More important, however, is the following glyph which is surely the posterior date indicator. This makes it virtually certain that the glyph under discussion represents a distance number (Thompson, 1945b).

The calculations in connection with all these short distance numbers are straightforward, and can be found in Morley (1937-38) with the exception of no. 6 (Ruppert and Denison, 1943), no. 7 (Beyer, 1935b), nos. 13, 14, and 15 (Thompson, 1944), and no. 16 (Thompson, 1945b).

In nos. 1-9 the inverted Ahau is the largest sign; in nos. 10-14 the single inverted Ahau is replaced by two small elements which in the two cases where details are clear are seen to be pairs of inverted Ahau signs. Beyer (1934a) illustrates examples in which the inverted Ahau, when used as affix, may be carved as a single large sign or as a pair of small signs. One must conclude, therefore, that in all these examples the Ahau is an affix despite the fact that it is frequently larger than the main sign.

Madrid 66b has an inverted Ahau over a postfix lacking detail, and with a coefficient of 3 to the left. This pretty

clearly denotes three days, but is not a distance number. Other compartments of this almanac have records of tuns, uinals, and, perhaps, days.

What is probably another example of this glyph occurs on Piedras Negras 9, D7. The glyph is somewhat weathered, but one can distinguish a *u* bracket to the left and a coefficient of 5 above a large glyph with suffix. No cartouche is visible, but there is a circle at the top such as normally marks the mouth of the inverted Ahau; and two smaller circles, which would be the eyes, are perhaps distinguishable below. However, it is possible that this is the shell variant of the kin sign, although nowhere else does that form occur with a *u* bracket. Morley (1937-38, 3:195) reads this as "end of a hotun," connecting it with the date immediately above, and assuming that the distance number of five days is suppressed. However, it is clear that the central element cannot be the cauc sign since it lacks the unmistakable three-quarter cartouche of that element.

There are a few damaged glyphs which form distance numbers of less than 20 days. These occur with coefficient of 1 on Seibal 11 and with coefficients of 2 on Naranjo 12 and Piedras Negras 35. The example from Seibal has a bundle beneath, but of the main element little is clear. The glyph on Balakbal 5 is complex; it certainly is none of the normal forms of the kin. The examples on Piedras Negras 35 and Naranjo 12 have high superfixes and might therefore be the form with inverted Ahau, but they are too weathered to make this identification more than a guess.

Thus we have the following kin variants occurring with distance numbers: shell, long-snouted animal, skull with quincunx, sun at horizon, inverted Ahau and serpent. It is to be understood that these designations are merely handy terms, and do not necessarily imply acceptance of the identifications involved therein.

OCCURRENCES OF KIN VARIANTS IN LUNAR SERIES

Every one of these variants of the kin or some of their component elements occur also in the lunar series. The shell variant with arms and legs attached becomes the so-called Glyph Z of the lunar series (fig. 31,35,37). There are four occurrences of the long-snouted animal in lunar series. Together with its coefficient of 15, it is attached to Glyph D of the lunar series of Yaxchilan L 29 (fig. 31,30), the combination indicating a moon age of 15 days. A second example of this coalescence, but with a coefficient of 7, on Quirigua E (fig. 31,31) declares a moon age of seven days. On Quirigua B this head, with a coefficient of 7 expressed as a full figure, is combined with Glyph E to record a moon age of 27 days (fig. 29,12).

On Quirigua Alt O a not very distinct head which is probably the same as that under discussion has a coefficient of 5 and precedes Glyph D of the lunar series. There is no doubt the whole indicates a moon age of five days.

The skull-and-quincunx headdress with a coefficient of 7 is attached to Glyph D of the lunar series of Yaxchilan L 21, the combination declaring a moon age of seven days (fig. 31,36). It should be noted that Glyph D is the variant with slit eye, not the form with circular infix which converts the whole to Glyph E. Another example of the skull-with-quincunx headdress attached to Glyph D of the lunar series, but this time with coefficient of 5, is to be seen on the Tablet of the Cross, Palenque, the combination indicating a moon age of five days (fig. 36,19).

The skull with quincunx also forms the so-called Glyph Y of the lunar series (fig. 31,37), or the skull may be suppressed, the quincunx alone replacing it (fig. 31,38). In either case the designation "Glyph Y" should be dropped, since the glyph is not an integral part of the lunar date. As Glyph Y, the quincunx glyph has a coefficient of 5 on Lintels 21, 29, 56, Yaxchilan; it may occur with a coefficient of 7 as Glyph Y on the upper step of the middle doorway, Yaxchilan Str 44, but neither the glyph nor the coefficient is certain. A very clear example, with coefficient of 5, is on a fragment of Yaxchilan 4; as it is apparently followed by a date indicator and a CR, it probably represents a distance number. As already noted, on the Tablet of 96 Glyphs, Palenque, the quincunx skull with coefficient of 7 records a distance number of seven days. With a coefficient of 5 it appears on the murals of Room 1, Bonampak, but not in a calendrical passage.

There are, therefore, six certain occurrences of this glyph with coefficients of 5, two certain and one possible occurrence with coefficients of 7, and no occurrence with any other coefficient on monuments of the Initial Series Period. However, once in Madrid (p. 52) the quincunx is inserted between the numeral 10 and the head of God Q. Nevertheless, there can be little doubt that in this case the coefficient is used primarily in an appellative sense, the number 10 forming part of the name of God Q.

In view of the use of this glyph only with coefficients of 5 and 7, it should be noted that there is a numerical classifier *bix* or *uix* which is used only with the numbers 5 and 7. This occurs with one or both of these numbers in Yucatec, Pokoman, Kekchi, Quiche, and Cakchiquel (Noyes, 1935). Where only one of the two (days 5 and 7) are given, information is lacking on the other number. The Motul dictionary lists *u bix* as an interval of seven days, a week, but it seems probable that after the Spanish conquest only *uuc bix* (seven days) was retained, *ho bix*

(five days) falling into desuetude, like other Maya time periods, because it did not correspond to any European time period. With the disappearance of *ho bix*, *bix* would refer only to the seven-day week and it would be unnecessary to retain the numeral. The Motul dictionary also gives *uucbix*, "a week hence," *uucbixhi* or *uucbixi*, "a week ago," but *u bix pascua*, "the eighth [seventh in our system] day from Easter." The use of this term *bix* for intervals of five and seven days suggests two new time periods. The first perhaps corresponded to the intervals between markets, the fourth part of a uinal (just as the quarters of the katun and of the 260-day cycle were of importance); the second perhaps also denotes a market interval, but it might represent a cycle of the seven days under the rulership of seven lords of the soil. Elsewhere I have discussed the possibility of such a period (Thompson, 1943d). *Bix*, then, would appear to have had some such connotation as cycle of days, the attached number indicating whether it was composed of five or seven days. I do not think that *uuc bix* can be a colonial innovation produced to supply a Maya equivalent to the Spanish week. Had such a term been coined, it is quite probable that it would have been *uaxac bix*, corresponding to the Spanish *ocho dias* (eight days—one week). Maya, like English but unlike Spanish, does not count both the starting and ending days of a period, but with the breakdown of the old system in the sixteenth century, a Maya term coined as the equivalent of the Spanish week might well have had the number 8 as one of its component elements. Furthermore, it would seem unlikely that the same term would be coined by Yucatec, Pokoman, Kekchi, and Cakchiquel in colonial times when the cultural ties binding the various parts of the Maya area had become very weak; the wide distribution of the expression 5 and 7 *Bix* is strong evidence for pre-Spanish usage. The same word probably appears in the Jacalteca name for the five days at the end of the year, *ho pix* (p. 118).

The words *bix* or *uix* supply no likely leads of a phonetic nature. The quincunx, however, was the badge of Venus as morning star (Tlauizcalpantecutli). In the pages of Borgia and Bologna dealing with Venus, this deity has a skull, whereas in Vatican B he has a normal head with the quincunx painted on it. I shall recur to this matter later (p. 172).

The sun-at-horizon combination does not occur in the lunar series, but the *caan*, "sky," element with an unknown element to its left and no coefficient substitutes for Glyph D of the lunar series on Quirigua E to record a moon age of no days (perhaps conjunction). It is possible, although far from certain, that there is a four-petaled kin sign in the center of this element to the left (fig. 36,29).

The inverted-Ahau-over-serpent-segment variant is probably recorded in the lunar series of Copan 9 (fig. 31,21). The main element is the head of God C with a coefficient of 5 above, and an Ahau face set on its side as a prefix to the left. The whole substitutes for the regular form of Glyph D of the lunar series and indicates a moon age of five days. By the rules of Maya affixes, a prefix may be placed above or to the left of the main element without altering the meaning in the slightest way, and the same edge of a prefix usually adjoins the main element whether the prefix be placed to the left or above it. Thus if the Ahau is inverted above the main element, its corresponding position to the left is on its side with top of glyph (the eyes) touching the main element. This is precisely the arrangement in this lunar text.

God C is perhaps the most elusive deity in the Maya pantheon. With the *u*-bracket prefix he is god of the north, but with color prefixes he is associated with all four world directions; with a coefficient of 9 and held in the hand, he functions as the first of the nine lords of the nights. Most significantly, the shell variant of the kin with legs, and also with a coefficient of 9, replaces him as lord of the night on Yaxchilan 6. Therefore God C equates with the shell variant of kin. God C can also substitute for the long-snouted animal of Glyph B of the lunar series (Copan P, 3, and 19, and perhaps Pusilha H) and, inserted in the jaws of a celestial dragon or serpent, he is an important element of one of the forms of Glyph X of the lunar series. In a somewhat similar manner his head sometimes serves as the headdress of the long-nosed skull which is inserted in, or by itself forms, the rear head of the double-headed celestial monster. More usually, however, the headdress of this long-nosed monster with bared lower jaw consists of the four-petaled kin sign surmounted by a triple ornament (see Seler, 1915, figs. 101-116). In one case the *caan*, "sky," sign replaces the four-petaled kin. Thus again God C equates with a kin sign, this time the four-petaled variant. (See p. 296.)

We conclude, therefore, that as God C can replace both the shell and the four-petaled variants of the kin sign, he also can function as a kin sign. This conclusion is reinforced by noting that he can substitute for the animal head of Glyph B of the lunar series, which, in turn, seems to be closely allied to the animal-headed variant of kin.

An examination of the so-called serpent-segment element makes it abundantly clear that the circle at the left with its curving line is an exact reproduction of the peculiar mouth of God C. This identification does not necessarily conflict with that of serpent segment, for the serpent segment may well represent the body of the serpent dragon from which God C emerges.

The head of God C without an inverted Ahau attached may also replace Glyph D of the lunar series. An example of this may be seen on Copan N, where God C has a coefficient of 1, indicating a moon age of one day (fig. 36,1). Here again, therefore, God C equates with kin.

SYMBOLISM OF KIN VARIANTS USED IN DISTANCE NUMBERS

As yet a common symbolism or meaning to link these various forms of kin is lacking. Such must be sought in order to give a coherent interpretation of these sundry signs used in distance numbers.

Of the five variants, the so-called caan-kin-caban or sun-at-horizon glyph appears the most promising from an ideographic point of view. Seler and Spinden independently concluded that the glyph represented the sun at the horizon because the sun is squeezed between two symbols which for many years have been accepted as representing sky and earth respectively. Beyer (1943a) appears to be the only writer who has challenged this interpretation; he considered that both symbols represent day sky, and therefore the whole means sun in day sky, that is, merely day. However, the evidence is strongly against such an interpretation.

Seler and Spinden differ, however, in one respect. Seler writes: "The sun disk issues from a cleavage between the hieroglyphs sky and Caban, an easily comprehensible picture of daybreak"; Spinden considers the glyph to represent sunset. Actually we have no information as to the starting point of the Maya day (24-hour period) during the Initial Series Period or, in fact, until modern times. Among the modern Jacalteca and Ixil it starts at sunset.

Ralph L. Roys, in a correspondence with me on the linguistic side of this problem, points out that the sky-sun-earth glyph seems to correspond very nicely to a Yucatec term for morn, *hatzcab*, which appears to be compounded of *hatz*, "divide or part," and *cab*, "earth." There is no linguistic evidence, however, for the use of the numeral one with this term, but this lack of numerical corroboration is purely negative, and there is similarly no evidence for the use of the number one with any Maya word for sunset. Yet it is not without importance that Seler should have recognized this form as depicting dawn by a cleavage of sky and earth by the sun, although apparently unaware of the fact that this action closely parallels one of the Maya terms for morning.

An examination of the inverted-Ahau-over-serpent-segment reveals its similarity to the symbol for east in the Maya codices, which is an inverted Ahau over (sometimes to the side of) the four-petaled kin sign (fig. 41,1-4). We have already noted that serpent segment probably

equates with God C, and that that in turn can serve as a substitute for the four-petaled kin under certain circumstances. It is, accordingly, a fair assumption that inverted-Ahau-over-serpent-segment and inverted-Ahau-over-four-petaled-kin may have the same symbolic value. Inverted-Ahau-over-four-petaled-kin is the glyph for east, but in Yucatec *likin*, "east," means literally sunrise. Similarly the words for east in Tzeltal and Cakchiquel mean sunrise, whilst the eastern Chol term appears to mean "where the sun grows strong." There is therefore good, but not unchallengeable, evidence that the glyph inverted-Ahau-over-serpent-segment means sunrise, and therefore agrees with the best interpretation of the caan-kin-caban glyph.

The long-snouted and quincunx variants have in common a rather marked tendency to display symbols of death, although these are not always present. The quincunx, as already noted, is a symbol of the Mexican deity Tlauizcalpantecutli, the god of Venus as morning star. The complete Maya glyph for the planet Venus resembles a quincunx, consisting of four circles, one at each corner of the glyph, and a central element which is usually a sort of diamond with incurving sides (figs. 7,52-56; 42, 31). The quincunx is frequently set on the regular four-petaled kin glyph, apparently without altering its value in any way (fig. 26,51).

In Mexican and Maya belief the sun, after setting, traveled during the night through the underworld, land of the dead, so as to emerge next morning once more in the east (Cline, 1944). The Mexican manifestation of the sun at the eastern horizon, Tlalchitonatiuh (literally "sun on the ground"), appears in Bourbon as a mummy; on Borgia 18 a deity who is apparently the sun god, for he has a sun disk on his back, is depicted as aged and with a bared jawbone, and as the scene is the underworld, one may assume that the jawbone indicates his nocturnal transit through the realm of death. According to tradition, Quetzalcoatl appeared as morning star after being dead for eight days, the period between disappearance of Venus as evening star and the planet's reappearance as morning star. As Venus as morning star is frequently depicted with death symbols, one may assume that he obtained these in his journey through the underworld during the eight days between his disappearance in the west as evening star and reappearance as morning star in the east.

There is therefore evidence that both the sun and Venus were believed to take on characteristics of death during the passage through the underworld, and to retain these at the moment of rising. Parenthetically one might remark that the purpose of human sacrifice to the sun (and perhaps to Venus, too) may not actually have been to nourish an already plump solar deity, but more specifically to

clothe the skeleton of the sun with flesh in replacement of what he had lost in his nocturnal journey through the underworld. This act of donning a carnal garment may be reflected in the Manche Chol term for the east, *tzatzibcin* (*tzatzibkin*), which seems to mean strengthening of the sun (*tzatz*, "strength"; *kin*, "sun").

Provided the above assumption is valid, the deity with skeletal features and the four-petaled kin on his forehead, who frequently forms the rear head of the celestial dragon or emerges from it, is some manifestation of the sun at the moment of rising. The presence of the long ophidian or draconian snout makes it doubtful that these heads directly represent the sun, but there can be no doubt that they have an intimate association with the solar deity.

These various incursions into the realms of Mexican and Maya mythology supply cogent reasons for accepting the quincunx and death symbols as indicative of dawn or sunrise.

The identification of the long-snouted head is not easy. Because of the shape of the nose and the general resemblance to heads of Oc and Xul, I am inclined to recognize it as a dog. On the other hand, Tozzer and Allen (1910, pl. 35, nos. 6, 9) class as jaguars heads which closely resemble those under discussion. Both the dog and the jaguar are intimately associated with the underworld, the former because he led the sun and the dead to the underworld; the latter because the jaguar god is a denizen of the underworld (p. 74). The crossbones which are frequently set over the eye confirm the association with the underworld.

This head, therefore, whether it be that of a dog or of a jaguar, clearly refers to the sun in the underworld or at the moment of its emergence therefrom at sunrise.

In Maya symbolism the shell represents the earth, the underworld, and death. The association perhaps arose from the water in which the earth crocodile floats, just as the water lily symbolizes both water and earth because of its intimate association with the earth crocodile. Alternatively, the conch or similarly shaped shells were the symbols of parturition, an idea prevalent in central Mexico, and since birth and the surface or interior of the earth were intimately associated in Mexican and Maya thought, the univalve shell came to have the more general meaning of earth.

The earth god, the Mam, is frequently depicted wearing a shell on his back or emerging from a shell (fig. 21,3-7). The glyph of the sun god (G9) as lord of the night consists of the head of the sun god or the four-petaled kin sign surmounted by three shells (or death eyes) or by a vegetal motif, also a symbol of the earth (fig. 34,46-57). Often, too, part of the four-petaled kin

sign, whether standing alone or worn as the headdress of the sun god, has part of its area crosshatched, the symbol for black, to denote either the interior of the earth or darkness.

The glyph for south on the monuments is an inverted shell with certain affixes (fig. 41,28,30,34,36), but south is the land of the death god, the realm of the dead, the underworld. A design of great frequency in the art of the Initial Series Period, as noted above, is a representation of the long-nosed dragon god without a lower jaw or with a skeletal jawbone, but wearing the four-petaled kin sign on his forehead. The head is usually surmounted by three elements, a central leaf-shaped ornament which is flanked on one side by crossed strips of such frequent occurrence in planetary bands; on the other side, by what has been generally recognized as a conventionalized shell. Sometimes the design appears as the rear head of the dragon, and it forms a glyph (fig. 21,14-18).

In Mexican art the conch is the symbol of Tepeyollotl, the jaguar god of the interior of the earth, and is frequently placed beside the "night eye," the symbol of darkness (fig. 21,9-13). It is also a symbol of birth, a function of which the moon goddess was the patroness, but the moon goddess among the Mexicans, as among the Maya, was also a deity of the earth. Xolotl, the canine god who led the way to the underworld, wears the conch ornament and so does Quetzalcoatl, who after residing eight days in the underworld, emerges as Venus the morning star, and as such was known as Tlauizcalpantecutli, "Lord of the dawn."

Tecciztecatl, "he of the conch shell," is a somewhat elusive deity. He is the god of the week 7 Miquiztli on Bourbon 6, where he is opposite Tezcatlipoca, and has the conch shell and night eye in close proximity. Since the day Miquiztli (the sixth week and the sixth day are both Miquiztli) is the sign death, we cannot fail to see in this deity a god of the interior of the earth, a Mexican equivalent of the Maya conch man, the Mam. Itztlacoliuhqui, as lord of the twelfth week, also has the conch as his symbol, and the night sky is in the picture. His name means "god of frost," and he appears to be merely a variant form of Tlauizcalpantecutli, god of the morning star, who was also Cetl, god of cold. Since the dawn hour is the coldest of the day, it is not unnatural that the god of the morning star should also be a god of frost and cold. Furthermore, Itztlacoliuhqui is one of the manifestations of Venus as morning star in Dresden (p. 50).

As lord of the twentieth week, 7 Tochtli, Xiuhotecutli has the conch and night eye near his person in Bourbon and in the Aubin Tonalamatl; as I have shown (p. 134), he was believed to dwell in the interior of the earth.

It is thus apparent that both in Maya and Mexican

symbolism the univalve shell betokens the earth, the underworld, and darkness. Used in distance numbers as a substitute for the normal kin signs, it would appear to have the meaning of night, or, since it is associated closely with the morning star, it may stand for dawn or sunrise.

It is not immediately apparent why these variants should occur in distance numbers but not in IS, or why the sun-at-horizon glyph should be used only in recording intervals of one day. Similarly, no explanation is forthcoming as to why the inverted Ahau variant should be used only to record intervals of eight days and less (there are, however, two or three possible examples of this variant with coefficients above 8 but below 20). It is probable that these variations correspond to linguistic differences.

If the use of the skull-with-quincunx variant only with the numbers 5 and 7 really corresponds to a linguistic arrangement, as is strongly suggested by the use of *bix* with those two numbers, it is probable that the sun-at-horizon and inverted-Ahau-over-serpent-segment forms have similar linguistic correspondences. Yet, as already noted, there is no known case of the use of a number with *hatzcab*, the assumed translation of the sun-at-horizon variant.

In connection with the possibility that the inverted Ahau variant might correspond to some specific term or numerical classifier, Ralph L. Roys calls my attention to the use in Yucatec of *pach*, a numerical classifier given in the Motul dictionary. This is used for enumerating birds and certain animals, but only in counts of 9-19 inclusive. Since there is this numerical classifier for numbers 9-19, there should be another attached to the numbers 2 (or 1) to 8. *Pach*, so far as we know, was not used as a numerical classifier in reckoning days, but as there was a special classifier used in counting birds from 9 to 19, and presumably another term for counts of less than nine birds, there may well have been a similar arrangement in telling days, in which some term with the meaning of sunrise was employed for intervals of two to eight days. In that case this would correspond to the glyph of the inverted-Ahau-over-serpent-segment (provided, of course, that that glyph can not be used with coefficients of more than 8).

In English we can speak of an interval of less than a month as so many mornings later—"He left, but returned three mornings later"—but we can hardly say, for example, "two years, a month, and three mornings later." To express intervals composed of months and days, or years, months, and days we would use only the word "day" to denote the lowest unit; the glyphic material suggests a similar arrangement may have existed among the Maya.

The suggested interpretations of these variant forms for kin are summarized below.

COUNT BY SUNRISES, NIGHTS, OR SUNSETS

GLYPHIC EVIDENCE

We have seen that in distance numbers kin is expressed by:

1. A glyph which appears to represent parting of the earth, and which probably corresponds to the Yucatec term *hatzcab*. This word has precisely that meaning, and is used to denote daybreak, although the Motul dictionary says the term applies to the whole morning.

2. A glyph (inverted-Ahau-over-serpent-segment) which corresponds indirectly to that used by the Maya for the east, called in Yucatec *liqin*, "sunrise."

3. Two glyphs (the animal head and the "bix" glyph) which customarily display prominent emblems of death. It has been shown that in Mexican and Maya mythology the sun was believed to pass through the underworld, the land of the dead. Representations in Mexican codices of the sun and Venus at the moment of rising not infrequently carry symbols of death, as though to imply that at the moment of rising the elements of death acquired in the journey through the underworld had not yet been shed. A combination of death symbols with insignia of the sun on the rear heads of sky monsters probably carries the same connotations.

4. A glyph which is almost certainly a conventionalized picture of a conch or some other species of univalve. Such shells in Maya and Mexican symbolism represent the earth and its interior, the underworld and death, the last because the abode of the dead was in the interior of the earth. By the addition of what may be death eyes or shells the sun god becomes, as lord of the night, the night sun; the deities who are connected with the interior of the earth or who have sojourned there wear conch shells or ornaments made from them. The shell glyph, therefore, would indicate a count by nights, or perhaps by dawns, or sunrise if the symbols of the underworld were still undodged at sunrise.

All these variants, therefore, have associations with the night or with dawn or sunrise. This conclusion is reinforced by finding these same variants, with the exception of the *hatzcab* glyph combined with glyphs of the lunar series. The lunar series presumably was a count by nights. On the whole, I think it is most probable that together the glyphs in question point to a count by sunrises, for whereas two of the glyphs appear to have the restricted meanings of dawn and sunrise, the other three stand for night in a general sense but probably have, in addition, the specific meaning of dawn or sunrise. One is therefore led to the conclusion that during the Initial Series Period distance numbers were reckoned by dawns or sunrises, or even perhaps by nights. If distance numbers were counted in that way, IS dates must surely have been

reckoned in a similar manner; otherwise terrible confusion would have arisen.

PRESENT-DAY USAGE

The present-day Jacalteca (La Farge and Byers, 1931) and the present-day Ixil (Lincoln, 1942) count their days from sunset to sunset, but it is far from certain that a sunset-to-sunset count was widespread in the Guatemalan highlands. Goubaud (1937) in describing the 8 Batz ceremony at Momostenango (p. 94) rather gives the impression that the day begins at sunrise, although he describes ceremonies which start the previous evening and continue through the second night. In answer to a letter from me he writes (April 1945) that he has no additional information on the 8 Batz ceremony to clarify this matter, but he supplies some very interesting information on practices elsewhere in the Guatemalan highlands:

As regards religious ceremonies, it may be well to distinguish between those of a decidedly preconquest character, and those of Catholic origin. For the first Rosales has given me a very good case which would show that the day in the ceremonial calendar of 260 days begins immediately after midnight. He consulted a shaman for a propitious day in which to do a certain task. The shaman recommended the day Kan to do the ceremony in the hills. They went to the place on the night previous to the day Kan, about eleven o'clock at night, when the shaman performed certain rites. But he did not start his rites to Kan until past midnight. The previous rites may have been to Akbal, Rosales could not tell me. This happened in San Pedro la Laguna.

In San Pedro la Laguna the staffs of office for the town official are changed at midnight of the 31st December, as at Chichicastenango. The holy day Todos Santos begins at midnight too. Indians believe that at midnight the souls of the ancestors come out of the graves. The officials of the religious brotherhoods (*cofradías* [*sodalities*]) receive their offices from former officials at 4 P.M. of the previous day to the day in which the change of office actually should take place. The saint is taken to the church at 12 noon of the following day, when formal exchange of office takes place. But the receiving brotherhood has a marimba playing in the church past midnight of the day when formal exchange of office takes place. Visiting of altars in the hills (*en el monte*) takes place at midnight.

Lastly, and general for all municipio cultures that I know of for Guatemala, the Indians have a system of ceremonies whereby they celebrate a Catholic religious day during two days, i.e. on the day preceding the actual day in the Catholic calendar, and the actual saint's day. This previous day is called *visperas* by the Indians in the central part of Guatemala.

As against the day beginning past midnight, I have information from San Juan Sacatepequez, for religious ceremonies in which the day begins at daybreak. Candles are placed in the church early in the morning of a holy day. But my informant was not conversant with shaman practices in the hills, so we cannot say that for the 260-day

calendar they do not place them at midnight in the hill altars.

I am a little more conversant with the Kekchí of Chamelco. There, the 260-day calendar is not in use. Old shamans to whom I spoke did not know of it. There, the sacred days are called by the Spanish names of *Martes*, *Jueves*, etc. Although a shaman woman performed health rites for me in Chamelco, I am unable to say (from my field notes) the precise hour at which this woman went to light candles at various places of the village for my health. I only know that she told me that she would place some candles at night in the *hermitas*, or wayside shrines, and other candles during the day, in the church.

The Kekchí, as you know, have the Tzultaká as their main deity. Since they do not use the tzolkin, they do not seem to have geared their religious ceremonies to specially significant days, as far as I know. The Chamelco Kekchí have a special ceremony against the wind which blows down their corn fields in September. The ceremony is held about the middle of September in the various caves in the vicinity of Chamelco. Groups of men and women, elders of the community, hold a prayer meeting in a house, at night, about 9 P.M. of the day previous to which they go to the caves. They go to the caves before the day breaks.

Furthermore, the pattern of the dual day is seen among the Kekchí of Chamelco in the Catholic rituals connected with the *cofradías*. The outgoing *cofradía* takes the saint to the church, from the *cofradía* house, on the day previous to the change of office. At 5 P.M. they go to the church to take it back to the *cofradía*, where the incoming *cofradía* awaits them. Ceremonies and a ritual meal are held that evening, and all during the night there is ceremonial drinking at the *cofradía* house. On the following day, the saint is taken to the church where the Catholic priest does the formal exchanging of *cofradía varas* [wands of office], by handing them to the new *cofrades*. The saint stays in church all day, until 5 P.M. when it is taken back to the new *cofradía* house. Both *cofradía* groups (outgoing and incoming) spend the night in ceremonial eating and drinking.

The custom of the *visperas* probably has a European origin so far as church festivals are concerned, or it may be a blending of Maya and European concepts. There is, however, a possible explanation of the 24-hour day starting at sunset among the Ixil and Jacalteca. In Yucatan, as we shall see (p. 204), there existed a peculiar arrangement by which katuns began to hold power 10 tuns before they officially entered. The incoming katun was the "guest" of the old katun and shared power with him. Thus Katun 13 Ahau officially ran from 1519 to 1539. In 1509 he began to share power as the guest of the preceding katun; from 1519 to 1529 he held sway alone; from 1529 to 1539 he was host to his successor. Unless this arrangement was a regional development, one would expect tuns, months, and days to share their powers in a similar way throughout the Maya area.

If a day started to hold power at sunset, 12 hours before

his real entry, that would supply an exact parallel to the katun practice of Yucatan, for 10 tuns are half the span of a katun just as one night is half the length of the kin. Alternatively, if the day officially began his reign at midnight, he may have held power also for the first half of the night. This arrangement, too, would be a parallel to the katun as guest, although the parallel would not be quite so close as in the other case. In time such a practice, assuming that it existed, might have given rise to the habit of attaching the name of the day, not to his true reign, but to the interval during which he held power. Alternatively, the all-night vigil, which seemingly originated in a desire to insure group continence (Thompson, 1930, p. 44) may have produced the shift for the start of the day to the preceding evening.

EVIDENCE IN LITERARY SOURCES

For Yucatan there is, so far as I am aware, no direct evidence as to when the day started. Had it been at sunset one would have expected some mention of that fact by Bishop Landa, for such an arrangement could not have failed to arouse the curiosity of that first student of Maya culture. Moreover, Landa had the benefit of well-educated informants, two of whom clearly had an intimate knowledge of the calendar. Had they been accustomed to a sunset-to-sunset count, the midnight-to-midnight reckoning of the Spaniards would have seemed equally strange to them and should have elicited comment on the difference. There is one piece of evidence that favors a count by sunrise: according to the *Relación de Valladolid*, at new year all arose to await the rising of the sun. In early colonial times sacrifices took place at night, but according to a Maya chief the reason for that was the danger of being caught by the Spaniards (Scholes and Adams, 1938, 1:108). At the present time the Yucatec Maya consider that the day runs from midnight to midnight, but that may be a result of European influence.

Evidence for a count by dawns or midnights is scant in the books of Chilam Balam. In the story of the birth of the uinal in Chumayel (p. 60) we read that the uinal was created in the east. "This was the count after it had been placed in order by 13 Oc, after his feet were joined evenly, after they had departed there in the east." And later: "The uinal was born, the dawn was created. . . . the setting in order of the sequence of the days according to the count, beginning in the east, as it is arranged." From these passages one can infer that the count of the first day started in the east, and therefore in all probability this took place at dawn or sunrise. On page 96 of the same book occurs the sentence, "This was when it dawned on our account"; on page 87 in connection with

the prophecy for Katun 11 Ahau, "You shall see its dawn."

It seems to me that the idea of a count from sunset is contrary to the whole philosophy of the Maya. The real start of time, as opposed to the theoretical extension of time far into the past, was the creation of the sun, presumably the last sun. The sun could hardly have been created at the moment of sunset. Such an arrangement, involving the disappearance of the new glory almost as soon as it had manifested itself, would have lacked all dignity. Indeed, the accounts of the creation of the sun, both Mexican and Maya, indicate that the orb first appeared in the east.

In the story of the creation as given by Sahagun (1938, bk. 7, ch. 2) the sun appears in the east; in the *Codex Chimalpopoca* we are not told directly where the sun first appeared, but, after being stationary some time, he crossed the sky, so one can infer that he rose in the east. According to *Popol Vuh* (8th tradition), the people awaited the first sunrise. The morning star rose, and then the sun. At the time of its appearance the sun had little strength, presumably because it had just emerged from the land of death (p. 172). The world as it is today therefore began at sunrise both in Mexican and Maya tradition.

Most students are of the opinion that the Aztec day ran from midnight to midnight. The great ceremony of the kindling of the new fire at the end of every 52 years took place at midnight (Sahagun, 1938, bk. 7, ch. 11), and that would suggest a count from that moment. In fact elsewhere Sahagun (1938, bk. 4, appendix, final section) says that as soon as the constellation of the Pleiades had passed the zenith the people were assured that the world would not end but would endure another 52 years. On the other hand, we are informed that the great fear was that the sun would not rise. That rather suggests that the new cycle may have started at sunrise, and that new fire was kindled at midnight so that it could be distributed to the surrounding towns before sunrise.

Another possible line of evidence in favor of a count by sunrises is to be found in the remark which, according to Sahagun (1938, bk. 7, ch. 1), the Mexicans made at sunrise: "Now the sun begins his task. What will it be? What will happen on this day?" Had the day commenced at midnight, the latter part of this remark should have been made then. Furthermore, a count from midnight to midnight would have raised complications with regard to the rule of the lords of the nights. Each ruler of a night would have held sway over parts of two days.

Thus there would appear to be evidence favoring a count among the Mexicans from midnight to midnight and also from sunrise to sunrise; among the Maya, from

sunrise to sunrise or sunset to sunset or perhaps midnight to midnight.

BALANCING OF EVIDENCE

The evidence of the kin variants used in distance numbers strongly supports a count by dawns, sunrises, or nights; literary testimony, particularly that connected with the creation of the world, favors a count by sunrises. I know of no evidence suggesting that the Aztec may have counted from sunset to sunset. Instead, the contestants are midnight and sunrise, with arguments in favor of both. Despite the importance of midnight in the new-fire ceremony, I think it unlikely that such an artificial point of departure was employed, and I would imagine that emphasis on midnight among the present-day Maya of the highlands of Guatemala is due to European contacts.

The Maya custom of counting in elapsed time might be thought to favor a reckoning by sunsets, yet sunset was not journey's end for the sun, for he spent the night traveling across the underworld. As it was at sunrise that the sun renewed his strength, once more clothing his skeleton in flesh, that would appear to be the moment when one sun ended and another began. The use of the word *kin*, "sun," to describe the whole period of 24 hours negatives the possibility that the Maya, like many primitive peoples (Nilsson, 1920) counted preferably by nights. That attention was paid to a count by nights is shown by the importance attached to the lords of the nights (pp. 208-12). Furthermore, on page 21 of Chumayel, which contains notes on both the European and Maya calendars, occurs this entry: "the count of days in one year, 365; the count of nights in one year, 365." Roys calls attention to the significance of this reference to a count by nights in a document of such late date.

The evidence is far from conclusive but, so far as it goes, rather favors a count from sunrise to sunrise during the Initial Series Period. The Jacalteca and Ixil reckoning from sunset to sunset may have arisen from the "guest" concept or from the custom of all-night vigil.

DIVISIONS OF THE DAY

The discussion of the point from which days were reckoned brings us to the question of divisions within the day. No glyph for a period of less than a day has yet been identified, and it is clear that "hours" did not enter into the LC or distance numbers recorded in the inscriptions and in the codices. Nevertheless, it is more than probable that the day and night were divided into parts. In truth, some such division would have been almost indispensable for astronomical computations.

The Motul dictionary gives *lat'ab kin* as meaning hour, and lists "*hun lat'ab kin, ca lat'ab kin, una, dos horas.*" *Hech* is another numerical classifier which, according to Beltran and the Motul dictionary, was used in counting hours and pages of a book. The existence of these terms is fair evidence that the Maya had regular divisions of the day, for usually the Spanish word for an entirely new concept was borrowed by the Maya, as, for example, the term *semana*, "week"; and as the Spanish term *hora*, "hour," was also adopted by the Maya, one can assume with a fair degree of certainty that *lat'ab kin* was a term for divisions of the day in use prior to the Spanish conquest.

That the Maya were interested in divisions of the day and night is perhaps to be seen in a notation in Perez, page 93, of the numbers of hours of day and night throughout the year. The Spanish months are listed with their lengths in days, the length of the moon (alternating 30 and 29 days), the hours of day, and the hours of night:

January, 31 days; moon, 30 days [written *horas* here; *dias* correctly for other months]; the day, 8 hours; the night, 14 hours (*sic*).
 February, 28 days; moon, 29 days; the day, 10 hours; the night, 14 hours.
 March, 31 days; moon, 30 days; the day, 12 hours; the night, 12 hours.
 April, 30 days; moon, 29 days; the day, 16 hours; the night, 8 hours, etc.

The alternating moons of 30 and 29 days are a pre-Columbian survival; the peculiar divisions of the hours must result from some blending of ancient Maya practice and Spanish custom. It certainly does not reflect actuality, for the length of the day varies little throughout the year in the latitude of Yucatan, and a variation from eight hours of daylight to 16 is far from nature's division. Can these figures have been copied from an almanac printed for use in Flanders? Even then the transcription shows an interest in divisions of the day.

Seler has suggested that the Mexicans divided the day into 13 hours, and the night into nine, the compartments corresponding to the 13 day lords and the nine night lords. There is no confirmatory evidence of this suggestion, but it is what one might expect. The Aztec priesthood appear to have divided day and night into nine ritualistic periods, for they made offerings at fixed intervals, four times during the day and five times during the night. These divisions, of course, may have had nothing to do with standard parts of the day, but may reflect only a ceremonial rhythm.

So far as is known, the Maya had no way of measur-

ing with accuracy the length of their divisions of the day and night; according to Rodaz (1688), the Tzotzil did not distinguish hours but used the term *oc* for a short indeterminate time. Pantaleon Guzman gives Cakchiquel terms for divisions of the day. The English equivalents of some of these are: now the sun has jumped up, now the sun is out, now the sun is high, midday, afternoon, after eating, sun falling, night entering, first cockcrow, second cockcrow, midnight, third cockcrow, very early in the morning, before dawn, and becoming light. There is some confusion and obvious repetition. Altogether 28 terms are listed. Thus for the period before sunrise we find seven terms, the Spanish equivalents of which are given as *al amanecer, cuando ya para amanecer se va oscuriendo, la obscuridad para amanecer, antes de amanecer, ya está claro, por la mañanita, por la mañana, ya amanece*. Obviously all or most of these must be alternative ways of expressing the same period.

Antonio Goubaud sends me a list of 19 divisions of the day and night collected by Juan Rosales at the Cakchiquel town of Panajachel. The same divisions, he informs me, hold good also for Solola and San Pedro de la Laguna. They are: coming out of the sun, sun already up, sun already far away, a little to midday, noon, past midday, falling sun, a little for the fall of the sun, sun has fallen, night has entered, night already up, a little to midnight, night already far away, midnight, first rooster, second rooster, third rooster, fourth rooster, and becoming light.

The occurrence in both lists of various cockcrows must indicate European influence, but in neither list is there a division into 24 hours. The Rosales list gives nine divisions of the day and 10 of the night. The fifth division in the one group corresponds to midday; to midnight, in the other. If the last cockcrow is regarded as the same as "becoming light," we would get nine hours of day and nine hours of night symmetrically arranged with four hours on each side of midday and midnight. Such an arrangement is, of course, purely conjectural. I would have expected to find 13 day hours and nine night hours to bring the count into relation with the 13 gods of the upper world and the days and with the nine gods of the underworld and the nights. The trouble with such an arrangement is that the night hours would then be longer than the hours of daylight. It is perhaps worth noting that the 18 hours, as amended, are just twice the number of ritualistic periods at which the Aztec made offerings (p. 177). Moreover, the Zapotec divided our 24-hour day into 18 parts, apparently nine for the night and nine for the day. As listed in Cordova's *Arte* the terms correspond approximately to those of the Cakchiquel. It is therefore quite possible, although far from certain, that among the Maya day and night each may have had nine divisions,

and in that case the Maya hour may have been of approximately 80 minutes duration. Elsewhere (Thompson, 1935, pp. 90, 91) I have cited some very dubious evidence for a division of the night into hours of 80 minutes.

LITERARY CURIOSITIES

There were definite canons of literary style, to which Maya writers were expected to conform. In the main they so did, but there are a few examples of glyphic presentation which are definitely in bad style. For the most part these date from the last katuns of the Initial Series Period, an age in which art styles, also, show some evidence of failure to maintain orthodox standards. Two or three examples of this decadence will be reviewed.

The text of Quirigua C opens on the east side with the IS 13.0.0.0.0 4 Ahau 8 Cumku, presented in perfectly regular manner save that the lunar series is defective. At the top of the west side there is an IS introductory glyph followed by what at first sight appears to be an IS recording the date 9.1.0.0.0 6 Ahau 13 Yaxkin. There are, however, three features which are irregular: (1) There is no lunar series. (2) The posterior date indicator, which has the special function of indicating that a distance number is to be counted forward to the date which it precedes, is present between the 0 kins and 6 Ahau. (3) The distance number postfix is attached to the tun sign. These irregularities are such that one can only conclude that the priest who prepared the drawings for this text was no respecter of literary style, a kind of forerunner of Gertrude Stein. He, too, lived in an age when literary standards were debased. The paragraph is neither an IS nor a distance number. It is a literary curiosity.

The opening glyphs on the back on Copan 4 have been read as the IS 9.8.15.0.0 10 Ahau 8 Zec by Morley (1920, pp. 356-57). To reach that reading it was necessary to suppose that Glyph Block B2, then missing, carried 15 tuns, 0 uinals, 0 kins. The compression of three periods of an IS into one glyph block would be without precedent. Recently, Glyph Block B2, which had flaked off, was found by Gustav Strömsvik and cemented in its original position. It does not show tuns, uinals and kins, but instead the anterior date indicator, which follows distance numbers, and indicates that the CR date to which it is juxtaposed, in this case 10 Ahau, is the earlier of the pair united by a distance number.

Most irregularly the inscription opens with the head variant of the distance number introductory glyph, and this is followed by the IS introductory glyph, the central variable of which is somewhat weathered, but as drawn in Maudslay is clearly the moon element, indicative of the month Ch'en. The distance number postfix shows with perfect clarity beneath the baktun and katun signs.

The month sign is gone, but presumably it was in the right half of A3, alongside the day Ahau. The baktun coefficient lies between 6 and 10; the katun coefficient is clearly 8.

The presence of the distance number introductory glyph, the prominence of the distance number post-fixes, and the addition of the anterior date indicator show that this is a distance number; the IS introductory glyph alone supports the idea that an IS is given. However, attention has already been called to several examples at Copan of IS introductory glyphs not followed by IS.

At A5b there is another distance number introductory glyph, but this is not followed by a distance number. In A6-A7 there is recorded the date 11 Ahau 18 Zac which is declared to fall on the fifteenth tun: the LC position of this date is 9.14.15.0.0.

If the baktun coefficient is restored as 9, the text can, perhaps, be reconstructed as follows:

A3	(13. 6. 15. 0. 0)	10 Ahau (18 Uo)
A2	9. 8. (0. 0. 0)	Add
A6	9. 14. 15. 0. 0	11 Ahau 18 Zac

Such an arrangement disagrees with the IS introductory glyph which appears to demand the month Ch'en. Alternatively, one can regard 10 Ahau as an error for 5 Ahau, and reconstruct the text as:

A2	9. 8. (0. 0. 0)	Add (to 4 Ahau 8 Cumku)
A3	9. 8. 0. 0. 0	5 Ahau (3 Ch'en)

Whether this reconstruction is correct or not, there is no doubt of the irregularity of the presentation, for the passage breaks all the canons of Maya literature; it is unforgivable.

An even more irregular presentation is that of Chinkultic 7 (Blom and La Farge, 1926-27, p. 432). There are only five glyphs on this monument, and these record an irregular IS 9.17.10.0.0, but the IS introductory glyph and the terminal date, 12 Ahau 8 Pax, are missing. The suppression of the CR date represents a most extraordinary failure to supply what in Maya eyes was the essential part of the text. Furthermore, the baktun glyph consists of only one cauc element, instead of the normal two, and the tun part of the katun glyph is in two parts, the lower half forming what one would regard as a post-fix did one not know better. The tun sign has an irregular postfix. These strange aberrations may be due to the location of Chinkultic, almost the ultima Thule of the Maya area, on the border of the Guatemalan highlands.

Two stelae from Santa Rosa Xtampak, Campeche, which is also a peripheral site, have IS which appear to lack terminal dates. although because of weathering

this is not absolutely certain. One has an IS 9.15.19.0.0; the other, what appears to be 9.15.19.17.13, although the katun coefficient is open to question. One wonders whether in these three cases the missing terminal dates may not have been recorded on altars which have not been recovered; as the inscriptions stand, they are highly irregular. The second IS of Lacanha 7, 9.6.0.11.0 8 Ahau 18 Zac, lacks the tun sign and coefficient, presumably because the latter is 0, or could this have been an error of omission on the part of the sculptor?

SUMMARY

Distance numbers, also called secondary series, bridge the interval from one Maya date to another by addition or subtraction. As the LC position of at least one date in a text is usually given by means of an IS or a PE, distance numbers serve to place CR dates also in the LC by linking them by addition or subtraction to dates, the positions of which in the LC are given directly or by calculation.

Distance numbers may be as little as a single day or they may span millennia. The periods of which they are composed are customarily arranged in ascending order, in contrast to the descending order of the IS.

Period glyphs used in distance numbers are the same as those used in IS, with the exception of the kin glyph. A special postfix indicative of a distance number is usually attached to one or more of the period glyphs, and thus serves to differentiate the periods of a distance number from those of an IS. It probably reflects a linguistic usage.

The kin glyph is often suppressed, and its coefficient attached to the uinal glyph. If the kin sign is present, it may take one of five different forms, none of which ever occurs with an IS, but three of which are of frequent occurrence in the lunar series. Elements of the remaining two also appear in the lunar series.

In all five variants there are indications of a reckoning by sunrises, dawns, or nights. A review of material on the subject in the literature suggests rather strongly that the Maya counted by sunrises, not by sunsets as appears to be the custom among the present-day Jacalteca and Ixil. The start of the day at sunset may have arisen in a development similar to that of the guest katun, in which a katun began to have power 10 tuns before its official beginning, or it may have evolved from the vigil of continence before a ceremony.

One kin variant, with a quincunx design, appears only with coefficients of 5 and 7. It may well correspond to the numerical classifier *bix*, which is used only to record five days and seven days, and which may indicate the intervals between markets. Another variant, used only to express an interval of one day, appears to be a picture of sunrise

or dawn, and probably corresponds to the Yucatec word *hatzcab*.

Distance numbers of 20–39 days inclusive are expressed in the divinatory almanacs of the codices by means of a moon glyph, with a value of 20, and a coefficient which is added to the 20. Thus 31 would be represented as a moon glyph with a coefficient of 11. This method was also employed in inscriptions of the Initial Series Period to denote distance numbers within the same limits. The practice must be of considerable antiquity since it is found on Balakbal 5, a Baktun 8 inscription.

Periods with coefficients of 0 could be suppressed. Thus 1.10.0.0 is given as a distance number on Copan U as a katun glyph with one dot above and two bars to the left. At Yaxchilan, 10.0.6 is written as a tun sign with two bars above, a bar and dot to the left. Distance numbers are often preceded by an introductory glyph, the central element of which vaguely resembles a swastika. It is possible that the whole glyph corresponds to the Yucatec *hel*, "change." There is a head variant of this introductory glyph.

Frequently there stands between the distance number and the terminal date one of two glyphs, which indicates whether the distance number is to be counted forward or backward to reach the terminal date. The main element of the glyph is the same in both cases, consisting of the head of the *xoc* monster or, in the symbolic form, the sign for jade (water). In the case of a count forward (posterior date indicator) the forward glyph is used as a prefix; the locative *ti*, "at" or "to" or "from," as a post-

fix. In the case of a count backward (anterior date indicator) there is no prefix, but two postfixes, one of which is the locative *ti*; the other, a sign indistinguishable from the distance number postfix. These glyphs may also be attached to the starting date of a distance number to indicate whether the count is backward to or forward from that point. At Palenque there is a special variant, a squiggly eel or snake, which replaces the anterior date indicator in some texts.

There are other glyphs which lie between distance numbers and terminal dates, and reveal the nature of the count. One form probably indicates that the distance number leads to the seating of a tun; another may warn that the terminal date is not a tun ending. At Piedras Negras and El Cayo there is a combination which means "forward to daybreak" or "forward to sunrise," and there are yet other glyphs with such general meanings, the use of which surely corresponds to variations in the spoken sentence.

The discussion of the point from which days were counted leads to the question of a possible division of the day into hours. The evidence is far from complete but, such as it is, rather suggests nine "hours" of daylight and nine "hours" of night. The Maya "hour" in that case would equal 80 of our minutes, although it is to be doubted that the Maya accurately measured the subdivisions of the day.

The chapter is concluded with some examples of degeneration in Maya literary style.