

Aids to Decipherment

Helpe then O holy virgin chiefe of nine,
Thy weaker novice to perform thy will.
Lay forth out of thine everlasting scryne
The antique rolles, which there lye hidden still.

—EDMUND SPENSER, *Prologue to Faerie Queene*

PATHS TO THE SCRYNE

THERE ARE FOUR PATHS which may profitably be trodden in search of that scryne wherein Clio, granting her dominion in the New World, hides the decipherment of Maya writing. Three, which hold most prospect of leading to success, are: an intensive study of the glyphs in the divinatory almanacs of the Dresden and Madrid codices; a careful search for interchangeable elements in glyphs so as to expand the groups which are synonymous or nearly synonymous; a listing of glyphs which have the same main element, but the meanings of which appear to change radically through variation in positions of the main sign (such as being inverted or placed on its side) or by the addition of sundry affixes, always bearing in mind that sometimes a radical change in meaning may be due to secondary use as a homonym. Lastly, the mathematical approach, which involves computing the distances between dates, with which a given glyph is associated, and seeking a common factor to account for those distances, has not yet come to a dead end, as the recent discovery of the 819-day cycle and the differentiation in the last few years between the glyphs for the fifth and fifteenth tun of a katun attest.

In this chapter I purpose to note progress in these various methods of solving our problems, and to sketch the ways in which these studies may be expanded. These blasts will not fell the walls of our Jericho, but they will, I trust, make some sizable breaches in it.

GLYPHS WHICH ACCOMPANY DIVINATORY ALMANACS

TYPES OF GLYPHS

A fundamental misconception has, I think, handicapped nearly all those who have endeavored to decipher the glyphs which are above the pictures in the divinatory almanacs of the codices. That misconception, I believe, arises from regarding the glyphs above each picture as serving to explain the pictures. Thus, for example, Whorf (1933) assumed that the glyph of a hand referred to the

actions of the god depicted below it, and on that assumption based a large part of his argument; Gates (1931, pp. 136-39) similarly linked glyphs to pictures.

I myself prefer to suppose the opposite, namely, that the pictures are subordinate to the glyphs and supplement them. I believe that whereas one or more of the glyphs, particularly the name glyphs of gods, are illustrated in the pictures, the actions of the gods do not necessarily correspond to the texts. For example, a long divinatory almanac starts on Dresden 4a and continues to 10a. Although some of the glyphs are missing, there is no good reason to doubt that the same pair stands at the head of each of the 20 divisions into which the whole is partitioned. The first of these is an animal head with an Etz'nab infix, a lunar postfix, a peculiar curved line around the eye, and dots around the mouth (fig. 42,84). According to Tozzer and Allen (1910), pictures of various mammals, notably deer, dog, peccary, and jaguar, show this curved line through the eye. The Etz'nab infix suggests either a knife or sacrifice.

The second glyph of each pair consists of two hands, held in the positions used for the Manik sign in the codices, and placed one above the other. There is a prefix to the left (fig. 42,64). The third glyph in each group is that of a god, almost invariably the deity depicted in the picture below. It is very improbable that the double-hand glyph refers to anything which the god in the picture below is doing with his hands, for the deities in all the illustrations to this almanac are doing nothing in particular.

The sundry almanacs in the books of Chilam Balam (pp. 297-302) should be of some assistance in identifying the general characters of the messages, albeit the sorry versions that have reached us are of the eighteenth century, and have clearly lost much of their old paganism in two centuries of Christian dominance. As they now stand, they list the good and bad influences of the days, and contain entries against certain days regarding the prospects for hunting, sowing, rain, and drought. There are also a few notes, no longer fully understandable, on old pagan rites. We should therefore expect the glyphs in

the divinatory almanacs to contain information of the same general nature, together with such items as the name of the god who is the author of the luck of the day and perhaps the appropriate ceremonies.

The glyphs of the gods have already been identified in most of these texts, and we can therefore be reasonably sure that their actions are under discussion. We can also be reasonably sure that one or more of the signs refers to the luck of the day. As we shall shortly note (p. 268), a glyph to which in all likelihood the general meaning of misery can be applied usually occurs in texts which also carry the glyph of the death god or stands above pictures of malevolent action; other glyphs appear to indicate favorable aspects. Such symbols usually conclude each text, and it is a fair assumption that they give the luck of the day.

The first two glyphs in each text are quite often repeated in all the compartments of the almanac in question. They may therefore indicate the general subject under discussion, or perhaps be of a still more general nature. I assume one is a verb or verbal noun; the other the object.

As an illustration, let us take the very simple almanac that runs across Dresden 13b-14b (fig. 61,5,6). In all six sections the first two glyphs are the same so far as their main elements are concerned, although there are changes in the affixes in the last three pairs of glyphs which may correspond to slight variations in the spoken word. The first glyph is a hand with the "comb" infix and the "down-balls" prefix; the second is the Kan with affixes (maize sign). The hand presumably represents the action and is perhaps verbal; the Kan (maize) glyph I take to be the object. The third glyph in each compartment is that of the god in question; the fourth is what I assume to be the resulting luck of the day. A tentative translation of the glyphs would be:

- 6 Ben. His influencing the maize, the death god. Heaped-up death (*multun tzeč*).
 2 Ik. His influencing the maize, the maize god. Change of aspect (?).
 9 Muluc. His influencing the maize, God C. Very good tidings.
 3 Cib. The black god influences his maize. Good crop (??).
 10 Akbal. The god of number 10 influences his maize. Evil.
 6 Eb. The rulership of God D influences his maize.

Here the construing of the hand glyph as "influence" is offered as a general term. The subject is discussed in greater detail on page 266. The translation for the glyphs denoting the luck of the day is no better than a guess in two of the texts; of the general correctness of the other three I am reasonably confident. Variation in the subject of the verb is to suggest the transposition of affixes (p. 39).

In the short almanac on Dresden 12b, there appear to

be no verbal nouns but, instead, two glyphs denoting influences (fig. 62,6). The opening glyph is a Muluc sign with two postfixes, one of which is the moon sign, probably here used as the possessive. The second glyph is the name of the god; the third and fourth appear to record the resultant luck of the day:

- 1 Manik. The water of the death god. Death. Evil.
 1 Ben. The water of the Chicchan god. Abundance of maize is his rule.
 1 Cimi. The water of the death god. Death. Evil.

GLYPHS OF ACTION

A number of these glyphs which usually stand at the head of the text in each compartment of divinatory almanacs are shown in figure 42,58-87. Many of them possibly correspond to verbal nouns or verbs. They are for the most highly conventionalized signs which for that reason are hard to translate.

Flare-uinal-moon Glyph (fig. 61,3, Col. 1, Gl 2). The conventionalized head with the Chuen-uinal infix, flame at the top, and lunar postfix, usually occurs immediately after month signs or adjacent to world-direction glyphs. It is often followed by the head of a dog. Coming after the month sign, it might correspond to the use of the kin glyph after day signs in the inscriptions of Yucatan, and merely indicate that the preceding glyph records the month sign. The explanation, however, is probably not so simple, because in all such cases the associated dates are far in the past and represent points of departure for the count. There are also a few instances where this sign precedes glyphs that are symbols neither of the months nor of world direction. For example, it precedes the burden glyph with "thatch" prefix on Dresden 34a-35a, and occurs before an earth-seed symbol (*milpa?*) on 38b.

What is clearly the same sign occurs as the opening glyph in all known recordings of the 819-day cycle, although the second postfix is different (the lunar postfix becomes an infix in one example: fig. 35,1-5). In one text the glyph is followed by the symbol for east; in other texts the sequent glyph is a head or a cauc with a count prefix. The closing glyph of the clause is that of an animal, with coefficient of 1, reminding one of the dog glyph of the codices.

On pages 48c-50c of the Venus table in Dresden there is what is probably a variant form (fig. 42,71). This stands between the month sign and the name glyph of the god in each of the 12 divisions. It is omitted from page 47, and is shifted to below the gods on page 46, probably through carelessness. Is the absence of this glyph from section *b* of the table fortuitous, or is it due to the fact that the numbers in that section are cumulative, or

that the month positions are not the earliest? The fact that the variant glyph in question is closest to the earliest set of month positions, that is to say the 1 Ahau 18 Kayab table, may be significant in view of the association of the regular form with the points of departure of a number of the IS on Dresden 61, 62, 63, and 70, probably on 45, and 58, and possibly on 51, and its appearance with records of the 819-day cycle, all of which involve a backward count in time. It would appear, therefore, that a translation must be sought which is applicable both to a point of departure in the past and to world direction. Such a word should also be related to the name Chuen, Zec, or uinal, or their equivalents in some other Maya language or dialect. With much hesitation I would suggest that the root *uin* may be involved. The Motul dictionary gives *uinan* as order or manner, *manaan u uinan u than . . . u beel*, "he has no order in his words nor in his works." The word *uinba*, "image, figure or portrait," and perhaps *uinal*, too, may derive from the same root. This root may have served to indicate both the setting in order or sequence of the world directions and the priority of one date or series of dates over another. This interpretation, however, must be regarded as no more than a hazard, for the possibilities are numerous, because three unrelated glyphic forms, each with variant names in different languages and dialects, are involved. However, we probably shall not err greatly in translating this glyph and the direction symbols as indicating together "it is set in the east" etc., or "it moves in order to the east" etc., or the subject may be the glyph of the god, "god *n* is set in the east" etc. That the meaning of the glyph is not fundamental is, I would suppose, indicated by its presence before the world directional sign in only one of the four divisions of the almanac which occupies Dresden 42c-45c (fig. 61,3). On the other hand, the dog glyph, which so frequently follows the glyph under discussion, is present in all four sections. The head with a uinal glyph infixed in the eye (Gates' Glyph 91) does not appear to be the head form corresponding to this glyph, for its associations in Dresden are entirely different.

Drilling Glyph (figs. 42,76; 43,53-55). The difficulties of interpreting glyphs with the aid of pictures is well illustrated by the so-called glyph of the fire drill. In two almanacs of Madrid 38, the fire drill glyph accompanies scenes of making fire with a drill. The main element prefixed to a dog head accompanies pictures showing the use of the fire drill on Dresden 5b-6b. On the other hand, the glyph, following the so-called burden glyph, occurs above pictures on Dresden 8b and 9b (figs. 42,77; 43,54), which show no evidence of fire-making. Twice the glyph accompanies pictures which illustrate spikelike implements being driven into heads of human forms.

These scenes have been identified as depicting the manufacture of idols.

However, if the postfixes are not neglected, a more logical classification can be made. The horseshoelike glyph is associated only with the dog head or the curving postfix with crosshatching when it occurs above pictures, showing the use of the fire drill. The dog is closely associated with fire, and, in view of the scenes depicted, we are probably not over-imaginative in seeing in the crosshatched extension, which emerges from the base of the main element, a pictorial representation of smoke. The main element, with a different postfix and with the three dots of its infix differently arranged, is above two figures showing the eye of a head being pierced. It is, again, perhaps not over-imaginative to suppose that the maker of idols is engaged in drilling the eyes. In Yucatec the word *hax* means to drill a hole, and to twist cord by rubbing between the palms of the hands; as a noun it signifies hole in general and holes made by wood lice and other insects, and twisted cord. *Hax kax* is to drill fire, and *haxab*, with the instrumental *ab*, is the drill. The same word occurs in Manche Chol, but only the meaning "to twist cord" is given in the Moran dictionary. Pio Perez lists also the verb *haxah* with the meaning "to twirl a drill between the palms of the hand, to twist cord in the same way, and to stir chocolate by twirling a swizzle stick between the palms of the hands." It is, then, highly probable that the main element of the glyph refers to the action of twirling with the hands, whereas the affixes indicate the particular use.

In the case of the fire drill, the infix of three dots arranged as a triangle may be significant, as this may represent the three stones of the hearth. The postfix, as noted, may be a stylized picture of smoke or, perhaps, fire. The replacement of this postfix by the head of a dog in Dresden is consonant with this interpretation, as the dog symbolizes fire. In the pictures which show the piercing or boring of the eye of the statue, the gods' hands are not indicated in the act of twirling, but neither, for that matter, are they correctly held for drilling fire. The postfix of the drill symbols on Dresden 8b and 9b is hard to explain. It resembles the symbol for jade. Could the whole glyph represent jade beads which have been drilled?

Clenched-hand Glyphs (fig. 42,58-61,65-68). The hand appears to serve in many instances as a glyph of action. Usually, unlike the outstretched positions indicative of completion (p. 184), the hand is clenched, and may be upright or upside down. There is also a group of glyphs in which the main element is a hand or two hands, one above the other, held in the position of Manik (fig. 42,62-64).

The clenched hand with Ik infix and vestigial mouth

and nose is the very common glyph for God B (fig. 42,57). In that case we are reminded that a hand was the symbol of Itzamna, and corresponded to his name *Kabul*, "the hand that works," according to Lizana, but Ah Kabul would be "he who works with his hands." The hand not infrequently appears in the headdress of figures on stelae, but in such cases it is usually outstretched in a vertical position.

The closed fist similar to that of the glyph of God B might therefore represent the act of doing something. In most lowland languages and dialects the word for hand is *kab*, but in Yucatec there is also a verb *kab*, "to do something with one's hands." To judge by the example in the Motul dictionary, which employs *kab* to indicate working in one's milpa, the word could be employed for any action which involved the hands, although their use was not necessarily stressed. The hand often appears above pictures which show a deity holding something. For example, in the almanac which runs across Dresden 15c each god holds the sign for the sun in his hand, and the texts for both divisions open with the same pair of glyphs (fig. 62,5). The first is a hand with a comb infix and Landa's *ma* symbol as an affix; the second is the sun glyph. In passing it is interesting to note that the *ma* sign is a postfix in the first compartment, a prefix in the second compartment. The same hand glyph, but followed by the Kan (ripe maize) sign, is at the head of the six compartments of the almanac on Dresden 13b-14b, already discussed (fig. 61,5,6), and in the pictures below gods hold the Kan sign in their hands. The act of holding ripe maize is understandable, but it is less likely that the glyphs tell us that the death god and God D hold the sun or day in their hands, unless we are to take the glyph as having a figurative meaning.

It is tempting to translate the glyph as *etma*, "to hold in one's hand," or as *machma*, which has the same meaning, thereby resting in part on Landa's translation of the affix as *ma*. The clause would then read: the action (the hand glyph) of the death god (Glyph 3) on the sun (Glyph 2). Evil (Glyph 4). A freer rendering of that would be: the death god is in power, and affects the sun, causing evil. Similarly, the other gods affect the ripe maize in the almanac previously discussed. Both *etma* and *machma* appear in ritualistic passages in Chumayel. Thus we find that Yaxal Chac, the patron of the katun, grasps the heavenly fan, the heavenly bouquet (*u machma canal ual canal utz'ub*; Perez, p. 75). There is a passage which Roys translates, "He set up the planets, Saturn, Jupiter, Mars, Venus, which he said were held in the grasp of the god (*u machma kui*) in heaven where he created them." Here, then, is a passage in which the god holds the planets in his hand, just as the picture depicts

the gods holding the sun in their hands. The employment of this term permits us to give greater consideration to the possibility that this expression is a figurative one to denote that the god in control wields power over activities in heaven and on earth, be they planets or crops or rains.

The various books of Chilam Balam employ several forms derived from *et*, "to hold," in ritualistic passages where the influences of the gods are under discussion. Roys notes that the term is used in connection with the heavenly fan and bouquet to which reference has already been made: *Etbom ual, etbom, utz'ub*, "The fan shall be displayed, the bouquet shall be displayed" (Chumayel, p. 73), *yetbal canal ual* (Tizimin, p. 23), *Etlahom utz'ub* (Chumayel, p. 100), *minan yutz kinnob yetzahob toon*, "no lucky days were displayed to us" (Chumayel, p. 20).

Other possibilities are *men*, "to do something, preferably with one's hands," *ch'a*, "to take," *tz'a*, "to give," and *kamac*, "to receive," all of which involve the use of the hand. Perhaps the expression *minan yutz kinnob yetzahob toon*, "there were no lucky days displayed to us," is the key to this passage. The *z* added to the root *et* is causal. "The god holds out in display to mankind the day," may be a ritualistic phrase indicating that the god controls the luck of the day.

Unfortunately, there appear to be no texts in European writing which explicitly refer to the influences of the gods over the days, although there are a few terms which appear to designate the influence of a god over his katun. The word *ich*, "face" or "eye," is frequently used in connection with the name of a god associated with a katun, presumably to indicate that he is the regent (p. 204); *tepal*, a word of Nahua origin meaning rule, and *t'an*, "command," appear often in contexts which imply a similar concept. Among the Lacandon the word *can* occurs in chants in the sense of protection by the god of the individual (Tozzer, 1907, chants 14, 21). The form *canan* is used in a similar way in Yucatec (Brinton, 1882, p. 241). None of these, or, for that matter, words of less currency, convey the idea of the hand. The only expressions of that nature in the various books of Chilam Balam which conceivably refer to the influences of the gods are *machma* and *et*. I am far from certain that either corresponds to the glyph in question. However, my intent at present is to discuss the general meaning of the glyph rather than to pair it with any definite word. That general meaning is, I think, influence, sway, or control.

There are several other hand symbols which are probably glyphs of action. One common sign is an inverted hand which in Dresden with three exceptions is the first glyph of its compartment. This has a peculiar infix regarded by Beyer as a death eye, an identification which

appears very dubious (fig. 42,65-68). In Dresden, with the exception of one example with entirely different affixes on page 46, this glyph appears only in almanacs which have to do with rain. Its distribution is:

29c-30c. First glyph in all four sections. All pictures are of God B. His glyph is the fourth. Second and third glyphs represent world direction and colors.

30c-33c. First glyph in all nine sections. All pictures are of God B. His glyph is the second in all sections. World-direction trees and colors are represented (fig. 62,1-4).

33c-39c. First glyph in all 20 sections. All pictures are of God B. His glyph is the second in 16 sections and third in two sections. Twice it is replaced by the head of a long-beaked bird with black markings, probably a king vulture, which is frequently shown in rainy settings (e.g. Dresden 38b), and appears to symbolize rain.

40c-41c. First glyph in all six sections. All pictures are of God B. His glyph is the third in all sections.

41b-43b. Probably first glyph Sections 2, 3, fourth glyph Section 1. Replaced by Cumku sign with lunar affixes Sections 4 and 5. Sections 1-4 show God B; Section 5 carries a portrait of the old red goddess pouring water from a jar. The glyph of God B is the second sign in all sections, including that in which the old goddess appears, but her glyph also is present there.

65b-69b. First glyph in all 13 sections. All pictures are of God B. His glyph is the third in all sections.

42a-44a. First glyph in four sections; opening glyph of other four sections obliterated; but presumably was this hand sign. God B is pictured in six sections; the old goddess and an unidentified deity occupy Sections 2 and 6, respectively. The glyph of God B appears in five sections. The glyphs in two sections are obliterated. In the section with the picture of the old goddess, Glyph B is omitted or obliterated, but the base of her glyph is recognizable.

Although this glyph does not appear in every almanac pertaining to rain, its close association with God B and his colleagues in divination for rain, and its absence from almanacs which deal with both rain and lightning storms suggest that when used with the given affixes, it conveys the idea of giving rain to mankind. The reversed position of the hand suggests the act of donation.

In Paris and Madrid the glyph occurs with different affixes; in the latter the main element is often doubled. It appears in almanacs of Madrid which closely parallel those cited in Dresden save that God C replaces God B. Compare, for instance, the almanacs on Madrid 10c-11c, and Dresden 33c-39c. Both have 13 Ahau as the point of departure, and several of the pictures in one almanac are repeated or closely paralleled in the other. However, in several places this glyph, but with other affixes, has no apparent connections with rain (e.g. Madrid 38a-39a).

Again, it would be premature to suggest a Maya equivalent for the glyph at this time, although the possibilities

of *tz'a*, "to give," and *matan*, "a gift" or "grace or mercy received" are worth bearing in mind.

Partly Open Hand (fig. 42,62-64). In a third use of the hand symbol apparently as a glyph of action, the position is that common to the day sign Manik. The main element is frequently duplicated. Where this sign is repeated through all sections of an almanac, it generally occupies the second place. Thus, it probably occupied the second position in all 20 sections of the almanac on Dresden 4a-10a, following the animal head with Etz'nab infix and lunar postfix (fig. 42,84). It follows a spiral glyph (water or fire?) on Dresden 4c-5c, or a queer element, conceivably a shellfish emerging from a bivalve, on Dresden 6b-7b.

Burden Glyph (fig. 43,37,61). This almost certainly corresponds to the word *cuch*, which is ritualistically applied to the luck of a period which shows deities carrying burdens. In such cases, I believe, the burdens symbolize the burden of good or bad luck of the period. The common form of affix with this glyph is the cauc element. It is tempting to read the whole as *cuch haab*, "the burden of the year." This would fit very well the appearance of the glyph on all four of the pages of Dresden (but not the equivalent pages of Madrid) devoted to the incoming year, where in three cases glyphs of good or bad augury (abundance of maize, evil, and drought) are juxtaposed (figs. 43,60,61; 64,1). In the fourth case the adjacent glyph is obliterated. The combinations would read:

p. 25. (Obliterated) the burden of the year.

p. 26. Drought the burden of the year. *Kintunyaabil u cuch haab*.

p. 27. Abundance the burden of the year. Kan-Imix (?), *u cuch haab*.

p. 28. Death the burden of the year, a year of evil. *Cimil u cuch haab, kaz tunil* (?)

Note the *u* prefix of the burden glyph, corresponding to the spoken word.

In the divinatory almanacs the burden cannot have been carried for a year, since the compartments refer to divisions of the 260-day cycle. Conceivably, the cauc element could refer to the year of 360 days in particular, but also time is general. Another possibility is that the burden glyph with cauc superfix represents the stem *cucuch*. The Motul dictionary lists *cucuchuc*, "things which go one above the other, like carrying them in a load one above the other." Landa, in his alphabet, gives to the cauc glyph the sound *cu*. This is not the primary sound corresponding to that sign, but it may be a secondary one. In that case it would agree well with this interpretation. A point which may be significant is that the "grape" element is always omitted from the cauc part of the *cuch* glyph, whereas it is seldom lacking from the day Cauac or from the cauc months in Dresden. However, the same occurs

when the cauc element is an infix of the katun sign in the inscriptions, so perhaps the grapes may be omitted when there is little space. Despite these misgivings, I am strongly inclined to read the combination as *u cuch haab*, "the burden of the year."

Little success can be reported in positively identifying these and other glyphs of action, but the suggestion made here, I believe, for the first time that these glyphs describe the influences of the various gods on the affairs of earth and heaven provides a new approach to the solution of this oburate problem.

AUGURAL GLYPHS

The final glyphs in compartments of almanacs in the codices are, I feel reasonably sure, records of the luck of the day in question or the object which will benefit or suffer on the assigned day. A number of the glyphs, which I call augural, are illustrated (fig. 43,33-36,38-48,50-52, 56-70); below are brief discussions of some of them.

Evil Glyph (fig. 20,37). This glyph almost invariably occurs in sections in which God A (the death god) or his comrade in malignity, the God of number 10 (God Q) are represented either pictorially or glyphically, usually in both media. This association is so close that the sign has at times been confused with that of God A, but they are distinct. Gates (1931, p. 127) first identified it as "a determinative of the 'evil' force active," although he did not carry this identification a step forward, and recognize the evil force as the luck of the day. Beyer (1929) saw in the glyph the head of a dog; I (Thompson, 1939, p. 175) believed its prototype to be a monkey with death symbols. Whatever may be the position in the animal kingdom of this impish creature, there is no doubt concerning its connection with death, for it wears the collar with death eyes which is one of the most prominent and constant attributes of God A. In the glyph the black infix is prominent. Although this infix might refer to the color of the creature, as Beyer supposed, it can just as well symbolize the underworld, the land of death.

The monkey, for I think the simian features of this figure with its crest and 3-shaped design on the temple (Thompson, 1939, p. 145) are undeniable, symbolizes one aspect of evil, that of licentiousness. Furthermore, there are several words in Yucatec signifying rogue or ruffian into which the word *maax*, "spider monkey," enters. Whether the monkey could symbolize all forms of evil and misfortune is another matter.

The two Yucatec words which appear most likely to translate this glyph are *kaz* or *kazal* and *lob*. *Kaz* as an adjective means "bad," "perverse," "stupid," "useless," "roguish," and "mean, vile, or despicable." For *kazal*, the

noun derived therefrom, the same meanings apply. *Lob*, the adjective, and *lobil*, the substantive formed from it, have the same general range of meaning. *Lob* is used very extensively in the divinatory almanacs of the books of Chilam Balam to denote that a day was evil, in contrast to *utz*, "good." However, in Perez I, which is the least European of these almanacs (p. 297), the word *kaz* appears several times, usually in combination with *lob*, or as a negative: *utz, ma kazi*, "good, not evil." I rather favor *kaz* as the equivalent of this glyph, because it has a homonym which modifies the following term, and has a meaning equivalent to our "somewhat." This secondary usage is discussed below. The glyph can be rendered "misery."

Death Glyph (fig. 20,4-6). This glyph is easily recognizable as a symbol of death because of the closed eye, and the death-eye prefix (p. 189). Moreover, there is a symbolic form in which the percentage sign, a common attribute of the death god, replaces the skull. This has generally been regarded as a name glyph of the god of death, which in a sense it is, but the death god has his regular name glyph (figs. 13,14; 42,9,16), whereas the element under discussion frequently appears in augural passages from which the death god is absent, or it follows the glyph of the god of death. This would indicate that the sign must be a general sign for death rather than a specific designation of "hell's grim tyrant." A ritualistic expression for death in Yucatan is *multun tzeĸ*, "heap of skulls," which is used to designate mass death as a result of plague or war or drought. One wonders whether this glyph could represent that term, for it is certainly used in passages where the glyph for drought also occurs (figs. 61,4), for the skull (*tzeĸ*) is certainly present. Could the little pyramid of three dots in the postfix represent the heap, *multun*? Whether or not we are justified in accepting the definite tag *multun tzeĸ* for this glyph, there can be no doubt that it represents widespread mortality.

The three dots in a triangle also occur as a postfix with the Imix, "abundance," glyph (fig. 46,2) for which a translation such as "heaped-up abundance" would not come amiss.

Good Glyph (figs. 43,33,34; 61,2,5). It is obvious that if we have correctly identified one glyph as a sign for evil, *kaz*, there should be a glyph denoting its opposite, good tidings. I think this is the dog-ear glyph, almost always with a coefficient of 3. The main element is the form for Oc used in the codices; the postfix is a sign which just possibly has the value *ak* (p. 282). The coefficient is probably not to be read as numerical, for *ox*, "three," has a secondary use, that of emphasizing or intensifying something, and is roughly equivalent to our use of "very." Thus *ox kanaan* is something very necessary; *ox kaz ol* is

a person who is vehemently lascivious; *ox numya* is miserable, presumably a more acute form of misery than is covered by *numya*; *ox tezcuntah*, "thrice hail," is a form of salutation. Other examples appear in the books of Chilam Balam. In English we have a similar use of thrice: "Happy, thrice happy are they, whom God hath doubled his spirit upon, and given a double soul unto to be poets" (Thomas Nashe, *The Unfortunate Traveller*). A monument in Salisbury Cathedral speaks of "that thrice worthy Lady Walsingham."

The dog-ear glyph occurs nearly a hundred times in the codices, almost invariably in favorable contexts, either with the glyph of gods who are generally well disposed toward man, such as Gods B, E, and K, or above their pictures. It is never found in association with a glyph or picture of the death god. Once, however, on Madrid 89d, it is juxtaposed to the glyph of God Q, but that sign occurs in this same position in six of the seven compartments of this almanac, and clearly has to do with the subject of the divination. The deity depicted in this compartment is the black god, God M, who is on the whole beneficent. In 19 texts the 3 Oc glyph is associated with the Kan-Imix compound (p. 271), and in a dozen others there are other associations with maize. The Ahaulil glyph (fig. 43,36; this page) is found with the 3 Oc glyph in 15 compartments, and if the identification I propose for the Ahaulil glyph, namely "rule," is correct, the combination of this glyph and the 3 Oc symbol probably signifies "His rule is very good, very favorable." Generally, the 3 Oc glyph appears in contexts which concern rain, crops, or agriculture, where *och*, "sustenance," would fit.

A few occurrences in texts apparently unconnected with food make an identification of the glyph as a sign of abundance less probable. It would appear, therefore, that we are dealing with a symbol of general good cheer. The corresponding word that first comes to mind is *utz*, "good," which is used throughout the divinatory almanacs of the books of Chilam Balam to designate lucky days. However, I must confess that I have not been able to recover any link connecting *utz* or any of its synonyms with dog. Furthermore, the expression *ox utz* is not apparently used.

There is one case where this glyph is combined with the sign for evil (fig. 43,35), and another in which the same combination occurs but with the *ox* element omitted. Both of these are in the almanac which stretches from Dresden 65a to 69a. The identification of the evil glyph as *kaz* has been suggested above, but in addition to its general meaning of evil, *kaz* can be used also as a modifier, corresponding roughly to our "rather" or "some-what." The Motul dictionary cites as examples *kaz calan*,

"a little drunk," and *kaz takan*, "half roasted." Such a meaning would fit this use, indicating that the luck of the day was half-way good.

Ahaulil Glyph (fig. 43,36). This, perhaps, is not truly an augural glyph, but it occurs very frequently in connection with what I take to be auguries. It is discussed at this point because of the reference to it in a preceding paragraph. The glyph consists of the day sign Ahau with the so-called knife element as a prefix and suffix. It is a very common symbol, occurring over 100 times in the codices. It has been generally accepted as a second name glyph of God D (Schellhas, 1904, p. 22), but it appears in many contexts which have nothing to do with that god, and not infrequently it is the last glyph of a text, following those which I assume to be augural.

There is a term in Yucatec, *ahaulil*, which signifies "rule, reign," and is both a noun and a verb. This is clearly the word Ahau, "ruler," with the addition of *lil*; *il* is the termination often added to form abstract nouns. It is, of course, possible that the inventors of the glyph used a slightly different word (Manche Chol has *ahaouilia*, "pity," which is probably the same root), and on the strength of this one glyph we should not be fully justified in translating the affixes as *il*. There are, however, a number of cases where such an identification works well. For example, the glyph of the death god has this affix (fig. 42,9,16); *cimil* is "death" and Yum Cimil, "Lord of death," is a name of that god. The element also occurs in the glyph of the maize god, whose Yucatec name is not surely known, but may be Ah Uaxac-Yol-Kauil, "He-eight-heart-of-food" (Roys, 1949), perhaps named also Kauil. The identification of the affix as the sign for *il* is demonstrated by its use with the drought glyph (see below).

Naturally, the *ahaulil* glyph could be construed with the glyph of the supreme God D, or could be read with augural glyphs, as suggested above, "his rule is good."

Drought Glyphs (figs. 43,57-60,63; 64,1). The usual term in Yucatec for a year of drought is *kintunyaabil*. Glyphs for each of the first three syllables, *kin*, *tun*, *haab* (the *y* is a change to denote relationship) are known, and the affix for *il* has been tentatively identified. Since a combination of these four elements occurs in contexts where a reference to drought would not be out of place, we can be reasonably sure of the correctness of the identification.

There runs across Dresden 42c-45c (fig. 61,1-4) an almanac divided into four sections of 65 days apiece. Each section is referred to a world direction; God B is depicted in all four. There is a column of six explanatory glyphs with each section. The directional glyph and that of God

B appear near the head of each column; augural glyphs at the bottom. The arrangement is as follows:

Page	Picture	Direction	Augural Glyphs
42	God B attacks maize (hail?)	South	Maize god; drought glyph
43	God B in canoe	East	3 Oc; maize seed; Kan-Imix
44	God B and unidentified god	North	Maize god; partly obliterated, but surely Kan-Imix
45	God B above fallen deer	West	Maize god; drought glyph; death sign

It will be noted that the glyph for year of drought appears with the sections assigned to south and west, but these are precisely the directions connected with droughts, for Landa tells us that in Cauac and Ix years, which were associated with south and west respectively, droughts were expected. On the other hand, the glyphs associated with the east, a direction connected with favorable harvests, are favorable. The first is the 3 dog-ear symbol, identified above as the sign of good tidings; the next glyph is that of maize seed; and the last is apparently the Kan-Imix sign, a symbol of abundance. Unfortunately the augural glyph for the north (p. 44) is obliterated, but enough of the prefix remains to make it virtually certain that it is the Kan-Imix sign (cf. fig. 43,48). Abundance is to be expected from the north. The *kintunyaabil* glyph in both cases consists of a small kin over a small cauc sign, with a larger tun sign over the postfix tentatively identified as the sign for *il*.

One of the two pictures illustrating the times of drought shows God B, axe in hand, attacking the cowed maize god; the other shows the same god above a prostrate deer. The Yucatec word *baat* signifies both axe and hail, and stone axes of the old times are called by their finders, the present-day Maya, *baat chac*, "axes of Chac," and are believed to be thunderbolts which the Chacs hurl to earth during storms. The first picture can, accordingly, be read with some confidence as giving the cause of the drought, namely destruction of the maize crop by hail and storms.

The second illustration accompanying the time of drought depicts God B above a prostrate deer. One is instantly reminded of the Maya expression *cim-cehil*, "when the deer die," a set phrase to indicate drought (Roys, 1933, p. 122). I think it is reasonable to see in this illustration a portrayal of that term for drought. This, then, supplies a good instance of the illustration supplementing or paralleling the glyphs, not the glyphs explaining the picture. The glyphs inform us straightforwardly that there will be drought (*kintunyaabil*); the picture depicts *cim-cehil*, "death of deer," a metaphor for drought. Similarly, in the other section, the glyph announces drought; the picture tells us that it will be caused by hail and storm damage to the crops.

The same drought glyph, but without postfix, appears on Dresden 40b, above a picture of a macaw holding a flaming torch in each hand. According to Lizana, a

macaw personified the sun at midday; a macaw with torches in both hands might, therefore, well symbolize

burning drought. The same compound appears again on Dresden 72c, where it is the first of three glyphs. The second is the maize sign but without the usual affix, the third is the glyph for evil (fig. 46,5). Surely these three together read, "Lengthy drought. Evil for the maize, or the maize crop is bad." Another appearance is on Dresden 71b, where it is followed by the Kin-Akbal glyph and that of maize seed. The whole perhaps reads: "Lengthy drought. Time of darkness. Maize seed."

The glyph is present on three of the pages in Dresden dealing with the ceremonies at the change of years. On page 27c (Akbal years) it again appears with the affix in a text which includes the glyph for west and the death god, whose picture appears below (fig. 64,1). On page 26a (Etz'nab years) the postfix is lacking. The glyph is followed by the sign *cuch haab*, the whole reading "Lengthy drought is the burden of the year." On page 25c the glyph has a slightly different arrangement: the kin and cauc signs are above the tun sign, and the postfix is absent. The glyph is in the same line as the sign for east. The ceremonies are connected with the entry of Ben years.

There are certain difficulties in the assignment of these pages and directions. Seler and I have both suggested that certain glyphs have been transposed. I have previously (Thompson, 1937, pp. 213-26) assigned the Etz'nab years to the west, the Ben years to the north, and the Akbal years to the south, but no longer feel so certain that the years are correctly allotted. On the assumption that these identifications are justified, the drought years are correctly assigned to west and south. This leaves unexplained the glyph of the year of drought assigned to the Ben years or, more probably, the Uayeb ceremonies of the preceding years. Is it possible that the glyphs state that unless such and such a ritual is carried out there will be drought?

The glyph also appears on Dresden 37a, above a picture of God B, who is merely striding along. As this almanac deals with thunder and lightning, a prophecy of drought is not out of place. On Paris 11, middle right, there is a partly obliterated glyph consisting of a kin and obliterated element above a cauc sign with *il* postfix. Perhaps we are justified in restoring the missing element as the tun sign. This page corresponds to a Katun 10 Ahau of which Chumayel says, "Lengthy drought is the burden of the

katun." The accompanying glyphs on this page of Paris are largely evil.

Dresden 72c, fourth column, comprises three glyphs (fig. 46,6). This is a part of an almanac which appears to deal with rain and drought. This compartment, corresponding to 4 Manik, clearly holds ominous portents. The first glyph is a kin sign with brilliance prefix (p. 147) and with the number 3 attached. Here again, 3 must be read not numerically but as a superlative, giving to the whole glyph the meaning "intensely brilliant sun." There follow the tun sign with *il* postfix and, below, the kin and winged cauc. I think that it is not overly rash to assume that the four elements must be read together as *kintunyaabil*, despite the inverted sequence. The whole text would then be translatable as "intensely brilliant sun; severe drought." There are also occurrences of the kin and winged cauc combination on Madrid 21d-22d, but without the tun sign. Perhaps in those cases the winged cauc is to be read as *tun: kintun*, "drought," but not necessarily so severe or of such duration. There may be an example of the *kintunyaabil* glyph in Madrid 37, column C17. The *tun* and *il* postfix are clear; the details of the elements which should correspond to *kin* and *haab* (above) are rubbed, but what remains does not contradict this identification. The page deals with 1x years, when drought was expected, and the signs for evil and sun immediately precede the glyph in question.

So far as I know, there are no other examples of this *kintunyaabil* glyph. However, there is an example of a combination of kin and tun which should likewise represent *kintun*. *Kintunyaabil* is a drought affecting the whole year; *kintun* should, therefore, denote drought in general, without specifying the duration of its effect. A tun sign above a kin composes one of the glyphs on Madrid 34, which deals with Cauac years (fig. 43,64). These were assigned to the south and were expected to bring drought.

Glyphs for Seed and Seed Plot and Maize Seed (fig. 43,40-43). The main element has in the middle of the cartouche a small circle or oval, from which one line rises vertically to the top of the cartouche, while a second joins the circle to the base. Occasionally these lines are somewhat wavy, suggesting that the straight stroke developed to save time in writing. Prefixed to this there is an element which is the distinguishing feature of the maize god, and which I designate *te* (3), for there is good evidence that this affix has the phonic value *te* (p. 285). If this prefix is absent, the *te* (2) element is generally postfix, but sometimes both affixes are missing.

There are four reasons for believing that this glyph has the general meaning of seed: (1) It is very frequently attached to the caban glyph, the sign for earth (fig. 43, 38,39). (2) In one example what is almost certainly a

young maize plant, but in any case a plant of some kind, is sprouting from its top (fig. 43,43). (3) In very many instances the *te* (3) element, which is set in the head of the god of maize and vegetation and is his most important attribute in the codices, is prefixed or *te* (2) is postfix. Both these elements have a vegetal connotation. (4) The glyph occurs in many contexts where agricultural activities are under discussion. Note, for example, its appearance in the divinatory almanac which deals with the newly planted maize on Madrid 26d-27d, where, however, the vertical lines are omitted. Mark, also, its frequency in the various almanacs on Dresden 71-73, dealing with weather (rain, drought, dark days etc.).

Although one could scarcely recognize the derivation of the glyph without confirmatory evidence, the circle with its two lines (one rising, the other descending) is a natural picture of germination. The one line could represent the developing stalk of the plant; the other, the root. Beyer (1928b) has identified this glyph as that of the *yaxche* (ceiba tree), but I do not consider that thesis sustainable. Indeed, the *yaxche* glyph has been identified (p. 58).

Pakal is the Yucatec term for sowing or seed; *pakalte* is seed plot. The question arises as to whether the *te* affixes are to be taken as indicating that the seed is maize or whether they translate the suffix *te* in *pakalte*. *Te* (3) is invariably prefixed and never appears when the *caban*, "earth," is adjoined; *te* (2) is invariably postfix, and is used only when the *caban* sign is present (joined or in the preceding space). I think, therefore, that there can be little doubt that *te* (2) postfix to the seed glyph converts it from *pakal* to *pakalte*, the *caban* sign serving to reinforce the meaning. Moreover, as *te* (3) is the symbol of the maize god *par excellence* and is never postfix to the seed glyph, it presumably indicates that the seed in question is maize. *Pakalte* from the sixteenth century onward has signified the vegetable-seed plot as opposed to the milpa (*col*), but I think that glyphically its use must have covered both vegetable plot and milpa, unless *pakal* with *te* (3) prefix stood for milpa. Alternatively, the glyph by itself indicates seed; with the *caban* element, milpa.

Abundance of Maize (fig. 43,46-48). This sign consists of a combination of those for Kan and Imix. The Kan sign definitely represents maize; Imix is a sign of abundance (p. 72). The combination occurs in contexts which indicate benevolence. As already noted (p. 269), the sign for good luck, the 3 dog-ear glyph, not infrequently appears in the same passages as the glyph for abundance of maize. The latter is written thrice on Madrid 35, which deals with Kan years, which were believed to bring excellent crops, but it also appears three

times on page 37, which is devoted to the Ix years during which drought was to be expected. Perhaps these occurrences refer to the possibility of changing drought into abundance by the required ceremonies to avert calamity, reported by Landa for some years. In the corresponding section of Dresden the sign occurs with the pages depicting the ceremonies prefatory to the Ben, Lamat, and Etz'nab years, which I have suggested correspond to north, east, and west. The first two were regarded as years of good crops; an Etz'nab year should be one of drought. Again, influences may have counteracted the general prognosis, for a straight average of two years of drought in four reflects extreme pessimism. Yucatan could not have flourished on such a record.

Dresden 27, which deals with the Akbal years, supplies some confirmation of the suggested identification. The top third of each of these four pages shows an animal carrying on his back a burden, which appears to be the burden or luck of the year. These drawings appear to supplement pictorially what is expressed glyphically above, for on each page the augural glyph and the *cuch haab* glyph are juxtaposed. The burden of page 27 is the maize god (fig. 64,1). Above, the burden glyph is adjacent to the Kan-Imix sign. If the suggested association of the glyphs with the pictures is correct, "abundance of maize is the burden" is a logical translation for these two glyphs, relating them to the picture of the maize god as the burden immediately below.

Maize God Symbol (fig. 43,44,45). Eight is the number of the maize god (p. 134). On Copan I, C6a, the coefficient of 8 is enclosed within an oval topped with a symbol of the young maize plant (figs. 13,1,2; 25,53). We have noted (p. 269) that a possible name for the maize god in Yucatan was Ah Uaxac-Yol-Kauil, "He-eight-heart-of-food." When, therefore, we find in the codices an augural glyph formed of the number 8 enclosed in a circle and surmounted by the maize symbol from the head-dress of the maize god (not a hand with pointing finger, as has been suggested), we can be reasonably sure that we are dealing with a symbol for maize or for its patron. This glyph appears seven times in the codices. Of its six occurrences in Dresden, four appear above pictures which show rain falling (pp. 36b, 39c, 67a, 68a), and which, therefore, may be regarded as favorable to maize. In the first two of these cases the glyph seemingly replaces the normal Kan—maize symbol—for it follows the Imix glyph in one case and is combined with it in the other. On Dresden 65a, the sign follows the kin glyph, perhaps indicating the affect of excessive sun on the growing maize; on page 37b it has the *te* (1) prefix in place of the maize symbol. The glyph appears once in Madrid, on the page (35) devoted to auguries for the Kan years, where

the suggested interpretation fits well, as Kan years were expected to bring abundant harvests.

Dark Day (fig. 43,50). This common glyph, consisting of a kin sign in combination with Akbal, could be construed as "day and night" or "dark day" or "time of darkness." At first thought the translation "day and night" would seem the most logical, but I am inclined to think the interpretation "dark day" is the most probable. The glyph appears with considerable frequency above pictures which are rain-swept, and apparently unaccompanied by any other glyph to indicate rain; often, the sign is followed by the Imix sign of abundance (but note its association with drought; p. 270). A translation "time of darkness" in the sense that the sky is dark with approaching storms fits the context somewhat better than "day and night." That *akab*, "night," can be used in this sense is shown by such phrases as *akab yeeb*, "dark mist," *akab u uich ha*, "dark, black water." The expression could also be followed by the drought glyph, as the Maya paid some attention to storms which produced no rain.

Sun Darkened, Moon Darkened (fig. 43,51,52). The so-called eclipse glyphs, consisting of a sun or moon disk set against a background half black and half white, probably have the general meaning of sun darkened and moon darkened, or sun amidst black and white clouds, although they could refer specifically to eclipses. In a number of contexts where these glyphs appear, eclipses are almost surely not the subject of discussion. In fact, their appearance in divinatory almanacs cannot possibly refer to actual eclipses, since these do not occur at intervals of 52 or 65 days (the usual grouping of days in those almanacs). However, rain is often shown in pictures which accompany these eclipse glyphs: on Dresden 74, which deals with the great flood, a stream of water flows from this glyph, and the same composition can be seen on Dresden 37c, 39c, 66a, and 68a and on Madrid 32a, 33a, 71a. On Dresden 45b, the so-called Mars beast, identified as a water-bringer (p. 258), hangs from the sky, and this glyph appears above (fig. 64,4). Similarly on Madrid 17b, Chac, the rain god, falls from the glyph under discussion. On Paris 23b–24b the sun disks figure in the so-called zodiacal band, for the sundry creatures grasp them in their open jaws; on pages 4, 5, and 10 of the same codex the glyph figures in the auguries for Katuns 11 Ahau, 9 Ahau, and 12 Ahau. I think that there can be little doubt that the glyphs refer to the darkened sun and the darkened moon, the context indicating whether that was because of eclipses, rain storms, or lightning storms.

Rainy Sky. Not infrequently the first glyph in the almanacs which deal with weather is a sky sign with three lines of drops falling from it. The sky sign is usually tilted (fig. 46,1,9). That this indicates rain descending from the

sky can hardly be doubted, especially as the compartment below is often filled with falling water. Probably the cleft sky-glyph with water affixes, so frequent on the monuments (fig. 43,17-23), has the same meaning. In the codices an element with a pattern perhaps representing thatch or turtle shell (a constellation?) can also be combined with the curving lines of drops to represent falling rain (Dresden 73c, cols. 2, 4).

TENTATIVE TRANSLATIONS OF PASSAGES IN CODEX DRESDEN

There is a considerable body of augural glyphs in addition to those briefly treated above. I do not purpose to discuss these at the present time, for my intention has been to outline a more than probable structure of presentation and to illustrate it with typical examples of the glyphs; but to indicate how they function I give below a tentative translation of the augural glyphs of the seven compartments of Dresden 72c, and two of 71c (fig. 46,1-9), reserving, however, the right to change my mind on interpretations at any future date. Dubious interpretations are followed by one query mark; sheer guesses are marked by two query marks; elements apparently not represented in the glyphs are in brackets; sequence is right to left; semicolons divide translations of glyphs.

9. Raining sky; God *n*; his wind.
8. White wind (?); maize seed; evil tun.
7. Good tidings; of maize seed; its growth (??).
6. Intensely brilliant sun; severe drought.
5. Severe drought; [for] maize; its evil.
4. Maize year (?); evil; [for] the maize god.
3. ??; ??; relative to the tun.
2. Cloud-darkened days; great heaped-up abundance (?); seed in the earth, or in the milpa.
1. Raining sky; God *n*; his wind.

In Compartment 2 I have translated the second glyph as "great heaped-up abundance." *Chac*, "red," corresponding to the prefix, can mean both "red" and "giant" or "much"; I have preferred the second meaning. The postfix is the same as that which we found in the death glyph, and for which I suggested the tentative translation of "heap," and that meaning seems to fit the case here. For Compartment 3 I can not offer any translation, but for the others I feel reasonably confident that the general sense has been rendered. Roys calls my attention to the fact that *zac ik*, "white wind" (Compartment 8), is listed in Motul as a term for wind. There is little doubt that the composer of the dictionary got his lines mixed here, for he adds the world directions against the four entries of this term, but has them badly mixed both in Maya and in the translations. In Compartment 8 the literal translation of the compound would be *kaxtunil*; the *tun* element might have an intensifying value as in

kintun, and have nothing to do with the 360-day tun.

In conclusion, I shall rehearse the section (Dresden 42c-45c) already discussed (fig. 61,1-4), giving as far as possible a free translation:

- 42c. 4 Ahau, etc. God B is set (??) to the south. The maize god [suffers from] prolonged drought.
- 43c. 4 Chicchan, etc. God B is set (??) to the east. Very good [for] the maize seed. Abundance of maize.
- 44c. 4 Oc, etc. God B stands (??) set (??) to the north. The maize god. Abundance of maize.
- 45c. 4 Men, etc. God B is set (??) to the west. The maize god [suffers from] prolonged drought. General death.

The only translations of which I am doubtful are the renderings "is set" and "stands." Those are sheer guesses, but the general meanings of the two glyphs in question can not be far removed from those suggested. The words in brackets are supplied to clarify the meaning.

There is a certain forthrightness in these texts which I deem to be in keeping with the Maya spirit. Drought and plenty are duly noted; adjectives or exclamations of woe or joy are not added in a string of glyphs. Moderation in all things. One is reminded of what Gilbert Murray has said of Greek literature, "It is all so normal and truthful; so singularly free from exaggeration, paradox, violent emphasis. . . ."

GLYPHIC GROUPS

A glyphic group or family consists of a varying number of complete glyphs, main elements, components of main elements used chiefly as affixes, or components of affixes, which are related either because they form a synonymous or near-synonymous family, or because they convey closely related ideas. Synonymous and near-synonymous glyphs or elements can be substituted for one another in some cases or in all cases, but not all the elements of a family are necessarily interchangeable. Interchangeability probably depended partly on meanings, partly on custom. Thus the jade water symbol can replace the *xoc*, "count," element, but the reverse is not the case. The glyph of the day Eb (mist, dew, frost) consists of a sign for death combined with one for water, presumably to indicate that mists and dew were regarded as baleful because they were believed to cause smut on the maize; the two elements together indicate destructive water (p. 81). However, the water element is always the same infix, the curve surrounded with circlets. So far as one can judge, any one of a dozen aquatic symbols could have served as this infix, but for reasons of clarity or because of tradition only the one symbol was used.

In assigning glyphs to groups I have been governed largely by interchangeability. Thus, if two or three elements could be substituted one for another without any

apparent change in the meaning, I have placed them in the same group. This procedure is not without danger, for one runs the risk of designating as synonymous, elements which vary in meaning. For instance, had not the functions of the anterior and posterior date indicators been known, there would have been a distinct chance that their variable elements would have been classed as synonyms. The same might have been true of the postfixes of period glyphs, for until recently no one had realized that the postfix alters according to the manner in which the period glyphs are employed (p. 160). This danger has been guarded against as far as possible by seeking confirmation in more than one glyph of the interchangeability of any two elements.

The glyphic groups are not compact or closely knit; rather, they are of an amorphous character. Some elements form subgroups, the components of which tend to keep themselves apart from the rest of the family, perhaps with one member of the subgroup bridging the gap to the main group. The kan cross-yax-Chicchan-shell series, for instance, forms a subgroup in the water group. The shell element also appears in the underworld group, and there are other elements linking the water and underworld groups.

In bringing small elements, such as curls, into the discussion one runs the danger of overlooking convergence or similarities in design. A simple curl, to cite one case, is often used as a water symbol, both glyphically and pictorially, but it is also used under certain circumstances as an element denoting maize, and it may also indicate flames or smoke.

Two glyphic groups are discussed below in detail.

WATER GROUP

This is a very large and complex group which involves a number of different elements, several of which are also used in other senses. The following are direct water symbols: jade, circle or part of a circle surrounded with circlets, the "bunch of grapes" of the caucac element, X, hook or spiral, the god of number 3, the Moan bird, the serpent, the kan cross, the yax symbol, and shells. Some of these emblems have other symbolic values. The shell, for instance, is also a symbol of the underworld and night; the spiral and three dots seemingly can represent fire in some contexts.

Jade Symbol. This has already been discussed (p. 49). Jade is the precious substance, water, and is intimately associated with rain in Mexican mythology and probably in that of the Maya, too. Jade disks adorn the glyph for water in the codices (fig. 14,3,5) and frequently appear on the bodies of snakes (fig. 14,6) and of celestial dragons, in the latter case often grouped in threes (fig. 15,12).

There is, of course, a secondary association of jade with water in the color of both. A simple disk, or part of a disk with two smaller disks attached thereto, forms the symbolic glyph for Muluc, the day "water" (fig. 8,4-7, 9-16). This element reappears, surrounded by circlets, as the sign for Mol, which apparently means rain clouds (fig. 17,14-22), and it is also one of the elements of the tun sign. Tun, which means "jade," is the year of 360 days, another name for which is haab, "the rainy season." The winged caucac sign, which comprises several water symbols, is a variant which under certain circumstances replaces the tun sign, and enters into the composition of the multiples of the tun (katun, etc.). It almost certainly corresponds to the word *haab*, although the uses of haab in the books of Chilam Balam do not quite parallel those of the caucac glyph. The most usual head form of the tun sign is that of the Moan bird, which also symbolizes water (p. 275; fig. 20,10,11). There is accordingly full evidence identifying the Muluc symbol as *tun*, "jade," a ritualistic expression for water.

The jade sign has at least one secondary use, and probably more will be discovered. It is the symbolic form corresponding to the head of the *xoc* fish, which is used to illustrate the homonymous verb *xoc*, "to count," in the posterior and anterior date indicators (p. 162; fig. 30,37-44). It functions principally as a substitute for the head of the *xoc* fish when that is the main element of a glyph; it does not normally replace the fish head when that is used as an affix or prefatory glyph. In such cases the comb element is the corresponding symbolic form, but in a few instances the jade symbol replaces the fish or comb as an affix (fig. 2,56).

Caucac Elements. Cauac, the basis of the winged caucac used as a variant of the tun sign, corresponds in meaning to rainstorm. The elements of which it may be composed are "the bunch of grapes" usually pendent from the top of the cartouche; an oval, curl, or quarter-circle (in early examples) surrounded with circlets, an X (codices), a long hook (codices), the jade beads (?) enclosed within a curving line of dots or circlets (codices), and what may be an Ik sign rendered very cursorily (fig. 10,33-45). The "bunch of grapes" and the oval curl or quarter-circle surrounded with circlets frequently appear as ornaments on the bodies of celestial dragons, which are rain monsters (fig. 15,11-13) or occur on the bodies of snakes (Madrid 14). The X is a frequent symbol on the bodies and the pendulous snouts of snakes or celestial monsters, so plentiful on the façades of buildings in Yucatan. Indeed, the lattice motif of Puuc architecture is merely serried X's which adorn the body of the celestial monster (Seler, 1917, pl. 5). The snouts of these monsters are usually decorated with alternating X's and jade disks

(Seler, 1917, pl. 7a) and the same design appears on the supraorbital plate of feathered serpents (Morris, Charlott, and Morris, 1931, fig. 8). The long hook is probably an exaggeration of the earlier curl.

Whether some of these sundry elements are supposed to represent the markings on the bodies of snakes or celestial crocodiles and dragons or whether they were added to stress the pluvial character of those saurians, realistic or imaginative, does not much matter, for snakes and dragons were very intimately connected with rain and water in the conceptions of the Maya and all their neighbors (Thompson, 1939, pp. 152-61; 1943f).

Moan Bird. The Moan bird, a variety of owl, serves as the glyph for the month of Muan, which means showery weather. The Moan is without much doubt the bird perched on top of the celestial serpents (fig. 20,10,11,17). This bird with the flesh removed from its lower jaw is the usual head variant for the tun sign. There is a symbolic variant in Dresden for the month Muan, the main element of which is a curl which here presumably represents water (fig. 20,18). In one case, according to Miss Hunter's drawing, the Muan sign has a kan cross in its eye (Maudslay, 1889-1902, vol. 2, pl. 31), although the photograph is not sufficiently clear to confirm this. A representation of the Moan bird at Tikal has the Chicchan diagonal lines beneath its mouth; one at Copan has a triangle of dots in the same position (fig. 20,10,17). All of these are water symbols. The owl is intimately associated with the rain gods in the art of classical Teotihuacan (Armillas, 1945, pp. 10-12), thereby supplying yet more evidence for its pluvial rôle in the cosmology of Middle America. Through substitution the Moan owl is linked to the cauac and tun symbols of rain, and also to the spiral.

Serpent God of Number 13 (figs. 25,9,10,14; 28,15). The head of this creature sometimes replaces that of the Moan bird as the head variant of the tun glyph; in such cases to assure its identification the head is frequently surmounted by the tun sign (figs. 27,28,30-33; 28,16,17; other examples are on Copan I, K, 23, and HS; Quirigua E and Alt O and P; and Palenque HS).

On the Leiden plaque, on Quirigua B and Alt O, and on Copan HS this head is attached to the body of a snake. It has already been shown that this serpent or dragon is the god of the number 13, whose day is Muluc, "water" (p. 136). He is therefore a logical choice as a head variant of tun, which means jade, the precious water.

Kan Cross. This is the symbol which denotes the color yellow, but the glyph is frequently used in contexts where there is no reason to suppose any reference to that color. Furthermore, it is interchangeable with a number of elements which do not refer to yellow. Indeed, one of the

elements for which it can be substituted is yax, which signifies, among other things, a color; but that color is blue-green, not yellow. Kan is the Yucatec word for yellow, but it has various homonyms, among which is the root *kan*, "precious, highly esteemed or necessary." *Kanan* is a thing which is precious or highly esteemed or necessary; *kanan hal* and *kanan cunah* are verbal compounds with the same meanings, and *kan* is also the name for the beads used as money in Yucatan. The Motul dictionary gives one the impression that usually they were of stone, but from other sources we learn that they were normally of shell. The question arises whether these beads were called *kan* because they were precious or because they were of a yellowish hue. The shell apparently held in highest esteem by the Maya was *Spondylus princeps*, an inhabitant of the Pacific coast of Central America. This figure in Mendoza as tribute paid to the Aztec; numerous finds of *Spondylus princeps*, usually as containers for jade and other jewelry, in votive caches in the Maya area attest to the high esteem in which it was held (Boekelman, 1935, pp. 262-66). The outside of *Spondylus princeps* is a coral pink to deep red, but, according to Boekelman, there is a yellowish species of *Spondylus* which occurs on the Atlantic coast of Middle America. However, we have a definite statement that *kan* beads were red (Relaciones de Yucatan, 11:183). Lopez de Cogolludo and the Relacion de Valladolid speak of the beads used as currency (apart from jade) as being red; Lopez de Gomara, writing of the Peten, says necklaces of reddish pink shells were highly esteemed. The term *kan* can also apply to vermilion, but there is no reason why the Maya should have called red beads yellow. Accordingly, I think there is not much doubt that these beads were called *kan* because they were precious.

We have seen that the Maya used the glyph for jade to represent water because jade was the most precious substance they had, and water was the precious thing. That *kan*, "precious," may have likewise been a symbol for water is therefore not an unwarranted supposition. In reality, there is much evidence which converts the supposition into certainty.

In the Zapotec glyphs and in the art of classical Teotihuacan this kan cross is quite frequently worn in the headdresses of the rain gods (Caso, 1928, fig. 21; Armillas, 1945, pp. 17-18). The kan cross is prominent on the cheek of the only head variant of the day sign Muluc, "water" (fig. 8,8). It is a constant feature of the month glyphs Pop and Kayab, and the only obvious link between these two is that both represent objects connected with water, namely, reed mat and turtle. In a portrait of the old earth god on Dresden 37a, the kan cross is plainly drawn on the object on his back, which from other illus-

trations of that god we know to be a conch shell. This same cross is frequently set on or in streams of what appear to be water (fig. 44,3,4; Spinden, 1912, fig. 84a). It is also found sometimes on the forehead of a terrestrial monster; a good example of this is the head from which the maize plant grows on the Tablet of the Foliated Cross, Palenque (fig. 45,7). This reptile, of which Spinden (1924, p. 165) shows several examples, is often preceded by the number 7 (fig. 45,8). The creature is clearly a saurian or draconian monster, not improbably the earth monster itself, and perhaps the same as Ah Uuc-ti-Cab, "Lord seven earth," mentioned in the Ritual of the Bacabs. On the Tablet of the Sun, Palenque, he has as a water symbol the jade glyph surrounded with circlets, before his forehead; at Copan and Yaxchilan he appears with a variant of the Imix sign on his head (fig. 12,1,2). This earth monster is almost surely the crocodile which in Mexican belief floated in primeval waters, bearing on his back the world. His associations are with the earth, the underworld, fertility, vegetation, and water (pp. 70-71). The kan (precious) cross is therefore a logical attribute, stressing his connection with water and the production of food. See important change of opinion, page 252.

Interchangeability of Elements. In several glyphs there is an elbow-shaped prefix, clearly a water symbol as it is outlined with circlets, at the top of which there may be one of several elements, namely, the kan cross, the completion symbol, what may be a conventionalized shell, the Chicchan sign, and what may be a bone element. Among glyphs which take this prefix are the head of God C (fig. 43,1,3,6), the bat head with "Ben-Ich" superfix (fig. 43,9,10,12,14-16) the cleft-sky sign with "Ben-Ich" superfix (fig. 43,17-19,22), and the Kankin-on-side glyph. It is fairly clear that these elements can replace one another without in any way affecting the meaning. Sometimes the whole of this prefix is replaced with a jade symbol surrounded with dots, the whole being like a Mol sign, usually on its side (fig. 43,5,25,26,30,31). In other glyphs the yax prefix (Chicchan sign) is substituted (fig. 43,4,11,19,20,24) and in at least two cases the head of God Nine, the Chicchan god, replaces the yax symbol, of which it is an elaboration (figs. 3,7; 31,51). The connections of these sundry elements with water are discussed below.

The kan cross is joined to the cauac glyph in all five sections of the almanac on Madrid 22c (fig. 41,68). The only picture is the vulture, often associated with rain, set in a blue frame, and as the tidings in all sections seem to be good, it is a reasonable assumption that the kan-cauac glyph means something like precious storm (i.e. storm bringing precious rain), and does not refer to the color yellow. The same glyph with a prefix appears on

Madrid 21d, above a picture of the maize god. It is followed by the glyphs of the maize god and of abundance.

Very frequently the kan cross is joined to the yax-Chicchan prefix (fig. 45,13,14). Usually there is what resembles the number 2 above the compound, but it should be noted that there is always a cross between the two dots, whereas fillers are not commonly used with numbers in the codices. Furthermore, on Madrid 92a, the glyph with two dots and two crosses above it has a regular coefficient of 7 to the left. Accordingly, it is to be doubted that this superfix has numerical value. The glyph conceivably might denote the green precious thing, water. The two elements of which it is compounded appear together on what one supposes to be falling water (fig. 44,3) and serve as affixes interchangeable under certain conditions. On the other hand, the glyph appears above a shallow dish in Dresden 27b, as a new-year offering. Water is hardly an appropriate offering and is not likely to have been poured into a shallow dish. Another difficulty in regard to this compound lies in the fact that a kin sign replaces the kan sign in all four of the legible examples in Madrid, but in view of the careless and inaccurate manner in which this codex is drawn, it is not an unwarranted assumption that the kin element is due to the scribe's ignorance. The compound is in the hand of the principal figure of Seibal 3. The affix might be a numerical dot between two crescents, but is probably non-numerical.

In an addition, made since this book went to press (p. 252), I have suggested that the kan cross may signify blue and, by extension, turquoise, hence water, "the blue-green, or precious thing." In that case this compound might mean jade and turquoise.

Not infrequently, snakes in Maya sculpture are decorated with the yax-Chicchan sign, the zero sign, the kan cross, or "shell" signs (fig. 44,6-8). In one case the body of the snake consists of linked yax-Chicchan signs (fig. 44,5); in other cases the reptilian markings consist of the pairs of slanting strokes of Chicchan set between jade disks (figs. 13,15; 28,17). In representation of what is apparently falling water most of these symbols recur (fig. 44,1-4).

The piers of the front of Room D of the Palace, Palenque, are of some importance in connection with the associations of these motifs. The first (a) is entirely gone, and of the last (g) one can only say that it carried a hieroglyphic inscription. The central designs of the preserved pillars are of interest, for they show pairs of individuals, one of whom holds a snake or axe (symbols of rain and storms), standing on representations of water and the underworld (the snake-bodied god of 13 and water lilies); the designs are clearly related in subject

matter. Each design is enclosed within a frame consisting of linked water symbols of kinds already discussed, namely, bone ornament (Pier b), zero (Pier c), yax (Pier d), kan cross (Pier e), and the bone design (Pier f) (fig. 45,2,3,5,11). All alternate with jade disks. Thus once again these symbols are shown to be very intimately related.

There are other places in which the zero sign is rather clearly to be read not as o, but as a symbol for water. In examples of Glyph X2 of the lunar series three circles in a line can be substituted for the zero sign above the double line of circlets (fig. 36,3,8,17,27,37). The number 3 has an aquatic connotation, for the god of that number is a storm god. In Glyph X5 of the same series the head with hooked nose has aquatic insignia, which may take the form of the cauc element as headdress or prefix, the Mol element, a simple jade disk or the zero sign (figs. 36,63; 37,3,13,19,25,29). In view of the range of affixes of Kan when not used as a day sign, I suspect that the zero sign as its prefix should also be read as an aquatic symbol, not as o (fig. 11,51-57).

These various relationships are shown in Table 19.

(Maudslay, 1889-1902, vol. 4, pl. 34), day sign Ik, and probably infix in cauc element.

X Symbol. Cauac element (codices), heads (snouts and eyebrows) of snakes (Yucatan).

Three Circles in Triangular Arrangement. This occurs on bodies of dragons (fig. 15,12) in the eye of the Moan bird used as tun (fig. 27,36-39), on the forehead of the frog head of uinal, on the shell symbol used as period glyph (figs. 32,46-55; 33,15-20), and occasionally as an infix of the yax sign (fig. 41,60). Once it appears below the mouth of a Moan bird (fig. 20,17), and rarely it replaces the usual infix of the Chicchan sign (fig. 42,37). The old goddess who is shown in Dresden pouring water from a vessel similarly has three dots in her eye. This element, which is not always arranged as a triangle, must be treated with caution, as it sometimes appears as a fire symbol (fig. 43,53-55), presumably in imitation of the three stones of the hearth (Thompson, 1930, p. 93). As a postfix it may perhaps have the value of heap (p. 268). Aquatically, it may represent the god of number 3, who, as a deity of the storm, could represent not only rain but also the fire of lightning.

TABLE 19—RELATIONSHIPS OF VARIOUS WATER SYMBOLS

Symbol	Muluc	Date Indicator	All Tun Glyphs	Muan	Count Affix	Ben-Ich Zotz'-Cauc	Ben-Ich Sky	Ben-Ich Bone	God C	Snakes and Crocodiles	Falling Water	Piers, Palenque House D
Jade.....	×	×	×	..	×	×	..	×	×	×	..	×
Xoc fish.....	..	×	×
Circlets.....	×	×	×	×	×	×	×	..
Serpent God of 13.....	×	×
Kan Cross.....	×	×	..	×	×	×	×	×	×	×
Yax.....	×	×	..	×	×	×	×
Zero.....	×	×	×	×
"Shell" or "Bone".....	×	×	×	..	×	..	×
Moan bird.....	×	×	×
Spiral.....	×	×	×	×	..
Grapes.....	×	×

OTHER WATER SYMBOLS

Other symbols which occur in connection with water and the extended uses of some of those listed above are:

T Symbol. God of number 3 (storm god), God B (rain god), serpent god of earth, god of number 13

Ring of Circlets. This element appears on the forehead of god of number 3, the god of storms (fig. 24,12,13,17), on the forehead of the uinal frog (fig. 27,44,49,50), and around the Mol glyph (fig. 17,14-22). All of these are directly connected with water.

Spiral. I believe that the spiral in the eye denotes an

animal with aquatic associations. It is a constant feature of Gods B and K, the Moan bird, Chicchan, and most snakes and crocodiles. The occasional appearance of the spiral in the eye of the sun god in the codices may, I think, be attributed to careless copying by scribes unaware of the significance of this mark; the sun god is generally given a squint. On the other hand, it is also possible that the spiral symbolized fire, as Beyer believed, although I am not inclined to attach much importance to that identification. An important point connecting the spiral with rain is that it can be substituted for the two diagonal strokes of Chicchan in the yax prefix as generally drawn in the codices (figs. 17,12,46; 41,23,24,26,73-76). The spiral is commonly set in water as an identifying symbol, both in Maya and Mexican art (fig. 20,30-34).

The Chicchan God. This deity is the god of number 9, as can be seen by the yax symbol often on his forehead (p. 135; figs. 24,50-52,54; 25,32,34,35; 55,3) or before him (fig. 25,46,49). The profile of this deity occasionally replaces the yax affix, as with the Copan variant of the glyph of the sun at the horizon (fig. 31,51), or with the bound sky (fig. 3,7). Had a Maya artist wished to be a little fanciful, he might have drawn the month sign Yaxkin as two heads, those of the Chicchan god of number 9 and the sun god of number 4, and the meaning would have been clear to any Maya priest of moderate intelligence and education, but such practice would not have been conducive to clarity, any more than if someone said "with the mercurial velocity of a courser he absented himself" when he merely wished to remark "he departed rapidly."

Section of Shell. The element which frequently serves as a prefix and is interchangeable with the kan and water symbols (fig. 43,15,16,22) I take to be a section of a shell, probably a conch, the dots corresponding to the knobs on the circumference of the shell. The crescent or oval or indented circle I assume to be the mouth of the conch. This may appear a bold identification, but it has already been made by other students. This element is best seen in the headdress of a deity of the earth who combines symbols of death with a kin sign on his forehead, good examples of which are to be seen at Palenque E, and on the ball court markers and stelae at Copan (fig. 21,14-17). This headdress appears to be the attribute of the rear head of the double-headed dragon. It also serves as a glyph (fig. 21,18). Seler (1915, p. 93) brings together a large series of these headdresses and concludes that the element in question is a section of a shell comparable to the *oyoualli* of the Mexicans; Spinden (1924, fig. 8) illustrates a number of examples and also identifies them as shells. It will be noted that several show three or more knobs. In naturalistic representations of conch

shells these knobs are frequently depicted with some prominence (fig. 21,4-7). The conch shell, as we have already seen (p. 173), is an attribute of gods of the underworld because the conch is a symbol of water, and the surface of the world is the back of the Cipactli monster resting in water. However, this is a secondary association, for the primary association of the conch is with water. For this reason we find conch shells prominently displayed in the so-called temple of Quetzalcoatl at Teotihuacan, a temple which seems to have been dedicated, however, to Tlaloc (Armillas, 1945, p. 26). One of the attributes of Quetzalcoatl himself was the ornament made from a section of conch shell; this he may have worn because he was primarily a god of the fresh vegetation which appears when the rains come, or because of his visit to the underworld (p. 172). That this section of conch is usually a symbol of the underworld is demonstrated, I think, by its use as a decoration of gods connected with that region. For example, on the Tablet of the Sun, Palenque, it is prominently displayed by the two jaguar gods of number 7 seated on the earth band who, like Bacabs, sustain the crossed double-headed monster. Earplugs representing this shell ornament blend imperceptibly into the inverted Ahau and bone motifs and are typically worn by gods of the underworld. That this element has a direct connection with water is amply shown, I think, by the fact that streams of water frequently descend or ascend from the headdress of which it forms a part. The long-nosed god with coefficient of 9, who is so frequently paired with the similar god with coefficient of 7, invariably has this shell ornament in his headdress (Spinden, 1924, fig. 46), and he is without doubt a god of the earth intimately associated with the growth of vegetation.

I am inclined to identify the prefix of the month Cumku and probably also Glyph G8 as variants of this same element. It also appears as part of Glyph X of the lunar series in a form following Glyph C5 on the Foliated Cross, Palenque, and, probably on Copan 9, the lower part of the glyph being the same in both cases (fig. 37,34,38). The kan cross, with which the shell element is under certain circumstances interchangeable, appears twice as Glyph X following Glyph C6 (fig. 37,47,50).

These associations of the shell ornament with water explain why this element could be logically used in place of other water attributes, such as the jade symbols or the kan cross, as a prefix of several glyphs.

Flattened-U Ornament. What may be a simplification of the shell element (cf. the shell on fig. 21,15) or may have a quite different origin is a flattened-u ornament, to which Kidder, Jennings, and Shook (1947, p. 225) call attention in their description of Serpent X, and which

they identify as the supraorbital plate. It may be a headdress, however, in view of the various cases in which similar monsters have shells as headdresses. It is often elaborated with the addition of two circles into a fantastic Ahau, and merges with the bone motif and the shell (fig. 43,15,25). The deity who wears this emblem is almost certainly one of the earth monsters, for on occasions he is adorned with vegetation (fig. 12,4; Kidder, Jennings, and Shook, 1947, fig. 98). As a glyphic element this flattened *u* appears as a prefix, generally at the top of a water symbol, in a number of glyphs, and in that combination it is almost certainly interchangeable with the kan cross, yax sign, and shell ornament. From its close connection with serpents or crocodiles, it is a fair assumption that it served as an aquatic symbol, an assumption which is partly confirmed by its substitution for elements known to have aquatic values.

Bone Ornament. An element like an inverted Ahau with pinched sides and often a nick in the top of the head sometimes serves as an ornament set in the earplug (figs. 23,19,20; 27,6,12,13,31,55-57) or as a nasal ornament. On occasions, it is indistinguishable from an inverted Ahau; at other times it blends with the shell ornament. It has been called a bone ornament, and I retain the name although I am not sure that it was made of that material. It is a fairly common decoration of earth monsters and snakes (figs. 12,2; 44,5-7; Spinden, 1912, figs. 115*e-g,i,k*, 118*b*). It appears, but not inverted and in a form more definitely that of Ahau, on a leaf of the maize plant of the Tablet of the Foliated Cross, Palenque, balancing a kan cross on the opposite leaf (Maudslay, 1889-1902, vol. 4, pl. 81). I do not know whether the inverted Ahau and the simple "bone" ornaments are two distinct elements which tend to converge, or whether they are the same element with varying amounts of elaboration, but as decorative motifs they do seem to be interchangeable. Small inverted Ahaus, grouped in twos or threes, form a common postfix (fig. 2,25,26,29-31), and sometimes they thus appear beneath the heads of earth monsters (fig. 45,7). The inverted position may not be significant because on occasion the Ahau is right side up (fig. 12,1). Because of the elusiveness of this element, it is impossible to list its functions with any certitude, but I would hazard that it serves to denote aquatic or terrestrial associations. Examples which blend with the shell and flattened *u* and which can be substituted for regular aquatic symbols are to be seen in figure 43,1-32.

The Maya sculptor or scribe wishing to indicate the aquatic character of any glyph or sculptural element had a wide choice of elements. In theory he could use any or all of them; in practice he was restricted by questions of space and tradition, and need of avoiding confusion.

The question of secondary meanings had also to be taken into consideration. In some cases the reader might be uncertain whether a kan cross referred to yellow or was to be read as connoting water; in the texts there might be doubt as to whether the muluc variant of the jade symbol referred to precious water or was to be taken as the geometric form corresponding to *xoc*, "count." Thus rules of correct usage in composition must have been established with sufficient latitude to allow the writer his own style. These allowable variations have been in the past a stumbling block to decipherment of the glyphs, but there is no reason why they should not be used to our glorious advantage, once their various groupings are established.

UNDERWORLD GROUP

The group of attributes which distinguish deities and concepts associated with the underworld and the surface of the earth is pretty extensive. Whether these can be further divided into subgroups, assignable respectively to the interior of the earth and its surface, is rather doubtful, for I think the two concepts merged in Maya thought. Among the attributes which belong to this group may be listed: water lilies, maize foliage, conch shells, black, the hair set with eyes of the death god, the gods of numbers 5, 7, and 13, the dog, and certain symbols specifically attributable to the death god, namely, bones, the percentage sign, and three circlets in a row.

Water Lily. This symbol, as the probable derivation of the Imix glyph, has already been discussed at length (pp. 72-73). It has also been demonstrated that its most common wearer is the jaguar god, the god of the interior of the earth, corresponding to the Mexican Tepeyollotl, who is at the same time the god of number 7 (fig. 12,12,14,15). The water lily sometimes adorns the headdress of the old god of number 5, blending with maize foliage, although this is not very clear in the illustrations of the god of number 5 on figure 24. The snake god of the number 13 is usually adorned with water lilies; they are particularly prominent on the full-figure representation of the snake god of number 13 on the west side of Quirigua D (fig. 28,15). In other cases this deity's headdress may be the Imix glyph, presumed to be derived from the water lily (figs. 12,1-2; 40,1-3), or water lilies grow from the god's head (fig. 12,4). The death god as lord of the number 10 sometimes wears a lily dangling from his earplug. On the murals of Bonampak the dancers, apparently all aquatic or terrestrial deities, are decked with water lilies, as are the three chiefs wearing jaguar skins.

Maize Foliage. As noted, maize foliage is often mingled with water lilies in the adornment of personages con-

nected with the earth. When the sun god goes underworld and becomes the night sun and the ninth lord of the night, his glyph is changed to denote his altered status by the addition of a prefix or an infix. One of the commonest of these prefixes indicative of his terrestrial location is that of maize foliage or the maize spiral (figs. 38,48,50,51,56; 60,B4), but this is never present when the god is ruling in his celestial abode. Sometimes the old god of number 5 (fig. 21,3) or the jaguar god of number 7 (fig. 12,13 and jaguar headdresses at Bonampak) are similarly bedecked; once (Dresden 73b) the glyph of the death god has the maize foliage as its prefix. Naturally, the maize god himself usually has the same attribute. Again, a single element has more than one meaning, for the maize foliage or maize spiral may embellish the number 8, the maize god himself, or may serve to indicate a general relationship with the surface or the interior of the earth.

Conch Shell. This attribute has already been discussed, and it has been noted that in Mexican and Maya mythology the conch is the attribute of the gods of the interior of the earth (p. 278). Attention has also been called to the use of a section of conch as the main element of the glyph for south in the inscriptions (fig. 41,28,30,31,34,36) and for a variant of the kin sign believed to represent dawn or sunrise (fig. 31,1-11).

Black. Frequently the glyph of the sun as lord of the night is partly crosshatched, the conventional presentation of black in sculpture (fig. 34,48,51,53,57). The death god is usually depicted in the codices with a black area on the crown of his head and black spots on his body (fig. 13,11,19). The connection between black and the underworld is a natural one. It is probably because of the evil associations of the underworld, Metnal, the place of death and eternal cold, that the glyphs for misery and general death carry symbols of the underworld, such as the death eye, percentage sign, and the black infix (fig. 20,3-7).

Eyes of the Death God. The eyes or stars which adorn the hair of the death god and appear on his collar (fig. 13,11,19) or at his wrists or ankles have already been discussed in connection with the affix incorporating those elements, which has been translated as "death of" or "expiration of" (p. 189). Frequently, the glyph of the sun as lord of the night has his terrestrial rôle marked by a prefix which appears to consist of three eyes of the death god (fig. 34,46,49,52,54,55). As noted immediately above, the glyphs for misery and general death carry this element as a prefix.

Three Dots. Profiles on the monuments of the death god as Cimi often display three small dots or circles in a line across the brow (fig. 7,21,25,27), but they are absent from representations of Cimi in the codices. The death

god, as lord of the number 10, usually has these three dots (fig. 24,56-59), and in some cases where they are no longer distinguishable, it is probable that they have been eroded. The glyph for general death has a postfix consisting of three dots arranged as a triangle, between two dots, which, to judge by an example on Madrid 40a, represent death eyes. I have made the tentative suggestion that this triangular arrangement as the postfix might indicate "heap" in the term *multun tzeĸ* (p. 268). It will be noted that on the monuments Ix, the day sign corresponding to jaguar, invariably has three dots arranged in triangular fashion in the lower half. The jaguar, as already noted, is a god of the underworld.

It is not clear whether these three dots are the same water symbol already discussed, or whether they have an entirely different origin. A water symbol would not come amiss as a postfix for any deity connected with the surface or interior of the earth, for we have already seen lily flowers and maize foliage as identifying tags of that region.

Head for Completion. The head variant of the glyph for completion, with hand across lower jaw, has many attributes connecting him with the nether regions. Often the death eye adorns the forehead, as in the head for 10 (fig. 25,37-41), or on the collars of full-figure representations of that god (fig. 29,1-3,7). In other cases the three dots in a line or the percentage sign appear on the crown of the head (fig. 25,41,45). Quite commonly the head for completion has the scroll and flare pendant attached to the earplug (fig. 29,1,3,5,7). This pendant seems to indicate an association with the underworld, as it is frequently worn by the jaguar god of the underworld (fig. 12,13,15), by the death god but not in the codices where he wears a bone (fig. 28,12), by the snake god of number 13 (figs. 12,8; 28,15), and by other beings who move on or under the earth's surface. It is highly probable that this design is conventionalized maize foliage (cf. figs. 12,1,10; 40,2; 45,7).

I would not hazard a guess as to what connection there is between the completion glyph and the terrestrial regions, other than that this is quite probably an extension of the natural connection between death and finality, already expressed in Maya writing by employing the death eyes and hair or a skull as the ending sign "expiration of." As already noted, it is possible that the hand is used as a completion sign because *lahal* means to end or finish, and also to buffet with the palm of the hand or with two or three fingers held straight. Thus the hand, could be used as a homonym for end or finish, and this idea of ending would often be reinforced by the addition of symbols recalling death.

Bones. Bones are naturally an attribute of the death

god, who is often shown as a skeleton or, less frequently, wears a cloak painted with crossed bones (Dresden 28b). This same design of crossed bones is worn by the old red goddess who pours destructive rain (with Eb sign, p. 81) on the world as depicted on Dresden 74, and it once appears on the garment worn by the jaguar god of number 7 (Yaxchilan L 12). Pictures of the god of death in Dresden often show a long bone pendent from the earplug (fig. 13,11,19); the hieroglyph of the dog, whose connection with the underworld has been discussed, shows his vertebrae. In the divinatory almanac which extends from Dresden 64c to 69c God B appears above the skies and on the earth. In one case he is seated on a rectangle decorated with two pairs of crossed bones. One is probably justified in assuming that the picture indicates that the god is seated on the surface of the earth, the bones symbolizing Metnal beneath its surface. Crossed bones usually appear in the eye of the animal (jaguar or dog?) which occasionally serves as the kin in distance numbers, and which may represent the night, that is to say, the underworld (fig. 31,22,24-27,29). The short earplug pendant, perhaps of bones, with two little circles is another attribute of gods of the earth and the underworld, but as noted above, this is often hard to distinguish from the inverted Ahau on the one hand, and from the section of shell on the other (cf. fig. 27,13, with fig. 12,2,4).

The various attributes connected with the underworld are not too well segregated at present. Some of them, because of their aquatic associations, are also attributes of gods of the clouds and rain. That, however, while it does not make our task any easier, is in conformity with the religious ideas of the Maya and their neighbors, for rain-making snakes pass constantly from the interior of the earth or its surface springs, rivers, and lakes to the sky, or are divided into celestial and terrestrial groups (Wisdom, 1940, pp. 392-94).

A PAIR OF AFFIXES

Several groups of prefixes have been discussed (pp. 276-77), and it has been demonstrated that changes in postfixes can alter the meaning or the function of the whole glyph (pp. 163, 195), but the surface of the subject has hardly been scratched.

POSTFIX A

A very common affix is that which forms the postfix of the month glyphs Pop, Zec, Kankin, and Kayab. It is joined to the last only in Dresden; to the second only on the monuments (figs. 16,1-9,45,47-51; 18,22-27,62-64). The codical form differs slightly from that used on the monuments in that two black spots in the codices replace the shallow lines of the larger element on the monu-

ments. The postfix, which for the moment I shall designate Postfix A, usually, although not invariably, accompanies glyphs which have the "Ben-Ich" prefix. For example, it appears with "Ben-Ich" Ahau (fig. 11,1-6,8) and occasionally with Ahau when the "Ben-Ich" prefix is replaced by the centipede or crossed-bands prefixes (fig. 38,5,6). I think in such cases the "Ben-Ich" prefix is suppressed on spatial grounds, and is not synonymous with those other two prefixes, because it can occur with either of them (fig. 39,1,3,4,6-8).

Similarly when the "Ben-Ich" prefix is attached to the kin glyph to form the glyph for Kinich Ahau, Postfix A is also attached (figs. 42,3; 43,66), and the same is true of glyphs of the sun god on the monuments (Piedras Negras 25, Piedras Negras shell plaque, Copan Alt of 13). The only possible example of the glyph of God D with a "Ben-Ich" prefix also has Postfix A (Paris 6c). The same seems to hold true for the seed glyph (fig. 43,38-43), for the appearance of the "Ben-Ich" produces also Postfix A (Paris 5c), but not when the double wing as prefix and affix is present (Madrid 68a, 69b, 71a). The rare occurrence of a "Ben-Ich" prefix with an Imix glyph similarly leads to the addition of Postfix A (fig. 40,16,36).

The "Ben-Ich" prefix is not inseparable, however, from Postfix A, as in the case of the "Ben-Ich" katun glyph (fig. 33,33,35-40); in some glyphs with this prefix Postfix A may or may not be present (fig. 43,9-16). With the "Ben-Ich" prefix Postfix A usually accompanies a variant of the sign tentatively identified as the *hel*, "change," sign, and which is used as an augural glyph (fig. 30,30), this form far outnumbering in the codices the variant forms illustrated with it.

Postfix A replaces the jaw of a god who is one of the directional deities in the Venus table, and who resembles in other respects God D (fig. 42,4); joined to the Oc glyph and usually with the *ox* prefix to add emphasis, this postfix converts that glyph into a sign of good tidings (fig. 43,33-35).

Postfix A is usually attached to the Kan sign when the latter is used in the sense of maize food, and thereby appears to change the meaning of the glyph from ripe maize to green corn (fig. 13,5,6). Here we have a definite hint of the meaning of this affix. Let us see what confirmation we can find for this suggestion.

Postfix A appears prominently emerging from behind the earplugs on each side of the earth monster with kan cross on his forehead on the Tablet of the Foliated Cross, Palenque (fig. 45,7), and it is from the head of this monster that grows the foliated cross which, of course, is nothing more nor less than a highly conventionalized maize plant. The same design, although somewhat more like maize leaves, appears in the same positions on each

side of the earth monster, from whose head grows the tree of the Tablet of the Cross, Palenque. Pairs of maize leaves are often arranged to take the shape of this motif, and the maize god himself frequently wears a headdress of conventionalized maize which is very like this affix, or he holds a maize plant of this form in his hand. These leaves may be a direct part of the headdress or rise from a Kan glyph set on the god's head (Lothrop, 1924, pl. 8; Dresden 9a, 11b, 12a, 13b, 14a, etc.). The only difference is that the two lines or black spots of the affix are replaced in representations of the maize god by a semicircle with two spots or squares or by spots on the outside of the design, but there are examples which approach closely the form of Postfix A (fig. 43,43). Actually, there would seem to be two distinct affixes derived from this foliage. One, already discussed, which has the values "maize" or "eight" (figs. 25,53,54; 43,41,42,44,45); the other, our Postfix A. I have wondered whether designs incorporating the circles refer directly to maize whereas those lacking them have a more general meaning of growth, but I do not place much confidence in this suggestion. Whether the elements of Postfix A are mutations of the maize foliage or not, we can at least be sure from the evidence of the Tablet of the Foliated Cross that these elements are associated with an earth monster who is a deity of vegetation and the young maize plant, and this surmise is strengthened by the variation of the affix which, attached to the kan, represents growing corn (fig. 43,43).

It is fairly obvious that Postfix A, when used with the month signs Pop, Zec, Kankin, and Kayab and with a very rare form of Muan (fig. 20,18) can carry no direct reference to maize. On the other hand, every one of these months has an association with water, and four of them are associated with kan. Pop and Kayab represent respectively (reed) mat and turtle, both of which have aquatic connections, and these two months carry the kan cross. Muan, which once is shown with the kan cross in its eye, is named for the Moan bird, whose connection with rain has been amply demonstrated (p. 114). Kankin embodies the word *kan*, and the Zec sign is not infrequently found in the headdress of the long-nosed earth monster, god of the number 13, who is a deity of water (fig. 25,10; see also fig. 33,53-56).

Similarly, the appearance of Postfix A with the "Ben-Ich" prefix in conjunction with Ahau to denote a position in the round of katuns or affixed to the kin sign to form the glyph of Kinich-Ahau cannot denote any connection with either maize, fresh vegetation, or water. In such cases Postfix A probably serves as a phoneme; with the month signs and with Kan it probably has an attributive value, that is to say, it has ideographic properties denoting the class to which the glyphs belong.

We must seek, therefore, a term which conveys the idea of green or fresh which will fit the meaning of new corn in the case of the Kan glyph with Postfix A, but which also embodies the concept of water to explain its presence with the month glyphs just cited. It seems possible that the word in question is *ak*. In Yucatec maize is *ixim* and *nal* is an ear of corn; *ak ixim* is green corn and *aknal* is an ear of green corn or a growing plant of young maize. *ak* means not only fresh or tender or new, as in *ak zi*, "green wood for burning," *ak cay*, "fresh fish," *aklaahal* and *aktal*, both of which refer to vegetation turning green, and the examples just given, but it also carries the idea of humidity. *akal* is to become humid, and *akacnac* is something humid; *akci* means the same or to pour water; *akzah* is to urinate; *akyaabil* is the rainy season, period of humidity, germination, and growth; and *akalche* is a swamp in the forest.

Interestingly enough *ak* has two other meanings, one of which perhaps serves to buttress weakly our identification, for the word is also used for tongue and liana. In many examples of serpents the bifurcated tongue is made to resemble foliage (figs. 12,1; 28,5,17; Spinden, 1911, figs. 24, 33, 49, 62). This might be taken as a conceit were it not that the little circles of the maize foliage are quite distinct on some examples. I am therefore inclined to think that as the artist strove to convey the associations of serpents with the rains, germination, and growth, he seized on the fact that *ak* meant both tongue and humidity or new growth to shape the tongue as a symbol of growth. In Tzeltal the term probably exists: *ghan* is ear of corn; *aghan* is new corn.

This identification of Postfix A with the sound *ak* is not satisfactorily established, for it does not at present account for the partnership of the postfix with the "Ben-Ich" prefix, but it can be offered as a good working hypothesis.

POSTFIX B

Another postfix which is perhaps even more common than Postfix A is to be seen in many glyphs, one of the best known of which is Glyph F of the lunar series (fig. 34,15-19,59-62,64-66). It is commonly subjoined to the sky glyph and is not apparently affected by changes of infix in that glyph (fig. 31,62-66). It is also found, although less commonly, with the earth glyph. It is the affix I designate *te* (2), but as the evidence for that identification has not been fully presented, I shall for the moment continue to speak of it as Postfix B. It accompanies the seed glyph, but not when that has the maize prefix (fig. 43,38-40). It has been shown (p. 271) that postfixed to seed, it converts *pakal* to *pakalte*. Occasionally it appears as a postfix to numerical heads. When the glyph

of God D has the prefix consisting of an element which resembles the top of Akbal and which is surrounded with dots, Postfix B is usually added, although there are quite a few exceptions (fig. 42,42), but this postfix never accompanies any other form of God D. The prefix of God D has been identified as the head of a centipede by Tozzer and Allen (1910, p. 303) on the strength of the centipede which so frequently depends from the head-dress of that god. I do not think this identification can be challenged. *Chapat* is the general word in Yucatec for centipede, and there is a deity or mythological character called Ah Uuc-Chapat, "Lord seven centipede." The connection of God D with the centipede is not known.

Luckily, we are able to identify a personified form corresponding to Postfix B, for in six texts a head is substituted for this element as a component of Glyph F of the lunar series (fig. 34,21,63,68). These texts are on Copan 1, I, A, 6, and HS, Date 24, and on Quirigua K. That these heads correspond to Postfix B is evident from the fact that the other elements of Glyph F, namely, the prefix and the knot (in turn with its own head variants, one with prominent hooked nose or the froghead on its side), are present, and only Postfix B is missing. It will be recalled that this is not the only case of a postfix being replaced by a head variant.

In all six cases the head is that of a youthful deity, and the full figure which replaces Postfix B in Glyph F of Copan HS, Date 24, is almost certainly the youthful maize god. The characteristics of the head of Quirigua K, with the lock of hair on the cheek, confirm this identification. It follows that the corresponding head variant would indicate that Postfix B has some connection with maize or, perhaps, the more general concept of vegetation.

The occurrence of Postfix B with the supposed seed glyph again suggests a connection with the vegetal world. The fact that this postfix never appears with the seed glyph when the maize prefix is present (fig. 43,41,42) would indicate either that the two affixes are synonymous or that they differentiate sundry types of seed or seed plot (p. 271).

Another clue to the meaning of Postfix B is to be found in its rare use with head variants of numbers (figs. 24,62; 25,20,36; 39,4-6; Copan 19, IS; Xcalumkin IS, Glyph A). It occurs only with head numerals attached to month signs, to period glyphs, and to Glyph A of the lunar series. There is a probable example of it on Copan H', but with a coefficient of bar and dots, the 9 which belongs with Glyph A. It will be remembered that an element occurring between coefficients and month signs or period glyphs has already been noted, and identified as the numerical classifier *te* (1) (p. 55; fig. 2,15-23). As Postfix B here seems to function precisely as does

te (1), I believe that it must have the same sound value.

How can we reconcile an association with vegetation or maize with the sound *te*? In several of the lowland languages, namely, Manche Chol, Chontal, Tzeltal, and Tzotzil, the word for wood or tree is *te*; in Palencano Chol it is *tie*. In Yucatec, which often substitutes a *ch* for the *t* of Chiapas, the corresponding word is *che*. Nevertheless, in not a few compound names of trees in Yucatec the termination *te* is retained (e.g. *nichte*, *xchite*, *pucte*, *tahte*, *uzte*, and *poite*) and the same is true, although to a lesser extent, of objects of wood (*xolte*, "wooden staff," *ah nabte*, "lancer," *halabte*, "weaving sword," *popte*, "wooden bridge"). Halpern (1942) suggests that the shift was from *ch* to *t*, but Yucatec material does not bear this out, for it is in ritualistic words (*amte*, *amtun*, "wooden spider, stone spider," *uinicilte*, *uiniciltun*, "wooden man, stone man"), and compounds that the *t* is found. These are precisely the types of words in which old forms are most likely to be retained. I assume therefore that the shift was from *t* to *ch*, and that this was of fairly recent date. It is noteworthy that the sign for tree in Dresden is *te* (1), but once *te* (2) (p. 56).

Che has the general meaning of "tree" or "wood," but there are some grounds for believing that it may have had a more extended meaning of vegetation in general, for the Motul dictionary lists *u cheel pop*, "the leaves or branches of the reed called petate from which they make the mats." *Che* also means fresh, tender, youthful, or new as in *che cimil*, "to die very young," *che pa*, "bread of new and tender maize, and that same maize," *che cay*, "fresh, newly caught fish," and *che col*, "new milpa worked for the first time." If the shift from *te* to *che* in Yucatec was of fairly recent date, as would seem to be the case, it is a fair assumption that *te* formerly had the same range of meaning, and that therefore among its connotations were those of youth, newness, and vegetation. In that case it would not be surprising to find the head of a youthful god, probably the maize god, used as the head variant of a glyphic element (Postfix B) corresponding to the sound *te*, and to find that *te* has a linguistic affiliation with fresh vegetation, as indicated by its association with Postfix A, for which the word *aḱ* has been suggested. Indeed, in Palencano Chol, according to Sapper (1908), *tye* and *ti* mean maize stalk.

Besides *te* as a numerical classifier and as a suffix of verbs (added to some active verbs to form a future; added to some passive verbs to convert them to substantives), and *te*, "wood," and the assumed *che-te* term for fresh, new or tender, there is an adverb *te* signifying "there" or "toward," but this generally comes at the beginning of a sentence, and *e* is attached to the last word, e.g. *te bin u malel Cumḱale*, "there by Cumkal he has to

pass," *te caanalile*, "towards on high [the sky]." In connection with the last it is interesting to recall that Postfix B generally accompanies sky signs (fig. 31,62-66,72) and sometimes appears with earth signs. Such an identification, however, raises the question whether a postfix of a glyph can correspond to an adverb which normally precedes the word believed to correspond to the main element of the glyph. Should we expect the glyphic order of elements to correspond to the spoken order? I do not believe that as yet we have enough evidence to establish such a rule despite the fact that it appears logical (p. 51).

The uses of *te*, both orally and in general meaning, appear to correspond well with Postfix B, so that we can pair the two without, however, making any claim that the matter is settled. Postfix B must not be confused with the *il* affix (p. 285). As the first *te* affix has been designated *te* (1), I refer to Postfix B as *te* (2).

RELATIONS BETWEEN POSTFIXES A AND B

Under certain conditions Postfixes A and B are interchangeable. Either postfix may be used with the shell variant of the kin glyph or with the animal variant of the kin sign (fig. 31,1-8,22-29). These two variants of the kin are used in distance numbers and, as suggested, they may refer to a count by nights or by dawns. As there is no possibility that these two glyphs change their meaning when the postfix alters, it is clear that Postfixes A and B must be synonyms or near-synonyms or, if I may coin a word, idonyms ("conveying the same idea"). Postfix B, as noted, usually accompanies sky glyphs, but in the case of the cleft-sky sign with "Ben-Ich" prefix, Postfix A sometimes replaces it (fig. 43,18-23). This is logical if this glyph with its water affixes means "rainy sky" (p. 273).

In the case of the glyph of the inverted fist, the postfix is commonly A (fig. 42,67) but the appearance of the prefix resembling an elephant's trunk in all 13 divisions of the divinatory almanac on Dresden 65b-69b, causes a shift to Postfix B (fig. 42,66). The only other occurrence of this prefix with the inverted fist (Dresden 33c) changes the Postfix from A to one with a spiral infix. However, this spiral postfix is nearly related to Postfix A, for it is substituted for the latter beneath the glyph Pop on Copan T 11 (figs. 16,6; 54,5), and below "Ben-Ich" Ahau on Chichen 12 (fig. 39,3).

In the case of the half-period glyph, Postfix B is usually under the shell part (fig. 32,46-50,54); with the glyph for 5 haab lacking, the postfix of the lacking element is always A (fig. 32,41-45). As previously noted the idea behind each glyph is that of a part lacking to the completion of a period. However, as Postfix B invariably accompanies the shell glyph with coefficient of 1 (fig. 33,15-20), it is possible that its appearance with the half-period is because

that shell element is also incorporated in the glyph for the half-period.

There is clearly a close connection between Postfixes A and B. The suggested interpretations of them, *ak* and *te*, conform to this connection, for both convey the idea of freshness and new growth.

The postfix, which for the moment we will call Postfix C, found with representations of Kayab on the monuments (fig. 18,53-61) must be synonymous with Postfix A, for it is replaced by the latter in Dresden. Postfix C resembles the affix for white or the *tu* affix save that it has an infix of three dots in a line. Postfix C occurs, although not with great frequency, at Chichen Itza and Halakal between the haab glyph and its coefficient (fig. 39,1,7,8). It is probable that Postfix C is a merger of a prefatory glyph, not uncommon at Chichen Itza, which is composed of a main element with three dots in a vertical line, a postfix of one or two inverted Ahaus, and the white prefix (fig. 38,1-6). This prefatory glyph, which Beyer identifies as an ending sign, appears only before the same haab glyph in combination with a CR date to indicate the tun in which the latter falls. On the assumption that this prefatory glyph and Postfix C are the same, the question arises whether it could occur before or after the coefficient without any change of meaning, or, as seems more probable, must we seek a term that could be used linguistically to correspond to the positions before and after the coefficient in the glyphic texts. *Te* appears to be the only possibility, for that word can be a locative ("there, in year *n*") or a numerical classifier usable with years. If we are justified in assigning to this affix and prefatory glyph the meaning *te*, we have established another link between Postfixes A and B. Postfixes B and C then would both represent the sound *te*. As Postfixes A and B are often interchangeable, the replacement of Postfix A by Postfix C in the Kayab glyph is understandable if, as may be the case, Postfixes B and C represent the same sound. Postfixes A, B, and C are prominent, but by no means the only, components of a group of affixes comparable in range, although not in meaning, to the kan cross, yax, and cirlet group.

I have discussed Postfixes A and B as examples of the double problem of identifying pairs or groups of affixes which are interchangeable under certain conditions, and of attempting to pair them with Maya words. The approach to the second half of this problem is a particularly dangerous one because one has to rely largely on Yucatec Maya owing to the lack of extensive vocabularies in other lowland Maya languages. Even if it is assumed that the inventors of the glyphic writing spoke a language closer to Yucatec than to any other lowland language or dialect, we have no means of knowing how much the language

changed between the invention of the glyphs and the sixteenth century. Those are perils which face any attempt to match words to glyphs. Nevertheless, I believe the danger is not so great as one might fear. The Yucatec word *kintunyaabil* so closely matches the glyph for drought, that one feels some confidence that the ancient speech must have been close to Yucatec. Similarly, if *u* moon is used as a rebus for *u* the possessive (before consonants), one can exclude several Maya dialects which have a different form of the possessive.

Withal, the primary object of this demonstration has been not to make actual identifications, but to outline a new method which may lead to decipherments. Hitherto, affixes have been largely ignored in translating glyphs; until Beyer took up their study, they were accorded little more importance than is given to the frame of a picture, and the impression was rather widespread that in many cases they were meaningless adornments. Therefore, whether the suggested interpretations of these two postfixes are correct or wide of the mark is beside the point, for what I would achieve is a system for examining the properties of each affix, questing for possible synonyms or near-synonyms, and then, if possible, pairing the affix with a Maya word. If the final step is a false one, the next student can start where I stumbled.

TE (3) AFFIX

Two affixes have already been assigned the meaning *te* with varying certainty; there is a third which seems to have the same phonic value, and which I call the *te* (3) affix. It has already been discussed, but a fuller review is called for. It is composed of two parts, the second of which is the same as the identifying characteristic in the codices of the maize god, and which is set on his head, a vegetal motif. The other is what may be a small face attached to the base of this vegetal motif. The whole would, accordingly, appear to be a symbol for the maize god, but that divinity was probably not restricted to a rulership over maize, for he was probably a deity of general vegetation, particularly of food plants, with special emphasis on his function as the spirit of maize.

This affix occurs as a prefix of the seed glyph (p. 271; fig. 43,41,42), and of the glyph eight maize (p. 272; fig. 43,44,45). One would be inclined to accept it as a symbol for maize alone were it not that it appears in a number of contexts where the restricted meaning of "maize" would hardly fit, but the more general term *te* is applicable.

In the case of the eight-maize glyph, there is one case (Dresden 37b) where *te* (1) replaces *te* (3) as the prefix (p. 272), a strong indication that the two affixes are synonyms. The brilliancy prefix (p. 147) pairs with

the *te* (1) affix when attached to the cauc glyph (fig. 43,65-67); it combines with the *te* (3) prefix when attached to the kin sign (fig. 43,69). This again suggests, although with less force, that *te* (1) and *te* (3) have the same value.

Attention has been called to the presence on Madrid 65-72, of a series of tun glyphs with coefficients, most of which have an affix identified as a numerical classifier, perhaps with the value *piz* or *p'el* or *tem* (p. 196). In one case, where this affix is missing, we find instead *te* (3) as a prefix (fig. 12,19,23,24). It is a fair conclusion that *te* (3) functions here also as a numerical classifier, and it will be recalled that *te* is used with the tun and other periods in the books of Chilam Balam as a numerical classifier. In this same almanac of Madrid thrice the uinal glyph has *te* (3) as a postfix, and each time there is a coefficient (fig. 12,20), and twice the same glyph in Dresden (13c, 21b), again with a coefficient, has the *te* (3) affix and the hand affix as prefixes. Here, too, one is, perhaps, justified in accepting the affix as the numerical classifier *te*. However, on Dresden 71a, there is an augural glyph composed of a Chuen sign, a *te* (2) prefix to the left, and above, according to Förstemann's edition, a *te* (3) prefix. The glyph is a little worn, and as on Dresden 72a, forming part of the same divinatory passage, what is apparently the same glyph has a clear hand with what is drawn as a kin infix instead of the *te* (3) prefix shown on page 71a, I think we are justified in supposing that the latter has been miscopied, and should be the same as the example on page 72a.

Te (3) occurs on the monuments affixed to a number of glyphs of unknown meaning, with and without coefficients. It is particularly common at Palenque (fig. 53,1, GI B14, C8, C16). One should not be surprised that at least three affixes apparently have the same phonic value; *te* is an important word with sundry meanings and uses. One has only to count the kin signs to realize how many glyphs could have the same meaning. Should Postfix C prove to have also the phonic value *te*, it would become *te* (4).

THE IL AFFIX

We will now discuss an affix of simpler use, for which I feel reasonably confident that I have discovered the meaning and the spoken equivalent. This is the *il* affix already briefly examined (p. 269), which has been identified as a symbol for a knife (Seler, 1902-23, 1:392; Förstemann, 1904; Schellhas, 1904), apparently because of its use as a prefix of the death god, for a knife blade is not infrequently inserted in the nostrils of that deity, particularly in Aztec art. Apart from the fact that the element bears no resemblance to a flint or an obsidian blade, its

use as an affix to other glyphs precludes this interpretation.

In discussing the glyph for drought, I pointed out that as we had glyphic elements corresponding to *kin*, *tun*, and *yaab* (*haab*), the remaining element, the postfix in question, should correspond to the suffix *il* to complete the word *kintunyaabil*. In Yucatec *il* is a suffix which is of very frequent occurrence, particularly to denote attributive or gentilicious relationship, also to form comparatives and abstract nouns and certain verbal terminations (Tozzer, 1921, pp. 31, 36, 38). It is therefore one of the commonest suffixes in Yucatec; it is used in a similar way as a suffix in Manche Chol, in Yocotan, and probably in other Maya languages and dialects.

In the codices the *il* affix is largely found with head forms, at least two of which are of known gods, those of death and of maize. The glyph of the death god is the head corresponding to Cimi with the *il* prefix (fig. 42, 9,16,39). It is not rash to suppose the whole represents the word *cimil*, "death," for a name for the death god was Yum-Cimil.

The name of the maize god in Yucatan has already been discussed; it may have been Ah Uaxac-Yol-Kauil (p. 269), and I have suggested that it is not improbable that the more generic name *kauil*, "foodstuff," may have been applied to the maize god, just as it was tacked on to Itzamna's name, probably to call attention to the rôle of those collective gods as providers of food. The head of the maize god's glyph with its maize details infix and placed on top of the head surely stands for food, and the *il* prefix would refer to the *il* termination of the word *kauil*.

This affix appears both as a prefix and postfix with the glyph Ahau, which frequently appears in clauses of divinatory almanacs, often following the glyph of God D. I have suggested (p. 269) that this glyph corresponds to *ahaulil*, "rulership." If *ahaulil* is a contraction of *ahaulilil*, the two glyphic affixes would correspond to the double *il* (fig. 43,36).

The *il* prefix not infrequently appears with the glyph of a water goddess (Gates' Glyph 123) of uncertain position in the Maya pantheon, and also with a head probably that of an animal, with kan or kin infix and a second infix of the two black bars found with the Oc glyph (Gates' Glyph 46). The same element serves as a suffix with Gates' Glyph 147, the lower part of which is an element in Akbal and other glyphs. There are a few scattered examples of this affix with common glyphs in the codices, but all are of rare occurrence save the tun glyph (fig. 46,3,5,6,8).

In the codices the tun glyph usually has the *il* element

as a postfix, but in the distance numbers on Dresden 61 and 69, this affix is missing and it does not appear in time counts on the monuments. Instead, the many examples of the tun with *il* postfix occur in divinatory almanacs and the divinations for the years. In most of these cases the tun glyph is followed by an augural glyph, and I think it is a fair assumption that the two go together to indicate a year of abundance or good crops or misery or whatever the augury may be. Thus, in the long divinatory almanac on Madrid 65-73b, the tun glyph with *il* postfix appears a number of times preceding or following such augural glyphs as the Kan-Imix sign, the Oc sign, or the death sign. I think that in such cases the glyph must represent *haabil*, for example *haabil numya*, "year of misery." How exactly the coefficient should be handled I do not know.

In the new-year pages of Dresden some interesting examples occur. On Dresden 27, above the picture of the death god, the regent of the entering year, is the glyph of that god followed by the tun with yax prefix and *il* postfix (fig. 64,1). The whole might be translated *Cimil yax-haabil*, "the new year is associated with the death god." Here *il* indicates the gentilicious relationship of the year with the death god. On Dresden 28c the entering god is God D, and, above, appears the same yax-tun-il glyph, in this case followed, not preceded, by the glyph of God D. On Dresden 26c the entering god is K, and, above, his glyph follows the tun glyph with *il* postfix but with a double prefix, consisting of the yax element attached to a kan sign. These two passages surely must declare that the new years belong respectively to Itzamna and God K. On Dresden 25 the entering deity is the sun god, but neither his glyph nor the haabil combination appear.

On the monuments the *il* affix is commonly found in the lunar series, usually with Glyph D but occasionally with Glyph C. It will be remembered that the Yucatec word for moon is *u*, the Motul dictionary lists the term *uil*, "cosa de luna." It is a fair assumption that this postfix with Glyph C converts the moon sign from *u* to *uil*. With the up-ended frog the *il* and lunar affixes are interchangeable (fig. 11,44-50). As the lunar affix here is surely the possessive *u*, and *il* expresses attributive relationship, their interchangeability confirms the identification of the *il* affix. Other occurrences of this affix are with the sky sign, but it is not the usual affix (fig. 3,5-8), with "the seating of the day" glyph (fig. 19,47,48), and with a hand glyph (fig. 42,55,56).

The evidence, I think, is strong for accepting the meaning of this affix as *il*. If the affix has been correctly deciphered as *il*, this decipherment demonstrates that the position of affixes in the glyphs does not correspond to

the order of the spoken word, for in the supposed Cimil glyph the element identified as *il* is prefixed to Cimi, whereas in the word itself *il* is a suffix. We had a hint of this in other cases in which an affix may be either a prefix or a postfix, notably in the case of Zec, which has the comb element as a prefix on the monuments but as a postfix in the codices, and in the cases of Gates' Glyphs 345.4, 7.4, 4.3.1 and 2, and 11.4.

THE ARITHMETICAL APPROACH

This method of seeking decipherments of glyphs involves segregating all known examples of a given glyph on the stelae, arranging them in chronological order, and computing the intervals between the dates with which they are associated. The system produces results if it can be shown that those intervals are multiples of a given number. In recent years three discoveries have resulted from this method. The glyphs of the lords of the nights were identified by finding that the intervals between recurrences of each member of the group were multiples of nine days (Thompson, 1929). By a similar method the cycle of 819 days was established (Thompson, 1943d). Likewise arithmetic was necessary to deduce the Yucatecan system of dating (Thompson, 1937) and to identify the 5-tun lacking glyph (Thompson, 1934a); it is used also to establish a relationship between the heads of Glyph C of the lunar series and Glyph X (p. 241).

Applied to dates and tables of supposed planetary significance, the arithmetical system is perilous; a single calculation has been identified as a multiple of the synodical revolution of two different planets. Clearly, with long intervals between dates and short synodical revolutions it is possible to reach agreement by adding or subtracting a hundredth of a day to the average length of the revolution in question. I do not believe that such calculations covering long spans of time can have much value until the correlation of the Maya calendar with our own is established beyond reasonable dispute, or until glyphs for the planets other than Venus have been identified.

There are still possibilities in this approach. It would seem that the meanings of a number of glyphs will be found only through an arithmetical solution. Among such glyphs might be cited the "Ben-Ich" katuns with coefficients usually ranging from 2 to 5 (p. 203) and the 1-shell period glyph (p. 194). The exact function of the world directional glyphs on the monuments can be established only arithmetically, and I suspect that the subject matter of the designs on stelae is governed by time cycles. Some glyphs will, I think, prove to be related to divisions of the 260-day cycle, and such associations can be proved only mathematically.

SUMMARY

In this chapter we have sent out reconnaissance patrols and probed the enemy's position, or, since we opened the chapter in terms of a siege of Clio, perhaps we should say that we have dallied with the muse, indulged in flirtation, and taken those first steps which may lead to conquest. In war, in love, or in Maya hieroglyphic research, one can learn from one's rebuffs how to conquer next time. I should not be among the least surprised should all the interpretations suggested in this chapter prove to be correct; in such pioneer work mistakes are to be expected. At present I am more interested in reconnoitering paths that may lead myself and others to success, than in battling in one small area to win an immediate but limited victory. The stronghold of Maya hieroglyphs can not be taken by an attack from a single direction. One must infiltrate at a dozen or more different points, and those points must first be tested.

We have discussed the glyphs which explain the divinatory almanacs in Dresden. It has been suggested that, contrary to general opinion, the glyphs do not explain the pictures, but that the pictures illustrate or supplement the glyphs. The opening glyphs of the clauses have been tentatively identified as verbal nouns and objects, and one or two guesses at meanings have been made; the closing glyphs of those clauses have been classed, with more justification, as augural signs which tell the luck of the day. Translation of a number of these has been offered. Among them are those for "good tidings," "evil," "abundance of food," "dark days" (storms), "drought," "rule," and "maize seed."

From the examination of glyphs accompanying the divinatory almanacs in the codices we passed to a review of two groups of associated elements, the water group and the underworld group. It was shown that there was in each case a considerable number of elements which under certain conditions were interchangeable. These associations were derived from community of idea rather than from linguistic similarities. Certain elements, such as the symbol for jade, the kan cross, and the Moan bird, have their primary and direct meanings, but all have also more extended use because all are connected with water. Just as water is a liquid, but a liquid is not necessarily water, so any of these symbols can stand for water, but it does not follow that a symbol for water can replace any one of them when it is used in its restricted sense, any more than we speak of liquid when we wish to treat specifically of water.

The various elements so far classified as belonging to these two groups have been enumerated, and it has been

found that the boundaries between the groups are not well defined, for certain elements can have a foot in both camps.

A slightly different approach was followed in examining two affixes, for which the translations *ak* and *te* have been suggested. It was shown that they were interchangeable under certain conditions, and evidence was adduced that both elements were used both linguistically and ideographically, but the demonstration was primarily one

of method. The decipherment of one of the affixes, the *te* element, is almost certainly correct, but here exact interpretation was a secondary consideration. There followed appraisements of two other affixes, the *te* (3) element and that corresponding to the relationship suffix *il* of spoken Yucatec.

The chapter concluded with a few suggestions concerning glyphs which may be solved arithmetically.