

Period Endings, Anniversaries, and Katun Counts

Mellow'd by the stealing hours of time.

—SHAKESPEARE, *Richard III*, Act 3, Scene 7

PERIOD ENDINGS

THE RESTING PLACES, the *lub*, of the eternal march of time were of transcendent consequence to the Maya. Each birthday of creation was celebrated, were it the end of a tun, a katun, or a baktun, the importance of the event naturally depending on the length of the period which was concluded. The end of the tun was of such frequent occurrence that it received little or no attention in the inscriptions, although if a date chosen for some other reason happened to coincide with the end of a tun, a note was made of that fact. Likewise, the priest-astronomers tried to manipulate their calculations so that they could reach the end of a tun. Let us suppose that the priest-astronomer found that the date 9.12.6.13.16 was the solar anniversary of some date he wished to note. I think we are safe in assuming that, unless there was some special reason for that choice, he would shift the calculation forward 16 solar years, and make it fall on 9.13.3.0.0, a tun ending.

The ends of katuns were of supreme importance to the Maya and around them revolved many, probably most, of the calculations contained in the inscriptions of the Initial Series Period. The end of a baktun was naturally of even greater importance, but this was such a rare event that a dozen generations of priest-astronomers made their contributions to science and passed to the bosom of Abraham without the privilege of witnessing such an outstanding event. Baktun 9 ended before the stela cult was well developed; Baktun 10 completed its journey in a period of decadence. Here I am speaking of baktuns in the Maya sense; in the incorrect modern usage these would be called Baktuns 8 and 9.

As presumably the Maya were then, as now, short-lived, the average priest-astronomer witnessed two or, at the most, three katun endings in his lifetime, and one of these would have fallen before his graduation in sacerdotal lore. Considerable attention was paid to the half-katuns, and the quarter-katuns, too, received their meed of honor.

Morley has shown how the largest cities strove to erect a monument to commemorate every quarter-katun. There is an almost complete sequence of texts marking the quarter-katuns (the so-called hotuns) at Piedras Negras

and Quirigua; other cities set up stelae and altars to honor the katuns and half-katuns, whereas still others frequently solemnized the quarter-katuns in stone but did not habitually do so. In some cases more than one stela was erected in connection with the end of a katun: Calakmul, where 103 stelae have been discovered, on various occasions erected several stelae in homage to the same katun, and even dedicated three or four at each of several half-katuns, but carved very few at quarter-katun intervals. A few monuments were dedicated at the ends of 13 tuns, and there are a handful of inscriptions which have as their latest date the end of an odd tun, but no regular PE. Naranjo 29, with the date 9.14.3.0.0 7 Ahau 18 Kankin, is a case in point. This date apparently was chosen because it is the katun anniversary of 9.13.3.0.0 9 Ahau 13 Pop, also given in this text, which presumably had for the Maya some astronomical significance not now apparent.

INFLUENCE OF THE KATUNS ON DAILY LIFE

From the abundant material on the subject, it is manifest that the divinity of each katun exercised full power during his reign over mankind, although that may not have coincided with the duration of the katun because of the guest concept (p. 204). As in the case of the gods of the days, some katun rulers were benign; others, malevolent. It must be confessed that the Maya, who were hardly given to facile optimism, expected a harsh rule more frequently than benevolence. The influences of 13 lords of the katuns (i.e. the days on which each katun ended) are set forth in the various prophecies for the katuns contained in the books of Chilam Balam. The tidings of the katuns according to Chumayel (pp. 87-100) are as follows:

- 11 Ahau "Niggard is the katun; scanty are its rains . . . misery."
- 9 Ahau No definite information, but Tizimin has: "Bread is mourned, then water is mourned . . . excessive adultery."
- 7 Ahau Carnal sin, roguish rulers.
- 5 Ahau "Harsh his face; harsh his tidings."
- 3 Ahau Rains of little profit, locusts, fighting.
- 1 Ahau "The evil katun."
- 12 Ahau "The katun is good."
- 10 Ahau "Drought is the charge of the katun."

- 8 Ahau "There is an end of greed; there is an end to causing vexation . . . much fighting."
 6 Ahau "Shameless is his speech."
 4 Ahau "The quetzal shall come . . . Kukulcan shall come."
 2 Ahau "For half the katun there will be bread; for half the katun there will be water."
 13 Ahau "There is no lucky day for us."

Thus, only the reigns of Katuns 4 Ahau, 8 Ahau, and 12 Ahau were beneficent; Katun 2 Ahau was halfway lucky; the portents for the other nine were direful in the extreme. The luck of the katuns in Tizimin and Mani is not precisely the same as in Chumayel. Mani assigns to Katun 4 Ahau drought, poor crops, and epidemics. Nevertheless, I think the expected return of Kukulcan in Katun 4 Ahau places it in the lucky class. The association of the Itza with Katun 4 Ahau would have caused that katun to have been lucky for them, but the unpopularity of the Itza due to their arrogant and sinful behavior, perhaps at first not evident, may have caused their special katun to become baleful for other groups in Yucatan. Accepting 4 Ahau as beneficent, we note that the favorable rulers have coefficients which are 4 and its multiples, 8 and 12. These, presumably, were well inclined toward man because four is the lucky number of the sun and the milpa. It is interesting to note that in the frequency of day signs (p. 91) 4 Ahau, 8 Ahau, and 11 Ahau tie for first place; 12 Ahau follows immediately behind, and at Santa Eulalia (p. 93) 4, 8, and 12 are good and 13 is very good. The multiples of 4, accordingly, may represent an ancient and widespread grouping for good luck, and from this one can perhaps infer that the aspects of the katuns had been generally established far in the past. Nevertheless, if we are correct in supposing that the aspect of 4 Ahau was affected by its association with the Itza, it follows that the pattern of the luck of the katuns was not inviolate. That is quite understandable. The Maya were both intelligent and conservative: they started with the premise that a katun brocaded the same design each time the stuff of history was in its hands, but their experience showed them that that was not always the case, for an evil design might be produced by a katun listed as favorable. Their reasoning would impel them to revise the aspect of that katun; their conservative instincts would warn them not to make innovations in an ancient and sacred formula. Probably, as seems to be the case with Katun 4 Ahau, one group would revise the aspect of the katun; another, more conservative, would retain the old pattern. Withal, the important point is that the aspect of the katun was predicted, and that form of predestination profoundly affected Maya life, both corporate and individual.

The fortunes of the katuns not only influenced the

everyday life of the community, they also affected history, noted by Roys (1933, p. 184) and elaborated by Morley (1938, pp. 558-62). Roys says: "A katun of the same name recurred after approximately 256 years, consequently, at the end of that time history was expected to repeat itself. The events recounted in the Maya chronicles . . . offer excellent grounds for believing that this belief was so strong at times as to actually influence the course of history. A surprising proportion of the important upheavals in Maya history appear to have occurred in some katun named either 4 Ahau or 8 Ahau."

In Yucatec the fortune of the katun was generally called *u uich*, "his face," or *u kuch*, "his burden" (p. 202).

Changes, conquests, and migrations seem to have been the burden of Katun 8 Ahau, although it is not improbable that one of the events, which is referred to separate recurrences of Katun 8 Ahau, may in fact have been assigned two different positions 13 katuns apart by the compilers of the chronicles, although in reality it happened but once. Furthermore, coincidences invariably receive more attention than they warrant. Apparently great changes were expected in any Katun 8 Ahau; when they occurred they were given prominence, but one suspects that lots of important events in other katuns were less well remembered because they did not happen to conform to the expected patterns. Those who plotted to overthrow the Cocombs of Mayapan were probably fortified in their hopes of success by the fact that a Katun 8 Ahau was then running its course, but under the circumstances the revolt would probably have taken place whatever the katun, save that waverers would have shown more inclination to join the revolt in a Katun 8 Ahau because they would have taken into consideration its bellicose aspect. Although, therefore, the destinies of the katuns certainly affected the pattern of Maya history, and imposed on the individual a marked fatalism, yet the results of such influences can be exaggerated. At least, it can be said of Hunac Ceel, the one live actor on the stage of Maya history, that he shaped his own destiny. Many accept predestination in theory but disregard it in practice.

The sundry matters probably involved in assaying the fortune of the katun have been briefly sketched. They are not directly pertinent to the present discussion of methods of recording the ends of katuns, and will be dealt with as occasion arises in other chapters.

COUNT BY ENDING OR BEGINNING DAYS

It is now taken for granted that Maya periods, be they tun, katun, or baktun, are not counted until they are completed, and that they are named for the day on which they end. Goodman held the opposite view, namely that

the katun was named for its beginning day. Even Morley (1910) was of the same opinion as late as 1910, but subsequently accepted the contrary view. Since the above was written Fulton (1947, 1948) has challenged our complacent acceptance of these ideas. Withal, the evidence for a reckoning by the ending day is very strong, for throughout the books of Chilam Balam the completion of the katun receives constant attention.

Roys has called my attention to a passage in Tizimin (p. 13), which gives the prophecy for the last tun of Katun 5 Ahau. One sentence reads: "13 Oc would be the day when the katun is measured by paces, and 4 Cauac would be the turn of the fold of the katun, the time when he gives up his mat, his throne. There comes another mat, another throne, another reign. The burden of 5 Ahau falls. He looks back, when he took what was granted to him. Gone is his cup, gone is his mat, gone is the bearer of his command."

As 4 Cauac is the day before 5 Ahau and is placed in the last tun of the katun, there is good evidence in this passage that Katun 5 Ahau ended on the day 5 Ahau.

If the proposed method of reading Maya dates in the Yucatec system is correct—and I feel reasonably certain that it is—then the katun must be named for its closing day, otherwise the system will not work (p. 196). A date, such as the IS of Xcalumkin which reads 9.15.12.6.9 7 Muluc 1 Kankin in Tun 13 in Katun 2 Ahau, will be incorrect if the katun was named for its opening day. Katun 9.16.0.0.0 opens on 4 Ahau (or 5 Imix) and ends on 2 Ahau. This system, therefore, provided it is correct, is strong evidence for the naming of katuns by their ending days.

Apart from any other considerations, the opening day of a katun was almost certainly Imix, not Ahau. Thus, had katuns taken their names from their opening days, in all probability they would not have been called 11 Ahau, 9 Ahau, etc., but 1 Imix, 12 Imix, 10 Imix, etc. That the opening day of a katun was Imix, not Ahau, rests on two lines of reasoning: the katun of the creation according to Chumayel was Katun 11 Ahau (Tizimin and Mani start the story in Katun 13 Ahau), but if 11 Ahau is assumed to be the last day of the katun, 1 Imix was the opening day; we know from various sources that 1 Imix was the starting point of the cycle of 260 days, and one can assume that it was similarly the start of other counts. Likewise, the books of Chilam Balam state that 11 Ahau was the first katun of the count, and it is so marked in at least one katun wheel. The information is added that 11 Ahau became the first katun because the Spaniards conquered Yucatan in Katun 11 Ahau, a statement which is surely incorrect, for the whole mechanics of the Maya calendar would have been disrupted had the

starting point of the katun round been shifted. Furthermore, had the katuns been counted by their starting days, the elaborate system of matching the various cycles by finding their lowest common multiples would have gone awry, for it would have been contrary to the fundamentals of the Maya calendar to try to harmonize the sacred almanac of 260 days, running from 1 Imix to 13 Ahau, with a long count which ran from 11 Ahau to 8 Cauac.

In the Chronicle of Chicxulub, paragraph 33 (Brinton, 1882, pp. 210, 236), it is stated that Ah Naum Pech told the people that on 1 Imix the bearded ones would come with the sign of Hunabku (the one God), and that the people must go to receive them. This reference to the coming of the Spaniards and Christianity is a condensation of the prophecy for Katun 11 Ahau which speaks of the sign of Hunabku and of the reception of the bearded men (Chumayel, pp. 87, 88). Ah Naum Pech gives the gist of the prophecy but does not name the katun by its day 11 Ahau, on which it would end; instead he refers the event to the day on which the katun begins. A second version of this prophecy in Chumayel (pp. 105-06) immediately follows a statement that the katun will expire (*u hitz'i uil katune*) on 13 Ahau, but the Tizimin and Mani versions change that to the establishment of the katun (*u hetz'i uil katun*) on 13 Ahau, thereby shifting the prophecy from Katun 11 Ahau to Katun 13 Ahau. This is clearly an error due to careless copying.

If Katun 11 Ahau began on the day 11 Ahau, the reference to 1 Imix has little meaning, but if the katun is completed on 11 Ahau, as seems almost certain, then the choice of 1 Imix, its opening day, as that on which action was to be taken on the prophecy is very much to the point. This statement from the Chronicle of Chicxulub is, accordingly, good evidence for the thesis that a katun was named for the day on which it was completed.

The Annals of the Cakchiquels (Brinton, 1885) throw some light on this subject. The Cakchiquel reckoned by years of 400 days, 20 of which formed a cycle called *may*, comparable to the katun although of 8000, not 7200, days. The zero point of the count was a day 11 Ah, which marked a revolt. The day 3 Ah is marked as the completion of one *may* from that date, and, indeed, it is precisely 8000 days from 11 Ah. I do not know whether Brinton is correct in his use of the word "completion" in this and similar passages, but if 11 Ah is the start of the first year of a *may*, then 3 Ah is not the completion of the twentieth year, but the start of the twenty-first, yet the passage indicates that the twenty-first year coincided with 13 Ah. There are numerous other statements noting

the conclusion of sundry years and *mays* after 11 Ah, all of which fall into the pattern.

Direct evidence from Maya sources and the indirect evidence of all we know of the mechanics of the Maya calendar and of the Maya philosophy of harmonizing concurrent cycles of time support the view that the katun was named for its ending day.

RECORDS OF BAKTUN AND KATUN ENDINGS

The ends of baktuns and katuns are expressed by means of the respective glyphs with the required coefficients and one or more of a number of prefixes or prefatory glyphs or both, which express such ideas as "completion of" or "count of." These statements, the precise meanings of which are discussed on page 187, almost invariably follow immediately a record of the date in question, so that the whole reads, for example, "6 Ahau, 13 Muan, completion of count of 14 katuns, haab completed" (fig. 4, 36). That is to say, 14 katuns have elapsed since the completion of the last baktun, in this case Baktun 9 in Maya thought. The endings of baktuns are similarly recorded. The first three glyphs on the front of Uaxactun 13 read: "7 Ahau 18 Zip, tenth baktun" (Morley, 1937-38, vol. 5, pl. 6, *a*). Rather rarely, the order may be reversed. Palenque, Foliated Cross, C7-D8, reads: "Forward to the completion of the second baktun, 2 Ahau 3 Uayeb" (fig. 32, 11).

A statement, such as 6 Ahau 13 Muan, completion of count of 14 katuns, fixes the position of a date without equivocation, for such a date can not repeat for 949 baktuns, approximately 375,000 years. Even a simpler statement, in which the katun number is unspecified, places a date in the LC with sufficient precision for most purposes, for 6 Ahau 13 Muan will not again end a katun for 949 katuns, which is slightly less than 19,000 years. This is so because there are 73 month positions on which a katun can end and 13 possible coefficients of Ahau. Even the statement "count of tun completed" attached to a date is sufficient for most purposes, for any given tun ending can not recur until the lapse of 949 tuns (the same combination of 73 month positions and 13 coefficients of Ahau).

Naturally, such a system of recording was to all intents and purposes as accurate as the IS. That the Maya generally used IS to record PE dates at the start of an inscription merely demonstrates that they were not interested in efficiency, but sought to honor time with the grandiloquence of the IS.

Because in sixteenth-century Yucatan katuns were not numbered according to their positions within the current baktun, but were identified by the day on which each ended and sometimes by its position in the round of

13 katuns, there exists no close parallel between glyphic texts such as "6 Ahau 13 Muan, count of 14 katuns" and references to katun endings in the books of Chilam Balam.

HAND SYMBOLS FOR COMPLETION

The most ornate, but not the commonest, ending sign is a prefatory glyph which consists of a hand with fingers pointing to the right and generally upward. This is usually combined with either a moon sign or a conventionalized element which has been identified as a shell (Spinden, 1924, fig. 8). Sometimes both are present (fig. 32, 1-11).

The position of the hand appears to have been important both in Maya art and in hieroglyphic writing. In sculpture and in paintings on pottery the hand is often shown in the same position, as though gestures were as significant as in Buddhist and Brahmanic art. The hand which serves as the glyph for Manik is the right, and is almost invariably shown with tips of forefinger and thumb touching or nearly meeting. Position varies from the vertical to near horizontal, and the back of the hand is exposed to view. Examples on the early Uaxactun murals are the only exceptions (fig. 7, 35-50). In contrast, when used as an ending sign the right hand is usually outstretched with thumb parallel to the fingers and, as noted, in a horizontal or slightly diagonal position, palm inwards. Sometimes the fingers, other than the index, are slightly flexed at the first joint; usually the index finger points to a small bonelike tassel (fig. 32, 1-11). Less commonly, the left hand serves as a completion sign. It is upright with palm outward, and fingers other than index slightly flexed sometimes grasping lightly some bent object which might be a wand or even a snake. When the hand is used in an IS with period glyphs to express zero or completion, it occupies the same position as with a PE (fig. 25, 57, 58).

With Glyph C of the lunar series the right hand is generally used in a horizontal position, pointing to right, with the dorsal part to front and without noticeable flexing of the fingers. In Glyph D the hand is in a more diagonal position, and may be the right hand, with back to the observer, or the left hand, with palm to the front. In either case the index finger is in a pointing position, the other fingers somewhat flexed, although there are a few exceptions in which the index finger does not point. The problem is to determine whether these are badly carved or whether the pointing forefinger is an unimportant element in this presentation of the hand (figs. 36; 37).

In a number of glyphs of unknown meaning the hand is placed horizontally with fingers pointing to left, but

thumb vertical. The variable element—kin, head of God C, inverted Ahau, uinal, etc.—rests on the side of the hand in the angle formed by the horizontal line of the fingers and the vertical line of the thumb (fig. 46, 18-23). To the best of my knowledge, the position of the hand is invariable in this group of compound glyphs and it is, I think, always the left hand. Again in the glyph of the hand holding a fish the hand is always the left, and is always shown palm to front with the fingers and thumb flexed to grasp the fish (fig. 30, 60-63). The hand glyph, identified on rather weak evidence as the sign for grasping, is common in Dresden (fig. 42, 62-64). So far as the hand itself is concerned, it is always placed in the same gesture as Manik, and is always the right hand. In the codices the hand in the sign for west is like that of Manik, but in the inscriptions it takes another form (fig. 41, 14-19).

Other examples of the use of the hand in glyphs could be cited, but enough has been written to show that the position of the hand does vary to a certain extent according to the glyph in which it occurs. Nevertheless, the divisions are not clear cut; the glyphs showing horizontal position with fingers slightly flexed blend with those which favor the diagonal position with pointing index, and in those, in turn, occur examples which approach the Manik form. In the case of Glyph G1 of the lunar series the normal form of the hand with fingers pointing to the left and thumb upright is in one text replaced by a grasping hand in the same position as in the glyph of the hand holding the fish (fig. 34, 1-7). From the above we are led to conclude that whereas certain positions were favored for certain glyphs, there was a good deal of overlapping. This was probably artistic license permitted only in the case of well-known glyphs, easily recognizable by their positions in the text. In the case of lesser known glyphs, such as hand grasping fish, and inverted Ahau, kin, God C, etc., enclosed in the right angle between thumb and fingers, no such deviations appear to have been tolerated.

There is inconclusive ethnological evidence that the position in which the hand is held affects the meaning. Wirsing, in some fragmentary ethnological notes on the Kekchi, shows a drawing of the left hand held in an almost vertical position, with fingers tightly flexed and thumb resting on top of the index finger. He notes that the hand is held in that position to indicate height or growth of children, animals, and crops, adding, "the other sign is not allowed. It stops growth." Unfortunately the other sign is not described or drawn. I had assumed that this implied that some other position of the hand indicates stoppage of growth, that is to say, completion. However, I have since been informed by Mr. Joe Cason,

who has made ethnological investigations in the Guatemalan highlands, that in some areas use of a hand gesture which refers to the height of an inanimate object will endanger an animate object if employed to indicate its height. This, of course, does not eliminate the possibility that a hand gesture may indicate completion of growth, but it does emphasize that categories of gestures are as distinctive as those of numerical classifiers.

Antonio Goubaud has most kindly taken the trouble to gather information for me from various ethnologists in the highlands of Guatemala on the use of the hand to express size or growth. Although these do not bear directly on the subject, they are listed below as examples of the Maya preciseness in detail and of the importance they attach to variations in gestures:

1. Hand vertical with fingers and thumb close together to indicate height of a person. Distance is from ground on which one stands to the hand of the speaker (San Pedro de la Laguna); same but with fingers cupped to show height of person (Nahuala).
2. Hand vertical with fingers together but thumb slanting out to indicate size of a vessel or gourd (San Pedro de la Laguna). Same position with back of hand toward questioner to show size of person or child (San Bernardino Suchitepequez).
3. Hand horizontal with palm toward questioner to indicate height of quadrupeds, such as horses and cattle (San Pedro de la Laguna); same but with thumb upright used for quadrupeds (San Bernardino Suchitepequez).
4. Hand horizontal with palm down to show size of birds (San Pedro de la Laguna).
5. Hand horizontal with palm up to indicate growth or height of plants and depth of rivers or lakes (San Pedro de la Laguna). The same position is used at San Bernardino Suchitepequez to indicate size of young plants of maize, cotton, rice and yucca.
6. Hand horizontal with fingers closed to indicate height or size of a bundle or bag of maize, beans, etc., or of a bottle of rum or beer (San Pedro de la Laguna).

Early writers on the Maya describe two signs with the hands: the right hand on the left shoulder was a sign of submission (Villagutierre Soto-Mayor, 1933, bk. 2, ch. 2); raising the hands together was a sign of peace (Lopez de Cogolludo, 1867-68, bk. 3, ch. 6).

That the hand, as used with counts of katuns, must mean end, or completion, or something very similar rests on four arguments:

1. Evidence already given that katuns (and therefore their multiples or divisions) were counted by their ending days.
2. Deduction that the hand sign as used in IS must signify completion or zero (p. 137), but the zero concept is eliminated by Argument 1.
3. A word meaning end or completion is constantly used

in connection with the ends of katuns in the various books of Chilam Balam.

4. Whereas it might be argued that the hand sign with, for example, 15 katuns might mean "start of Katun 15," the use of the hand with katun anniversaries proves that it cannot have the meaning of start. The date 9.14.13.4.17 12 Caban 5 Kayab is very prominent at Quirigua. Quirigua D has as one of its two IS the second katun anniversary of that date, to wit 9.16.13.4.17 8 Caban 5 Yaxkin. This date is followed by a hand sign, the head of the *xoc* fish, signifying count, and then the katun sign with a coefficient of 2 (fig. 33,26). This must mean "end of the count of two katuns." It cannot mean "start of the count" because in that case the coefficient of the katun would have to be 3, for the date would be the start of the third katun after 12 Caban 5 Kayab. The hand must indicate the completion or end of two katuns. There are other examples of the use of the hand with one-katun anniversaries (fig. 33,25).

The Maya words used for end or completion of a katun derive from the root *tz'oc*, which as a noun means "end, finish, conclusion." It occurs in verbal forms, as *tz'ocol*, "finish or conclude something," and the participle *tz'ocean*, "just finished or completed." In Mani we find: *ma tz'ococ u xocol oxlahun Ahau*, "Will not be ended the count of [katun] 13 Ahau." In Chumayel occur passages such as *He ix bin tz'ocbal nicté katun lae*, "This shall be the end of the katun of the plumeria" (p. 96); *Ya ix bin tz'ocean nicté katun*, "In sorrow shall end the katun of the plumeria" (p. 65); *Tz'oc ix u k'uchul tu kinil u tz'ocol yahaulil yetel u tepal halibe*, "The time has come for the end of his [Katun 3 Ahau] rule and reign. It is finished" (p. 28); *Tz'oci lay lae*, "Then he [Katun 11 Ahau] ended" (p. 21); *tu kin u tz'oc katun*, "at the time of the ending of the katun" (p. 12); *U tz'oc katun talzabi Ix Tziu nene*, "at the end of the katun when Ix Tziu nene was brought." The term *tz'oc* is similarly used in Tizimin: *tu tz'oc u cuch katun*, "at the end of the burden of the katun" (p. 13) and again on the same page *tu kin u tz'oc katunob*, "at the time of conclusion of the katuns."

There is another term for end or, more precisely, expiration, used in these pages of Tizimin, namely, *hitz'*. This is discussed on page 189. As we shall see, there is probably a distinctive prefatory glyph and a distinctive affix which correspond to this linguistic expression.

The root *tz'oc* does not appear to have any connection with the hand, but that is understandable, for the hand sign is without much doubt derived from gesture language. I think, then, that we can be positive that the hand sign in these contexts means "end" or "completion," and fairly certain that it corresponds to the word *tz'oc*.

Although the use of the hand to express completion is probably a case of gesture language, it might be an ex-

ample of rebus writing: *lah* is a root meaning "to complete," "to end," but it also signifies "to slap with the open hand."

In some cases the hand sign is combined with a lunar glyph to form a prefatory glyph. In that compound the moon sign appears to be an example of rebus writing, for *u* not only signifies moon but is also the term for the possessive. Thus the combination could correspond to *u tz'oc* or *u tz'ococ* as given in the books of Chilam Balam.

This was the interpretation I suggested a few years ago (Thompson, 1944, p. 19), but I am now less certain that it is correct, although I believe that the lunar sign is still to be read rebus fashion. Among other uses of *u* is that of converting a cardinal number into an ordinal. As we shall see under the next heading, the bracket element also stands for the sound *u*, and the lunar postfix and the bracket prefix are interchangeable under certain conditions. However, the *u* bracket occurs with numbered katuns and other period glyphs which lack a prefatory glyph, and it can hardly represent the possessive *u* in such cases. A good example of this practice is supplied by the so-called hotun glyph (fig. 32,36-40), which never has a prefatory glyph. Moreover, when the *u* bracket follows the hand glyph, the lunar glyph does not appear with the latter, indicating that they have the same meaning in these clauses as in others, and the appearance of both would be pure redundancy. Accordingly, I feel confident that hand, moon, 15 katun, for example (fig. 32,4), should be read "completion of the fifteenth katun." This question of the conversion of cardinal numbers into ordinals is discussed below at greater length.

To return to the hand as a prefatory glyph, there is commonly below the outstretched hand an element which has been rather generally identified as a shell. Shell also has the meaning of completion, for it is used as such (the so-called zero sign) in the IS and distance numbers of Dresden (fig. 25,59). Why this meaning should have arisen is not now apparent, although it may have developed from the use of a shell to mark the completion of each unit in a primitive count (cf. Spinden, 1924, p. 158). As thus used it does not appear to have any connection with the shell as a symbol of the underworld, unless conceivably it represents the idea of death as the finish. It appears also with the hand symbols for completion used with period glyphs in IS. Perhaps its purpose is to indicate that the hand is to be read in such cases as completion. (See also p. 138.)

"COUNT" GROUP OF PREFIXES

There are four distinct prefixes and two or three variants of these which are used with tun, katun, and baktun

glyphs with coefficients to mark the ends of periods. They are:

The *u* bracket (figs. 32, 12, 13; 33, 21, 23, 25, 27, 30).

The flattened fish head (fig. 32, 14, 34).

The bracket with line of dots (figs. 4, 36; 5, 48; 32, 15).

The death eye (figs. 32, 17-19; 33, 22, 24).

All four have generally been translated as "end of," but it is extremely probable that only the last actually has that meaning.

The fish head, as already pointed out (p. 162), is a rebus for the word *xoc*, "count," which is used in connection with periods in the various books of Chilam Balam. For example, the first chronicle of Chumayel starts with the words *u kahlay u xocan katunob*, "the record of the count of the katuns." In Mani we find *tz'ococ u xocol oxlahun ahau*, "ended the count of [Katun] 13 Ahau," and in Tizimin, *uacp'el hab u binel ca tz'ococ u xoc oxlahun ahau*, "six years to go to the end of the count of [Katun] 13 Ahau." The Motul dictionary lists *u xocan haab*, *u xocan kin*, "all the years or each year, all the days or each day." The actual meaning must be "the count of the years, the count of the days." The Chronicle of Chicxulub gives *lai cu xocol yabil*, "here the count of the years." There is, therefore, ample evidence that the root *xoc* was used for counting periods and for recording their ends.

In spite of this, the glyph of the *xoc* fish occurs only rarely with a PE date; instead, we find the flattened head of a fish to which reference has already been made above. Moreover, the comb affix, the symbolic variant of the *xoc* fish (p. 162), does not appear with PE; instead, we find the bracket with line of dots. Similarly, the flattened fish head never replaces the comb affix in a number of combinations, notably the glyphs of the months Mac and Zec and the double Imix glyph (fig. 5, 14, 15).

As affixes have from their very nature to be narrow, one would normally expect a fish head flattened to the breadth of an affix to correspond in meaning and function to the regular *xoc* head used as a main element, but the issue is clouded by the confinement of each form to separate categories. Fortunately, there are enough exceptions to this rule of mutual exclusion to justify the extension of the meaning of *xoc*, "count," to the flattened fish head:

1. In the only case of which I know where the fish is used as a prefatory glyph to a PE, this takes the form of the *xoc* fish (fig. 5, 50). This indicates that when the flattened head prefix is converted to a main element it assumes the regular *xoc* form.

2. Very rarely the anterior date indicator (p. 163) has the *ti* part as its main element (personified as the head of a vulture with the *ti* on its forehead). In one such case the *xoc* head, displaced from its position as the main ele-

ment, becomes a prefix and takes the form of a flattened fish head (fig. 4, 29). Therefore when the *xoc* main element is changed to a prefix it can be carved as the flattened fish head.

3. The flattened fish head is a common prefix of the distance number introductory glyph, Glyph B, completion of the haab glyph, and the caban glyph, but in all four glyphs there are rare cases of the *xoc* head being substituted for the flattened form (fig. 5, 20, 31, 42, perhaps 26; Copan I, D2a). These four cases, accordingly, supply full confirmatory evidence that the *xoc* head and the flattened fish head are interchangeable, the latter being a prefixal form, the shape of which was imposed by spatial considerations.

The comb, as noted, does not appear with PE or with a number of other glyphs with which the flattened fish head is used. In its place we find the bracket with line of dots, usually three or four in number, but this appears to derive from the same original as does the comb, for comb and dots are combined in the lateral appendages of the IS introductory glyph (fig. 5, 8). Yet we again have the situation of one affix occurring with some glyphs; the other with a different set. The question again arises whether we are dealing with two distinct signs, and once more the answer must be in the negative, for there are rare cases of one being substituted for the other:

1. The double Imix glyph, often the final glyph in a text, almost invariably has the comb affix, but according to Miss Breton's drawings (the photographs are not sufficiently distinct to supply confirmation) it is replaced by the bracket with line of dots on Yaxchilan L 13 and L 56. Once the bracket with line of dots replaces the comb as the postfix of the glyph with crosshatched center (Palenque, Inscriptions, east, S12). These three cases show that comb and bracket with line of dots have the same value. In both cases the head of the *xoc* fish or a full-length fish (figs. 5, 16; 11, 60) can replace the comb, assuring the *xoc* identification.

2. Once the bracket and line of dots as a prefix replaces the *xoc* head as main element of the anterior date indicator (Pusilha D, C10). In this case two things (bracket with line of dots and comb) being equal to a third (the *xoc* head) must be equal to one another.

3. In one postfix of the glyph with crosshatched center (Copan Q, west side) dots and comb appear together, blended into a single element.

Although there is good evidence for giving the same value to comb and bracket with line of dots, the situation is somewhat fogged by the substitution in Madrid of what appears to be the comb element for the *u* bracket. Withal, this is probably a case of fortuitous convergence, for in all likelihood this Madrid affix is a simplification of the bracket with sawtooth (fig. 6, 1, 5, Glyphs C1, E1) which in Dresden has the same value as the *u* bracket. At Quirigua and Copan the *v* of the *u* bracket is occasionally shown as a circle (fig. 11, 40). Such examples closely re-

semble the bracket with line of dots, but in the latter glyph the circlets are always small, often more than three in number, and often enclosed by a line connecting the two horns of the bracket.

With our present knowledge it is difficult to surmise why certain glyphic forms, such as those just discussed, should be confined to one group of compounds, whereas others, with precisely the same meaning, should be used exclusively with another set. Probably it is a matter of traditional usage, but I have wondered if grammatical construction may not enter: a substantive might call for one form; a verb, with the same root, for another.

Having established that the flattened fish head and bracket with line of dots have the value of *xoc*, "count," let us return to the discussion of this group of prefixes. The *u* bracket prefix casually resembles the Venus half-glyph, but this resemblance, as well as that to the decorative design often seen on the pottery vessels in the codices, is surely fortuitous. It is difficult, almost impossible, to hazard an acceptable guess as to its derivation because of the extreme conventionalization which has apparently taken place, and because of its lack of any outstanding resemblance to anything in nature.

The *u* bracket is one of the commonest elements in Maya glyphic writing, and it occurs with many glyphs, particularly in Dresden, which clearly have nothing to do with ending, the meaning commonly assigned it. For example, it is prefixed to the burden glyph on the pages of Dresden devoted to the ceremonies for the new year. This burden glyph on all four pages accompanies glyphs giving the luck of the coming year. On Dresden 26 it follows the glyph for drought, and the two glyphs together clearly read "drought is its burden" or, more probably, "drought is the burden of the year." In Maya the former would be *kintunyabil u cuch* (fig. 43,60,61). The *u* bracket here clearly corresponds to the use of *u* in the spoken word; it can not signify ending, since this is a prophecy for the incoming year. This element also appears with verbal glyphs of action (fig. 42,63,67) where it probably corresponds to *u* as used as a nominal third person pronoun. It also appears as a prefix in the name glyphs of gods (figs. 41,10-13; 42,1), where a meaning such as "ending" is hardly to be expected.

The *u* bracket figures in Landa's alphabet where it is assigned the sound *u*. Landa's drawing lacks the two circlets, but that is not a serious objection to its identification, because these circlets are usually omitted in examples of this prefix at Chichen Itza (they are absent from nearly 75 per cent of the examples of this prefix which appear in the drawings by Beyer [1937]). At Xcalumkin, too, the circlets are usually suppressed, whereas at Sayil they may be present or absent; scattered records from

other sites in Campeche show the circlets. It is clear, then, that the absence of the circlets is a regional variation which was in force in the area in which Landa obtained his so-called alphabet.

There is, moreover, evidence that the *u* bracket prefix can be substituted for the lunar postfix without apparent change of meaning. A good example of this is supplied by a glyph with a crosshatched area which at Quirigua normally follows immediately after the IS if that is a PE (fig. 11,37-41). In most cases this glyph has a lunar postfix, but the *u* bracket, as a prefix, occasionally replaces it (fig. 11,40,41). Although the exact meaning of this glyph is not known, we are justified from its constant position at the close of the IS in assuming that the substitution of one affix for another makes no change in the meaning, and that both have the value of *u*, probably used as a possessive. In a pair of glyphs which repeats through all the divisions of a divinatory almanac the same shift takes place (fig. 2,58-61). This text is discussed on page 39, where it is concluded that the substitution occasions no alteration in meaning. In many glyphs of uncertain interpretation the same interchangeability rules, probably without affecting the meaning.

I see no reason not to accept the identification of this bracket as a sign for *u*, as Landa indicates, especially as *u* is one of the commonest words in Yucatec and this bracket is one of the commonest glyphic elements. Certainly, the meaning of "ending" generally attributed to the *u* bracket has little to recommend it, for it will not fit interpretations of many of the glyphs to which it is attached.

As has been noted, the prefixing of *u* to a number in Yucatec converts it from a cardinal to an ordinal, and this is surely the sense in which the *u* bracket is to be used when it is attached to period glyphs with coefficients. Thus we have records such as tenth katun, fifteenth katun, and tenth baktun (fig. 32,12,13,16), and completion of the fourteenth katun (fig. 32,8) following the CR dates which coincide with the ends of those periods. The same interpretation, of course, would apply to records of anniversaries which use this prefix (fig. 33,21,23,25, 27,28,30). Generally the *u* bracket attached to the katun sign and the lunar glyph postfixed to the hand used as a prefatory glyph surely function in the same way, but there are very rare examples where both the lunar sign and *u* bracket are present (fig. 33,23 and Yaxchilan 3). In such cases I assume that the lunar postfix must be read as a possessive *u*; the bracket prefix, as converting cardinal to ordinal.

The *u* bracket, therefore, has the value *u*, and, as used with time periods with coefficients, it converts the coefficient into an ordinal.

Another prefix in this group is the death eye which

takes a number of forms. The commonest is shaped as a bar with a design on its outer side which usually consists of two circles with inset details, and which are separated by a number of short parallel lines (fig. 5, 19-22, 27, 33, 45, 51, 52), more rarely, by a St. Andrew's cross. This last variant appears only in late inscriptions, and so far as I know, is not found in carved texts prior to 9.17.0.0.0. Sometimes, the circles have been mistaken for numerical dots (Morley, 1920, p. 301; 1937-38, 3:443). Beyer (1937) was the first to identify the elements that compose this sign. The circles with their inset details are the eyes of darkness or the eyes of death which are commonly set before the foreheads of pictures of deities connected with death. These eyes of death commonly adorn the dress and accoutrements of God A, the death god (fig. 13, 11, 19), and God Q, the god of human sacrifice (p. 131; fig. 15, 2). They are also associated with gods of the underworld in Mexican art (fig. 21, 10-12). Usually one of these eyes is set before the forehead in glyphs of Gods A and Q (figs. 13, 14; 15, 6). In the latter case the eye has sometimes been mistaken for a numerical dot, and added to the coefficient of 10 which forms part of that god's name glyph (p. 131), but the diagnostic circle inset at the edge (the pupil?) is clear in most cases.

A peculiar arrangement of the hair or a wig is characteristic of Mictlantecutli, the Mexican god of death. This is frequently set with the eyes of darkness or the eyes of death (e.g. Fejervary-Mayer 32, 37). We can, therefore, accept without hesitation Beyer's identification of the short parallel lines in this affix as the peculiar hair or wig of the death god. The whole prefix, then, is a symbol of death. As a skull is sometimes used as an ending sign in cases where one would expect to find the eye-and-hair prefix or one of the count prefixes, we can be certain that the death-eye prefix is the symbolic variant pairing with the skull, its equivalent head variant (fig. 5, 22, 36, 43).

In the books of Chilam Balam *hitz'* is sometimes used where one would expect to find *tz'oc* or *xoc* or *tzol*. For instance, in the discussion in Tizimin of the end of Katun 5 Ahau we find: *u ch'a be katun . . . tu hitz' katun*, "the katun takes his departure . . . at the demise [death throes] of the katun" (p. 12), and *u hitz'il katun uale tu kin u kaxal u cuch ah ho ahau*, "at the expiration of the katun it would be at the time of the binding [falling?] of the burden of [Katun] 5 Ahau." In Chumayel (p. 104) we find *cu hitz'ibte katune*, "at the end of the katun." As used in Perez 156 its sense is even more explicit: *u hitz'il cabil ahau katun lae ca culac oxlahun ahau katun*, "the expiration of Katun 2 Ahau, there is then the seating of Katun 13 Ahau." The old katun passes; the new one is seated in its place.

The Motul dictionary gives for *hitz'* the translation "death throes," and notes that it is applied to the end or last day of the year or month or week, *u hitz' haab*, "the last day of the year." The expression clearly implies the concept of the death of the period, and corresponds to our expression "the dying year" or to our extension of the words expire and expiration to periods of time.

Hitz' is not confined to Yucatec; in the Manche Chol vocabulary of Friar Moran is listed *hitz'hitz*, "pains," "to palpitate." The Chol word has a milder connotation than the death throes of its Yucatec equivalent. It is accordingly perfectly logical to accept the death-eye prefix and its variants as signs for the word *hitz'*, "death throes," "expirations," and, by extension, "end."

The Maya priest, therefore, had a choice of words derived from the roots *tz'oc*, *xoc*, and *hitz'* to denote the end of a katun, and he had one or more glyphs or prefixes to express each of them.

One or two other terms occur frequently in the books of Chilam Balam in connection with the counting of time, and particularly with reference to PE. The commonest of these is *tzol*, "to set in order." For instance, the chronicle in Mani is headed *lai u tzolan katun*, "here the setting in order of the katuns." I have not found a glyphic element to correspond to this expression. Another term used in the various books of Chilam Balam, which appears to be roughly comparable to *tzol*, *tz'oc* and *hitz'*, is *uutz'*. The Motul dictionary assigns to this root the meanings "crumple, fold, turn over, double." The word appears in the various chronicles in connection with Katun 8 Ahau. The starting point of the chronicles, in which the expression occurs, was either 8 Ahau or 6 Ahau. Each repetition of 8 Ahau, therefore, marked the completion of one round of 13 katuns. Several of these repetitions carry the words *Oxlahun uutz' katun*, "thirteen foldings of the katun," indicating the completion of the round of 13 katuns. Similarly, in connection with the prophecy for the last tun of the 20 of a Katun 5 Ahau given in Tizimin, we read *u uutz' hun tz'it katun*, "the folding of one katun" and *canil cauac uil u ualax u uutz' katun*, "4 Cauac would be the turning over (or the return) of the fold of the katun" (Roys, 1949). The day 4 Cauac is the eve of 5 Ahau, on which the katun ended. Thus it is perfectly clear that *uutz'* in some way symbolized the completion or at least the passage of time. So far as I know, it is used only with katuns. I have not noted any glyph or affix which would appear to correspond to it. The word *xul*, "end," is also used occasionally with time periods, but again I have not succeeded in identifying a corresponding affix or prefatory glyph.

Two other matters should be mentioned before we leave

the discussion of the hand as a prefatory glyph. Morley (1937-38) draws several of these prefatory glyphs as ending hands over shells and with *u* bracket prefixes. In no case is the original sufficiently well preserved to be sure of the details, and in one or two instances I believe the main element is not a hand, but the prefatory glyph with curving medial line discussed below. The *u* bracket prefix could be used with this prefatory glyph (Tikal 3), but the combination is rare. So far as I know the *u* bracket and moon sign do not appear together in this prefatory glyph. Secondly, the death-eye prefix appears never to be attached to the period glyph and its coefficient when the prefatory hand glyph is used. The fish prefix is extremely rare in such clauses. The noting of such small details may appear hairsplitting, but they must be considered in assigning different meanings to the elements which compose these glyphs.

There is another prefatory glyph which takes a prefix of the *u* bracket-fish-head group, but in no case are the details sufficiently clear to permit of a definite identification. The main element has a curving line which rises vertically from the base. There seem to be circlets attached to this line, and there appears to be a second line paralleling it (fig. 32,20,21,23); the element is slightly reminiscent of the "swastika" sign (fig. 30,9-15,20-35). In that connection it will be remembered that the translation *hel*, "successor," "change," has been offered for this glyph, and it has been noted that *hel* is used in passages which deal with the change of rule when a new katun takes over from an old one. This prefatory glyph, with the fish-head prefix, might mean "change of the count," a reasonable interpretation for a glyph with katun endings.

Sometimes, the period glyph stands alone without any prefatory glyph or symbol. This is particularly true of Tun 13, but katun endings and tun endings sometimes lack those additions (fig. 32,35).

There is yet one more prefix which must have a general meaning equivalent to "count" or "set in order," but which does not occur with period glyphs other than the tun when the CR position is stated. This is a double link, which we shall encounter in reviewing the variant forms of the count of the tuns. It is used with higher period glyphs at Palenque, notably with the baktun and pictun glyph, but never when these are in association with CR dates (fig. 5,46). From its use as a substitute prefix in the glyph for the count of the tuns concluded, it is clear that its meaning must be closely akin to that of count or expiration or set in order.

COMPLETION OF HAAB

Very frequently a glyph, which must mean "count of haab completed," "completion or expiration of the haab,"

or something very similar, accompanies or replaces the regular PE glyphs. This consists of the winged cauc sign above a hand placed horizontally with fingers almost always to right. A prefix of the *u* bracket-fish-head group may or may not be present (figs. 5,40-46; 32,24-29). This glyph was first identified as a tun-ending sign by Morley (1920, p. 153) and has been discussed at length by Beyer (1932a). When it accompanies a regular PE glyph, it is redundant so far as fixing a date in the LC is concerned, but surely reflects a ceremonial phrase. It is the second half of an antiphonal chant: "Completion of the fourteenth katun; the end of the count of a haab" has a fine literary swing. Sometimes, particularly at the close of the Initial Series Period, the actual lapse of katuns was not noted, and only this glyph identifies the date as a PE. Prefixes used with the glyph are the *u* bracket, fish head, death eye, skull, dots, and links. In one or two cases a yax prefix appears over the winged cauc. The significance of this is not obvious, but I am inclined to think it is an additional symbol of rain, since the yax sign is intimately associated with the Chicchan snakes (p. 135). The cauc sign, it will be remembered, is a sign of rain and storm.

Not infrequently the tun sign and the cauc sign stand alone without hand or prefix, but have the same function of denoting the end of a tun, just as a katun sign with coefficient, but without prefatory glyph or affixes is sometimes used as a PE. In such cases the winged cauc is most commonly used, sometimes converted into a head (fig. 32,30,31) or, rather rarely the head form, the Moan bird, of the regular tun sign may be used (fig. 32,32,33). Almost invariably the winged cauc sign is used, the substitution for it of the regular tun sign, either the symbolic form or the head form, being quite rare. In those few cases where a half-period glyph is followed by a statement that 10 tuns have been counted or completed, or have expired, the normal form of the tun sign is used or occasionally the winged cauc.

TUN OR HAAB

In assigning the word *tun* to the glyphs shown in figure 26,33-40, and *haab* to the sundry glyphs representing the period of 360 days which incorporate the cauc element (fig. 32,24-31,35-45), I run the risk of making a false identification. This risk, I feel, is small, and is outweighed by the confusion which would arise were one to use a single term for both glyphs; to avoid the issue by referring to those periods as years of 360 days would add clumsiness to a subject which does not easily lend itself to clear exposition.

Haab, it was once thought, referred only to the year of 365 days, but Long (1925) showed conclusively that it is employed in the books of Chilam Balam in the sense of a

year of 360 days. He notes the distinction that the Maya make in the use of tun and haab in the chronicles. The word tun is employed for tun endings, e.g. *tu lahun tun uaxac ahau*, "at the tenth tun of 8 Ahau," and in all cases these are tuns in the LC. That is to say, they are counted from the start of a katun. *Haab*, on the other hand, when it has a number attached to it, "is used as a mere counter to give the distance between points of time which need not be either katun-endings or tun-endings." Haab was also used as a term for the year of 365 days in colonial times, e.g. *u tzol kin ichil hunppel haab, 365*, "the setting in order of the days in one haab, 365." This secondary usage may have been a colonial innovation, but I incline to the belief that both uses were correct in pre-Columbian times.

The various uses of the tun glyph and the winged cauac do not agree with these linguistic differences. The tun sign is used both in the LC and as a distance number, whereas the first would require the word *tun*, the second the word *haab*, to conform to the style of the books of Chilam Balam. The tun sign is used to denote the end of 10 tuns, the half-katun; the winged cauac, to mark the end of the fifth and thirteenth tun, but there are exceptions: on Palenque Sun a half-katun is recorded as 10 winged haab, and on Yaxchilan L 2 the tun glyph with a coefficient of 5 and a prefix of the death eyes marks the end of 5 tuns (fig. 33,22). In the books of Chilam Balam this usage would be covered by the word *haab*. With other anniversaries, however, a form of the cauac glyph is used (fig. 33,27-31). A clear case of failure to conform to colonial practice is supplied by the employment of the winged cauac to mark both the fifth tun and five tuns lacking to the end of the katun. The books of Chilam Balam use *tun* to express the first; *haab* to signify the second (fig. 32,36-45).

One must conclude, I think, that the use of these two words in colonial Yucatan differed widely from their use during the Initial Series Period. The meanings of words change in all languages, and so it is not strange that a difference should have arisen in the millennium which separated the Initial Series Period from eighteenth-century Yucatan.

The tun sign, because it contains the symbol for tun, "jade," must, I think, be correctly translated. Similarly the winged cauac glyph, with its prominent symbols of rain, must surely correspond to haab, which means rain in several Maya languages and dialects.

GLYPHS FOR FIFTH HAAB AND FIVE HAAB LACKING

Special glyphs exist for recording the fifth and fifteenth haab. The glyphs were first interpreted by Goodman

(1897), and first proved by Morley (1917a). It was not until 1934 that it was shown that these were really two different signs with slight changes in affixes to differentiate that used with the fifth tun from that used with the fifteenth tun (Thompson, 1934a). These variations supply a good example of the importance of studying the humblest affix.

The fifth haab glyph consists of the winged cauac glyph with a coefficient of 5 and the *u* bracket as a prefix above or to the left. In most examples the *u* bracket lacks the two circlets, and the central element sometimes develops into a sort of flare. These abnormalities might lead one to suspect that in the cities of the Central Area the absence of the circlets might affect the meaning of this prefix. This suspicion is allayed, however, by one certain and two possible examples of the bracket complete with circlets attached to this glyph (Copan J and Alt of I; Piedras Negras 9). Moreover, there are cases where the *u* bracket without these circlets is prefixed to other period glyphs (Palenque Inscr. (E), D6; Tikal 3, B8), and, as we have noted, that variation is extremely common at Chichen Itza. Here, as with other period glyphs, the *u* bracket presumably functions to convert the attached number from a cardinal to an ordinal. The prefix is arranged so that the coefficient is included within the span of its points. The whole reads "fifth haab" or "fifth tun" (fig. 32,36-40).

The glyph used with dates which fall at the end of a fifteenth tun likewise has the winged cauac as its main element, and a coefficient of 5. The affix, however, is not the bracket, but takes one of two forms: it may be an oval containing a crosshatched area on which impinges a smaller circle, or it may be a flaring flamelike element (fig. 32,41-45).

The Maya were accustomed to count toward a number not yet reached. For example, 63 would be called "three to the fourth score"; 97, "seventeen to the fifth score." Similarly, half was reckoned toward the next number. The Motul dictionary gives *tancoch tu yoxppel lub*, "half lacking to three leagues," i.e. two and a half leagues. In Tizimin (p. 35) we read of a certain event: *uocppel hab u binel ca tz'ococ u xoc oxlahun ahau*, "six haab to go until the completion of the count of Katun 13 Ahau." This is not quite the same as the method of counting, but corresponds precisely to the use of the winged cauac with a coefficient of 5 to represent not the fifth, but the fifteenth tun. It is clear, therefore, that this glyph corresponds to the expression "5 haab [or tuns] lacking to the end of the period," or, more correctly, as the Maya pictured time as traveling toward its destination, "5 haab to go to the end of the period." In fact, the word *binel* means "to go" and by extension is used for

lacking and to express the future. Presumably the oval with crosshatched area expresses the idea of "lacking" or "to go."

GLYPH FOR HALF-PERIOD

Period endings which coincide with the end of 10 tuns or the end of 10 katuns are usually accompanied by a glyph which denotes that half the next highest period (usually the katun, very rarely the baktun) is completed. This glyph was also first identified by Goodman (1897, p. 99), but his interpretation was not accepted by his colleagues until its correctness was proved by Morley (1917a). Morley, however, failed to recognize the true elements of the glyph, and, in addition, caused some confusion by baptizing it lahuntun (10 tuns) glyph, although, as we shall see, the glyph denotes not 10 tuns but the half-period.

The most usual form of the glyph consists of the completion (or zero) sign cut across the top with one or more horizontal lines, and with a peculiar infix, which shows a "mouth" and three circles placed irregularly around it, set in its center. There is usually a suffix and the "down-balls" prefix found with Mac and other glyphs (fig. 32, 46-55). Actually, this is not a single glyph, but a fused glyph, as can be seen by examining those examples which consist of two separate glyphs (fig. 32, 47, 49, 51, 54) or a single glyph with the completion sign as a postfix (fig. 32, 50).

The first glyph consists of the "mouth" with three circles, to which the *te* (2) affix is postfixed. A *ti*, "at," "to," "from," prefix may be present. The central element with its "mouth" and three circlets is a shell, as can be seen by comparing it with representations of shells in sculptural art. The shell which is attached to the kin sign on the rear head of the double-headed monster from which water flows (Rands, 1946) generally has those three circlets similarly arranged. Maudslay (1889-1902, vol. 4, pls. 92, 93) has brought together a number of examples, and where the three circlets are not visible, one can probably assume that they have been obliterated by weathering. There can be little doubt, I think, that these designs represent cross sections of conch shells, and that the mouth is the orifice, and the three circles are knobs on the shell (fig. 21, 4-7, 14-19). Seler (1915, p. 93) says of this design: "In some instances it looks like the cross-section of a large marine univalve. The little circles in the wide portion, or the globular pendants filled with small circles lead me to assume that this design was a shell ring, comparable to the *oyoualli* of the Mexicans also cut from a univalve." Spinden (1913, p. 53), too, identifies the decorative element as a shell. The shell, as we have seen, is a symbol for a completed period.

The second glyph is again a symbol for completion, being the so-called zero sign which is used with period glyphs in IS, but which, I have argued, must mean completion (p. 137). One or more bars across the top cut it in half or, more strictly, cut off about one-third. There can be little doubt, I think, that this implies that completion is cut in half, and that the whole therefore means half-completion. This is approximately the interpretation Morley (1917) gives to the glyph, although, influenced by the belief that the four-petaled glyph means zero, he argues that the Maya regarded 10 as half of zero.

I cannot hazard a guess as to the linguistic value of the "down-balls" prefix; the meaning of the postfix is discussed on pages 282-85. Neither affix can be of vital importance, since both can be omitted. The prefix is rarely absent; the postfix frequently. When the two glyphs are fused, the St. Andrew's cross in the center formed by the diagonal loops is omitted to make room for the shell element.

Finally, it should be noted that the two glyphs can be fused to form an affix. In two cases at Tikal the fused glyphs are affixed to a katun sign (fig. 32, 53). The matter is a little confused by the fact that the katun signs, both head variants, have a hand on the lower jaw. This is, strictly speaking, a symbol of the baktun head, but there are a few cases where it appears on katun heads, notably on the Leiden plaque, and Oxkintok L 1. Apparently, there was some doubt in early times as to which period should be denoted by a hand.

Sometimes the day on which the current katun ends is given in the adjacent glyph block. I presume this is to indicate the complete period to which this glyph denoting half to completion of the period refers. This surmise is strengthened by the fact that in such cases the half-period seems to be the date which the monument was erected to commemorate. Examples of this practice are to be seen on Tulum 1 (9.6.10.0.0, half-period, 7 Ahau), Copan 6 (9.12.10.0.0, half-period, 8 Ahau), Calakmul 9 (9.11.10.0.0, half-period, same repeated as distance number, 10 Ahau 8 Yaxkin), Quirigua F (9.16.10.0.0, half-period, 13 Ahau), and Copan F (9.14.10.0.0, half-period, obliterated [*ti* 4 Ahau], demise of 15 katuns). I am inclined to think Uaxactun 22 belongs in this series, for I believe the IS is 9.2.10.0.0. This is followed by half-period, 2 Ahau, completion of Katun 3.

In the case of Quirigua F the half-period glyph impinges on 13 Ahau (fig. 32, 55). Such impingement, I believe, is evidence of direct relationship between the two glyphs involved.

A close parallel to sixteenth-century usage is supplied by Naranjo 25, where a three and half katun anniversary is followed by the half-period glyph and 4 katuns. Half

lacking to four katuns is precisely how this would be said in Yucatec—*xel u can katun* or *tancoch tu can katun*.

A somewhat different arrangement obtains at Piedras Negras, for on Stelae 4 and 7 of that city distance numbers of 10 tuns lead forward to the end of the current katun. In each of these two cases there are good reasons for believing that the dedicatory date is the half-katun. The second half-period glyph on Calakmul 9 probably serves as a distance number.

Of the use of the half-period glyph with the PE 10 katuns I know of only one example, that on the Tablet of the Inscriptions, Palenque, but that particular PE is rare in Maya inscriptions. Nevertheless, the evidence is conclusive that this glyph expresses the idea that half the period is lacking to its completion. To continue to refer to the sign as the lahuntun glyph is inaccurate, and fails to reflect the pattern of Maya thought and linguistic usage.

As noted above, the Maya of Yucatan generally expressed half by placing it before the next highest number. Two and a half leagues was *tancoch tu yoxp'el lub*, "at the half span lacking to the third league." The addition of the days of the current katun, therefore, corresponds closely to this linguistic arrangement. Thus, the text on Tulum 1 would mean half-period lacking to completion of Katun 7 Ahau. The Motul dictionary also lists the word *xel* as meaning half, but notes it is used only with numbers less than 20—*xel u ca cuch*, "a load and a half." *Xel* means "piece," and is also used as half on the next number. The San Francisco gives *xel u ca katun*, "30 years," more correctly a katun and a half, or literally half on the second katun.

VARIOUS ENDING GLYPHS

There are two or three glyphs which almost certainly are signs used to denote the ends of periods, and several others which I feel reasonably sure have the same function, but which I shall not discuss at this time.

About 9.17.0.0.0 Copan tired of recording the ends of katuns, half-katuns, and quarter-katuns with the usual glyphs such as "count of *n* katuns," "half-period lacking" etc. In a few cases (e.g. G³ and I') merely the CR date was inscribed, and supposedly, it was assumed that the reader knew that the date marked the end of a period. Such brevity is surely a mark of decadence. However, Copan partly atoned for this lapse by employing two rare glyphs.

The first consists of a stylized shell with a water symbol as prefix (fig. 32,56-60). The prefix I identify as a water symbol on the strength of the circle of dots, like those of Mol, which is its most distinctive feature. In some cases the circle is reduced to a semicircle. There

may be other prefixes, namely "the forward" element or the "down-balls" superfix.

This glyph occurs in the following texts at Copan:

Monument	Glyph	Associated Date
Z	B3	9.17.0.0.0 13 Ahau 18 Cumku
T 21a	Pb?	" " "
Review Stand	Q7b	" " "
11	B1	9.17.5.0.0 6 Ahau 13 Kayab?
Q	F1	" " "
G ²	B2	9.18.5.0.0 4 Ahau 13 Ceh
F'	A3b	Date uncertain

In the last case the glyph follows a record of 1 katun 4 tuns (p. 197), although there is no information on the PE date. It may be an anniversary (p. 196). This sign also occurs with the PE 9.10.10.0.0 at Palenque (Sun, P16 and I1) and a somewhat similar glyph is associated with 9.17.0.0.0 on Quirigua E. What appears to be the chac prefix is present in some cases, perhaps with the value "great." See Addendum, p. 296.

The shell, as we have seen, has the meaning of period completed; water is the symbolic equivalent of the *xoc* fish which means "to count." It is accordingly logical to translate the whole glyph as "count of completed period" or words to that effect. Alternatively, water stands for haab, "rainy season."

A second glyph to denote a PE appears in the last years of Copan's devotion to the hieroglyphic cult. Examples are to be seen on U, N5 (with 9.18.5.0.0), G¹, A2 (9.18.10.0.0), and S, 9b (10.0.0.0.0). The tail of the winged cauc is attached to an element with lines of dots and a peculiar prefix (fig. 33,1-3). At one end of this prefix is a ring of little circles suggesting jade or water. The rest of the prefix might pass as a distorted hand. In that case the ring of circles would represent the jade ornament commonly worn on the wrist. However, I am inclined to doubt the identification of the hand (cf. fig. 37, 55,60,69). Be that as it may, I think the glyph may be tentatively accepted as a PE sign.

A glyph which most probably connotes completion is the hand scattering water (fig. 33,4-8). At one time I had thought that the circles falling from the hand represented grains of maize, as in the scene on Piedras Negras 40, but the many cases in which, as Rands (1946) has shown, streams fall from the hand held fingers down, have convinced me that the glyph in question represents the sprinkling of water. Furthermore, in some cases the circles falling from the hand are enclosed within lines, indicating more clearly a liquid stream (fig. 44). One of the names given the Chacs, the rain gods of Yucatan, is *Ah hoyaab*, "the sprinklers," because they are supposed to sprinkle water on the earth from their stores; this is apparently the action shown in the glyph. A connection between the root *hoya* and the completion of a period is

not obvious. Conceivably, the glyph symbolizes the rainy season and, by extension, the whole year, just as haab has the primary meaning of rainy season but stands for the whole year by the *pars pro toto* principle. The arrival of the Chacs, the sprinklers, still marks the start of the rainy season (Redfield and Villa, 1934, p. 116).

The glyph is common, and is associated with PE dates with a few exceptions. One exception occurs on Naranjo 23, following the date 9.13.18.9.15 1 Men 13 Yaxkin. There are several *u* brackets with glyphs of unknown meaning, and then the hand sprinkling water, but without a prefix of the count group, attached to a glyph resembling Muluc. Clearly on 1 Men 13 Yaxkin several unknown matters were set in order, and those events may have accounted for the presence of the water-sprinkling symbol. A second exception is on Tonina 7 where the glyph precedes (9.14.17.9.0) 1 Ahau (3 Uo).

That the sign is not a prefatory glyph is established by the fact that not infrequently it directly precedes the PE date; that it does not modify the glyph it follows is shown by its occasional presence immediately after a PE.

Normally there is a prefix, either the *u* bracket, fish head, comb, or death eye. On Copan J (W) the prefix is a symbol, such as occurs with frequency at Quirigua (fig. 33,8-14).

Attention was called to the presence of a shell as one of the two glyphs which, separated or merged, indicate together the half-period. This shell, with its peculiar mouth and three little circles, reappears as a distinct glyph, either without a coefficient or with a coefficient of 1. The little circles are in line or in an arc around the mouth, there is a *te* (2) postfix, as with the glyph for half-period, and commonly a prefix of the bracket group (fig. 33,15-20). I find the following occurrences with coefficient of one:

Palenque Inscr. (M), F7	9.11. 0. 0. 0	12	Ahau 8 Ceh
Palenque Inscr. (W), S11	9.12.11.12.10	8	Oc 3 Kayab
Palenque Fol. Cross, N17	9.12.18. 5.16	2	Cib 14 Mol
Naranjo 24, D8	9.13. 7. 3. 8	9	Lamat 1 Zotz'
Piedras Negras 3, C7b(?)	9.13.16. 4. 6	4	Cimi 14 Uo
Morales 2, B11	9.13.19. 8. 1	2	Imix 14 Zec
Pusilha M, C7	9.14. 0. 0. 0	6	Ahau 13 Muan
Pusilha E, C4	9.15. 0. 0. 0	4	Ahau 13 Yax
Tikal T 4, L 3, H5	9.15.15. 2. 3	13	Akbal 1 Ch'en
Tikal T 4, L 2, K1	9.15.16. 4.18	12	Etz'nab 11 Zac
Yaxchilan 10, H1	9.16.15. 0. 0	7	Ahau 18 Pop(?)
Palenque 96 Glyphs, I8	9.17.13. 0. 7	7	Manik, Pax seated

Palenque Cross, doorway No associated date

As to the exact usage of this glyph I would not hazard a guess, but the sign must mean something like "period completed" in view of its employment in other texts, but its use clearly is not restricted to the time periods of the LC. Note how on Copan A this glyph, but with "down-

balls" postfix, precedes fifteenth katun (fig. 32,10), and replaces the more conventionalized shell postfix.

The pursuit of all glyphs derived from a shell would take us too far afield, but before leaving the subject I desire to call attention to one other glyph. This is a right hand held vertically with back to observer, and only the thumb shown. It has as an infix the "mouth" and three circlets of the shell, the latter arranged as a triangle. There is a prefix and sometimes, in addition, four dots which may or may not have a numerical value. The derivation of the merged glyph is obvious (fig. 33,9-13). Sometimes the katun prefix is present (fig. 33,12,13). The glyph probably means the completion of a period.

It may seem strange that the meaning "completion of a period" should be assigned to so many diverse glyphs. Yet, such variation merely reflects the paramount importance of such events in the Maya concept of time. The orderly completion of each stage of time's march through eternity was a matter of prime concern to the Maya priest; it is a subject treated at considerable length in the measured phrases of the books of Chilam Balam. If, as I first assumed and, I trust, have now furnished evidence, the set phrases of the books of Chilam Balam reflect the patterns of speech incorporated in the glyphic texts of the Initial Series Period, then one would expect various glyphs to express those phrases. Some we have identified; others are still dubious.

Moreover, it must be remembered that the surviving writings on the ends of periods are without any doubt but a fraction of the ritual on the subject which existed in the sixteenth century, and that in turn was but a be-draggled survival from the great cantatas of time which the Maya priests of 1200 years ago composed, recited, sang, and wrote. Those infinite variations on the theme which the different glyphs denote are its magnificence. Much of that beauty is now lost because our present knowledge does not permit us to identify and translate those antiphonal changes, or to reproduce the meter.

KATUN AND TUN ANNIVERSARIES

The term anniversary is here used to designate CR dates other than baktun and katun endings, and the ends of fifth, tenth, thirteenth, and fifteenth tuns, which by declaration or by implication are an exact number of tuns or katuns later than a date already recorded in the same or some other text in the same city. Thus 9.18.2.5.17 3 Caban, seating of Pop, is the one and one-half katun anniversary of 9.16.12.5.17 6 Caban 10 Mol. Both dates with the required distance number are declared on Copan U. The anniversaries observed are generally those with a span of one katun, but $1\frac{1}{2}$, 2, 3, and 5 katun anniversaries are recorded, as well as 5, 7, 10, and 13 tuns. The

dates thus commemorated are for the most part those which had particular importance in solar and other astronomical calculations; most of them appear to be solar determinants.

The glyphs used to denote these anniversaries are the usual PE signs, together with their prefatory glyphs and affixes, with two exceptions. The first of these is the occasional presence of a "bundle" suffix with the katun

or tun sign (fig. 33,21-23). This postfix appears with period glyphs only when they are anniversaries. The other is a peculiar cauac glyph which lacks the wing postfix but has a peculiar prefix (fig. 33,27-32).

As anniversaries have received little comment, it seems advisable to list all known examples in the order of their appearance within each site, together with the dates they commemorate.

TABLE 12—LIST OF DATES WITH THEIR ANNIVERSARIES

LETTER	MONUMENT	DATE	ASSOCIATED GLYPHS
PIEDRAS NEGRAS			
A	L 4	9.10. 6. 2. 1	5 Imix 19 Kayab
B	L 2	9.11. 6. 2. 1	3 Imix 19 Ceh
C	3, 7, 8	9.11.12. 7. 2	2 Ik 10 Pax
D	7	9.14. 9. 7. 2	8 Ik 5 Uo
E	8	9.14.12. 7. 2	9 Ik 10 Pop
F	33, 36, 38, etc.	9.10. 6. 5. 9	8 Muluc 2 Zip
G	34	9.10.19. 5. 9	8 Muluc 2 Cumku
H	38	9.12. 6. 5. 9	4 Muluc 7 Zac
I	7, 8	9.12.14.11. 1	6 Imix 19 Kankin
J	1	9.13.14.11. 1	4 Imix 19 Ch'en
K	3, 7, 8	9.12.14.13. 1	7 Imix 19 Pax
L	Jade	9.13. 7.13. 1	7 Imix 14 Mac
M	1	9.13.14.13. 1	5 Imix 19 Zac
N	Jade	9.13.14.13. 1	5 Imix 19 Zac
O	8	9.13.14.13. 1	5 Imix 19 Zac
P	3	9.13.19.13. 1	11 Imix 14 Yax
Q	11, Alt 2	9.14.18. 3.13	7 Ben 16 Kankin
R	9	9.15. 5. 3.13	5 Ben 1 Mac
S	L 3	9.15.18. 3.13	5 Ben 16 Ch'en
T	Not found	(9.14.18.16. 7	1 Manik 5 Ch'en)
U	Alt Sup.	9.15. 5.16. 7	12 Manik 10 Yaxkin
V	Thr 1	9.15.18.16. 7	12 Manik 5 Zotz'
W	12	9.18. 4.16. 7	10 Manik 0 Zac
X	Thr 1	9.17.10. 6. 1	3 Imix 4 Zotz'
Y	L 3	9.17.11. 6. 1	12 Imix 19 Zip
COPAN			
Z	5, W. alt	9. 7.19.17.11	9 Chuen 14 Mol
A'	1, altar	9.12.19.17.11	12 Chuen 19 Pop
B'	3	9.10.19. 5. 0	12 Ahau 13 Kayab
C'	A	9.14.19. 5. 0	4 Ahau 18 Muan
D'	1	9.11.15.14. 0	11 Ahau 8 Zotz'
E'	I	9.12. 3.14. 0	5 Ahau 8 Uo
F'	Q, R, U, T, 8 etc.	9.16.12. 5.17	6 Caban 10 Mol
G'	T	9.17.12. 5.17	4 Caban 10 Zip
H'	U	9.18. 2. 5.17	3 Caban Pop seated
NARANJO			
I'	25	9. 5.12. 0. 4	6 Kan 2 Zip
J'	25	9. 6.12. 0. 4	4 Kan 7 Pax
K'	25	9. 7.12. 0. 4	2 Kan 7 Zac
L'	25	9. 8.12. 0. 4	13 Kan 7 Xul
M'	25	9. 9. 2. 0. 4	12 Kan 17 Zip
N'	29	9.13. 3. 0. 0	9 Ahau 13 Pop
O'	29, 30	9.14. 3. 0. 0	7 Ahau 18 Kankin

Hand bracket, 17 haab,¹ 2 katuns?
Hand, moon, bracket, 3 katuns²

13 haab, completion of haab
Hand? 2 katuns?

Bracket 1 katun?

Hand 13 tuns

Hand 1 katun
Hand, moon (?), bracket, 1 katun
Hand, bracket, 5 haab,¹ 1 katun

Hand, bracket, 7 tuns
Bracket 1 katun²

Bracket-tun (?) hand

Bracket 6 haab¹, bracket 3 katuns

Hand (5) katuns?

u bracket katun

1 katun, completion of haab
2nd katun, completion of haab
3 katuns
1/2 period lacking to 4th katun

TABLE 12—Continued

LETTER	MONUMENT	DATE	ASSOCIATED GLYPHS
P'	E, F, etc.	QUIRIGUA 9.14.13. 4.17 12 Caban 5 Kayab	Hand, fish, 2 katuns
Q'	D	9.16.13. 4.17 8 Caban 5 Yaxkin	
R'	Str. 44	YAXCHILAN 9.11.18.15. 1 7 Imix 14 Zotz'	Death eye 5 tuns ²
S'	L 25	9.14.11.15. 1 3 Imix 14 Ch'en	
T'	L 27	9.13.13.12. 5 6 Chicchan 8 Zac	
U'	L 26	9.14. 8.12. 5 11 Chicchan 13 Yaxkin	
V'	11	9.15.19. 1. 1 1 Imix 19 Xul	
W'	L 8, L 41	9.16. 4. 1. 1 7 Imix 14 Zec	
X'	L 1	9.16. 1. 0. 0 11 Ahau 8 Zec	
Y'	L 2	9.16. 6. 0. 0 4 Ahau 3 Zotz'	
Z'	L 26	9.14.12. 6.12 12 Eb 0 Pop	
A''	L 9	9.16.17. 6.12 1 Eb, End of Yaxkin	
B''	96 Glyphs	PALENQUE 9.16.13. 0. 7 9 Manik 15 Uo	Hand, u bracket, 1 katun
C''	96 Glyphs	9.17.13. 0. 7 7 Manik Pax Seated	
D''		BISHOP JADE 9.10.10. 6.14 4 Ix 7 Zip	Hand, bracket with dots, katun
E''		9.11.10. 6.14 2 Ix 12 Pax	

¹Cauac with unusual prefix.²Bundle suffix.

Probably a more careful scrutiny of texts would reveal other anniversary dates. In one or two cases, notably on Yaxchilan 3, much of the inscription is obliterated, but two glyphs record "completion of first katun," and it is probable that the missing date which these two glyphs explain was an anniversary. Similarly, the date 9.10.4.16.2 8 Ik 5 Kankin on Naranjo HS is declared to mark the completion of one katun, but a date one katun earlier has not survived. The date on Copan I perhaps is not an intentional anniversary, for it is eight tuns after the original date, but the eighth tun had, so far as we know, no significance for the Maya. The date on Copan A also may not be meant as an anniversary of that on Stela 3, for the distance of 19.5.0 which each records in excess of the katun ending is of lunar significance, since the interval is 6940 days, the Metonic cycle, as first pointed out by Spinden (1924, p. 175). This is one katun less one 260-day cycle and equals 19 tropical years or 235 lunations. In both these texts there is a winged-cauac glyph, but I am not certain that these refer to the anniversaries.

The various anniversaries at Yaxchilan, with the exception of the pair X' and Y', are somewhat open to doubt because of the nonplacement of several of the CR dates in the LC. The incised text on the Bishop jade (D'' and E'') is certainly a katun anniversary, but the LC positions of the dates are not given: the assigned position is

probably correct, since it proves to be an excellent determinant of 9.11.0.0.0 12 Ahau 8 Ceh (p. 205). Another possible anniversary may be given on Quirigua Alt O, where there appears to be a record of 9.16.6.14.6 4 Cimi 9 Cumku, which is the katun anniversary of 9.15.6.14.6 6 Cimi 4 Zec, a date very prominent at Quirigua.

THE HAAB VARIANT

As already noted, a special glyph for the 360-day period is used with several of these anniversaries. This consists of the cauac sign without the wing, but with the addition of a prefix with a crosshatched oval (fig. 33,27-32). This haab variant never stands alone, but is always followed by the katun sign (once by another tun sign), and is apparently used only with anniversary dates, that is to say to mark a count forward from some determined position which is not chosen because it is a PE in the round of tuns or katuns. What is probably the same element occurs frequently with the tun sign and once with the haab glyph without wing in the 260-day almanac on Madrid 65-72 (fig. 12,23,24). In every case the tun and haab signs have coefficients; the affix may be a prefix or postfix, lying between the coefficient and main element in the former case. Here, also, it is clear that no PE in the LC are involved. On the other hand this affix almost surely is not the same sign as that used with month glyphs and sometimes with the winged cauac at Chichen

Itza and other sites in the Northern Area (figs. 38; 39), tentatively identified as the *tu* element. The *tu* element has an infix with three circlets which is lacking in this affix, and it stands outside the coefficient, whereas this affix lies between coefficient and main element or may even be postfixed to the main element.

The situation is somewhat unsatisfactory, but perhaps we shall not be much amiss if we assume that this affix is a numerical classifier, possibly *piz* or *p'el*, both of which may be used with the word *haab*, corresponding to a specialized use of *haab* in the recording of anniversaries, but not in marking regular PE. The presence of this affix (once) with the half-period glyph when that is used as a distance number leading to the end of the current katun (fig. 32,48) and its attachment to glyphs without coefficient do not militate against its identification as a numerical classifier, for both *piz* and *p'el* have other uses: both words can also mean "only," and *piz* has the additional significance of "simple," "ordinary," and *p'el* in the compounds *p'el hun* and *p'elech* denotes "exactly." This affix should be distinguished from another which terminates in a ring of circlets (fig. 33,8-14), and which probably has a different meaning.

In the list of anniversaries given above, this *haab* variant occurs with Dates D, P, and W. It also appears at Copan on Temple 11 and Stela 8. On Temple 11 (west panel of north doorway) there is a damaged IS, which Morley has read as 9.14.15.0.0 11 Ahau 18 Zac, a decipherment which can hardly be challenged. Immediately after 18 Zac follow two glyphs, which, like all on this panel, are reversed. The first is a katun glyph with a coefficient of 3; the second is this *haab* variant with a coefficient of 5 (fig. 33,29). Unfortunately, the following glyphs are not recognizable (they are probably on an adjacent panel.) If this is to be regarded as an anniversary, the date commemorated is 9.11.10.0.0 11 Ahau 8 Ch'en. On the east panel of the south doorway there is a date 11 Ahau 8 Ch'en or 8 Uo. In view of what has been said about anniversaries, it is highly probable that these fragments of the texts should be reconstructed as follows:

(9.11.10.0.0)	11 Ahau 18 Ch'en
9.14.15.0.0	11 Ahau 18 Zac
	3 katuns 5 <i>haab</i>

I suspect, but have no proof, that the next occurrence of 11 Ahau at the end of a katun—9.18.0.0.0 11 Ahau 18 Mac—was also inserted in this inscription.

The second occurrence of this combination of 3 katuns 5 *haab* variant is on Copan 8, and precedes the date 10.0.0.0.0 7 Ahau 18 Zip. One would expect to find the date 9.16.15.0.0 7 Ahau 18 Pop in this text, but it is not present on what remained of the inscription when it was photographed. Several glyphs are entirely gone, and

there is therefore a possibility that originally the date occurred on this monument (fig. 33,30).

This particular form of the cauc glyph occurs rather rarely in other texts. For example, it appears with a coefficient of 2 on Copan U in an obscure passage immediately before a record count of 4 tuns, 9.18.5.0.0 4 Ahau 13 Ceh. It follows a date 9.18.1.13.2 9 Ik 10 Mol, which actually falls in a second tun, and if four completed tuns are counted from that point the date 9.18.5.0.0 will be reached. The passage would then read "(9.18.1.13.2) 9 Ik 10 Mol in the second *haab*. Fourth tun (from 9 Ik 10 Mol) to (9.18.5.0.0) 4 Ahau 8 Ceh." Such methods of recording dates are not in conformity with practice in the Central Area during the Initial Series Period, but old usage was breaking down at 9.18.5.0.0, and the suggested interpretation may be correct (fig. 33,32).

This same cauc glyph appears also on Altar F' with a coefficient of 4. It is followed by 1 katun, and what is apparently a PE glyph. This is probably an anniversary, but the associated date is not recoverable to give a definite answer.

A YUCATECAN METHOD OF RECORDING DATES

The hieroglyphic texts of Chichen Itza and some other cities of Yucatan and Campeche are set apart from those of the cities of the south by the rarity of IS and by the complete absence of PE. In none of the 20-odd inscriptions recovered so far at Chichen Itza is a statement such as "13 Ahau 18 Cumku, completion of [or count of] 17 katuns." Such PE, as we have seen, abound in the texts of the Central Area, and in their abundance and ease of general decipherment perhaps delude epigraphers, leading them to regard their task as less onerous. They are absent from the texts of Yucatan; they do not appear in the pages of the books of Chilam Balam.

In the books of Chilam Balam, events are referred to katuns identified not by the numerical positions of those katuns within a baktun, but by the day on which each closes. An event, in their narrative, took place in a katun ending on the day *n* Ahau, or in tun *n* of a katun ending on *n* Ahau. For instance on page 80 of Chumayel are the statements: *Tu hunpiz tun Buluc Ahau, laix u katunil*, "In the first tun of 1 Ahau, that of the katun"; *tu hunpiz tun ichil hun Ahau u katunile*, "in the first tun in the katun of 1 Ahau." In Mani we read: *tu lahun tun uaxac Ahau*, "in the tenth tun, 8 Ahau."

Similarly, each sentence of the various chronicles commences with the day Ahau of the katun: *Uaxac Ahau paxci u Chich'een Itza*, "8 Ahau, the abandonment of Chichen Itza." That the katuns were named for the day Ahau on which each ended is further seen in statements

such as: *Can Ahau u kaba katun emciob*, "4 Ahau was the name of the katun when they descended."

Nowhere is an event said to have taken place in Katun 7, 2, or 3, etc., except in one passage in Tizimin which appears to state that the Katun 8 Ahau of the Hunac Ceel incident was the seventeenth (Roys, 1922, p. 46), and that is almost surely incorrect, perhaps a reference to the tun number. Nowhere is a CR date declared to be a PE.

In the Central Area there is no exact parallel to the Yucatecan custom of omitting the word katun, and giving merely the day on which it ended, with the clear understanding that so and so happening on *n* Ahau does not mean on that day but on the katun that ended on that day. There are indications, however, of an approach to that system. The somewhat rare practice of following the half-period glyph with a notation of the day on which the current katun will end (p. 192) is analogous, for the whole clearly means something like "half-period lacking to the completion of *n* Ahau," the katun glyph being omitted. Another parallel, although somewhat weaker, is to be found on the Tablet of the Inscriptions at Palenque. The katun endings, 9.9.0.0.0 3 Ahau 3 Zotz', 9.10.0.0.0 1 Ahau 8 Kayab, and 9.11.0.0.0 12 Ahau 8 Ceh, are followed after a lapse of several glyphs by the day Ahau on which each ends, namely 3 Ahau, 1 Ahau, and 12 Ahau. I think there can be little doubt that these repetitions are references to the katun endings, for in each case Ahau is followed by a tun glyph. In each case Ahau is supplied with an unusual postfix, which perhaps serves to indicate that the day Ahau represents an abbreviated reference to the katun ending. In this connection attention should be called to the *ak* postfix with 8 Ahau, which appears on Copan 6 as an abbreviated reference to the katun ending 9.13.0.0.0 (fig. 11,59).

This system of naming a katun by the day on which it ended was not confined to Yucatan and to the few uncertain examples of the Initial Series Period of the Central Area just discussed; it was clearly favored by the users of Paris, for that codex contains a series of pages giving the round of the katuns, each apparently with its prophecy, and each katun is designated by the day Ahau on which it ends. There is also on these pages a sequence of tuns similarly labeled. Moreover, a clouded passage in Ordoñez y Aguiar (1907, note 57, par. 119) suggests that the author may have had a confused knowledge of this practice among the Tzeltal. A jade from Ocosingo has a 4 Ahau (note typical forehead ornament) with the katun prefix and the *ak* postfix (fig. 11,58), and this must surely indicate a Katun 4 Ahau.

The murals at Santa Rita, British Honduras, name a sequence of tuns by the day on which each is completed,

and it is a fair assumption that the people of that part of Chetumal did the same for the katuns. The Itza of Tayasal, of course, used the same system, but presumably they brought it with them from Yucatan. I think that had the Maya inscribed full prophetic material for the katuns on their monuments, we would have encountered complete evidence for the existence of this system of nomenclature throughout the Maya area in the Initial Series Period.

The calendrical inscriptions at Chichen Itza largely fall into a single pattern of which those of Chichen 2-5 (Four-Lintels) is typical. Ignoring for the moment certain affixes, we read them as: 9 Lamat the day, on the 11th of Yax, haab 13, 1 Ahau (fig. 38,1-3).

Morley (1918) at first tried to reach a decipherment which would make the CR date fall in a Tun 13 ending on the day 1 Ahau, but as that was not possible within historical limits, he (1925) abandoned the idea, and treated the two parts of the text as separate items: a CR date 9 Lamat 11 Yax, and a reference to a Tun 13 which fell on 1 Ahau, viz:

(11.8.19.5.8) 9 Lamat 11 Yax
(11.9.13.0.0) 1 Ahau (13 Pop)

Beyer (1937) accepted these readings, although by the time he wrote, enough architectural evidence had been accumulated to brand as preposterous such late datings.

In that year I suggested an entirely new interpretation of this and similar dates at Chichen Itza, proposing that the whole should be read as: 9 Lamat 11 Yax falling in a Tun 13 of a katun that ended on 1 Ahau (Thompson, 1937). The decipherment offered was: 10.2.12.1.8 9 Lamat 11 Yax which fulfills the required conditions in that it falls in a Tun 13 of a katun (10.3.0.0.0 1 Ahau 3 Yaxkin) which ended on the day 1 Ahau.

The one surviving IS at Chichen Itza is 10.2.9.1.9 9 Muluc 7th of Zac. Later in this text occur the glyphs 10 Winged Cauac and 1 Ahau (fig. 39,2). Beyer reads this last as (10.9.10.0.0) 1 Ahau (3 Zac), thereby placing the second date some 140 years after the first. Morley misread the "Ben-Ich" prefix of Ahau as a coefficient of 2, and thereby obtained a reading 10.2.9.1.9 tun ending on 2 Ahau (10.2.10.0.0). By the system I proposed, the reading would be 10.2.9.1.9 9 Muluc 7th of Zac in Haab 10 in [Katun] 1 Ahau, which is in agreement with the thesis since 10.2.9.1.9 is in the tenth haab or tun of a katun (10.3.0.0.0 1 Ahau 3 Yaxkin) which ends on 1 Ahau.

In this last case, if one does not accept the suggested association between the CR date and the latter half of the chronological statement, one must suppose that the tun-and-Ahau combination agrees with the thesis merely by chance. As there are 260 tun-and-Ahau combinations

(Tuns 1-20; 1-13 Ahau), the chances of a coincidental agreement are 1 in 260. In the case of the 9 Lamat 11 Yax text the chances of coincidence are somewhat less, since 9 Lamat 11 Yax theoretically might occupy two or three places in the LC, thereby reducing the odds to a mere 80 or 100 to 1.

It has been objected that there is no mention of katun

bad weathering, the proposed reading requires one to assume that the 1 haab and the month sign have been transposed. Such transpositions are contrary to all Maya practice, and so, in view of the bad condition of the glyphs, one is very hesitant to accept the Beyer reconstruction involving such drastic irregularity in the arrangement.

TABLE 13—RECORDS OF DATES BY YUCATECAN METHOD

INSCRIPTION	CALENDAR ROUND	HAAB	KATUN
Chichen 27.....	10. 1. 17. 5. 13 11 Ben 11 Cumku?	18	(10. 2.0.0.0) 3 Ahau
Chichen 27.....	10. 1. 18. 6. 5 6 Chicchan 18 Cumku??	19	(10. 2.0.0.0) 3 Ahau
Chichen 20.....	10. 2. 0. 11. 3 5 Akbal 1 Zec??	1	(10. 3.0.0.0) 1 Ahau
Chichen 20.....	10. 2. 0. 15. 3 7 Akbal 1 Ch'en	1	(10. 3.0.0.0) 1 Ahau
Yula 1.....	10. 2. 4. 8. 4 8 Kan 2 Pop?	5	(10. 3.0.0.0) 1 Ahau
Yula 2.....	10. 2. 4. 8. 12 3 Eb 10 Pop	5	(10. 3.0.0.0) 1 Ahau
Chichen 1.....	10. 2. 9. 1. 9 9 Muluc 2 Zac	10	(10. 3.0.0.0) 1 Ahau
Chichen 12, 15, 16	10. 2. 10. 11. 7 8 Manik 15 Uo	11	(10. 3.0.0.0) 1 Ahau
Chichen 2-5.....	10. 2. 12. 1. 8 9 Lamat 11 Yax	13	(10. 3.0.0.0) 1 Ahau
Chichen 2.....	10. 2. 12. 2. 4 12 Kan 7 Zac?	13	(10. 3.0.0.0) 1 Ahau
Chichen 23.....	10. 3. 0. 2. 1 3 Imix 4 Ch'en??	1	(10. 4.0.0.0) 12 Ahau (written 14 Yax)
Chichen 28.....	10. 8. 10. 11. 0 2 Ahau 18 Mol?	11	(10. 9.0.0.0) 2 Ahau
Xcalumkin IS.....	9. 15. 12. 6. 9 7 Muluc 1 Kankin	13	(9.16.0.0.0) 2 Ahau
Uxmal, Monjas.....	10. 3. 17. 12. 1 5 Imix 18 Kankin	18	(10. 4.0.0.0) 12 Ahau?

in these texts, but such an objection is easily surmounted; frequently, the word katun is omitted in the books of Chilam Balam, and an event is said to have occurred in *n* Ahau with the understanding that *n* Ahau refers to the katun ending on that day (p. 197). Thus carved glyph and written word once more agree.

As a number of other readings conform to the thesis, I think one can not hesitate to accept the suggested interpretation in view of the impossibility of explaining a succession of agreements as coincidences when the chances against each coincidence vary from about 80 to 1 to 260 to 1. Furthermore, the suggested method of reading very closely parallels that used in the books of Chilam Balam.

The list of dates of this type so far deciphered is given in Table 13. The reading of the date of Chichen 23 is quite doubtful. The text is irregular, for certain affixes, to be discussed shortly, are wanting. The head coefficient of the day Ahau is best as 12 (Beyer's reading). Furthermore, a position in a Katun 12 Ahau (10.4.0.0.0) is in closer agreement with other dates associated with the Caracol. I assume that the month was written 14 Yax instead of 4 Ch'en. Naturally, this can not serve as support for the proposed method of reading, but errors do occur. The form of Yax is most irregular, and were it not for the prefix would be quite unrecognizable.

It is not proposed to discuss these readings one by one. They have been threshed out by Beyer (1937), Thompson (1937, 1941), and Satterthwaite (1944). I have not included the date on Halakal Lintel 1 because on top of

These texts introduce affixes attached to the haab and Ahau glyphs not previously encountered. In most cases the prefix or prefatory glyph of the haab is a sign with four or five dots arranged in a vertical line; often the topmost is considerably larger than the rest and is a regular circle. A *ti* element is present as a prefix to the prefatory glyph (suppressed when the glyph is a prefix) and one or two inverted Ahaus serve as a postfix (fig. 38, 1-7). I know of no similar glyph in the inscriptions of the Initial Series Period, but the vertical arrangement of dots is a not uncommon motif on late pottery of that period (R. E. Smith, 1936, pls. 13b, 14a), and it is of fairly frequent occurrence in the codical forms of the day sign Caban, although not in the inscriptional forms. However, its use with the codical forms of Caban is of little assistance to us, since it is an element secondary in importance to the lock of hair. Beyer (1937) designates it an ending sign ("end of") without adducing any evidence in support of that identification. However, as Beyer translated a formidable number of prefixes as "end of" on the flimsiest of evidence, there is no reason for assuming that in this case he was right.

In view of what has been written above, it seems more probable that the affix or prefatory glyph has some such meaning as "in the course of" (cf. *cu ximbal*, "when [the year] was marching," in Mani) or, conceivably "forward to."

In a few cases other prefixes replace the one just discussed. On Monjas L 4 (fig. 39, 4) the prefix consists of the forward element, Landa's *i*, above a hand, held in the

Manik position. Since the hand is in that position, we have at present no evidence for interpreting it as a sign for completion, but perhaps as a sign for grasping (p. 267), and conceivably corresponding to the expression *te ch'abi Otxmal u tunile*, "there it was taken at Otxmal, its tun." This, however, is not probable since *ch'a* carries the implication of movement, and the sense is that of taking away, not of seizing *per se*.

Be that as it may, the presence of the forward element appears to confirm the assumed association of the CR date with the haab. In this particular text a number of glyphs intervene between the date 8 Manik 15 Uo and "forward,—, 11 haab."

In the Casa Colorada text (no. 20) the haab sign appears six times, on each occasion with the *tu* prefix. In two places the glyph forms part of a full date, declaring the CR date to lie in the first haab in (Katun) 1 Ahau; in the other examples the haab does not directly determine the position of a CR date. In all six texts there is a conglomeration of small elements between the coefficient and the haab (fig. 39,7,8). The 13 haab of Xcalumkin similarly has a *tu* prefix. This use of the *tu* prefix gives a clue to the use of the haab glyph, since, together with the haab and its number, it means "in, at, on, or from the *n*th haab." The *ti* prefixed to the element with dots in a vertical line is the same locative, but does not call for the use of ordinal numbers unless the sign with dots in a vertical line has the value *u*. A translation "in the *n*th haab" would, of course, be in agreement with the proposed decipherment of these texts.

The two dates of the ball-court rings of Uxmal also show the *ti* element as part of the prefatory glyphs before the haab signs. These last are rather weathered; they may represent the element with dots in a vertical line.

On Stone 18 of the Caracol there is a clear 3 Imix 9 (or 14) Yax, 1 haab, 12 (or 4?) "Ben-Ich" Ahau, but there is no prefix attached to the 1 haab (fig. 38,8). A prefix is similarly absent from the 10 haab of the Initial Series Lintel, and probably from the 11 haab of Chichen 28 (the High Priest's Grave), although it is possible that the badly weathered glyph which precedes 11 haab is a prefatory glyph.

The day Ahau also has unusual affixes. In almost all cases (exceptions: Chichen 1, 8, 28, and Yula 1, 2) Ahau is surmounted by the "Ben-Ich" prefix. Nowhere in the texts of the Central Area is this prefix attached to a day sign. In the codices Ahau appears hundreds of times, but on only three occasions does it have this prefix: twice (Dresden 60, Paris 4) it has a coefficient of 11; in its third appearance it lacks a coefficient (Madrid 34). No other day sign ever has this prefix either in the inscrip-

tions or in the codices, although it is one of the commonest of affixes.

It has been pointed out by Gates (1931, p. 39) that the Ik part of Ben Ik, here called "Ben-Ich," is not an Ik at all. This element has also been identified as Lamat because of its resemblance to the center of that glyph (Teeple, 1930, p. 71; Beyer, 1937, p. 161). I accept this identification because of the resemblances of early forms of this superfix to Lamat (fig. 33,47).

Of its three occurrences with Ahau in the codices, it is fairly certain that it refers to a Katun 11 Ahau in Paris, and there is a strong probability that it is similarly used in Dresden. In the first case it occurs on Paris 4, but that is precisely the page which deals with Katun 11 Ahau in the sequence of katuns on pages 2-11, and is immediately below what is probably a haab glyph with a coefficient of 15, suggesting the possibility that the two together indicate a Tun 15 in Katun 11 Ahau. In the second case it is associated with a page (60) of Dresden which is not connected with any divinatory almanac and apparently not with any astronomical tables, but which conceivably relates the struggles of the gods of the underworld with those of the heavens at the creation. This occurred in Katun 11 Ahau according to Chumayel. Be that as it may, with 11 Ahau in the same box of six glyphs is a katun glyph without a coefficient, the only katun without an attached number in the codical writings. That makes the identification of this unattached 11 Ahau as a katun ending more probable.

The third occurrence of "Ben-Ich" Ahau, but this time without a coefficient, is in Madrid 34. Ahau has a comb postfix below, and probably a second postfix to the right—a unique combination.

As we shall see, the "Ben-Ich" prefix is commonly used with a count of katuns, with coefficients from 1 to 5 (possibly 6) frequently encountered in the inscriptions of the Central Area. This numbering of katuns may refer to an enumeration in some way linked to the cycle of 13 katuns (p. 203). Should that be the case, it would tend to strengthen the surmise that the "Ben-Ich" prefix indicates the specialized use of Ahau as a station in the round of the katuns.

The "Ben-Ich" superfix, with the addition of a common postfix, converts the symbolic glyph for kin into the name glyph of the sun god. In sixteenth-century Yucatan the commonest name for the sun god was Kinich Ahau, "Lord sun face" (figs. 33,44; 42,3).

This "Ich" element decorates the earplug of a head glyph on a recently discovered stone at Palenque. The portrait is that of a deity with the features of God D, the Roman-nosed god, with the barbels of the *xoc* monster.

It also is a glyph in its own right enclosed within a solid or broken line (Gates' Glyph 341). It may take affixes and a numerical coefficient. In Madrid it once appears with a coefficient, which is 8; its four appearances with coefficients in Dresden are on the four pages dealing with the new-year ceremonies. It is followed in each case by a moon glyph with a coefficient, the arrangement being:

Eb-Ben (p. 25)	9 "Ich"	7 moon glyph
Caban-Etz'nab (p. 26)	7 "Ich"	16 moon glyph
Ik-Akbal (p. 27)	11 "Ich"	5 moon glyph
Manik-Lamat (p. 28)	6 "Ich"	6 moon glyph

I have no idea what these glyphs and numbers signify save that I think they should be read together, and that the moon glyph may have the value of 20.

The examples of "Ben-Ich" on Yaxchilan L 35, 37, and 49 are both early and detailed. What is without much doubt a "Ben-Ich" prefix over B1 of L 35 shows the "Ich" as a straightforward Lamat sign, and in other examples on these lintels the element is a small cross, such as frequently occupies the center of the Lamat sign in place of the rhomboid as seen in some Lamat signs and the usual "Ben-Ich" (fig. 33,46,47). It is highly probable, therefore, that the prefix was originally Lamat-Ben, but that to save space in the crowded area of the prefix the four little circles were eventually dropped.

Lamat, as we have seen, is the day of the planet Venus. One of the names for Venus is *Noh Ich* or *Nohoch Ich*, "big eye" or "big face." The stars in Mexican art are commonly represented as eyes from which rays of light radiate, so it is probable that *ich*, in addition to meaning eye or face, was a general term for stars; Venus was merely the big star or the big eye. It is, therefore, not improbable that the Lamat sign stands for *ich* when used in the "Ben-Ich" prefix. This would satisfactorily account for its employment with the kin sign to convert that to the symbol for Kinich Ahau, the sun god.

It will be remembered that one of the ways of stating *n* tun in (Katun) *n* Ahau in the books of Chilam Balam was, for example, *hunpiz tun ichil hun Ahau u katunile*, "in the first tun in the katun of 1 Ahau." The word *ichil* means "in" or "within." The preposition is *ich*; the addition of *il* denotes relationship with the adjacent word, converting it into a relative noun. The Motul dictionary says that *ichil* replaced *ich* when a possessive is used, e.g. *bini ich col*, "he went to the milpa," but *bini ichil u col*, "he went to his milpa." In the passage quoted there is of course a possessive—the katun of 1 Ahau. However, in the books of Chilam Balam the form *ichil* is retained even when the words *u katunile* are suppressed.

In view of the possibility that the Lamat of the "Ben-Ich" has the value *ich* it is interesting to note that the

translation of the prefix as *ich* or *ichil* would be in agreement with the phrase of the books of Chilam Balam. The occasional absence of the prefix would agree with linguistic usage, for *ichil* is sometimes suppressed in sentences, and one finds *tu lahun tun uaxac Ahau*, "in the tenth tun of 8 Ahau." The weakness of this translation is that it leaves the Ben element unexplained. I am far from convinced of the correctness of this interpretation but offer it as a possibility.

Another possibility, and one which I prefer, is that the "Ben-Ich" prefix corresponds to the use in the books of Chilam Balam of the word *ich* to indicate the aspect of the katun or its associated god, for *ich* means both eye and face. As examples of this usage may be cited: *Eḱ cocohmut u uich ti yahaulil*, "Black Cocahmut his [Katun 3 Ahau] aspect (face) in his rule" (Chumayel, p. 92); *Yaxal chuen u uich Buleu caan chac u uich ti yahaulil*, "Yaxal-Chuen his [Katun 12 Ahau] aspect (face), Buleu-Caan-Chac his aspect (face) in his rule" (Chumayel, p. 96); *chich u uich*, "harsh his [Katun 5 Ahau] face" (Chumayel, p. 91); *och u uich ti yahaulil*, "the opossum is his [Katun 1 Ahau] face in his rule" (Chumayel, p. 93, inserted). In the prophecies of the years of a katun in Tizimin we find *te u uich ti caan ti yahaulil*, "there is his [the new occupant of the throne, the new katun] face in the sky in his rule," and, again, "the day shall march before his face." One gets the distinct impression that *ich* has in these contexts the meaning of countenance and, by association, patronage, almost augury.

There seems to be a lot of symbolism connected with this idea of the countenance of the katun, for passages in the prophecies for the years in Tizimin suggest that at the beginning of the katun his eyes were unbound when he arrived (*choch ich*); *ḱaxan u uich ti ualac yahaulil*, "his eyes were bound in the time of (or during) his reign" seems to refer to the departure of the katun (Tizimin, p. 10). The same expression, *ḱaxan u uich*, "blindfold his face," on page 12 of the same manuscript certainly refers to the departure of the old katun, although there is no indication whether he was blindfold when he departed or had been so for some time.

There is also an indication that a more drastic treatment might be in store for the departing katun, for in another passage, in which the katun is depicted as loath to give up his rule, we read: *u ḱin pacat col ich ah tzai ḱanche*, "the time of viewing the tearing out of the eye of him who clings to the chair [i.e. the departing katun]." Again: *ti ho muluc u ḱin u ch'aic u bel tu ḱin u hoch' ich*, "On 5 Muluc the time he takes the road, on that day (at that time) his eye is pierced" (Tizimin, p. 3). However, Mani, in the parallel passage, has not *hoch' ich*, but

choch ich, "unbound his eyes," and as the context suggests the beginning of the katun, when the katun takes its road (that is, begins his journey), I would think that the Mani version was the correct one, but Roys tells me that the Tizimin paragraming would permit the piercing of the eye to refer to 4 Kan, who had run his course.

In connection with the piercing of the eye, it should be noted that the eye of Kinchil Coba, lord of Katun 13 Ahau, the last in the katun cycle, is pierced with an arrow in the series of katun prophecies in Mani (Perez 85); the same is true of the regent of Katun 13 Ahau in the Kaua series, and of the ruler of that katun in the Europeanized katun wheel of Lopez de Cogolludo (Morley, 1920, fig. 73) although the numerical coefficients are absent from that picture. It can hardly be coincidence that the eye of the ruler of the last katun in the series is the only one pierced, for, as pointed out previously (p. 183), Katun 11 Ahau which starts on the day 1 Imix is the first of the series, and Katun 13 Ahau the last. Piercing of the eye might therefore be a ritualistic expression for the end of a period; among the Aztec it symbolized penance.

In the Lopez de Cogolludo picture all heads of katun rulers have their eyes closed, and most of them have a tear or a drop of blood on the cheek (the pierced head has several tears or drops of blood on the cheeks). The faces of the 13 rulers of the katuns in Chumayel, page 84, are blackened and almost obliterated, that of 13 Ahau being the worst besmudged of all. Roys has suggested that this blackening may represent the blindfolding of the gods. Roys has also called my attention to the fact that the patrons of the first eight katuns of the series on pages 87-100 of the same manuscript lack eyes, although their brows are prominent (the head of Katun 3 Ahau is perhaps an exception), whereas the last five patrons, starting with 8 Ahau, have eyes. He suggests the possibility that the original manuscript, from which Hoil made the present copy, may have been composed during Katun 8 Ahau; should that be the case, the preceding katuns may have been represented as sightless because they had passed at the time the volume was written (late seventeenth century?).

In any case, one gets the impression from this material that at the beginning of the katun the eyes of the katun are unbound, and at its end the eye of the departing katun is pierced or he is blindfolded. This rather suggests the concept of the uncovering of the face at the start of the period; the covering of it or the extinction of its power of seeing at the close. Whether that is so or not, the primary concept of the countenance of the katun is well established.

Benel ich, which, with the addition of the attributive *el*, would correspond to our "Ben-Ich" prefix, means to

lose one's sight. *Benel* signifies to depart or absent oneself, and the whole would therefore mean literally that the sight had gone. Can the "Ben-Ich" prefix have that meaning? I doubt it. As used in the Yucatecan system of writing dates with Ahau, this prefix should indicate that the katun (*n* Ahau) to which it is attached is running its course, not that it is ended. Moreover, a meaning of sight gone would not fit the name glyph of Kinich Ahau, the sun god, unless this can be construed as the name glyph of the elusive Colop-u-Uich-Kin (sun with plucked-out eye).

Ignoring the Ben part of the prefix and applying to the *ich* part the meaning of countenance or patronage, we see that it would fit well the Yucatec system of dating: 9 Lamat 11 Yax in Haab 13; the *ich* (countenance or patron) is that of (Katun) 1 Ahau.

As prefixed to the swastika glyph, tentatively assigned the value *hel*, "change," or "succession in office," the meaning of countenance or patron would fit very nicely the use of that glyph on the pages in Dresden and Madrid dealing with the entry of the new year. There it normally precedes the glyph of the god of what I have taken to be the expiring year (that of the entering year would serve as well), and the whole would mean "the change of the patron (or countenance), God so-and-so" (figs. 30,29-35; 64,1). In the last illustration, that of Dresden 27, the glyph may be seen in the center of the page, followed by that of God D and the *ahaulil* glyph, the whole perhaps translatable as *u hel ich—Itzamna—yahaulil*, "the change of the patron (of the year), Itzamna, his rule." Below, Itzamna (or God D should that identification not be acceptable) is seated in the temple.

This interpretation of the glyph would similarly fit its appearance, repeated three or four times, on the left of each of the pages (2-12) of Paris which deals with the sequence of katuns. In each case our swastika glyph with "Ben-Ich" prefix is followed by the glyph of a god, but owing to the poor condition of these pages, one cannot be certain of the identities of the patrons of the various katuns. The suggested interpretation would also appear to fit, so far as we can tell, the use of "Ben-Ich" katuns on the monuments (fig. 33,33,35-40).

Later research may well prove the proposed meaning of the "Ben-Ich" prefix to be incorrect; provisionally it will serve, although the failure to bring the Ben element into the interpretation speaks against the translation.

Sometimes the Ahau has a different prefix, to wit, the so-called centipede glyph. This may occur as the only prefix or may share the honors with the "Ben-Ich." This "centipede" element not infrequently accompanies day signs in texts which date from the early stages of the Initial Series Period (fig. 47,2,4). Its importance can not

be very great because it does not always occur in the early texts, and entirely disappears as a prefix of day signs in texts of the Central Area inscribed from 9.5.0.0.0 onward. Its appearance in these Chichen Itza texts of considerably later date probably reflects the conservatism of a peripheral center. There are other examples of archaism in the inscriptions of Chichen Itza.

There is another and far commoner prefix or prefatory glyph with these Ahau signs. This consists of crossed bands above what is probably Beyer's serpent segment (fig. 39,1,3,6,7). The precise interpretation of this prefix must remain undetermined for the present.

There are a number of records of n haab n Ahau which stand alone, and do not determine the LC positions of CR dates. These, one must suppose, are to be read in the same way because of the presence of the "Ben-Ich" prefix in most cases, and are to be regarded as PE. Examples include 10 haab, crossed bands 1 Ahau (Text 8). This presumably represents 10.2.10.0.0 2 Ahau 13 Ch'en which falls in a katun (10.3.0.0.0) 1 Ahau. On Chichen 19 we find 1 haab, centipede 1 "Ben-Ich" Ahau, presumably 10.2.1.0.0. On the Akab Tzib lintel (Text 19) there is also a record of 11 haab, crossed bands 1 (?) "Ben-Ich" Ahau. The haab prefix may be the death eye, and the whole would then read "Expiration of haab 11, —, in 1 Ahau," that is, 10.2.11.0.0. On Yula 2 there may be a record of thirteenth haab, 1 "Ben-Ich" Ahau. However, it is far from certain that the haab prefix is the μ bracket.

Attention should be called to the postfix almost invariably attached to Ahau in these katun references. No other day sign has this suffix. The only occasion in texts of the Central Area in which a postfix, other than the tripod support of the cartouche, is used are precisely those in which the day Ahau definitely or probably represents a katun ending (p. 198). In fact in one case (Copan 6) the postfix of Ahau has the same form, except for the addition of a crosshatched spot, as do those of the katun Ahau of Chichen Itza. This postfix very frequently accompanies the "Ben-Ich" prefix with other glyphs. It is discussed at greater length on page 281; Beyer calls it the owl-plume suffix; I tentatively name it the *ak* affix.

In favor of the suggested interpretation of these CR dates, haab, and Ahau combinations the following points may be cited:

1. It is in close agreement with the method used in the books of Chilam Balam for fixing dates.
2. In most cases the method works, whereas the chances of accidental agreement are exceedingly slim.
3. The suppression of the katun glyph with the Ahau sign corresponds to the frequent suppression of the word

- katun with the day Ahau in the books of Chilam Balam.
4. The interpretation securely places all the associated CR dates in the LC. If it is not accepted, there is no known way of telling what positions these dates should occupy in the LC. Yet preciseness of dating was of supreme importance to the Maya.
 5. The two occasions where the method involves IS dates supply striking evidence for the correctness of the method. In each case only one out of 260 combinations of Ahau and tun can be correct, and in both cases that precise combination is given.
 6. There is slight evidence that something approximating this method of recording dates made its appearance on a late text at Copan (U, p. 197), and the practice of adding the terminal day of the current katun after the glyph of the half-period is perhaps an earlier stage in this system.

"BEN-ICH" KATUN

In a considerable number of texts of the Central Area there are isolated katun glyphs with coefficients of 2-5. There is one case (Yaxchilan L 27) of a coefficient of 6, and two or three head coefficients which might represent the number 1, but which I am more inclined to read as 3. Frequently, but by no means always, the "Ben-Ich" prefix is present (fig. 33,33-43). We have seen in the case of the Chichen Itza texts that the "Ben-Ich" prefix could be suppressed almost certainly without affecting the meaning. The same is without doubt true of these katun records. The date 9.16.1.0.0 11 Ahau 8 Zec on Yaxchilan L 31 is accompanied by 3 "Ben-Ich" katuns; on Yaxchilan L 1 the same date is followed by 3 katuns (the head coefficient has the Ik sign on the cheek assuring its identification). This seems to confirm that in these scattered references to numbered katuns, the general meaning is not affected by the presence or absence of the "Ben-Ich" prefix. There are some grounds for believing that different katun coefficients can occur with the same date: on Yaxchilan 12, 5 "Ben-Ich" katuns may follow a reference to 9.16.1.0.0 11 Ahau 8 Zec, although on Lintels 1 and 31 this date is followed by 3 katuns. There is every reason to suppose that the coefficient of the "Ben-Ich" katun is not affected directly by the CR date, but by the accompanying glyphs. In fact, the "Ben-Ich" katun at Yaxchilan is one of a group of about five glyphs which shows variation in its composition (fig. 46,10-16), but repeats the same combinations in many texts. Lunar glyphs are prominent. I suspect that these glyphs serve to determine the LC position of the CR dates with which they are associated, but the problem is too complex to offer a ready solution.

The numbering of the katuns in the katun prophecies of Chumayel (pp. 87-100) may hold a clue to these numbered "Ben-Ich" katuns. There the series of 13 katuns

are numbered 1, 2, 3, 4, 5, 1, 2, 3, 4, 5, 1, 2, 3, starting with Katun 11 Ahau as the first. The numbers are given in Spanish, *primero*, *segundo*, etc., but there is no reason for supposing that this grouping of the katuns by fives indicates Spanish influence.

The solution of the problem of the "Ben-Ich" katun must await correct placement of the associated dates at Yaxchilan. For the moment it is worth bearing in mind the suggested meaning of "countenance" proposed above for the "Ben-Ich" prefix.

THE GUEST KATUN

Bishop Landa, discussing the strange arrangement of the guest katun, writes:

They had in the temple two idols dedicated to two of these characters [days Ahau on which the katuns ended]. They worshipped and offered homage and sacrifices to the first according to the count from the cross on the circle shown above [the katun wheel with cross above 11 Ahau] as a remedy for the calamities of his twenty years. But for the 10 years lacking [to the completion] of the 20 of the first, they did no more for him than burn incense to him and reverence him. When the 20 years of the first had been completed, they began to be guided by the destinies of the second and to make sacrifices to him, and, that first idol having been removed, they set up another to venerate it another 10 years.

For example, the Indians say that the Spaniards had just arrived at the city of Merida in the year of our Lord 1541 which was precisely the first year of the era of Buluc Ahau [11 Ahau], which is that which is in the "house" where the cross is. . . . If there had been no Spaniards, they would have adored the idol of Buluc Ahau until the year of '51, that is to say 10 years. The tenth year they would have set up another idol, to Bolon Ahau [9 Ahau], guiding themselves by the prognostications of Buluc Ahau until the year '61. Then they would have removed it from the temple, and [in '71] they would have set up the idol of Uuc Ahau [7 Ahau], and they would have been guided by the prognostications of Bolon Ahau another 10 years. Thus they gave to each its turn, so that they worshipped these katuns 20 years, and [for] 10 [years] they were ruled by their superstitions and deceits, which were so numerous, and sufficed so well to trick the simple people that it astonishes one [Englished in part by me].

From the above account, it is reasonably clear that a katun became the guest of the ruling katun halfway through the latter's rule, it then held power alone for the first 10 years of its own reign, but during the last 10 years it received as its guest the incoming katun. I have followed Roys' suggestion, given in a footnote by Tozzer, that words such as "in 10 years" were omitted, perhaps by the copyist, from the sentence discussing Katun 7 Ahau. Landa tends to contradict himself as to whether the ruling katun or the guest katun influences life during

the last ten years of the former's reign, but he appears to favor the belief that the power of the katun coincides with its actual reign, and such a view is in agreement with data in the books of Chilam Balam.

In the tun prophecies which occupy pages 1-13 of Tizimin there may be allusions to the installation of the guest katun in the tenth tun, but somewhat similar statements occur with other tuns.

PATRONS OF KATUNS

Although the day of the katun was a god and the ruler of the katun, other deities were associated with the katuns. In the various katun prophecies each katun usually has assigned to it a deity who is called the countenance (*u uich*) of the katun. There are gaps in the sequence probably due to faulty copying. The three best lists are given in Table 14.

Concerning most of the deities listed as patrons of the katuns little or nothing is known. The two or three who are known do not fit any recognizable pattern of the katuns, based either on their sequence or on the coefficients of Ahau. Thus, one would expect Kinich Kakmo, as a manifestation of the sun god, to be associated either with the fourth katun in the sequence or with a katun ending on 4 Ahau. Such is not the case. Perhaps the deities are associated with the world directions to which the katuns are assigned, but not enough is known about the subject to make an examination profitable.

I would expect the personages depicted on stelae to conform to a pattern of katun rules, but if such a system does in fact exist, its elucidation still escapes me.

DETERMINANTS

A word should be said at this point about determinants because of their close connection with the ends of katuns; a fuller discussion of the subject will be found in Appendix V. The term "determinant" was coined by Teeple (1930) to designate those Maya dates which, as he first demonstrated, give the correction which should be applied to convert dates in the Maya year of 365 days to their positions in the solar year, the reckoning being made from 13.0.0.0.0 4 Ahau 8 Cumku. One of the most noteworthy of these corrections is the date 9.16.12.5.17 6 Caban 10 Mol. The current katun was 9.17.0.0.0 13 Ahau 18 Cumku. Since 4 Ahau 8 Cumku, 3876 years have passed. For that interval, according to the Gregorian system of intercalating 97 leap days every 400 years, there is required a correction of 940 days, that is to say, 210 days after removing the two complete years. The problem the Maya wished to solve was to find the solar position in the year of 4 Ahau 8 Cumku which corresponded to

18 Cumku, the day on which the current katun would end. Using the Gregorian system, we would note that the Maya calendar had gained 210 days in that interval of 3876 years, therefore by subtracting 210 days from 18 Cumku, we would get the day in the year of 4 Ahau 8 Cumku on which the sun rose or set at the same points on the horizon. Subtracting 210 days from 18 Cumku, we would reach 8 Mol as the answer. The Maya calculations tended to run a couple of days under the Gregorian; their equation was 208 days, which, subtracted from 18 Cumku, gives 10 Mol as its equivalent at 4 Ahau 8 Cumku.

It was mentioned on page 196 that 9.10.10.6.14 4 Ix 7 Zip was a preferable position for the earlier date on the Bishop jade because, by design or accident, it is an excellent determinant of 9.11.0.0.0 12 Ahau 8 Ceh, for 7 Zip at 13.0.0.0.0 4 Ahau 8 Cumku occupies the same position in that year as 8 Ceh in the year then current. The distance from 4 Ahau 8 Cumku is 3755 years, requiring a correction of 181 days by Gregorian. The Maya equation would have been 7 Zip + 181 days = 8 Ceh. Piedras Negras, on 36, 38, and L 2, made the same calculation in reverse order four years earlier, using the date 9.10.6.5.9 8 Muluc 2 Zip. Here 2 Zip is the present

TABLE 14—COUNTENANCES OF THE KATUNS

<i>Katun</i>	<i>Kaua</i>	<i>Tizimin</i>	<i>Chumayel</i>
11 Ahau	(pp. 167-71) Yaxhal Chac	(pp. 23-28) Yaxal Chac	(pp. 13, 72, 73, 87-100) {Yaxxaal Chac (p. 13) {Yaxhaal [Chac] (p. 73)
9 Ahau	Sac Uacnal	Sac Uacnal	Yaxal Chac {Puzkohom (p. 72) {Kauil (p. 91) {Ek Cocahmut (p. 92) {Yax Cocaymut (p. 72)
7 Ahau	Ek Chuuah	Ek Chuuah	
5 Ahau	P'es sahom Kauahom	Pus hom ¹	
3 Ahau	Yax Cocaymut	Yax Cocaimut ²	
1 Ahau	Amayte Ku	Amaite Kauil	{Yaxal Chuen (p. 96) {Yaxaal Chuen (p. 72)
12 Ahau	Yaxhol Chuen	Yaxal Chuen	
10 Ahau	Lahun Channal	{La]hun Chaan ³	Kinich Kakmo (p. 98)
8 Ahau	Amayte Kauil	{Amaite Kauil {Cit Bolon Ua	
6 Ahau	Kinich Kakmo	Kinich Kakmo	
4 Ahau	Ah Bacocob ⁴	Ah Bal Cab	Ah Bacocol (p. 73)
2 Ahau	Buluc Ch'abtan? ⁵	Buluc Ch'abtan?	Buluc Ch'aabtan? (p. 73)
13 Ahau	Ytzamna Ytzam Tzab ⁶	Itzamna Chac Sabin	Ytzamna Ytzam Tzab (p. 73)

¹Perez 160 has *piz kouhom uil*. Kaua also has *uil*, but in both cases there is little reason to doubt that *u uich* has been wrongly copied. Mani (Perez 77) has P'uzhan.

²Perez 161 has *yax cocat mut*, but on page 78 *ya cocah mut*.

³Perez 164 has *lahun ch'an*, which is certainly wrong, and, on page 81, *hun chaan* and *citbolon ua*.

⁴Kaua has *Ah-bacocob macan u uich, cimen*

uich. Gates translates this "Ah Bacocob. Covered its [his] face, dead its [its] face." Mani (p. 83) has *ahba cocol*. Ah Bac alone, would be "the bone one." Perez 154 has *Uac chu ahua*.

⁵Buluc Ch'abtan is not given as the countenance of the katun but as the bearer of the burden. Mani (Perez 84) has *buluc chaab tan*.

⁶Mani (Perez 85) has *ytzamna: zab*, and on Perez 156 *itzamna* followed by an illegible word, perhaps *cabib*.

Thus the numerous representations of the date 6 Caban 10 Mol indicate that the astronomers of Copan had decided that on 10 Mol at 13.0.8.10.7 10 Manik 10 Mol the sun rose and set at the same position as at 9.17.0.0.0 13 Ahau 18 Cumku. The equation might be reversed, and the present-day solar equivalent of 18 Cumku at 13.0.0.0.0 4 Ahau 8 Cumku might be sought. On Copan Z occurs the date 9.17.0.0.0 13 Ahau 18 Cumku, and a distance number leads to a suppressed 9.16.18.9.19 12 Cauac 2 Zac. The date is six years later than the 6 Caban 10 Mol, and the correction therefore is one or two days greater; 18 Cumku plus 209 days is 2 Zac. Then 13.0.0.0.10 1 Oc 18 Cumku occupied the same position in that year as did 9.16.18.9.19 12 Cauac 2 Zac at the time the monument was erected.

position of 8 Ceh at 13.0.0.0.0 4 Ahau 8 Cumku. The interval is 3751 years, calling for a correction of 180 days by Gregorian, but the Maya correction, as in the case of Copan, runs a day or so less than Gregorian, viz. 8 Ceh + 179 = 2 Zip. At 9.11.0.0.0 the LC dates were just half a year ahead of solar positions, hence the interest in solar corrections at that time.

The Maya also applied corrections to reach the solar positions in current time of 8 Cumku at 13.0.0.0.0 4 Ahau 8 Cumku, or the reverse (solar equivalent at 13.0.0.0.0 of 8 Cumku in current time). Copan I carries the date 9.10.19.15.0 4 Ahau 8 Ch'en which is a determinant of 8 Cumku. Gregorian calls for a correction of 183 days; the Maya calculation is 8 Ch'en + 180 = 8 Cumku.

At Palenque the date 9.12.18.5.16 2 Cib 14 Mol, to-

gether with its sequent day, 9.12.18.5.17 3 Caban 15 Mol, occurs several times, and on more than one occasion is linked to 13.0.0.0.0 4 Ahau 8 Cumku. The interval is 3802 years, calling for a correction of 191½ days. In Palenque calculations of that time 14 Mol at 13.0.0.0.0 occupied the same position as 8 Cumku in the year then current. The calculation is: 14 Mol + 194 = 8 Cumku, with 15 Mol + 193 = 8 Cumku given as an alternative. These last are not so close to the mark as the determinants already cited. The subject is discussed in greater detail and illustrated with a table of determinants in Appendix V. At one time I accepted Teeple's suggestion that 7.6.0.0.0 was used in addition to 13.0.0.0.0 as a base for calculating determinants (Thompson, 1932b). Subsequently, I expressed skepticism as to the Maya use of that second base (Thompson, 1936), a view I continue to hold. Of the correctness of the determinant theory, as first outlined by Teeple, I have no doubts, although I would hesitate long before accepting Teeple's views as to the corrections having been calculated with the aid of lunar-solar equations.

These calculations concerning positions in the solar year were of great value to the Maya in determining the auguries of each katun (p. 64). Another kind of count, the 819-day cycle (p. 212), relates positions, both solar and lunar, with the close of the current katun.

SUMMARY

The ends of periods, particularly the ends of katuns, were of great importance to the Maya, not only because each marked the completion of one more stage in the endless journey of time, but also because with the end of each period a new set of gods, wielding new powers, took command. The luck of the katun changed, thereby affecting the whole community.

In the books of Chilam Balam are found many terms and set phrases to describe the ends of periods; in the hieroglyphic texts there are arrangements of hieroglyphs to mark those endings. There is fairly strong evidence for the identification of some prefixes and prefatory glyphs used in these groupings with the terms *xoc*, "count," *tz'oc*, "completion," and *hitz'*, "expiration," which occur in chronological passages of the books of Chilam Balam. Special glyphs were employed to mark the end of the tun as well, and also to indicate completion of five tuns from the end of the preceding katun, and five tuns lacking to the end of the current katun. A special affix served to convert cardinal numbers to ordinals.

The glyph for completion of half a period, misnamed the lahuntun glyph, is used to mark the half-katuns and half-baktuns. It illustrates in an interesting manner the use of the shell symbol for completion, and, as well, the

Maya practice of fusing glyphs so that the main element of one becomes an infix of the other.

There are several other glyphs which appear to be associated with period endings.

The Maya frequently recorded in the inscriptions anniversaries of important dates which did not end a period. Most commonly the first katun anniversary was thus signalized, but 5-tun, 13-tun, 1¼-katun, 1½-katun and 2-katun anniversaries were also noted. All known cases of such anniversaries are listed. A special postfix, the bundle, was sometimes employed with the katun or tun signs to mark such anniversaries, and in such dates a variant of the haab glyph could be substituted for the usual tun sign or the winged cauc.

A method of recording dates, which was almost certainly used in parts of Yucatan, involves a record of the tun in which the given CR falls, together with the day Ahau on which the current katun ends, e.g. (10.2.12.1.8) 9 Lamat 11 Yax falling in Tun 13 of (Katun) 1 Ahau. The interpretation corresponds closely to the method of writing dates, even to the omission of the word katun, followed in the books of Chilam Balam. The various texts supply some interesting prefixes and prefatory signs, and hint that the so-called "Ben-Ich" prefix may mean "countenance."

The appearance of katun glyphs, often with this same "Ben-Ich" prefix, and with coefficients running from 2 to 6 but most generally 3, 4, and 5, presents a difficult problem. Solution is hindered by the fact that the best series of occurrences of this glyph is at Yaxchilan, where the correct positions of most of the CR dates are uncertain.

The strange custom of the "guest" katun is outlined, and the patron gods of the katuns, as given in various passages of the books of Chilam Balam, are listed. The chapter concludes with a brief outline of the determinant theory.

Most unfortunately, we who style ourselves Maya epigraphers tend to regard the ends of katuns primarily as units in a mathematical system, and transcribe them as a jumble of digits, periods, and strange-sounding words. We forget that ringing sentence of Elihu: "for the ear trieth words, as the mouth tasteth meat." Despite the danger of being repetitious I feel the need to emphasize once again the very different position the ends of katuns held in Maya eyes. They were the climaxes of the great mysteries, every whit as sacred as were those of Eleusis to the early Greeks. Each marked the end of a major stage in that great imaginative concept of the Maya, the majestic journey of time through eternity. Each was celebrated in the antiphonal chants of the Maya. Each was honored by the painstaking hewing and arduous trans-

portation and erection of great shafts of stone. Glyphs, laboriously carved, told in measured lines of the greatness of the event. The grand cadences of the Initial Series sang its glory and the concluding hieroglyphs echoed its praise; towering pyramids rose to exalt it and

stone lintels intoned its majesty. Captives lost their lives in sacrifice to it; priests shed their own blood in its honor. The whole pomp and wealth of each community was directed to its greater glory in a degree not seen by western eyes since the passing of mediaevalism.