Maya Numbers & The Maya Calendar

A Non-Technical Introduction to MAYA GLYPHS – Book 2

BY MARK PITTS

Maya Numbers and Maya Calendar

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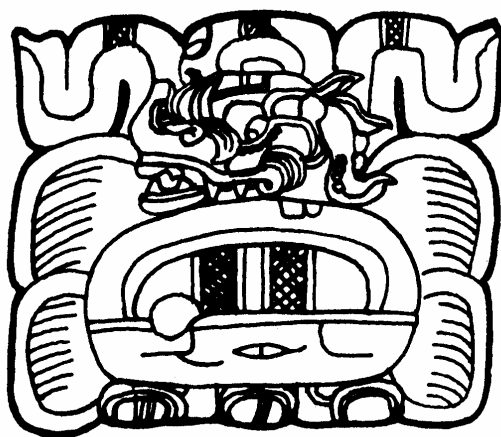*This book is dedicated to the Maya people living today in Mesoamerica.*

Title Page: A Maya glyph signifying10 periods of about 20 years each, or about 200 years. From Palenque, Mexico.

Book 2:

Maya Numbers & The Maya Calendar

A Non-Technical Introduction to MAYA GLYPHS

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Maya Numbers and the Maya Calendar

Chapter 1.

Writing Numbers with Bars and Dots

A Maya glyph from Copán that denotes 15 periods of about 20 years each, or about 300 years.

THE BASICS: THE NUMBER ZERO AND BASE 20

The ancient Maya created a civilization that was outstanding in many ways. They were great artists. They were one of only three civilizations in the world that invented a complete writing system. They were also great mathematicians, time keepers, astronomers, and architects. In this book you will learn a little about their calendar and about their mathematics that allowed them to make so many scientific advancements.

One of the truly great accomplishments of the ancient Maya, and something which has been done only twice in the history of the world, was the "invention" of the number zero.

Although we don't think much about the number zero, it makes writing and working with numbers much easier. Think about how you would write a number that contains a zero (for example, 20, 101, or 1023), if you could not use a zero to write the number.

The Europeans never invented the zero. The Romans, for example, never had a zero and so most of their numbers were quite hard to write, and their mathematics very difficult and cumbersome. The Europeans eventually borrowed the number zero from the Arabs, who themselves borrowed it from India.

So how do we write a zero in Maya script? The ancient Maya usually had more than one way to write something, and numbers were no exception. Here are the four ways of writing zero that were most popular:
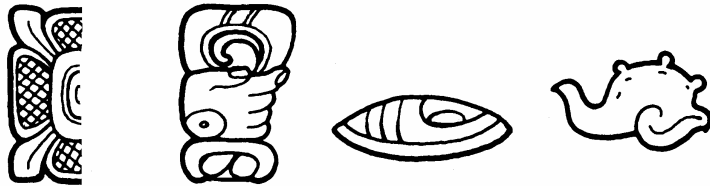
Note that the last two glyphs look like shells. Shells are often empty containers; they contain 'nothing', zero contents.

Our way of writing numbers, which is Arabic in origin, is based on the number 10. Even though we don't usually count on our fingers, (or at least we're not supposed to), we probably use 10 because we have ten fingers.

The Maya based their number system on 20, instead of 10, (no doubt from a total of 20 fingers and toes). This may seem odd at first, and it does take a little getting used to. But, really, it doesn't matter what base you use, at least as long as you have a zero. The computer, which we all know can do math incredibly well, uses a number system based on 2, that is, it only uses the numbers 1 and 0.

So, let's write some simple numbers as the ancient Maya would. The numbers one through four are the easiest:

Our Number		The Maya Number
1	=	●
2	=	● ●
3	=	● ● ●
4	=	● ● ● ●

This is easy since the number of "dots" equals the number we need. So, to write the numbers 1, 2, 3, or 4 as the ancient Maya would, we just use 1, 2, 3, or 4 dots.

For the number five the Maya used a "bar:"

| 5 | = | ▬▬▬ |

For the numbers 6 through 10, the ancient Maya combined dots and bars:

●

6   =   ▬▬▬

               ● ●
7   =   ▬▬▬

              ● ● ●
8   =   ▬▬▬

              ● ● ● ●
9   =   ▬▬▬

              ▬▬▬
10 =   ▬▬▬

Thus, counting each dot as a one, and a bar as a five, we just use the right number of dots and bars to add up to the number we want.

Just as when they wrote words, the Maya used a lot of variety in writing numbers. They could write their numbers with horizontal bars and the dots above, just as we have shown above. Or they could write their numbers with vertical bars and the dots

to the left. For example, they could write the number 9 as shown above, or as:

9 =

No matter how you arrange the parts, one bar and four dots placed together add up to 9, and thus stand for the number 9.

Below you have the number glyphs for 11 thru 19. These glyphs use the very same rules as the numbers from 1 to 10. Each bar counts as five, and each dot counts as a one to give the total number that you want.

11 =

12 =

13 = ●●●
‗‗‗‗
‗‗‗‗

14 = ●●●●
‗‗‗‗
‗‗‗‗

15 = ‗‗‗‗
‗‗‗‗
‗‗‗‗

16 = ●
‗‗‗‗
‗‗‗‗
‗‗‗‗

17 = ●●
‗‗‗‗
‗‗‗‗
‗‗‗‗

.

18 = • • •

▬▬▬
▬▬▬
▬▬▬

.

19 = • • • •

▬▬▬
▬▬▬
▬▬▬

.
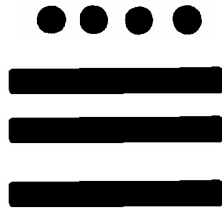
Note that you never use more than four dots in one group. You should practice writing all these numbers until you are sure you understand them.

In addition to plain dots and bars, the ancient Maya often used fancier number glyphs. Here are two examples.

6   6

These two arrangements are just fancier ways to write the number 6. When you first look at the number glyph on the left, you may think this is the number 8; after all it looks like a bar and

three dots. However, in the glyph on the left, the two loops (one above and one below the solid dot in the middle) do not count as dots. Thus the number is really just one bar and one dot, or 6. Similarly, on the right, the Xs do not count as dots, and again the number is 6. Only solid, circular dots count as dots; loops and X's don't count.

The Maya used the loops and the Xs for artistic reasons. They made all their glyphs more or less square in shape to make them fit together more nicely. In these glyphs for the number 6, you can also see that the Maya would often decorate the bars to make them more interesting and artistic.

Here we have three more decorated number glyphs. Can you tell what numbers each of these glyphs stand for?
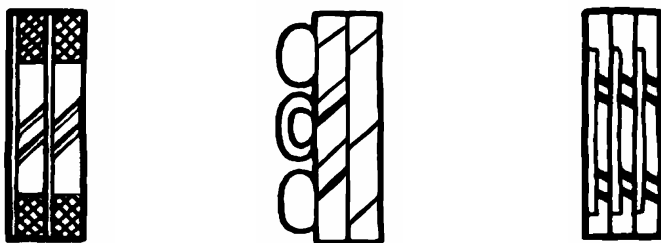
(If you said ten, twelve, and fifteen, you're learning fast.)

NUMBERS GREATER THAN 19

So far, so good. But how do we write numbers greater than 19?

First let's think about how we write numbers. Our system is based upon the number 10. In our system 10 is also the first number that is made up of two other numbers (namely, a '1' on the left and a '0' on the right). To write the number 10, we put a '0' in the position for the smallest part, and a '1' in the position for the larger part. That is, we put a '1' in the 'tens' position because there is just one ten in the number 10. The zero acts like a 'place holder' in the 'ones' position because there are no 'ones' in the number 10, and having the zero in that place tells us so.

The Maya system was based on the number 20. Thus 20 was also the first number where they had to have digits in two positions (just like 10 is the first number where we have digits in two positions). To write the number 20, they would have a zero in the position for the smallest part, and a '1' in the position for the larger part. Like us, they would use a zero as a place holder in the ones position, because there are no ones in the number 20. In their way of doing things, the second position stood for 20s (not 10s). The number 20 has one twenty and zero ones. So, remembering that the shell glyph stands for zero, here's how 20 could be written:

●   This is the second position and always tells you how many 20s there are in the number.

This is the first position and always tells you how many 1s there are in the number, after subtracting the sum of the numbers in the higher positions

Note that the two signs, the dot and the shell, are separated and not placed together like the bars and dots were above. This is important because it has to be clear that they are in two different positions, with the dot clearly in a higher position than the shell.

Just so you are sure which position the bars, dots, and shells belong in, we are going to put them in boxes. (The Maya did not do this. Instead, they would just make sure there was enough space between the signs that it was clear what position they were in.) Thus,

20　　=　　　　　　　　　　　　　　(because 20 = **1**x20 + **0**x1)

Now, to start writing numbers bigger than 20, we replace the shell sign with the right number of dot and bars. Thus, we have:

21　　=　　　　　　　　　　　　　　(because 21 = **1**x20 + **1**x1)

In the upper position we have one dot, which stands for one 20.

In the lower position we have one dot, which stands for one 1.

Using the same idea we can write other numbers:

22 = (because 22 = **1**x20 + **2**x1)
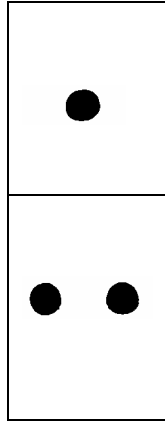
23 = (because 23 = **1**x20 + **3**x1)
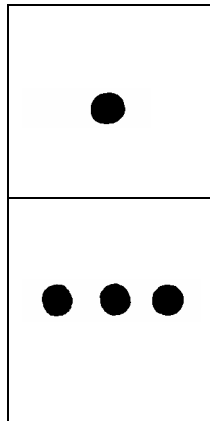
24 = (because 24 = **1**x20 + **4**x1)
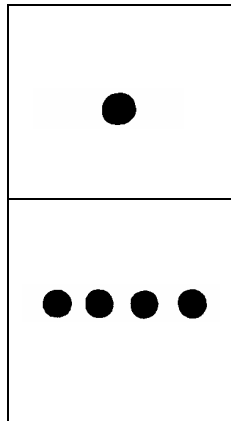
Now, as before, when we want a digit greater than 4, we start using bars:

25 = (because 25 = $\mathbf{1}$x20 + $\mathbf{5}$x1)
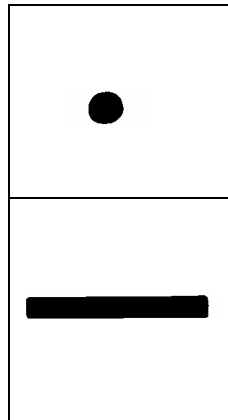
26 = (because 26 = $\mathbf{1}$x20 + $\mathbf{6}$x1)
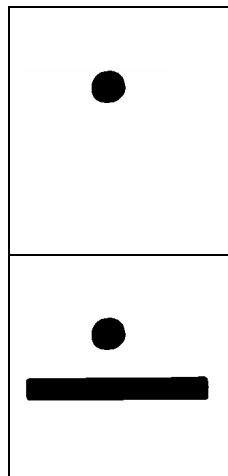
You probably get the idea by now. Here are a few more numbers up to 39. Make sure you understand each of these and that you can figure out how to write the numbers not shown.

30   =   (because 30 = **1**$_x$20 + **10**$_x$1)
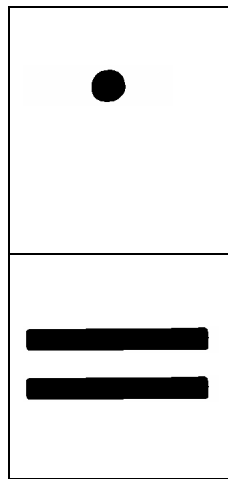
33   =   (because 33 = **1**$_x$20 + **13**$_x$1)
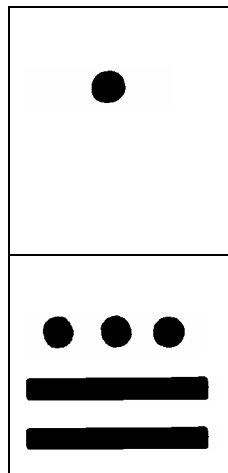
35 =   (because 35 = **1**x20 + **15**x1)
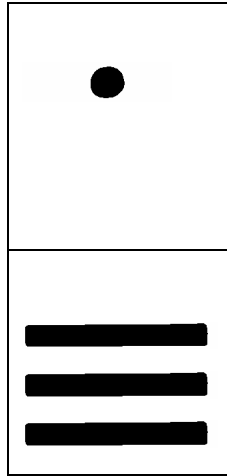
39 =   (because 39 = **1**x20 + **19**x1)
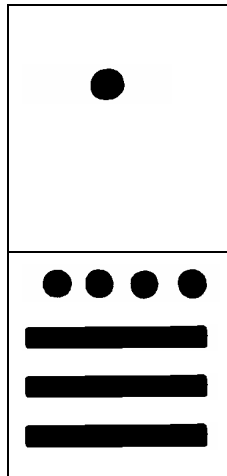
To start writing the numbers 40 and larger, we increase the number of 20s to two, and move the number of 1's back to zero. Thus, because 40 = **2**x20 + **0**x1 we have 40 =

The second position always tells you
how many 20s there are in the number.

The first position always tells you
how many 1s there are in the number, after
subtracting the sum of the
numbers in the higher positions.

The following is a sampling of numbers greater than 40. Make
sure you understand why each number is written the way it is.

41   =   (because 41 = **2**x20 + **1**x1)
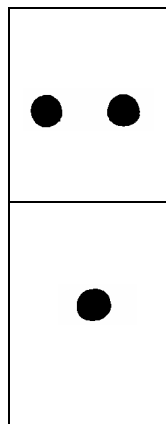
In the upper position we have two dots, which stand for two 20s.

In the lower position we have one dot, which stands for one 1.

45   =   (because 45 = **2**x20 + **5**x1)
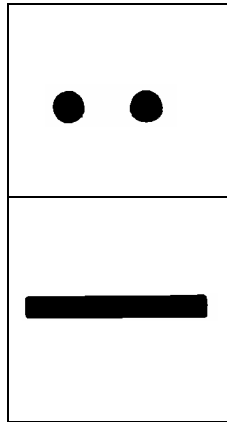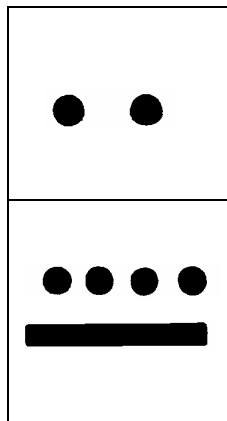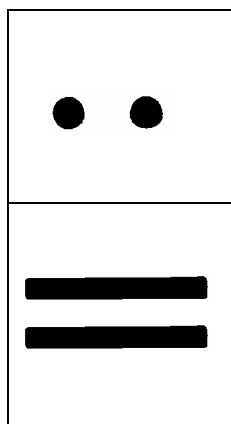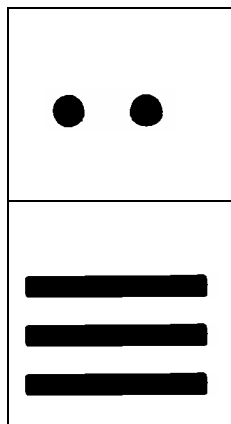
49   =   (because 49 = **2**x20 + **9**x1)

50   =   (because 50 = **2**x20 + **10**x1)

50 (Maya numeral: two dots over two bars)

55   =   (because 55 = **2**x20 + **15**x1)

55 (Maya numeral: two dots over three bars)

60   =   (because 60 = **3**x20 + **0**x1)

60 (Maya numeral: three dots)
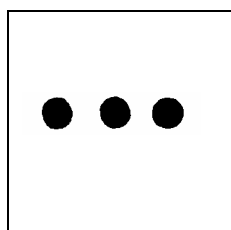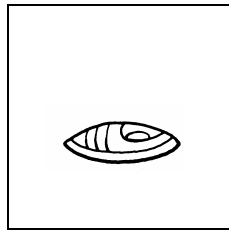
77　=　　　　　　　　　　　　　　(because 77 = **3**x20 + **17**x1)
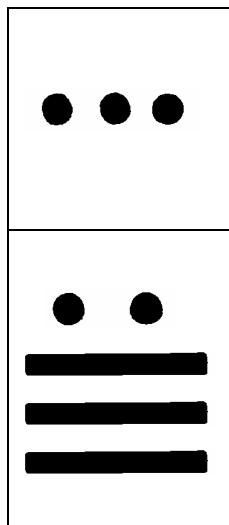
80　=　　　　　　　　　　　　　　(because 80 = **4**x20 + **0**x1)
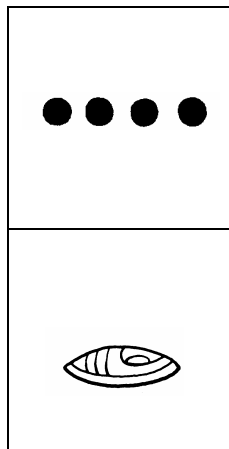
99 =   (because 99 = **4**x20 + **19**x1)
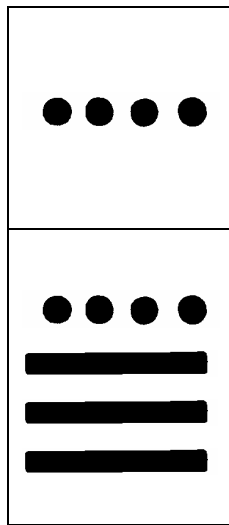
100 =   (because 100 = **5**x20 + **0**x1)
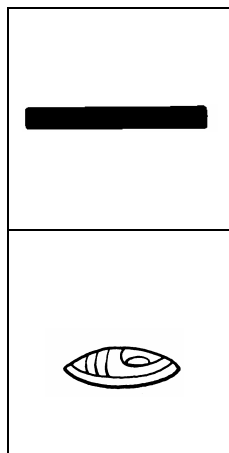
200 =   (because 200 = **10**x20 + **0**x1)
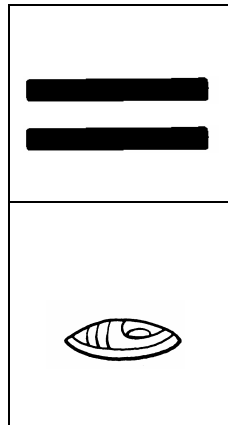
355 =   (because 355 = **17**x20 + **15**x1)
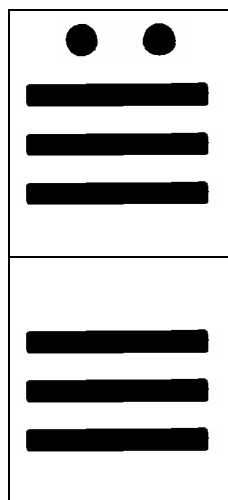
399 =   (because 399 = **19**$_x$20 + **19**$_x$1)
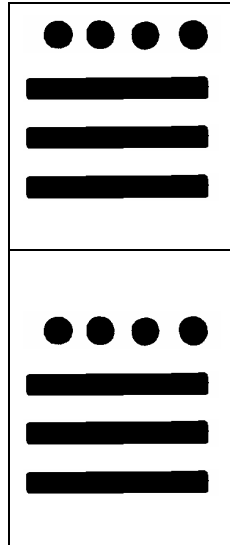
NUMBERS GREATER THAN 399

For numbers over 399, we start using the third position. The third position tells you how many 400s there are in the number. (Remember, the first position always hold the 1s, the second position holds the number of 20s, and now the third position will hold the number of 20x20s, that is, the number of 400s.) Thus,

400 =   (because 400 = **1**x20x20 + **0**x20 + **0**x1)
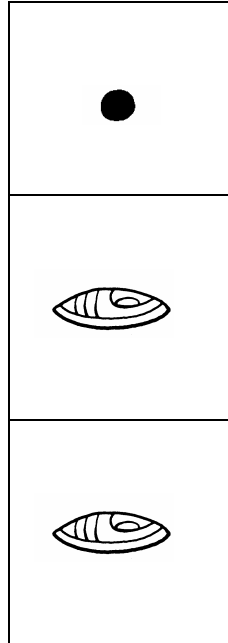
401 =   (because 401 = **1**x20x20 + **0**x20 + **1**x1)
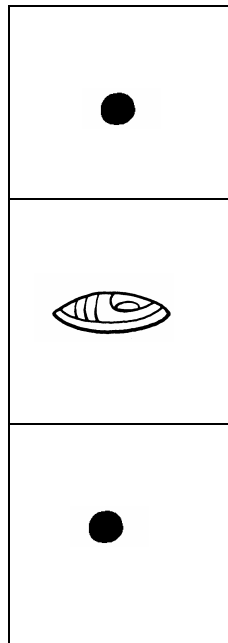
Maya numbers are quite useful for writing the years of the Gregorian calendar (i.e. the calendar that we use every day). Thus, for example, we can write 2006 as:

2006 =   (because 2006 = **5**x20x20 + **0**x20 + **6**x1)
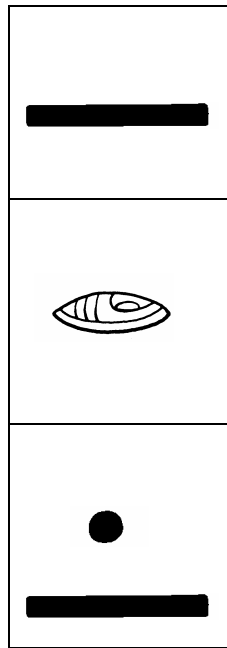
We can continue writing numbers in this manner up to 7999:

7999   =   (because 7999 = **19**x20x20 + **19**x20 + **19**x1)
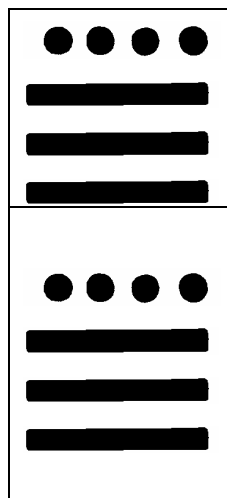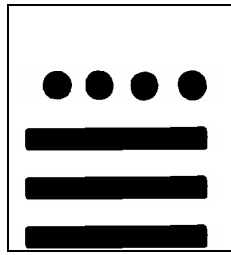
NUMBERS GREATER THAN 7999

When we get up to 8000, we have to use the fourth position in the Maya numbers. The fourth position holds the number of 8000s that are in the number we want to write, the third position holds the number of 400s, the second position the number of 20s, and the first position the number of 1s. (Note that you get these numbers by multiplying 20s. That is, first position = 1s, second position = 1x20 = 20s, third position = 1x20x20 = 400s, forth position = 1x20x20x20 = 8000s. This is the same as $20^0 = 1$, $20^1 = 20$, $20^2 = 400$, and $20^3 = 8000$. You can continue the same way for the fifth, sixth, and all higher positions.)

Thus, 8000   =
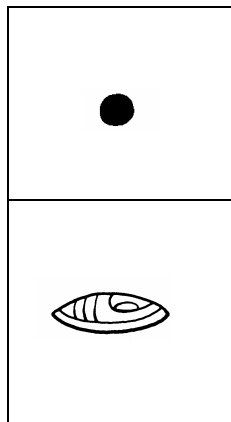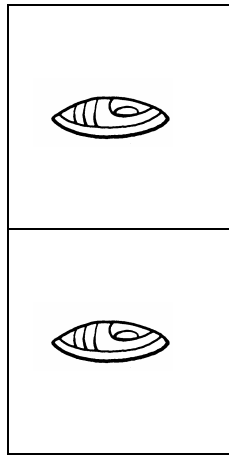
(because 8000 = 1x20x20x20 + 0x20x20 + 0x20 + 0x1).

And, 8421   =
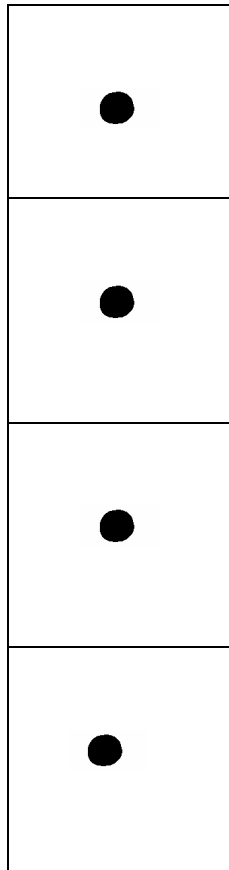
(because 8421 = 1x20x20x20 + 1x20x20 + 1x20 + 1x1).

    It should be obvious by now that we can write really big numbers using the Maya number system. In fact, just as in our

number system, there really is no limit to how big a number you can write.

Make up some numbers and practice writing Maya numbers on your own.
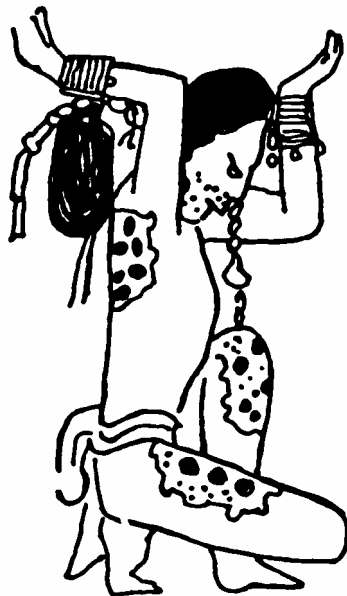
Maya God of the Number Nine

Chapter 2.

Writing Numbers with Glyphs

A Maya glyph from Palenque signifying zero days.

MAYA HEAD GLYPHS

The Maya usually had more than one way to write things. As we saw earlier, the Maya had some special glyphs for the number 0. In addition, the Maya used 'head glyphs' and 'full body glyphs' for the numbers from 0 to 19.

First, let's look at some head glyphs for the numbers. The following shows the most common head glyph for each number up to 19, together with a few clues on how to distinguish each one. We've also included in parentheses the ancient Maya word for each number.
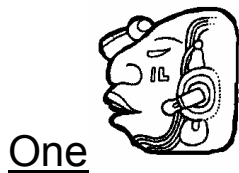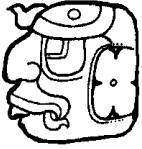
One (*jun*) – Young female goddess (possibly of the moon). Note the single long curling lock of hair along the jaw. Also, the 'IL' sign frequently appears on the cheek and there is an ornament on the forehead. Usually the forehead ornament (just behind the upper part of the nose) has more than one part.

<u>Two</u> (c*ha'*) – The head of a man, with a hand over the head and the '*sak*' sign to the left. (*Sak* was a Maya sign for white. See *Book 1: Writing with Maya Glyphs.*)

<u>Three</u> (*ux*) – The head of a person with a disk on the forehead, often with a woven headdress, and often with the 'IL' sign or a "T" sign on the cheek.

<u>Four</u> (*chan*) – The Sun God, identified by the square shaped eye and square pupil. It often has the *k'in* (sun) sign, here shown where the ear would be. Also, there is often a filed front tooth and a wavy sign coming from the corner of the mouth.

<u>Five</u> (*ho*) – An aged face. This glyph always contains the 'tun' or year sign, i.e. . (We will explain this sign later when we discuss the Maya calendar.)

Six (*wak*) – Identified by the hatchet (which looks like an X) where the pupil ought to be. Also, like the number 4, there is often a filed front tooth and a wavy sign coming from the corner of the mouth.

Seven (*wuk*) – The Jaguar God of the underworld, this glyph has a curl in the eye, and often a filed front tooth.

Eight (*waxak*) – The young Corn God. In the glyph there is a single curl on the forehead, the 'IL' sign may appear on the cheek, and a series of dots or wavy line along the side of the face (which may represent grains of corn). Sometimes the hair and the back of the head sweeps back to form a shape like an ear of corn with protruding corn silk. It can be easy to confuse the eight with the one. Usually the eight will have a single ornament on the forehead, (whereas the number "one" will usually have an ornament with 2 or 3 separate parts).

Nine (*bolon*) – A young man with a beard and jaguar spots on the check, this glyph is probably a representation of Yax

Balam. Note the *yax* glyph, , meaning 'first' on the forehead.
(Yax Balam was one of the heros from the Maya creation myth
called the Popol Vuh.)
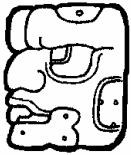
Ten (*lajun*) – The skull of the God of Death. Note
the large fleshless jaw. Sometimes there will be a '%' sign on the
check (a Maya sign of death).

Eleven (*buluk*) - Head of the Earth Goddess. Note
the cross-hatched eye and the curl on the forehead in the shape
of a question mark.

Twelve (*lajcha*) – A god who wears the sky symbol,
 ,*chan*, on his forehead.

For numbers 13 through 19, the glyphs are the same as for
the numbers 3 through 9, except that the fleshless jaw of the God
of Death is added:

Thirteen (*uxlajun*) - Same as the number three,
except that the glyph has the jawbone of the God of Death.

<u>Fourteen</u> (*chanlajun*) – Same as the number four, except that the glyph now has the jawbone of the God of Death.

<u>Fifteen</u> (*holajun*) – Same as the number five, but with the jawbone of the God of Death.

The pattern is repeated for numbers sixteen through nineteen:

<u>Sixteen</u> (*waklajun*).

<u>Seventeen</u> (*wuklajun*).

<u>Eighteen</u> (*waxaklajun*).

<u>Nineteen</u> (*bolonlajun*).

<u>Zero</u> (*mih*) – A head with a hand over the lower jaw.

As indicated before, zero is often used to signify that something

has been completed or finished. Similarly, as we will explain later, when used in relation to time and the calendar, the Maya used the number zero to indicate the end or completion of some period of time (often the 20th period of time).
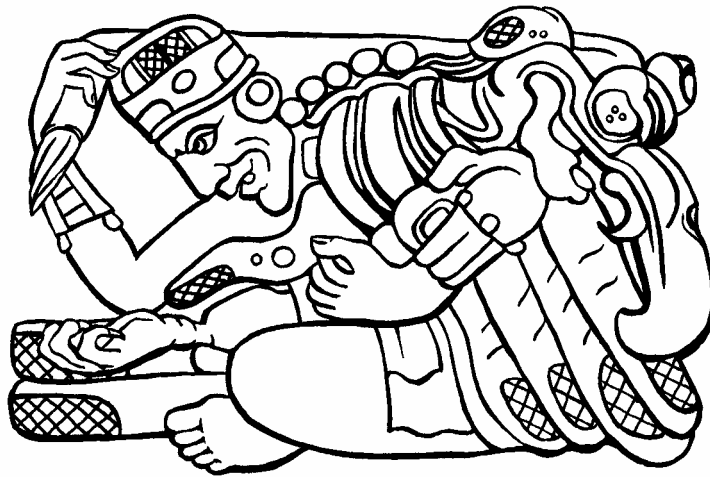
A glyph signifying 5 years from Copán, Honduras.

Below all the head glyphs are placed together. Before moving on to the next section, make sure you know one or two key characteristics for each head glyph and can distinguish each one.

1   11

2

3

4

5

6

7

8

9

10

12

13

14

15

16

17

18

19

0
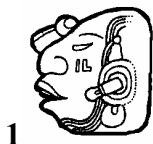
THE NUMBER 20

Before we start on the Maya calendar, there are some special glyphs that you should know for the number 20. The number 20 was special because the whole number system was based on this number, and the Maya had some special signs for 20. Here are two of the most interesting, which you should learn to recognize:

20   20

Two numbers that you will see frequently in Maya glyphs are the numbers 29 and 30. This is because the 'lunar month' (i.e. the time from one New Moon to the next New Moon) is always about 29 ½ days. The Maya would round this fractional period to the closest number of full days, which would be either 29 days or 30 days. Here's how the Maya often wrote the numbers 29 and 30:
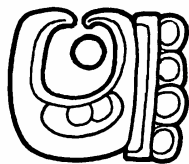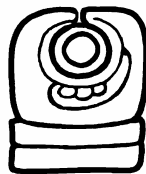
29   30

These numbers combine the special sign for the number 20 with bars and dots for either 9 or 10. Make sure you understand why these glyphs equal the numbers 29 and 30.

As we will see in later chapters, Maya months in the "civil" calendar had 20 days. And they had another cycle of 20 days in their "sacred" calendar. Instead of decades consisting of 10 years, they had *k'atuns* that were 20 years each. So, 20 was indeed a special number.

Although it is frequently said that the Maya did not have fractions, they certainly understood fractions, and even sometimes had symbols to denote them. For example, to denote a period of 10 years, they might use a glyph that stood for one-half a k'atun (that is, one-half of a twenty year period). The glyph for a 10 year period written this way was .

Finally, there was a special glyph for the number 1. How would you say "one" if you could not speak? If you said: "by holding up one finger", you are beginning to think like the ancient Maya. Thus, besides the single dot, the Maya glyph for the number one (*jun* in the Maya language) is: .
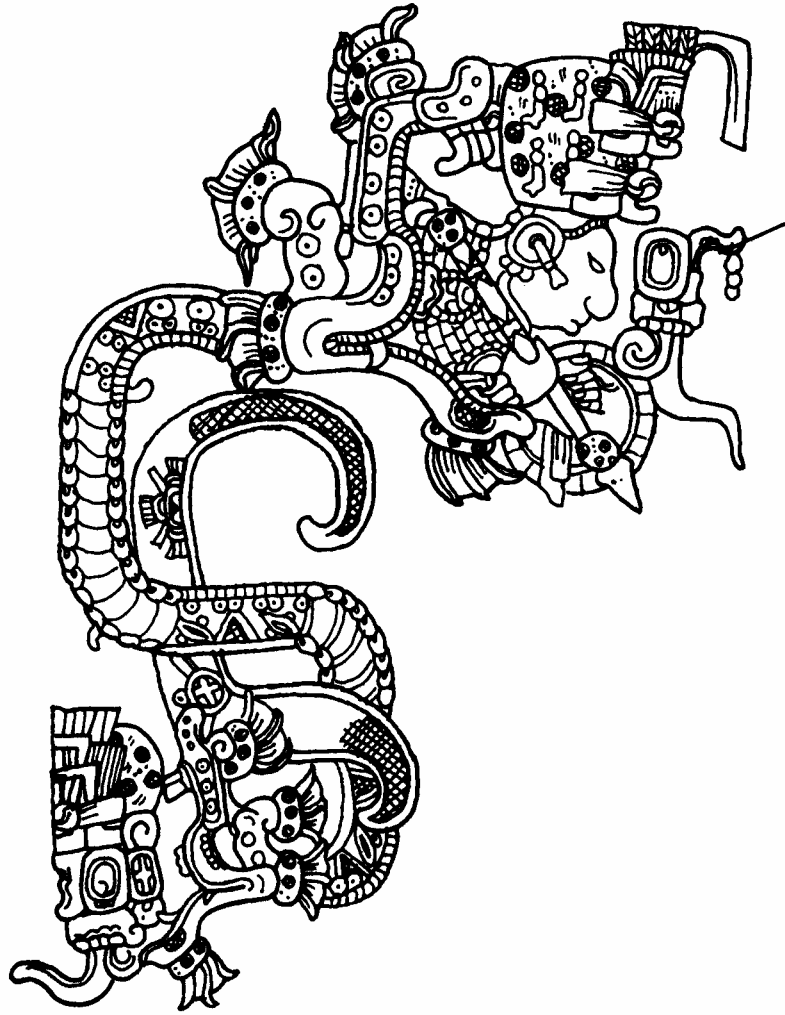
A Vision That Appeared to a Maya Queen on 9.12.9.8.1 .

Chapter 3.

The Sacred and Civil Calendar

of the Maya

A carrier of time bearing his load, from Copán, Honduras.

OVERVIEW OF THE MAYA CALENDAR

Creating a calendar and keeping track of the days and seasons is not easy. And no one's calendar is simple. To understand how complicated it can get, all you have to do is think about our own calendar. Our year has 12 months, some with 31 days, some with 30 days, and one with 28 days (except every four years, when it has 29 days.) Then, we have 24 hours in each day (which consists of two segments of 12 hours each, am and pm), 60 minutes in each hour, and 60 seconds in a minute. So we use 28, 29, 30, and 31 days, 12 and 24 hours, and 60 minutes and 60 seconds, despite the fact that we base our number system on 10. In fact, the number 10 is not really used at all in keeping track of time. Now that's complicated!

The ancient Maya were incredible astronomers and mathematicians. In fact according to some calculations, when the Spanish came to Meso-America in the early 1500s, the ancient Maya measurement of the length of the year was the most accurate in the world, including that of Spain.

In this chapter, we will explain the Maya calendar system and how it worked. The Maya calendar is made up of three cycles called the *Tzolk'in*, the *Haab*, and the Long Count. Despite its precision, the Maya calendar is steeped in traditions that in many cases relate to Maya stories about the creation of the world.

In parts of Guatemala and Mexico the traditional Maya calendar is still used alongside the Gregorian calendar.

You might find the Maya calendar hard at first. But if you read through this section more than once, and keep in mind that there is no one "right" way to keep track of time, you will soon be able to understand the Maya calendar. The Maya calendar is beautiful and in many ways more logical than our own.

AN EXAMPLE

The Gregorian date we call "Saturday, April 12th, 1997" records:

Saturday	The day in a cycle of 7 **days** with *names* (the week)
12th	The day in a cycle of **days** with *numbers* (day of the month)
April	Where the day falls in a cycle of 12 **months** with *names*
1997	Count of *years* since the beginning of the Christian cycle

To compare, this same date as written by the Maya is
"*5 Lamat 6 Pop   12.19.4.1.8*"

5	The **day** in the cycle of 13 **Tzolk'in** *days with numbers*
Lamat	The **day** in the cycle of 20 **Tzolk'in** *days with names*
6	The **day** in the cycle of 20 **Haab** *days with numbers*
Pop	The **month** in the cycle of 18 **Haab** *months with names*
12.19.4.18.8	Count of *years* since the birth of a Maya cycle

The Maya would also normally record additional information about the moon -- days since its appearance, the name and number of the lunar cycle, and the number of days in the lunation. They would also tell us which "Lord of the Night" ruled[1]. (Endnotes appear at the end of this book.)

Now let's learn what these names and numbers mean and how we can write a Gregorian date in Maya glyphs.

THE SACRED CALENDAR & SACRED YEAR (Tzolk'in)

The sacred Maya calendar was called the *Tzolk'in*. This Sacred Calendar is still used in some Maya communities today.

The sacred *Tzolk'in* calendar had 260 days. The *Tzolk'in* consists of the numbers 1-13 alternating against a cycle of 20 day names, with their number-day combination restarting every 260 days (13 x 20 = 260). You might find it useful to think of these two cycles as two "weeks" going on at the same time – one week where the days have numbers, and one week where the days have names.

The twenty day names in the Maya Sacred Calendar are:

Imix

Ik'

Ak'bal

K'an

Chikchan

Kimi

Manik'

Lamat

Muluk

Ok

Chuwen

Eb

Ben

Hix

Men

Kib

Kaban

Etz'nab

Kawak

Ajaw

The other cycle within the Tzolk'in had 13 days and gave each day a <u>number</u> (but not a name). Thus, the days were simply 1, 2, 3, etc up to 13. After 13, this started over again with day 1, then 2, 3, etc.

For example, as shown in the table below, if we start with 1 Imix the Tzolk'in will proceed for 13 days until it reaches 13 Ben. Then, for the next 7 days it counts from 1 Ix (day 14), 2 Men (day 15), 3 Kib(day 16), etc, up to 7 Ajaw — for a total of 20 days.

Then the days with names will start over again with Imix, but with the day number 8, i.e. a Tzolk'in date of 8 Imix.

Count of the Tzolk'in
1 Imix
2 Ik'
3 Ak'bal
4 K'an
5 Chikchan
6 Kimi
7 Manik'
8 Lamat
9 Muluk
10 Ok
11 Chuwen
12 Eb
13 Ben
1 Hix
2 Men
3 Kib
4 Kaban
5 Etz'nab
6 Kawak
7 Ajaw
8 Imix, etc…

The reason the *Tzolk'in* has 260 days is that it takes exactly 260 days for the calendar to repeat. If you start with any day

number and day name combination, it will be 260 days until that combination of day number and day name are repeated.

Thus, in the sacred *Tzolk'in* calendar every day had both a name and a number. Like most sacred calendars, the days were full of meaning. Much meaning was, and is, ascribed to each of the twenty days in the 20 day cycle, and to a lesser extent, to each of the numbers in the 13 day cycle.

Below are the days that formed the 20 day cycle in the sacred calendar together with their glyphs. Each day glyph is composed of a "cartouche," which is a circular frame with some curls on the bottom. Whenever you see a date glyph with a cartouche, you can be sure you are looking at a glyph for one of the days.

You should learn to recite these days in order, and learn to recognize at least one glyph for each day. Also, read the descriptions carefully so that you understand the meaning of the day or the glyph for the day.
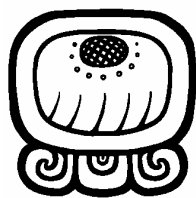
Imix

The glyph for Imix contains a water lily. According to Maya traditions, Imix represents darkness and the Water Lily Monster.
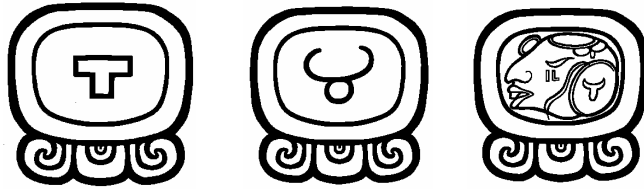
Ik'

Ik' represents the wind. The 'T' form in the center is the Maya glyph for wind. A similar form appears on the ear spool of the head on the right. (We also saw it on the head glyph for "3.") Ik' can also represent the human voice, air, and life.

Ak'bal

Ak'bal represents a serpent and darkness. Within the glyph are representations of snake markings (on the upper part) and the scales of a snake (on the lower part). Ak'bal can also represent dawn and morning.
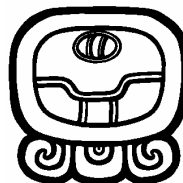
K'an

K'an represents a grain of corn, the Corn God, and food itself. The word K'an in Mayan languages means yellow.
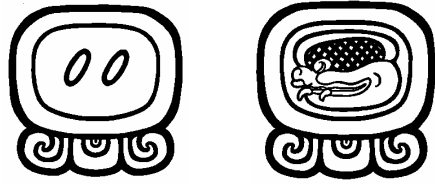
Chikchan

Chikchan represents the feathered serpent, or the serpent of the heavens. It also represents justice, peace, and truth.
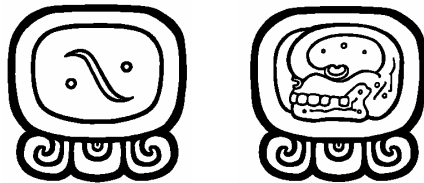
Kimi

Kimi represents death, the Lord of Death, and the Lords of the Underworld. The "percent" sign in the center of the glyph on the left, and on the cheek of the skull on the right, was a Maya symbol of death. (We saw these signs earlier on the glyphs for the number 10.)
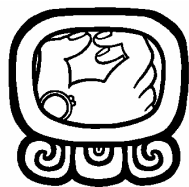
Manik'

In the center of the glyph for Manik' was a hand. This glyph represents the deer.

Lamat

Lamat represents Venus. Venus was very important to the ancient Maya.
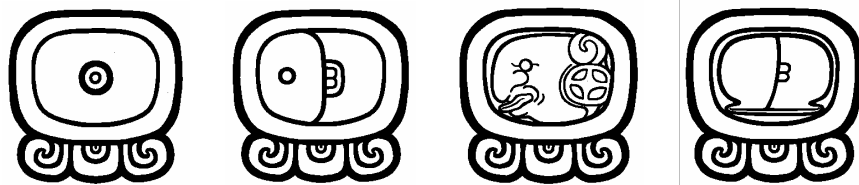
Muluk

Muluk represents water and animals that live in the water. In the third glyph, you can see the head of an animal.

Ok

Ok represents the dog, the guide, friendship, and fidelity.
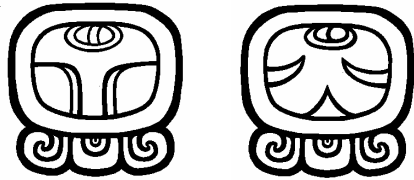
Chuwen

Chuwen represents a monkey. According to tradition, the Sacred Year starts on 8 Chuwen. Chuwen is a symbol of the step-brothers in the Maya story of creation, the Popol Vuh. These brothers were changed into monkeys.

Chuwen can also represent thread and the continuity of life.

Eb

The glyph for Eb contains the skeletal head of the Lord of Death. The glyph for Eb is similar for the glyph for Kimi (see below), but it has the cluster of "grapes" on the back part of the head. Eb can also represent the teeth.
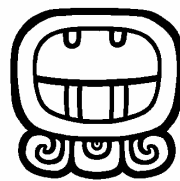
Ben

The glyph for Ben can be quite simple. It represents corn, but also trees and reeds.
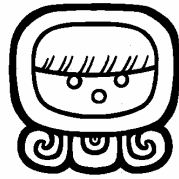
Hix

Hix signifies the jaguar. The three dots could represent the spots of the jaguar.

Men

A supernatural bird appears in the center of the glyph for Men. Men represents the birds.
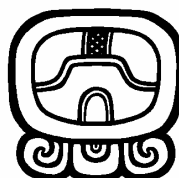
Kib

Kib is a representation of a sea shell.

Kaban

Kaban represents the Earth. (The shaded spot together with the 'squiggle' usually represent the Earth.) It can also represent thought, knowledge, and science.

Etz'nab

This glyph represents a knife blade made of stone or obsidian.
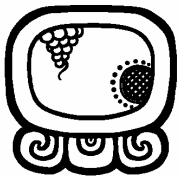
Kawak

Kawak is associated with rain and storms. The form in the upper left represents storm clouds. The circular part inside the cartouche can represent the year or a stone.

Ajaw

Ajaw is the day of the God of the Sun. It is also a title that means "Lord." It also represents Junapuh one of the hero twins of the Maya creation story, the Popol Vuh. On the glyph on the right, you can see the characteristic single *jun* spot on the cheek, as well as the headband that was a symbol of royalty.

In Appendix 2 all the days of 2004 are shown with their corresponding day from the Maya Sacred Calendar (as well as other aspects of Maya dates that we have not discussed yet). Look at those dates to make sure you understand how the day names were used alongside the day numbers in the *Tzolk'in*.

It is important to know that while all days in the Sacred Calendar have a special meaning, certain days in the sacred calendar stand out above the rest. For example, according to modern Maya traditions in Guatemala, *8 Chuwen* is the first day of the sacred year. Other special days in the sacred year together with their meanings can be found in Appendix 1.   Since the *Tzolk'in* has only 260 days, special days in the *Tzolk'in* may sometimes occur twice in one year in the *Haab*, or twice in our Gregorian calendar. For example, in 2005, the start of the sacred

year, i.e. day 8 *Chuwen* occurs two times, and thus there are two 'New Year's Days' in the Gregorian year of 2005.

THE CIVIL CALENDAR & CIVIL YEAR (*Haab*)

The ancient Maya had both a Sacred Calendar and a Civil Calendar. We also have both sacred and civil calendars. For example, we have the regular (i.e. civil) calendar that everyone uses. However, the Christian church, for example, has its own calendar to mark important events in the life of Christ and the saints. The church calendar can operate quite independently from the civil calendar. This is why Easter falls on a different date each year. Similarly, other religions have their own sacred calendars to mark days that are important in those religions.

The Maya Civil Calendar is called the '*Haab*' in Mayan languages. This calendar has 365 days per year, which is sometimes called the 'vague year.' It is the same as our year, but does not make the leap year adjustments every four years, (although the ancient Maya certainly knew that the length of the year was approximately 365-1/4 days).

The year in the civil, or *Haab*, calendar consists of 18 months, each with 20 days. At the end of the year, there is a special month of only 5 days, which gives the total of 365 days.

The names and glyphs for the 18 full months and the one short month are given below. The name in ancient Maya is given in parentheses.

Pop   (*K'anjalab*)

Wo   (*Ik'at*)

Sip   (*Chak'at*)

Sotz'   (*Sutz'*)

Sek (*Kasew*)

Xul (*Chikin*)

Yaxk'in (*Yax K'in*)

Mol (*Mol*)

Ch'en (*Ik' Sijom*)

Yax   (*Yax Sijom*)

Sak   (*Sak Sijom*)

Keh   (*Chak Sijom*)

Mak   (*Mak*)

K'ank'in   (*Uniw*)
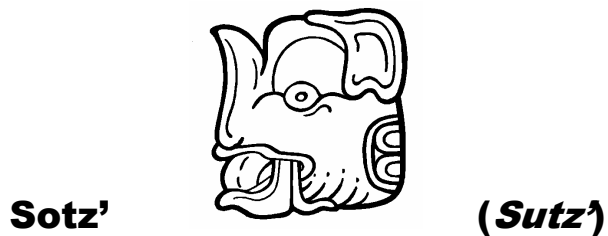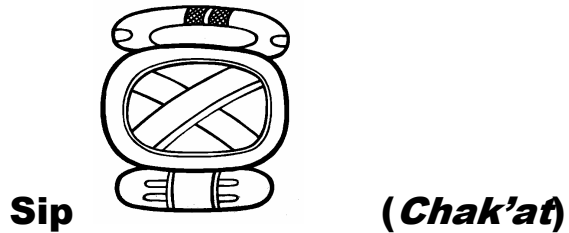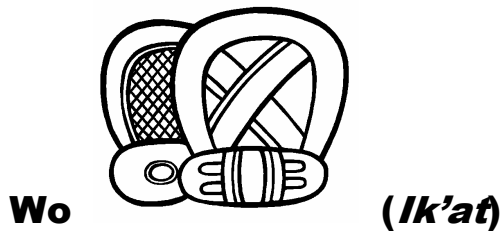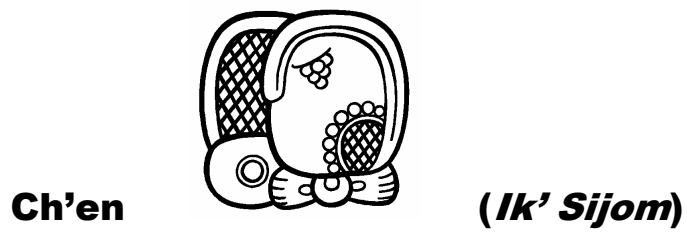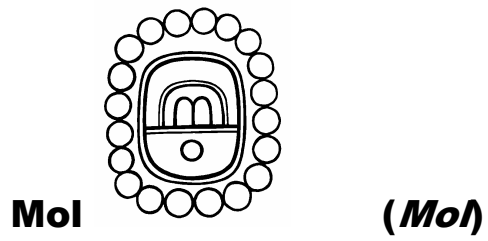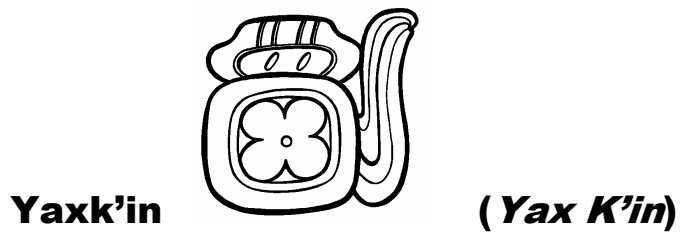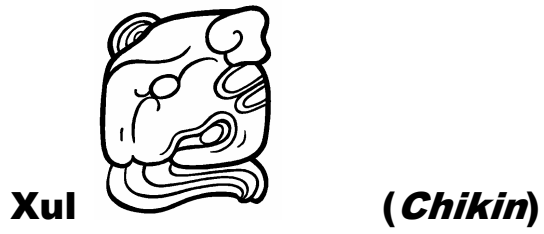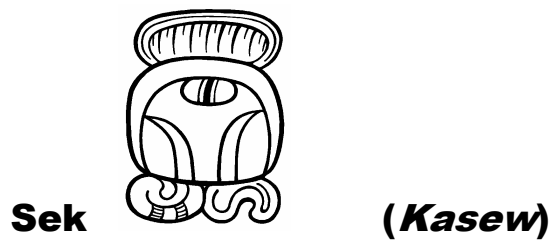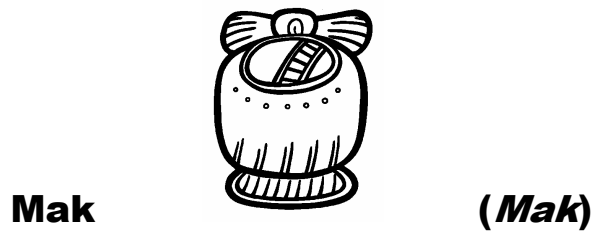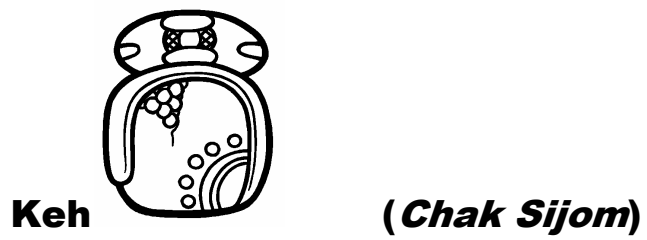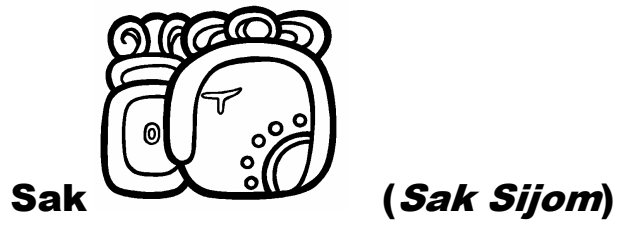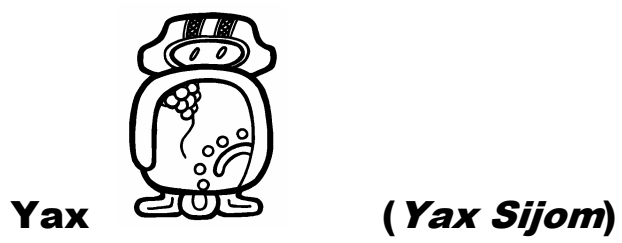
Muwan (*Muwan*)
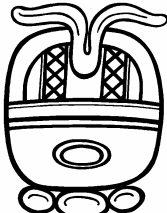
Pax (*Paxil*)
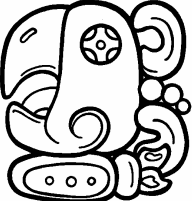
K'ayab (*K'anasiy*)
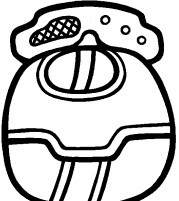
Kumk'u (*Hul Ol*)
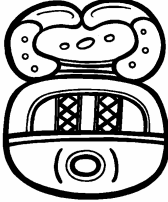
Wayeb (*Uway Hab*)

In the Maya *Haab* calendar, the months function very much like ours do. That is, for any given month we count through all the days of that month, and then move on to the next month. All the Maya months have 20 days, except the very last month Wayeb, which has only 5 days. The 5 days of the month of Wayeb are usually considered to be a time of bad luck.

Normally the day 1 Pop is considered the first day of the civil year, just as 1 January is the first day of our year. In 1999, 1 Pop was on April 7th. But, because of the leap year in 2000, 1 Pop falls on April 6th in the years 2000, 2001, 2002, and 2003. Then, because of the leap year in 2004, the day 1 Pop shifts to April 5th in the years 2004 through 2007. Thus, 1 Pop stays on the same day for four years in the Gregorian calendar, but then comes one day sooner in the year after each leap year.

As we said, the *Haab* calendar months work very much like ours do. Starting with 1 Pop, the next day is 2 Pop, then 3 Pop, etc. We move through the 20 days of the month of Pop, and then move on to the next month, called Wo. We go through the 20 days of Wo, and move on to the next month, called Sip, and so forth throughout the year in a manner very similar to our own calendar.

The only unusual aspect of this calendar is that although there are 20 days in each of the 18 months, the last day of the month is not called the 20th. Instead, the last day of the month is referred to as the 'seating,' or 'putting in place,' of the next month.

So, the day after 19 Pop is not 20 Pop, but instead the 'seating of Wo.' And the day after 19 Wo is not 20 Wo, but instead the seating of Sip. The day after 19 Sip is the seating of Sotz', and the day after 19 Sotz' is the seating of Sek, and so forth throughout the year.

If you think about it, the Maya were not doing things very much different from the way we sometimes do things. For example, we often call December 31st "New Years Eve." Thus, like the ancient Maya, we don't name the day for what it is (the last day of the old year), but instead we name it for what is about to happen (i.e. the New Year).

In the language of the ancient Maya, the word for seating was *chum*, and they had several special glyphs to signify the day of seating, or the last day of the month. Here are three that you will see a lot:
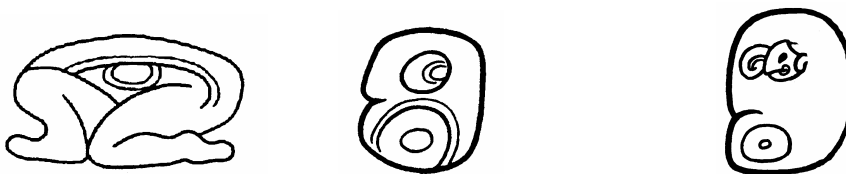
So, how do we write a Maya date? It's easy! To write the Maya month and day of the month, just combine the glyph for the month with the glyph for the number. The number glyph should be placed to the left or above the glyph for the month. For the

number, you can use either bars and dots or a head glyph that stands for the number. Thus, for example, you can write:

 11 Ch'en
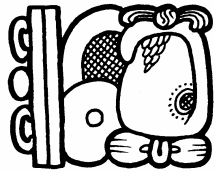
17 Mak

9 Yax

Seating of Muwan

(i.e. the last day of K'ank'in)

We can do the same with dates from the Tzolk'in. To write a date from the Tzolk'in, just write the glyph for the name, with the Tzolk'in number to the left or on top.

Make sure you understand each of these glyphs before moving on to the next section.

THE CALENDAR ROUND

Okay, now you know about the *Tzolk'in* and sacred year, and about the *Haab* and civil year. When we put them together we get the "Calendar Round." The Calendar Round for any day is just the date in the *Tzolk'in* together with the date in the *Haab*.

When the ancient Maya wanted to give a date, they would usually tell us the date in Calendar Round. Thus, for example, a day might be given as *5 Kimi 4 Pop*. This means that the day <u>number</u> in the *Tzolk'in* is 5. The day <u>name</u> in the *Tzolk'in* is *Kimi.* And, in the *Haab*, the day falls on the 4th day of the month *Pop*.

In a Calendar Round date there are always two numbers and two names, and they are always written in the same order:

(1) the day number in the *Tzolk'in*,

(2) the day name in the *Tzolk'in*,

(3) the day of the month in the *Haab*, and

(4) the month in the *Haab*.

As you can see by now, in the Maya calendar there are several cycles all going on at the same time. First, there is the *Tzolk'in* cycle which consists of numbers 1 - 13 alternating against a cycle of 20 day names. Then there are the days and months in the *Haab*, which has 18 months of 20 days each, and one short month of 5 days.

Below is a picture of how it all works. In the illustration the calendars are shown as gear wheels that move ahead one cog

each day. In the picture, we start with the Calendar Round date of *4 Ajaw 8 Kumk'u*, (but we could have started with any Calendar Round day). The important thing is to visualize how the calendar gears move forward and how the Maya dates change each day.

In Appendix 2, the Calendar Round dates for each day in 2004 are given. Look through these dates to check your understanding of how all the Maya cycles of time fit together.
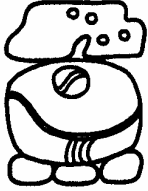
You now know that the *Tzolk'in* repeats every 260 days, and that the *Haab* repeats every 365 days. But how long does it take for a Calendar Round date to repeat? For example, if we start with 4 Ajaw 8 Kumk'u, how long before 4 Ajaw 8 Kumk'u shows up again? It turns out that it takes approximately 52 of our years for this exact date to reappear. (To be more exact, it takes exactly 52 Maya civil years, or 52 x 365 days, for the date to show up again.)

For the ancient Maya, who usually did not live as long as we do today, any particular Calendar Round date would usually show up only once in a life time. Thus, one could speak of 5 *Kimi 4 Pop*, or any other Calendar Round date, and it would be clear when one talking about. We do more or less the same thing ourselves. For example, we might say someone was born in '98, and everyone knows perfectly well that we are talking about 1998, and not 1798, 1898, or 2098.

The number that will be in effect in 4 days' time.

K'an, the day that will be in effect in 4 days' time.

16 Kumk'u

15 Kumk'u

14 Kumk'u

13 Kumk'u

12 Kumk'u =

12 Kumk'u = Day that will be in effect in 4 days' time

11 Kumk'u

10 Kumk'u

9 Kumk'u

4 Ajaw 8 Kumk'u

7 Kumk'u

6 Kumk'u

5 Kumk'u

4 Kumk'u

3 Kumk'u

2 Kumk'u

1 Kumk'u

Seating of Kumk'u (The last day of K'ayab

19 K'ayab
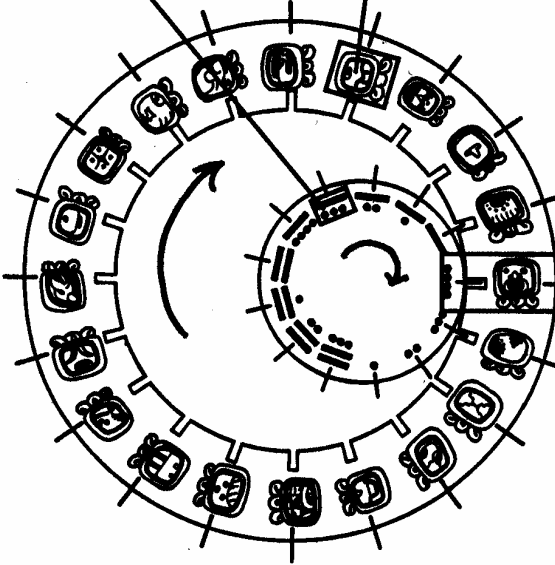
Kumk'u (month name)
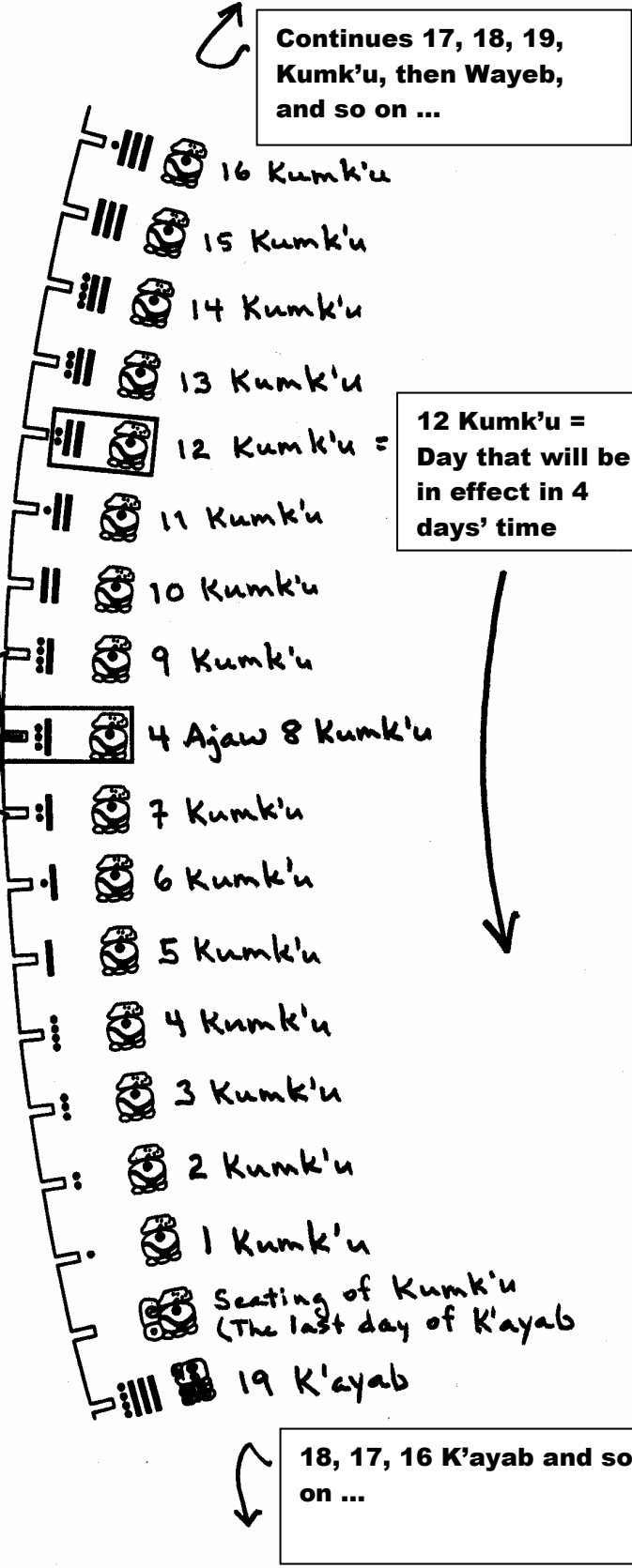
Finally, let's think a little bit more about how the Tzolk'in and Haab calendars fit together. The fact that there is a cycle of 20 days in the *Tzolk'in* and there are 20 days in the 18 months of the *Haab* produces some interesting facts of which the ancient Maya were well aware. First is the fact that, in any given civil year, the first day of all the months in the *Haab* start with the same day from the *Tzolk'in*. Thus, for example, if the first day of the civil year (i.e. 1 Pop) is on Ak'bal, then the first day of every month in that civil year will be Ak'bal. Similarly, if 1 Pop falls on Ben, then every month in that year will start on Ben.

Given the short month of 5 days at the end of the civil year, the first day of the next year has to be 5 days later in the Sacred Calendar. Thus, for example, if all the months in one civil year start with Ak'bal, then all the months in the next civil year will start with Lamat (because Lamat is five days after Ak'bal in the Sacred Calendar). Then, in the next civil year, all the months will start with Ben (because Ben is five days after Lamat in the Sacred Calendar). In the next civil year, all the months will start with Etz'nab (because Etz'nab is five days after Ben); and in the next civil year all the months will once again start with Ak'bal.

A rare glyph from Quirguá, Guatemala signifying one winal

70

Chapter 4.

Counting Time Through the Ages

A pair of glyphs signifying 9 Bak'tun, or about 3600 years. From Palenque, México.

THE LONG COUNT

The Maya had one very important way of measuring time that did not run in cycles. Instead, much like our years, each day just gets a little further from the starting point. For the ancient Maya, the starting point was the 'creation date' of the current world. This date corresponds to our date of August 11, 3114 B.C. For any important date, the ancient Maya would usually tell us how many days had transpired since this important starting date, and this was called "the long count."

For example, take the day April 12, 1997 that we looked at earlier. The Calendar Round date for this day is *5 Lamat 6 Pop*. It also turns out that this date is exactly 1,866,268 days after August 11, 3114 B.C., the beginning of the current era. (The ancient Maya also believed that there were earlier eras and earlier worlds each lasting 100 complete calendar rounds, or about 5200 years, but they say little of those very ancient times in their inscriptions.)

While the Calendar Round which repeats every 52 years is fine for most dates within a person's lifetime, it can be confusing when we look back over hundreds of years of Maya history. The good thing about the Long Count is that it lets us pin down a date more exactly than the Calendar Round. Thus, the Long Count number often comes to the rescue when there is confusion about

a date given by the ancient Maya. Knowing the Maya creation date of August 11, 3114 B.C. and knowing the Long Count date, means that we can calculate the exact date in our calendar simply by counting days since the creation date. (It might be easier to let a computer do the counting, rather than trying to do it yourself, as the Maya did.)

When the Maya gave a Long Count date, they would not say "It was 1,866,268 days after the creation of the current world." That was just too hard. Instead they would do what we do. When we are talking about a date in the distant past we don't use the exact number of days. Instead we say, for example, "a thousand years ago," "a century ago," "3 ½ years ago," or even "4 score and 7 years ago."   Even when we give a date like April 12, 1997 we are really making reference to an event that happened 1997 years, 3 months, and 12 days ago and which marked the start of *our* current era.

The Maya did likewise, but of course used their own numbering system (based on the number 20), and their own 18 months with 20 days each. This system of keeping track of time was distinct from the civil and sacred calendars, although like the civil calendar, there were 18 months of 20 days each.
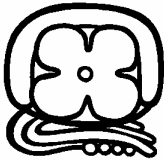
The blocks of time in this system were the day (called the *k'in*), a month of 20 days (called a *winal*), and a period of 18 months or 360 days (called a *tun*). This 360-day time block is also sometimes called a "short year," and does not include the

extra 5 days that are included in the civil year. For longer periods, the Maya used a period of 20 short years (called a *k'atun*), and a period of 20 *k'atuns*, or 400 short years (known as a *bak'tun*).
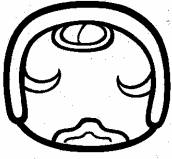
Thus, a Long Count date, i.e. the number of days since the beginning of the current era, would be the number of bak'tuns, the number of k'atuns, the number of tuns, the number of winals, and the number of k'ins since the creation date.

Here is a summary of the time periods used in the Long Count, and some of the glyphs that the ancient Maya used to signify these units of time.

Period	Length of Time	Simple Glyph	Head Glyph	Full-Body Glyph
K'in =	1 day			"Sun God"

The simple glyph and the head glyph for K'in contain the sign for the sun, which often resembles a four petal flower. The head and full body glyphs portray the Sun God.

| Winal = | 20 K'ins (= 20 days or one "month") | | | "Frog-Iguana" |

The simple glyph for Winal resembles a mouth with fangs. The head and full-body figures are usually combinations of portraits of a frog and an iguana. Note the characteristic curl at the corner of the mouth.

Tun =   18 Winals

(= 360 days, or one short year)
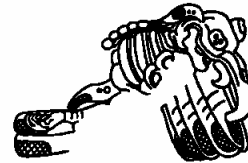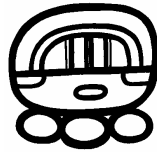
"Skull-Jaguar-Bird"

The simple glyph for Tun is a split oval with a "button" on the lower half, and an opening containing two vertical shaded stripes on the upper half. The head and full-body glyphs represent a figure that is part bird and part jaguar, and often has a skeletal jaw.

K'atun =   20 Tuns

(= 20 short years)

"Bird"

The simple K'atun glyph is similar to the simple Tun glyph, except that it is topped by an oval with side fins (which are glyphs for *k'a*). The head and full-body glyph are birds.

Bak'tun =   20 K'atuns

(= 400 short years)
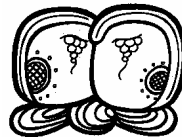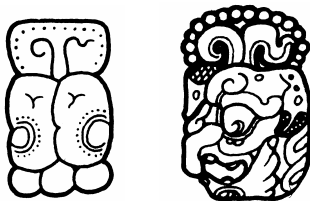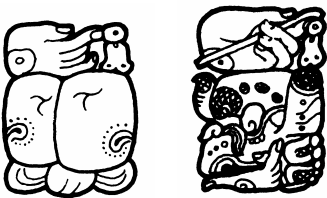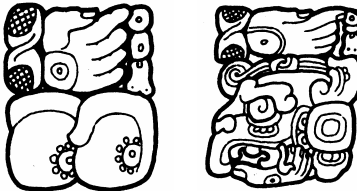
"Bird with Hand-Jaw"

A bird with a hand on the jaw is a characteristic of the head glyph and the full body glyph for the Bak'tun.

In most cases the Maya did not need units of time longer than the Bak'tun. However, they did have much larger units of time that

they could use when they wanted. Here are three even larger units of time.

Piktun   20 Bak'tuns
              (= 8,000 short years)

Kalabtun   20 Piktuns
              (= 160,000 short years)

Kinchiltun   20 Kalabtuns

              (= 3,200,000 short years)

Note how all the blocks of time fit in neatly with the Maya counting system based on 20. We use a counting system based on 10s, yet our calendar has 12 months, and the 12 months have 28, 30, 31, and sometimes 29 days. Next to our own system, the Maya system is quite logical and consistent.

The ancient Maya were conscious of units of time even larger than those shown above. Much longer periods appear on stelae from Tikal, Guatemala. A stela at Quiriguá in Guatemala

tells of events that happened about 24 trillion years ago. On a stela at Macanxoc (Cobá) in México, there are references to a block of time equal to about 42 x 1 billion x 1 billion x 1 billion years.

However, in most cases, the Maya used the blocks of time only up to the bak'tun because that was all they needed to describe dates in this era, or this world. Most of the inscriptions left by the ancient Maya start with 9 bak'tuns because it was in the 9th bak'tun that the ancient Maya flourished and did most of their writing. However, there are a few Long Counts dates from the ancient Maya that start with 8 bak'tuns and few that start with 10 bak'tuns. Also, when they wrote about mythological events in the distant past, the Maya would refer to the 13th bak'tun since each era is comprised of exactly 13 bak'tuns.

So then, how would we write the date April 12, 1997 in the Long Count system? If you counted all the k'ins, winals, tuns, k'atuns, and bak'tuns since the creation date of August 11, 3114 B.C, you would find that April 12, 1997 was the following quantity of time after creation:

12 Bak'tuns

19 K'atuns

4　Tuns

1　Winal

8　K'ins

A simple way to write such a date is to separate the parts with decimal points. In other words, we would write this Long Count date as "12.19.4.1.8" .

Also, we can easily calculate the number of days since creation given this information. In this case we have:

8 days + **1** x (20days) + **4** x (360 days) + **19** x (20 x 360 days)

  + **12** x (20 x 20 x 360 days) =

8 + 20 + 1440 + 136,800 + 1,728,000 days =   1,866,268 days

Using computer programs you can find the Long Count date, Calendar Round, and the Lord of the Night for almost any date that might be important to you, for example a birth date, the day an ancestor died, the birth of a brother or sister, or a wedding date. (See "Online Resources" at the end of this book for date program calculator and downloads.)

HOW TO WRITE A DATE IN MAYA GLYPHS

Finally, we are ready to write a date exactly as the Maya would have. We know that April 12, 1997 was *5 Lamat 6 Pop* in the Calendar Round, and that the Long Count date was 12.19.4.1.8 . We also know how to write all these numbers, and we know all the glyph signs as well.

So, here is the day April 12, 1997 as it might have been written on a Maya stela:
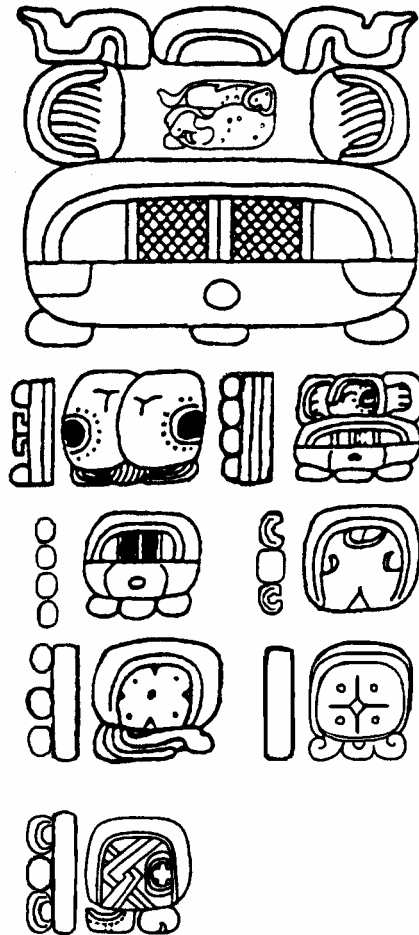
The only part of this date that you don't already know is the big sign at the very top. This is called the 'Introductory Glyph,' and tells you that a date is about to follow. It is usually the same for any date, except that the head on the inside of the glyph will change depending upon the month. As you can see, the Introductory Glyph resembles the K'atun sign, but is more

elaborate, and usually bigger. (See Appendix 3 for the head signs that appear in the Introductory Glyph for each month.)

The Maya wrote their sentences and their dates in paired columns. Thus, after the introductory glyph, you read from left to right on the first row, then move to the second row and read left to right, then on the third row, etc.

If you read in this way you will see that the inscription says

" 12 Bak'tuns, 19 K'atuns, 4 Tuns, 1 Winal, & 8 K'ins, (after the creation date) on 5 Lamat 6 Pop…"

At this point, a real Maya inscription would go on to tell about something important that happened on this date, like a birth, a death, or a coronation ("seating") of a king.

READING MAYA DATES

Now let's see how well you can read a Maya date from an ancient Maya monument. (You probably know more than you think you do.)

If you keep a few things in mind, you will find it easy to read the Long Count dates. Remember:

- The Long Count usually starts right after the introductory glyph and usually starts with 9 bak'tuns (although 8, 10, and 13 bak'tuns are also possible).

- Monuments are usually read in paired columns from top to bottom.

- The order for the Long Count is: bak'tuns, k'atuns, tuns, winals, then k'ins. The day number and day name from the Sacred Calendar come immediately after the number of k'ins.

If you keep these facts in mind, you can read dates even if you don't recognize the glyphs for the bak'tun, k'atun, tun, winal, and k'in. Keep in mind that we read from left to right, two columns at a time, move down one row and read left to right again, etc.

You can also do a quick calculation of the date on a stela to find out what year is referenced by the stela. To do such a calculation, first calculate the total number of tuns, (i.e. number of tuns, plus 20 times the number of k'atuns, plus 400 times the number of bak'tuns). The approximate year on the stela will be -3114 + 1 + .985 x (total number of tuns). You could be off by a year or so with this calculation, but at least you will know fairly closely the date on the stela.

You can test yourself on the following stelae. If given, you should also be able to read the Tzolk'in and Haab dates, as well as the Long Count.   For these inscriptions, you must remember

that zero has the special sign . (See endnote 2 at the end of this book for answers.)

   Besides just reading the Long Count number, calculate the approximate number of years since the creation date and the approximate year referred to on the stela.
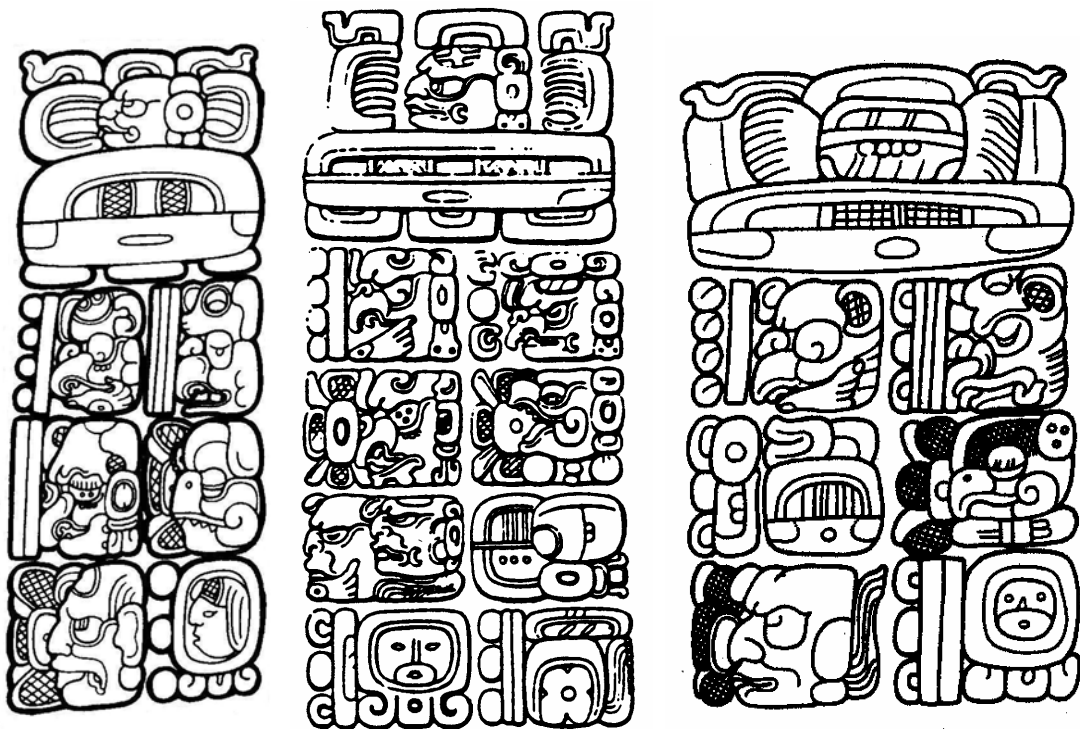
Below are two more to practice on. (Hint: The second one uses periods greater than a Bak'tun and indicates a truly major period ending.)
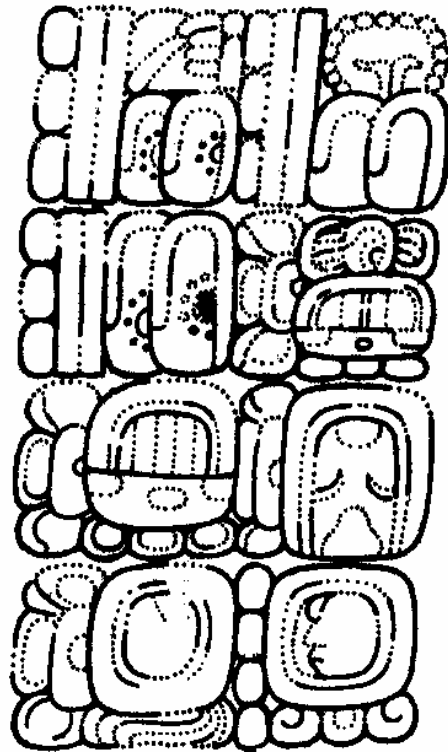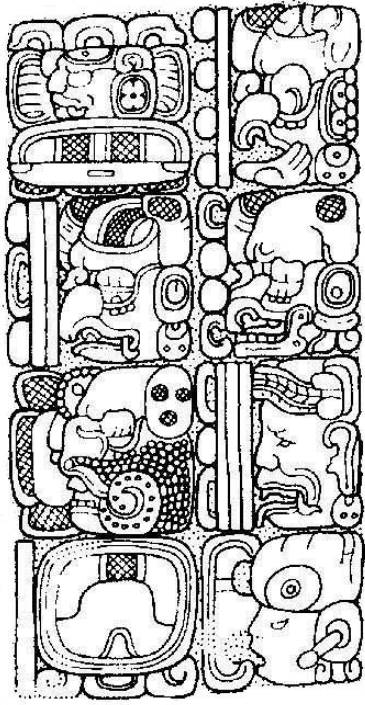
Now see if you can read the date from photographs of stelae.

This is usually harder than reading from drawings.

To test yourself on something a little harder, see if you can translate the following date taken from Quiriguá in Guatemala. Looking at the stela below, at first you may see a few numbers that you know, but otherwise there may not be anything you've seen before. You can see head glyphs attached to the numbers, but they are new.

But, you CAN read the date, despite the fact that there are glyphs you haven't seen before, because you know that right after the introductory glyph the inscription will give us the number of bak'tuns (usually 9), then the number of k'atuns, then the number of tuns, and then the winals and the k'ins. As usual, we read in paired columns.

So, you are ready to start reading this stela. Just read the numbers in order. You should see 9, then 17, then 0, another 0, and another 0. Thus, we have the Long Count date of 9.17.0.0.0 . So, you have been able read the Long Count date even though the glyphs that are attached to the numbers don't look familiar and there are other parts of the stela that you don't understand.

Dealing with glyphs you don't understand is part of the challenge of reading Maya glyphs. It happens to everybody, even the experts. There are Maya glyphs that no one understands and parts that are confusing to everyone. But usually there are other parts that we can read quite easily.

Here are some more stelae that you can practice on. The long count dates are given in endnote 2. (Hint: The second stela starts with an unusual number of bak'tuns because it refers to something that happened in the distant past.)
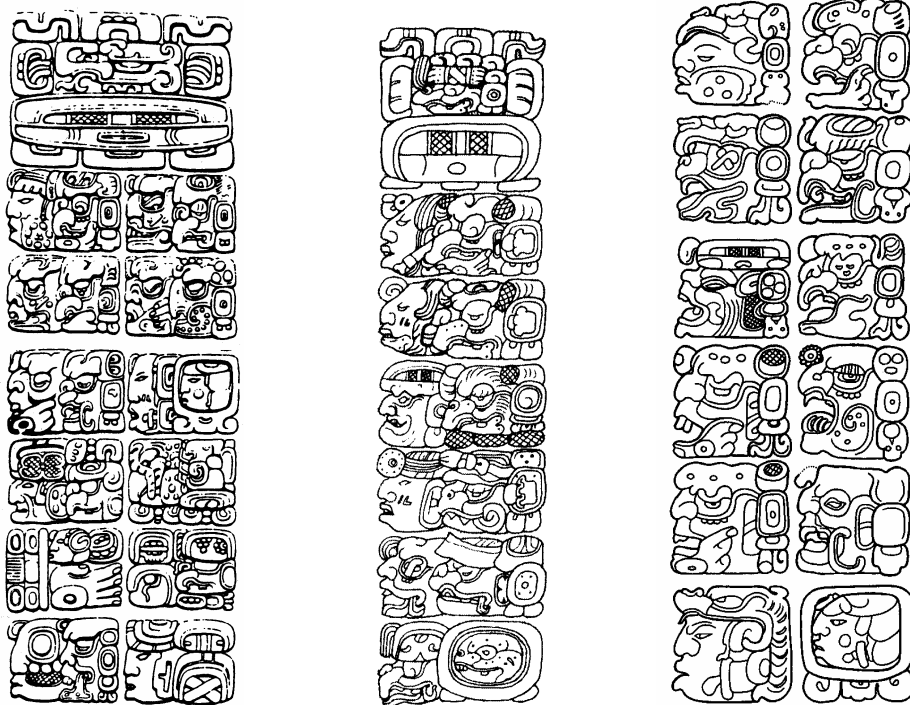
On most stelae there are other date-related glyphs besides the Long Count dates and the Calendar Round. Most of these other glyphs have to do with other time cycles that the Maya often included in their inscriptions. We will discuss these in the next two sections.

THE LORDS OF THE NIGHT

Maya nights were ruled by nine "Lords of the Night." Each of these 9 gods ruled for one night, and the next night another Lord of the Night would take over. In the Maya calendar, this was a never-ending cycle of 9 nights.

Each of these 9 gods had their own glyph. For an important date, the ruling Lord of the Night was given, along with all the other ways of writing the date. We often refer to the Lords of the Night as simply G1, G2, G3, and so on up to G9.

G1

G2

G3

G4

G5

G6

G7

G8

G9

G9
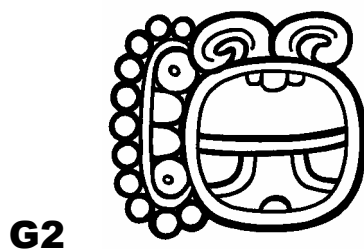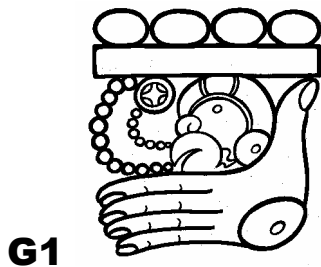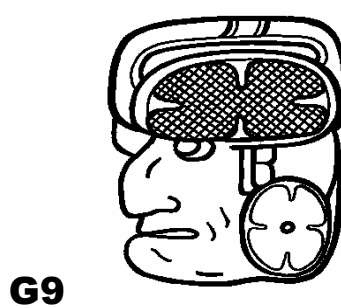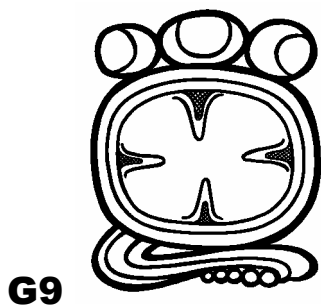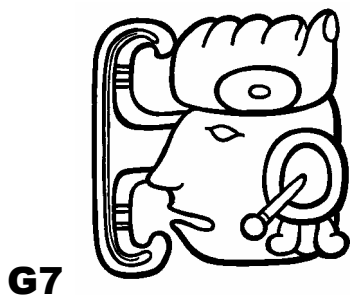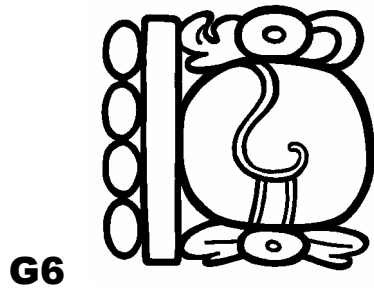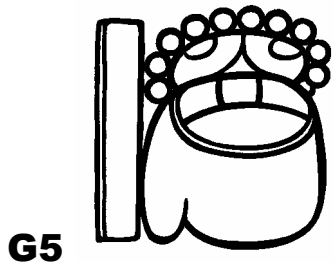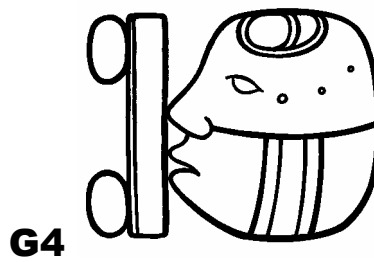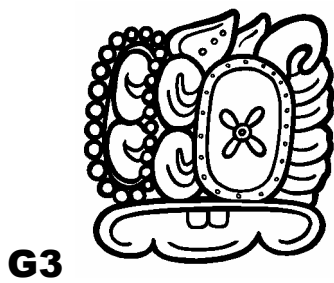
The following glyph described the Lords of the Night in some way, but no one knows how to translate them. It is simply

referred to as "Glyph F" and would be placed on the stelae after the glyph for the Lord.

Glyph F

It turns out that every tun, k'atun, bak'tun since creation has terminated with G9, or the 9th Lord of the Night. G9 is the aged god of darkness and the 'night sun,' and thus a fitting end to each of the blocks of time (much like our Father Time who caps off the end of each year).

Jun Ajaw, one of the Hero Twins from the Popol Vuh

TIME AND THE MOON

Ixchel, the Moon Goddess, and her rabbit, the scribe.

Ancient people throughout the world relied on the moon to measure time. In fact, the sacred Christian, Jewish, and Moslem calendars still use phases of the moon to keep track of important events. This is why, for example, Easter comes at a different time each year. Easter depends upon the phases of the moon, and those phases change each year.

The ancient Maya also paid close attention to the moon. However, because they were such great time keepers, they did not rely on the moon as other ancient people did to keep track of time.

The ancient Maya did, however, often tell us about the moon when they wrote about an important date. For example, they would tell us how many days it was since the last New Moon, i.e.

when the moon "arrived." They would tell us whether the length of the current lunar month (i.e. the time from the last New Moon to the next New Moon) was closer to 29 days or closer to 30 days. And, they would tell us the position of the lunar month in a never ending cycle of 6 lunar months.

PUTTING IT ALL TOGETHER

So how do all these parts fit together, and what was the order of things? When the ancient Maya were giving a date they would usually give us all the facts about that date. For important dates, these usually included (in the following order);

- The Long Count calculation of the number of days since creation
- The Tzolk'in day number and Tzolk'in day name
- The ruling Lord of the Night (usually 2 glyphs)
- Information on the current cycle of the moon, i.e. the current lunar month
- The Haab month and day

The information on the current cycle of the moon had several parts, each with their own glyphs:

- o The number of days since the arrival of the last New Moon, then

- The position of the current lunar month in the continuous cycle of six lunar months
- The Maya name and title of the god presiding over the current cycle of the moon
- Whether the current lunar month is closer to 29 or 30 days

On the Maya monuments these facets of the date were usually given in this order, which makes it easier to read the date information because we know what to expect.

Here's an example from a stela found in the ancient Maya city of Piedras Negras in Guatemala:
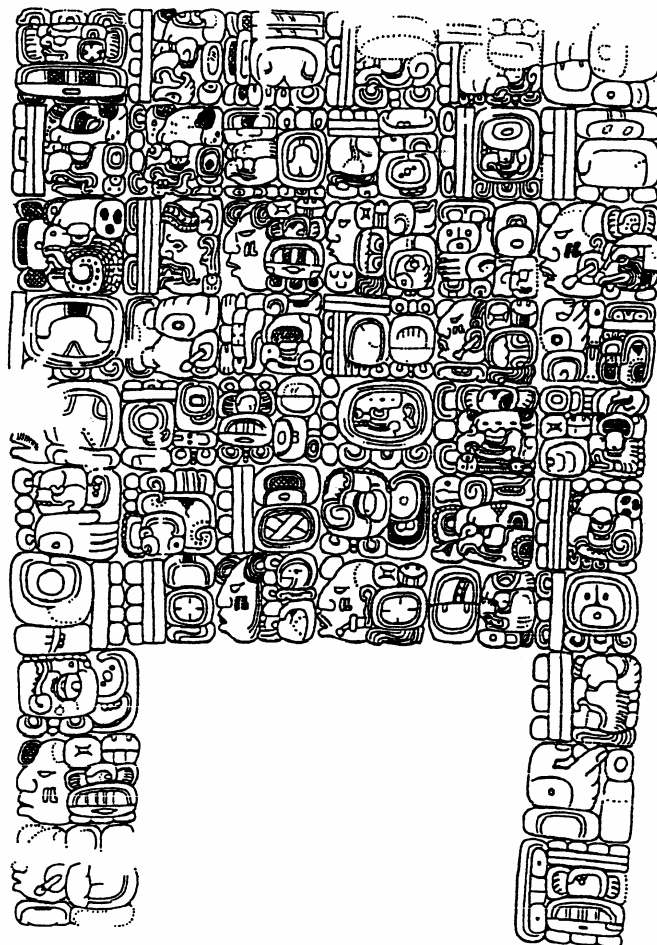
Here is a translation of the date portion of this stela which starts in the upper left corner of the text. See if you can follow along.

"*It was 9 bak'tuns*   (Line 1)

 12 k'atuns, 2 tuns,   (Line 2)

 no months, and 16 days   (Line 3)

        since the beginning of this world.

It was on 5 Kib, and the night was ruled by G7,   (Line 4)

(undeciphered glyph F). It was 27 days since the last new moon.

                                          (Line 5)

It was the 2nd lunar month (in the cycle of six lunar months),

and the lunar month was (undeciphered name and title).

                                          (Line 6)

The length of the lunar month was 29 days, and the

date (according to the Haab calendar) was 14 Yaxk'in." (Line 7)

        The actual date referred to on this stela is July 5, 674 A.D., and the stela tells us about the life of a famous queen. (In another booklet, you will learn to read the whole inscription.)

We are now at the end of our study of Maya numbers and the Maya calendars. Some of what we have covered is difficult the first time you read it. But if you read it more than once, it will get easier and you will see how logical the Maya calendar is.

You should continue to study the Maya calendar.   If you can master the material presented in this small book, you will be able to read the dates on the most of the Maya inscriptions ever found.

Appendix 1.

Special Days in the Sacred Year
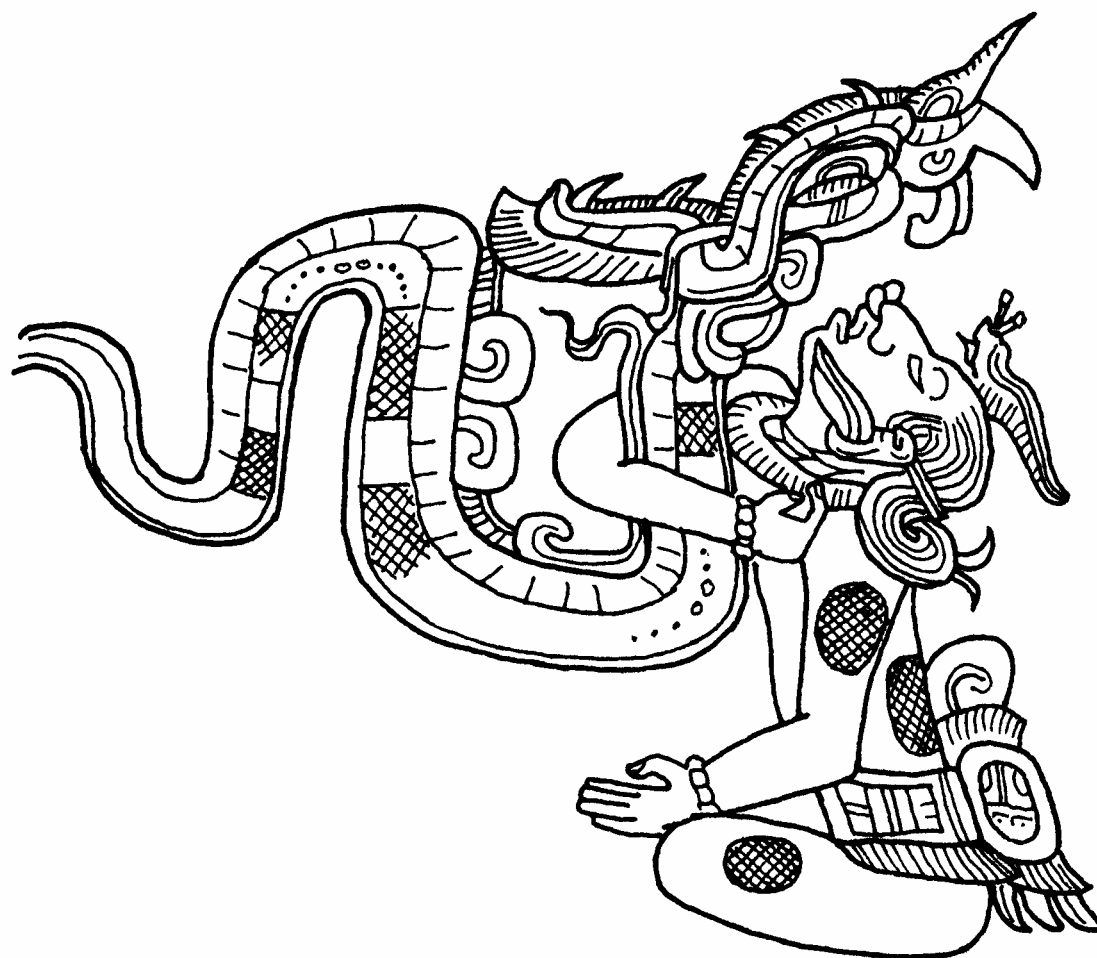
A Vision and Yax Balam, one of the Hero Twins from the Maya book of creation, the Popol Vuh

According to Maya traditions, the following are special days in the *Tzolk'in / Cholq'ij* calendar:

8 Chuwen / 8 Batz':

First day of the year in the sacred (Tzolk'in / Cholq'ij) calendar.

Day of revelation and formation of the human being.

Special day for spiritual guides, for praying for all of humanity.

8 Eb / 8 E:

Day to celebrate life and one's good fortune.

8 Ben / 8 Aj:

Day to give thanks for one's destiny, especially in one's work.

8 Ix / 8 I'x:

Day to give thanks for the past, for the land one owns, whether purchased or inherited.

Day to give thanks to one's grandparents for all they have left us.

8 Men / 8 Tz'ikin:

Day to give thanks, and to ask for luck in all things financial.

8 Manik' / 8 Kej:

Day to commemorate the dead.

Day to give thanks to one's ancestors for all they have done.

8 Lamat / 8 Q'anil:

Day to give thanks for the crops and the fertility of the earth.

This offering must be given every year.

12 Ok / 12 Tz'i:

Day to honor the work of the midwife.

7 Men, 8 Kib, and 9 Kaban /

7 Tz'ikin, 8 Ajmaq, and 9 No'j:

Day to offer ceremonies for protection, for in these days a person can be harmed for their sins and bad thoughts.

8 Kaban / 8 No'j:

Day to ask for good thoughts and to be delivered from bad thoughts.

8 Est'nab / 8 Tijax:

Day to seek protection and to confess sins, especially arguments with one's family, and most especially with one's parents.

8 Kawak / 8 Kawoq:

This is an unfavorable day.

Thus, it is a good day to offer ceremonies for protection.

7 Ajaw / 7 Ajpu':

Day to ask protection against ill feelings within the family.

8 Imix / 8 Imox:

Day to offer ceremonies for protection against domestic problems and against mental and spiritual problems.

8 Ik' / 8 Iq':

Day to offer ceremonies against physical illnesses.

8 Ak'bal / 8 Aq'abal:

Day to seek protection against those who might say bad things about you.

13 Ak'bal / 13 Aq'abal:

Day to seek protection against negative feelings and thoughts. Day to seek justice and truth.

8 K'an / 8 K'at:

Day to ask protection from envy, cruelty, and those who might say bad things about you.

8 Chikchan / 8 Kan:

Day to seek protection against illness.

8 Kimi / 8 Kame:

The day to ask pardon for the bad things one has done.

8 Muluk / 8 Toj:

Day to ask for protection against illnesses and accidents.

9 Ok / 9 Tz'i:

Day to ask forgiveness for one's sins, especially bad thoughts and immoderate use of one's resources.

In the 260-day sacred (Tzolk'in / Cholq'ij) year, every combination of number and name will occur one time. Thus, each of these special days will occur once in every sacred year.

A glyph from Copán signifying zero winals.

Appendix 2.

Maya Dates for 2004

(Correlation = GMT)

Gregorian Date	Tzolk'in		Haab		Long Count					Lord of the Night
	Day No.	Day Name	Day of Mo.	Month Name						
Thursday, January 01, 2004	3	Ak'bal	11	K'ank'in	12	19	10	16	3	G8
Friday, January 02, 2004	4	K'an	12	K'ank'in	12	19	10	16	4	G9
Saturday, January 03, 2004	5	Chikchan	13	K'ank'in	12	19	10	16	5	G1
Sunday, January 04, 2004	6	Kimi	14	K'ank'in	12	19	10	16	6	G2
Monday, January 05, 2004	7	Manik'	15	K'ank'in	12	19	10	16	7	G3
Tuesday, January 06, 2004	8	Lamat	16	K'ank'in	12	19	10	16	8	G4
Wednesday, January 07, 2004	9	Muluk	17	K'ank'in	12	19	10	16	9	G5
Thursday, January 08, 2004	10	Ok	18	K'ank'in	12	19	10	16	10	G6
Friday, January 09, 2004	11	Chuwen	19	K'ank'in	12	19	10	16	11	G7
Saturday, January 10, 2004	12	Eb	0	Muwan	12	19	10	16	12	G8
Sunday, January 11, 2004	13	Ben	1	Muwan	12	19	10	16	13	G9
Monday, January 12, 2004	1	Ix	2	Muwan	12	19	10	16	14	G1
Tuesday, January 13, 2004	2	Men	3	Muwan	12	19	10	16	15	G2
Wednesday, January 14, 2004	3	Kib	4	Muwan	12	19	10	16	16	G3
Thursday, January 15, 2004	4	Kaban	5	Muwan	12	19	10	16	17	G4
Friday, January 16, 2004	5	Etz'nab	6	Muwan	12	19	10	16	18	G5
Saturday, January 17, 2004	6	Kawak	7	Muwan	12	19	10	16	19	G6
Sunday, January 18, 2004	7	Ajaw	8	Muwan	12	19	10	17	0	G7
Monday, January 19, 2004	8	Imix	9	Muwan	12	19	10	17	1	G8
Tuesday, January 20, 2004	9	Ik'	10	Muwan	12	19	10	17	2	G9
Wednesday, January 21, 2004	10	Ak'bal	11	Muwan	12	19	10	17	3	G1
Thursday, January 22, 2004	11	K'an	12	Muwan	12	19	10	17	4	G2
Friday, January 23, 2004	12	Chikchan	13	Muwan	12	19	10	17	5	G3
Saturday, January 24, 2004	13	Kimi	14	Muwan	12	19	10	17	6	G4
Sunday, January 25, 2004	1	Manik'	15	Muwan	12	19	10	17	7	G5
Monday, January 26, 2004	2	Lamat	16	Muwan	12	19	10	17	8	G6
Tuesday, January 27, 2004	3	Muluk	17	Muwan	12	19	10	17	9	G7
Wednesday, January 28, 2004	4	Ok	18	Muwan	12	19	10	17	10	G8
Thursday, January 29, 2004	5	Chuwen	19	Muwan	12	19	10	17	11	G9
Friday, January 30, 2004	6	Eb	0	Pax	12	19	10	17	12	G1
Saturday, January 31, 2004	7	Ben	1	Pax	12	19	10	17	13	G2

Gregorian Date	Tzolk'in		Haab		Long Count					Lord of the Night
	Day No.	Day Name	Day of Mo.	Month Name						
Sunday, February 01, 2004	8	Ix	2	Pax	12	19	10	17	14	G3
Monday, February 02, 2004	9	Men	3	Pax	12	19	10	17	15	G4
Tuesday, February 03, 2004	10	Kib	4	Pax	12	19	10	17	16	G5
Wednesday, February 04, 2004	11	Kaban	5	Pax	12	19	10	17	17	G6
Thursday, February 05, 2004	12	Etz'nab	6	Pax	12	19	10	17	18	G7
Friday, February 06, 2004	13	Kawak	7	Pax	12	19	10	17	19	G8
Saturday, February 07, 2004	1	Ajaw	8	Pax	12	19	11	0	0	G9
Sunday, February 08, 2004	2	Imix	9	Pax	12	19	11	0	1	G1
Monday, February 09, 2004	3	Ik'	10	Pax	12	19	11	0	2	G2
Tuesday, February 10, 2004	4	Ak'bal	11	Pax	12	19	11	0	3	G3
Wednesday, February 11, 2004	5	K'an	12	Pax	12	19	11	0	4	G4
Thursday, February 12, 2004	6	Chikchan	13	Pax	12	19	11	0	5	G5
Friday, February 13, 2004	7	Kimi	14	Pax	12	19	11	0	6	G6
Saturday, February 14, 2004	8	Manik'	15	Pax	12	19	11	0	7	G7
Sunday, February 15, 2004	9	Lamat	16	Pax	12	19	11	0	8	G8
Monday, February 16, 2004	10	Muluk	17	Pax	12	19	11	0	9	G9
Tuesday, February 17, 2004	11	Ok	18	Pax	12	19	11	0	10	G1
Wednesday, February 18, 2004	12	Chuwen	19	Pax	12	19	11	0	11	G2
Thursday, February 19, 2004	13	Eb	0	K'ayab	12	19	11	0	12	G3
Friday, February 20, 2004	1	Ben	1	K'ayab	12	19	11	0	13	G4
Saturday, February 21, 2004	2	Ix	2	K'ayab	12	19	11	0	14	G5
Sunday, February 22, 2004	3	Men	3	K'ayab	12	19	11	0	15	G6
Monday, February 23, 2004	4	Kib	4	K'ayab	12	19	11	0	16	G7
Tuesday, February 24, 2004	5	Kaban	5	K'ayab	12	19	11	0	17	G8
Wednesday, February 25, 2004	6	Etz'nab	6	K'ayab	12	19	11	0	18	G9
Thursday, February 26, 2004	7	Kawak	7	K'ayab	12	19	11	0	19	G1
Friday, February 27, 2004	8	Ajaw	8	K'ayab	12	19	11	1	0	G2
Saturday, February 28, 2004	9	Imix	9	K'ayab	12	19	11	1	1	G3
Sunday, February 29, 2004	10	Ik'	10	K'ayab	12	19	11	1	2	G4

Gregorian Date	Tzolk'in		Haab		Long Count					Lord of the Night
	Day No.	Day Name	Day of Mo.	Month Name						
Monday, March 01, 2004	11	Ak'bal	11	K'ayab	12	19	11	1	3	G5
Tuesday, March 02, 2004	12	K'an	12	K'ayab	12	19	11	1	4	G6
Wednesday, March 03, 2004	13	Chikchan	13	K'ayab	12	19	11	1	5	G7
Thursday, March 04, 2004	1	Kimi	14	K'ayab	12	19	11	1	6	G8
Friday, March 05, 2004	2	Manik'	15	K'ayab	12	19	11	1	7	G9
Saturday, March 06, 2004	3	Lamat	16	K'ayab	12	19	11	1	8	G1
Sunday, March 07, 2004	4	Muluk	17	K'ayab	12	19	11	1	9	G2
Monday, March 08, 2004	5	Ok	18	K'ayab	12	19	11	1	10	G3
Tuesday, March 09, 2004	6	Chuwen	19	K'ayab	12	19	11	1	11	G4
Wednesday, March 10, 2004	7	Eb	0	Kumk'u	12	19	11	1	12	G5
Thursday, March 11, 2004	8	Ben	1	Kumk'u	12	19	11	1	13	G6
Friday, March 12, 2004	9	Ix	2	Kumk'u	12	19	11	1	14	G7
Saturday, March 13, 2004	10	Men	3	Kumk'u	12	19	11	1	15	G8
Sunday, March 14, 2004	11	Kib	4	Kumk'u	12	19	11	1	16	G9
Monday, March 15, 2004	12	Kaban	5	Kumk'u	12	19	11	1	17	G1
Tuesday, March 16, 2004	13	Etz'nab	6	Kumk'u	12	19	11	1	18	G2
Wednesday, March 17, 2004	1	Kawak	7	Kumk'u	12	19	11	1	19	G3
Thursday, March 18, 2004	2	Ajaw	8	Kumk'u	12	19	11	2	0	G4
Friday, March 19, 2004	3	Imix	9	Kumk'u	12	19	11	2	1	G5
Saturday, March 20, 2004	4	Ik'	10	Kumk'u	12	19	11	2	2	G6
Sunday, March 21, 2004	5	Ak'bal	11	Kumk'u	12	19	11	2	3	G7
Monday, March 22, 2004	6	K'an	12	Kumk'u	12	19	11	2	4	G8
Tuesday, March 23, 2004	7	Chikchan	13	Kumk'u	12	19	11	2	5	G9
Wednesday, March 24, 2004	8	Kimi	14	Kumk'u	12	19	11	2	6	G1
Thursday, March 25, 2004	9	Manik'	15	Kumk'u	12	19	11	2	7	G2
Friday, March 26, 2004	10	Lamat	16	Kumk'u	12	19	11	2	8	G3
Saturday, March 27, 2004	11	Muluk	17	Kumk'u	12	19	11	2	9	G4
Sunday, March 28, 2004	12	Ok	18	Kumk'u	12	19	11	2	10	G5
Monday, March 29, 2004	13	Chuwen	19	Kumk'u	12	19	11	2	11	G6
Tuesday, March 30, 2004	1	Eb	0	Wayeb	12	19	11	2	12	G7
Wednesday, March 31, 2004	2	Ben	1	Wayeb	12	19	11	2	13	G8

Gregorian Date	Tzolk'in		Haab		Long Count					Lord of the Night
	Day No.	Day Name	Day of Mo.	Month Name						
Thursday, April 01, 2004	3	Ix	2	Wayeb	12	19	11	2	14	G9
Friday, April 02, 2004	4	Men	3	Wayeb	12	19	11	2	15	G1
Saturday, April 03, 2004	5	Kib	4	Wayeb	12	19	11	2	16	G2
Sunday, April 04, 2004	6	Kaban	0	Pop	12	19	11	2	17	G3
Monday, April 05, 2004	7	Etz'nab	1	Pop	12	19	11	2	18	G4
Tuesday, April 06, 2004	8	Kawak	2	Pop	12	19	11	2	19	G5
Wednesday, April 07, 2004	9	Ajaw	3	Pop	12	19	11	3	0	G6
Thursday, April 08, 2004	10	Imix	4	Pop	12	19	11	3	1	G7
Friday, April 09, 2004	11	Ik'	5	Pop	12	19	11	3	2	G8
Saturday, April 10, 2004	12	Ak'bal	6	Pop	12	19	11	3	3	G9
Sunday, April 11, 2004	13	K'an	7	Pop	12	19	11	3	4	G1
Monday, April 12, 2004	1	Chikchan	8	Pop	12	19	11	3	5	G2
Tuesday, April 13, 2004	2	Kimi	9	Pop	12	19	11	3	6	G3
Wednesday, April 14, 2004	3	Manik'	10	Pop	12	19	11	3	7	G4
Thursday, April 15, 2004	4	Lamat	11	Pop	12	19	11	3	8	G5
Friday, April 16, 2004	5	Muluk	12	Pop	12	19	11	3	9	G6
Saturday, April 17, 2004	6	Ok	13	Pop	12	19	11	3	10	G7
Sunday, April 18, 2004	7	Chuwen	14	Pop	12	19	11	3	11	G8
Monday, April 19, 2004	8	Eb	15	Pop	12	19	11	3	12	G9
Tuesday, April 20, 2004	9	Ben	16	Pop	12	19	11	3	13	G1
Wednesday, April 21, 2004	10	Ix	17	Pop	12	19	11	3	14	G2
Thursday, April 22, 2004	11	Men	18	Pop	12	19	11	3	15	G3
Friday, April 23, 2004	12	Kib	19	Pop	12	19	11	3	16	G4
Saturday, April 24, 2004	13	Kaban	0	Wo	12	19	11	3	17	G5
Sunday, April 25, 2004	1	Etz'nab	1	Wo	12	19	11	3	18	G6
Monday, April 26, 2004	2	Kawak	2	Wo	12	19	11	3	19	G7
Tuesday, April 27, 2004	3	Ajaw	3	Wo	12	19	11	4	0	G8
Wednesday, April 28, 2004	4	Imix	4	Wo	12	19	11	4	1	G9
Thursday, April 29, 2004	5	Ik'	5	Wo	12	19	11	4	2	G1
Friday, April 30, 2004	6	Ak'bal	6	Wo	12	19	11	4	3	G2

Gregorian Date	Tzolk'in		Haab		Long Count					Lord of the Night
	Day No.	Day Name	Day of Mo.	Month Name						
Saturday, May 01, 2004	7	K'an	7	Wo	12	19	11	4	4	G3
Sunday, May 02, 2004	8	Chikchan	8	Wo	12	19	11	4	5	G4
Monday, May 03, 2004	9	Kimi	9	Wo	12	19	11	4	6	G5
Tuesday, May 04, 2004	10	Manik'	10	Wo	12	19	11	4	7	G6
Wednesday, May 05, 2004	11	Lamat	11	Wo	12	19	11	4	8	G7
Thursday, May 06, 2004	12	Muluk	12	Wo	12	19	11	4	9	G8
Friday, May 07, 2004	13	Ok	13	Wo	12	19	11	4	10	G9
Saturday, May 08, 2004	1	Chuwen	14	Wo	12	19	11	4	11	G1
Sunday, May 09, 2004	2	Eb	15	Wo	12	19	11	4	12	G2
Monday, May 10, 2004	3	Ben	16	Wo	12	19	11	4	13	G3
Tuesday, May 11, 2004	4	Ix	17	Wo	12	19	11	4	14	G4
Wednesday, May 12, 2004	5	Men	18	Wo	12	19	11	4	15	G5
Thursday, May 13, 2004	6	Kib	19	Wo	12	19	11	4	16	G6
Friday, May 14, 2004	7	Kaban	0	Sip	12	19	11	4	17	G7
Saturday, May 15, 2004	8	Etz'nab	1	Sip	12	19	11	4	18	G8
Sunday, May 16, 2004	9	Kawak	2	Sip	12	19	11	4	19	G9
Monday, May 17, 2004	10	Ajaw	3	Sip	12	19	11	5	0	G1
Tuesday, May 18, 2004	11	Imix	4	Sip	12	19	11	5	1	G2
Wednesday, May 19, 2004	12	Ik'	5	Sip	12	19	11	5	2	G3
Thursday, May 20, 2004	13	Ak'bal	6	Sip	12	19	11	5	3	G4
Friday, May 21, 2004	1	K'an	7	Sip	12	19	11	5	4	G5
Saturday, May 22, 2004	2	Chikchan	8	Sip	12	19	11	5	5	G6
Sunday, May 23, 2004	3	Kimi	9	Sip	12	19	11	5	6	G7
Monday, May 24, 2004	4	Manik'	10	Sip	12	19	11	5	7	G8
Tuesday, May 25, 2004	5	Lamat	11	Sip	12	19	11	5	8	G9
Wednesday, May 26, 2004	6	Muluk	12	Sip	12	19	11	5	9	G1
Thursday, May 27, 2004	7	Ok	13	Sip	12	19	11	5	10	G2
Friday, May 28, 2004	8	Chuwen	14	Sip	12	19	11	5	11	G3
Saturday, May 29, 2004	9	Eb	15	Sip	12	19	11	5	12	G4
Sunday, May 30, 2004	10	Ben	16	Sip	12	19	11	5	13	G5
Monday, May 31, 2004	11	Ix	17	Sip	12	19	11	5	14	G6

Gregorian Date	Tzolk'in		Haab		Long Count					Lord of the Night
	Day No.	Day Name	Day of Mo.	Month Name						
Tuesday, June 01, 2004	12	Men	18	Sip	12	19	11	5	15	G7
Wednesday, June 02, 2004	13	Kib	19	Sip	12	19	11	5	16	G8
Thursday, June 03, 2004	1	Kaban	0	Sotz'	12	19	11	5	17	G9
Friday, June 04, 2004	2	Etz'nab	1	Sotz'	12	19	11	5	18	G1
Saturday, June 05, 2004	3	Kawak	2	Sotz'	12	19	11	5	19	G2
Sunday, June 06, 2004	4	Ajaw	3	Sotz'	12	19	11	6	0	G3
Monday, June 07, 2004	5	Imix	4	Sotz'	12	19	11	6	1	G4
Tuesday, June 08, 2004	6	Ik'	5	Sotz'	12	19	11	6	2	G5
Wednesday, June 09, 2004	7	Ak'bal	6	Sotz'	12	19	11	6	3	G6
Thursday, June 10, 2004	8	K'an	7	Sotz'	12	19	11	6	4	G7
Friday, June 11, 2004	9	Chikchan	8	Sotz'	12	19	11	6	5	G8
Saturday, June 12, 2004	10	Kimi	9	Sotz'	12	19	11	6	6	G9
Sunday, June 13, 2004	11	Manik'	10	Sotz'	12	19	11	6	7	G1
Monday, June 14, 2004	12	Lamat	11	Sotz'	12	19	11	6	8	G2
Tuesday, June 15, 2004	13	Muluk	12	Sotz'	12	19	11	6	9	G3
Wednesday, June 16, 2004	1	Ok	13	Sotz'	12	19	11	6	10	G4
Thursday, June 17, 2004	2	Chuwen	14	Sotz'	12	19	11	6	11	G5
Friday, June 18, 2004	3	Eb	15	Sotz'	12	19	11	6	12	G6
Saturday, June 19, 2004	4	Ben	16	Sotz'	12	19	11	6	13	G7
Sunday, June 20, 2004	5	Ix	17	Sotz'	12	19	11	6	14	G8
Monday, June 21, 2004	6	Men	18	Sotz'	12	19	11	6	15	G9
Tuesday, June 22, 2004	7	Kib	19	Sotz'	12	19	11	6	16	G1
Wednesday, June 23, 2004	8	Kaban	0	Sek	12	19	11	6	17	G2
Thursday, June 24, 2004	9	Etz'nab	1	Sek	12	19	11	6	18	G3
Friday, June 25, 2004	10	Kawak	2	Sek	12	19	11	6	19	G4
Saturday, June 26, 2004	11	Ajaw	3	Sek	12	19	11	7	0	G5
Sunday, June 27, 2004	12	Imix	4	Sek	12	19	11	7	1	G6
Monday, June 28, 2004	13	Ik'	5	Sek	12	19	11	7	2	G7
Tuesday, June 29, 2004	1	Ak'bal	6	Sek	12	19	11	7	3	G8
Wednesday, June 30, 2004	2	K'an	7	Sek	12	19	11	7	4	G9

Gregorian Date	Tzolk'in		Haab		Long Count					Lord of the Night
	Day No.	Day Name	Day of Mo.	Month Name						
Thursday, July 01, 2004	3	Chikchan	8	Sek	12	19	11	7	5	G1
Friday, July 02, 2004	4	Kimi	9	Sek	12	19	11	7	6	G2
Saturday, July 03, 2004	5	Manik'	10	Sek	12	19	11	7	7	G3
Sunday, July 04, 2004	6	Lamat	11	Sek	12	19	11	7	8	G4
Monday, July 05, 2004	7	Muluk	12	Sek	12	19	11	7	9	G5
Tuesday, July 06, 2004	8	Ok	13	Sek	12	19	11	7	10	G6
Wednesday, July 07, 2004	9	Chuwen	14	Sek	12	19	11	7	11	G7
Thursday, July 08, 2004	10	Eb	15	Sek	12	19	11	7	12	G8
Friday, July 09, 2004	11	Ben	16	Sek	12	19	11	7	13	G9
Saturday, July 10, 2004	12	Ix	17	Sek	12	19	11	7	14	G1
Sunday, July 11, 2004	13	Men	18	Sek	12	19	11	7	15	G2
Monday, July 12, 2004	1	Kib	19	Sek	12	19	11	7	16	G3
Tuesday, July 13, 2004	2	Kaban	0	Xul	12	19	11	7	17	G4
Wednesday, July 14, 2004	3	Etz'nab	1	Xul	12	19	11	7	18	G5
Thursday, July 15, 2004	4	Kawak	2	Xul	12	19	11	7	19	G6
Friday, July 16, 2004	5	Ajaw	3	Xul	12	19	11	8	0	G7
Saturday, July 17, 2004	6	Imix	4	Xul	12	19	11	8	1	G8
Sunday, July 18, 2004	7	Ik'	5	Xul	12	19	11	8	2	G9
Monday, July 19, 2004	8	Ak'bal	6	Xul	12	19	11	8	3	G1
Tuesday, July 20, 2004	9	K'an	7	Xul	12	19	11	8	4	G2
Wednesday, July 21, 2004	10	Chikchan	8	Xul	12	19	11	8	5	G3
Thursday, July 22, 2004	11	Kimi	9	Xul	12	19	11	8	6	G4
Friday, July 23, 2004	12	Manik'	10	Xul	12	19	11	8	7	G5
Saturday, July 24, 2004	13	Lamat	11	Xul	12	19	11	8	8	G6
Sunday, July 25, 2004	1	Muluk	12	Xul	12	19	11	8	9	G7
Monday, July 26, 2004	2	Ok	13	Xul	12	19	11	8	10	G8
Tuesday, July 27, 2004	3	Chuwen	14	Xul	12	19	11	8	11	G9
Wednesday, July 28, 2004	4	Eb	15	Xul	12	19	11	8	12	G1
Thursday, July 29, 2004	5	Ben	16	Xul	12	19	11	8	13	G2
Friday, July 30, 2004	6	Ix	17	Xul	12	19	11	8	14	G3
Saturday, July 31, 2004	7	Men	18	Xul	12	19	11	8	15	G4

Gregorian Date	Tzolk'in		Haab		Long Count					Lord of the Night
	Day No.	Day Name	Day of Mo.	Month Name						
Sunday, August 01, 2004	8	Kib	19	Xul	12	19	11	8	16	G5
Monday, August 02, 2004	9	Kaban	0	Yaxk'in	12	19	11	8	17	G6
Tuesday, August 03, 2004	10	Etz'nab	1	Yaxk'in	12	19	11	8	18	G7
Wednesday, August 04, 2004	11	Kawak	2	Yaxk'in	12	19	11	8	19	G8
Thursday, August 05, 2004	12	Ajaw	3	Yaxk'in	12	19	11	9	0	G9
Friday, August 06, 2004	13	Imix	4	Yaxk'in	12	19	11	9	1	G1
Saturday, August 07, 2004	1	Ik'	5	Yaxk'in	12	19	11	9	2	G2
Sunday, August 08, 2004	2	Ak'bal	6	Yaxk'in	12	19	11	9	3	G3
Monday, August 09, 2004	3	K'an	7	Yaxk'in	12	19	11	9	4	G4
Tuesday, August 10, 2004	4	Chikchan	8	Yaxk'in	12	19	11	9	5	G5
Wednesday, August 11, 2004	5	Kimi	9	Yaxk'in	12	19	11	9	6	G6
Thursday, August 12, 2004	6	Manik'	10	Yaxk'in	12	19	11	9	7	G7
Friday, August 13, 2004	7	Lamat	11	Yaxk'in	12	19	11	9	8	G8
Saturday, August 14, 2004	8	Muluk	12	Yaxk'in	12	19	11	9	9	G9
Sunday, August 15, 2004	9	Ok	13	Yaxk'in	12	19	11	9	10	G1
Monday, August 16, 2004	10	Chuwen	14	Yaxk'in	12	19	11	9	11	G2
Tuesday, August 17, 2004	11	Eb	15	Yaxk'in	12	19	11	9	12	G3
Wednesday, August 18, 2004	12	Ben	16	Yaxk'in	12	19	11	9	13	G4
Thursday, August 19, 2004	13	Ix	17	Yaxk'in	12	19	11	9	14	G5
Friday, August 20, 2004	1	Men	18	Yaxk'in	12	19	11	9	15	G6
Saturday, August 21, 2004	2	Kib	19	Yaxk'in	12	19	11	9	16	G7
Sunday, August 22, 2004	3	Kaban	0	Mol	12	19	11	9	17	G8
Monday, August 23, 2004	4	Etz'nab	1	Mol	12	19	11	9	18	G9
Tuesday, August 24, 2004	5	Kawak	2	Mol	12	19	11	9	19	G1
Wednesday, August 25, 2004	6	Ajaw	3	Mol	12	19	11	10	0	G2
Thursday, August 26, 2004	7	Imix	4	Mol	12	19	11	10	1	G3
Friday, August 27, 2004	8	Ik'	5	Mol	12	19	11	10	2	G4
Saturday, August 28, 2004	9	Ak'bal	6	Mol	12	19	11	10	3	G5
Sunday, August 29, 2004	10	K'an	7	Mol	12	19	11	10	4	G6
Monday, August 30, 2004	11	Chikchan	8	Mol	12	19	11	10	5	G7
Tuesday, August 31, 2004	12	Kimi	9	Mol	12	19	11	10	6	G8

Gregorian Date	Tzolk'in		Haab		Long Count					Lord of the Night
	Day No.	Day Name	Day of Mo.	Month Name						
Wednesday, September 01, 2004	13	Manik'	10	Mol	12	19	11	10	7	G9
Thursday, September 02, 2004	1	Lamat	11	Mol	12	19	11	10	8	G1
Friday, September 03, 2004	2	Muluk	12	Mol	12	19	11	10	9	G2
Saturday, September 04, 2004	3	Ok	13	Mol	12	19	11	10	10	G3
Sunday, September 05, 2004	4	Chuwen	14	Mol	12	19	11	10	11	G4
Monday, September 06, 2004	5	Eb	15	Mol	12	19	11	10	12	G5
Tuesday, September 07, 2004	6	Ben	16	Mol	12	19	11	10	13	G6
Wednesday, September 08, 2004	7	Ix	17	Mol	12	19	11	10	14	G7
Thursday, September 09, 2004	8	Men	18	Mol	12	19	11	10	15	G8
Friday, September 10, 2004	9	Kib	19	Mol	12	19	11	10	16	G9
Saturday, September 11, 2004	10	Kaban	0	Ch'en	12	19	11	10	17	G1
Sunday, September 12, 2004	11	Etz'nab	1	Ch'en	12	19	11	10	18	G2
Monday, September 13, 2004	12	Kawak	2	Ch'en	12	19	11	10	19	G3
Tuesday, September 14, 2004	13	Ajaw	3	Ch'en	12	19	11	11	0	G4
Wednesday, September 15, 2004	1	Imix	4	Ch'en	12	19	11	11	1	G5
Thursday, September 16, 2004	2	Ik'	5	Ch'en	12	19	11	11	2	G6
Friday, September 17, 2004	3	Ak'bal	6	Ch'en	12	19	11	11	3	G7
Saturday, September 18, 2004	4	K'an	7	Ch'en	12	19	11	11	4	G8
Sunday, September 19, 2004	5	Chikchan	8	Ch'en	12	19	11	11	5	G9
Monday, September 20, 2004	6	Kimi	9	Ch'en	12	19	11	11	6	G1
Tuesday, September 21, 2004	7	Manik'	10	Ch'en	12	19	11	11	7	G2
Wednesday, September 22, 2004	8	Lamat	11	Ch'en	12	19	11	11	8	G3
Thursday, September 23, 2004	9	Muluk	12	Ch'en	12	19	11	11	9	G4
Friday, September 24, 2004	10	Ok	13	Ch'en	12	19	11	11	10	G5
Saturday, September 25, 2004	11	Chuwen	14	Ch'en	12	19	11	11	11	G6
Sunday, September 26, 2004	12	Eb	15	Ch'en	12	19	11	11	12	G7
Monday, September 27, 2004	13	Ben	16	Ch'en	12	19	11	11	13	G8
Tuesday, September 28, 2004	1	Ix	17	Ch'en	12	19	11	11	14	G9
Wednesday, September 29, 2004	2	Men	18	Ch'en	12	19	11	11	15	G1
Thursday, September 30, 2004	3	Kib	19	Ch'en	12	19	11	11	16	G2

Gregorian Date	Tzolk'in		Haab		Long Count					Lord of the Night
	Day No.	Day Name	Day of Mo.	Month Name						
Friday, October 01, 2004	4	Kaban	0	Yax	12	19	11	11	17	G3
Saturday, October 02, 2004	5	Etz'nab	1	Yax	12	19	11	11	18	G4
Sunday, October 03, 2004	6	Kawak	2	Yax	12	19	11	11	19	G5
Monday, October 04, 2004	7	Ajaw	3	Yax	12	19	11	12	0	G6
Tuesday, October 05, 2004	8	Imix	4	Yax	12	19	11	12	1	G7
Wednesday, October 06, 2004	9	Ik'	5	Yax	12	19	11	12	2	G8
Thursday, October 07, 2004	10	Ak'bal	6	Yax	12	19	11	12	3	G9
Friday, October 08, 2004	11	K'an	7	Yax	12	19	11	12	4	G1
Saturday, October 09, 2004	12	Chikchan	8	Yax	12	19	11	12	5	G2
Sunday, October 10, 2004	13	Kimi	9	Yax	12	19	11	12	6	G3
Monday, October 11, 2004	1	Manik'	10	Yax	12	19	11	12	7	G4
Tuesday, October 12, 2004	2	Lamat	11	Yax	12	19	11	12	8	G5
Wednesday, October 13, 2004	3	Muluk	12	Yax	12	19	11	12	9	G6
Thursday, October 14, 2004	4	Ok	13	Yax	12	19	11	12	10	G7
Friday, October 15, 2004	5	Chuwen	14	Yax	12	19	11	12	11	G8
Saturday, October 16, 2004	6	Eb	15	Yax	12	19	11	12	12	G9
Sunday, October 17, 2004	7	Ben	16	Yax	12	19	11	12	13	G1
Monday, October 18, 2004	8	Ix	17	Yax	12	19	11	12	14	G2
Tuesday, October 19, 2004	9	Men	18	Yax	12	19	11	12	15	G3
Wednesday, October 20, 2004	10	Kib	19	Yax	12	19	11	12	16	G4
Thursday, October 21, 2004	11	Kaban	0	Sak	12	19	11	12	17	G5
Friday, October 22, 2004	12	Etz'nab	1	Sak	12	19	11	12	18	G6
Saturday, October 23, 2004	13	Kawak	2	Sak	12	19	11	12	19	G7
Sunday, October 24, 2004	1	Ajaw	3	Sak	12	19	11	13	0	G8
Monday, October 25, 2004	2	Imix	4	Sak	12	19	11	13	1	G9
Tuesday, October 26, 2004	3	Ik'	5	Sak	12	19	11	13	2	G1
Wednesday, October 27, 2004	4	Ak'bal	6	Sak	12	19	11	13	3	G2
Thursday, October 28, 2004	5	K'an	7	Sak	12	19	11	13	4	G3
Friday, October 29, 2004	6	Chikchan	8	Sak	12	19	11	13	5	G4
Saturday, October 30, 2004	7	Kimi	9	Sak	12	19	11	13	6	G5
Sunday, October 31, 2004	8	Manik'	10	Sak	12	19	11	13	7	G6

Gregorian Date	Tzolk'in		Haab		Long Count					Lord of the Night
	Day No.	Day Name	Day of Mo.	Month Name						
Monday, November 01, 2004	9	Lamat	11	Sak	12	19	11	13	8	G7
Tuesday, November 02, 2004	10	Muluk	12	Sak	12	19	11	13	9	G8
Wednesday, November 03, 2004	11	Ok	13	Sak	12	19	11	13	10	G9
Thursday, November 04, 2004	12	Chuwen	14	Sak	12	19	11	13	11	G1
Friday, November 05, 2004	13	Eb	15	Sak	12	19	11	13	12	G2
Saturday, November 06, 2004	1	Ben	16	Sak	12	19	11	13	13	G3
Sunday, November 07, 2004	2	Ix	17	Sak	12	19	11	13	14	G4
Monday, November 08, 2004	3	Men	18	Sak	12	19	11	13	15	G5
Tuesday, November 09, 2004	4	Kib	19	Sak	12	19	11	13	16	G6
Wednesday, November 10, 2004	5	Kaban	0	Keh	12	19	11	13	17	G7
Thursday, November 11, 2004	6	Etz'nab	1	Keh	12	19	11	13	18	G8
Friday, November 12, 2004	7	Kawak	2	Keh	12	19	11	13	19	G9
Saturday, November 13, 2004	8	Ajaw	3	Keh	12	19	11	14	0	G1
Sunday, November 14, 2004	9	Imix	4	Keh	12	19	11	14	1	G2
Monday, November 15, 2004	10	Ik'	5	Keh	12	19	11	14	2	G3
Tuesday, November 16, 2004	11	Ak'bal	6	Keh	12	19	11	14	3	G4
Wednesday, November 17, 2004	12	K'an	7	Keh	12	19	11	14	4	G5
Thursday, November 18, 2004	13	Chikchan	8	Keh	12	19	11	14	5	G6
Friday, November 19, 2004	1	Kimi	9	Keh	12	19	11	14	6	G7
Saturday, November 20, 2004	2	Manik'	10	Keh	12	19	11	14	7	G8
Sunday, November 21, 2004	3	Lamat	11	Keh	12	19	11	14	8	G9
Monday, November 22, 2004	4	Muluk	12	Keh	12	19	11	14	9	G1
Tuesday, November 23, 2004	5	Ok	13	Keh	12	19	11	14	10	G2
Wednesday, November 24, 2004	6	Chuwen	14	Keh	12	19	11	14	11	G3
Thursday, November 25, 2004	7	Eb	15	Keh	12	19	11	14	12	G4
Friday, November 26, 2004	8	Ben	16	Keh	12	19	11	14	13	G5
Saturday, November 27, 2004	9	Ix	17	Keh	12	19	11	14	14	G6
Sunday, November 28, 2004	10	Men	18	Keh	12	19	11	14	15	G7
Monday, November 29, 2004	11	Kib	19	Keh	12	19	11	14	16	G8
Tuesday, November 30, 2004	12	Kaban	0	Mak	12	19	11	14	17	G9

Gregorian Date	Tzolk'in		Haab		Long Count					Lord of the Night
	Day No.	Day Name	Day of Mo.	Month Name						
Wednesday, December 01, 2004	13	Etz'nab	1	Mak	12	19	11	14	18	G1
Thursday, December 02, 2004	1	Kawak	2	Mak	12	19	11	14	19	G2
Friday, December 03, 2004	2	Ajaw	3	Mak	12	19	11	15	0	G3
Saturday, December 04, 2004	3	Imix	4	Mak	12	19	11	15	1	G4
Sunday, December 05, 2004	4	Ik'	5	Mak	12	19	11	15	2	G5
Monday, December 06, 2004	5	Ak'bal	6	Mak	12	19	11	15	3	G6
Tuesday, December 07, 2004	6	K'an	7	Mak	12	19	11	15	4	G7
Wednesday, December 08, 2004	7	Chikchan	8	Mak	12	19	11	15	5	G8
Thursday, December 09, 2004	8	Kimi	9	Mak	12	19	11	15	6	G9
Friday, December 10, 2004	9	Manik'	10	Mak	12	19	11	15	7	G1
Saturday, December 11, 2004	10	Lamat	11	Mak	12	19	11	15	8	G2
Sunday, December 12, 2004	11	Muluk	12	Mak	12	19	11	15	9	G3
Monday, December 13, 2004	12	Ok	13	Mak	12	19	11	15	10	G4
Tuesday, December 14, 2004	13	Chuwen	14	Mak	12	19	11	15	11	G5
Wednesday, December 15, 2004	1	Eb	15	Mak	12	19	11	15	12	G6
Thursday, December 16, 2004	2	Ben	16	Mak	12	19	11	15	13	G7
Friday, December 17, 2004	3	Ix	17	Mak	12	19	11	15	14	G8
Saturday, December 18, 2004	4	Men	18	Mak	12	19	11	15	15	G9
Sunday, December 19, 2004	5	Kib	19	Mak	12	19	11	15	16	G1
Monday, December 20, 2004	6	Kaban	0	K'ank'in	12	19	11	15	17	G2
Tuesday, December 21, 2004	7	Etz'nab	1	K'ank'in	12	19	11	15	18	G3
Wednesday, December 22, 2004	8	Kawak	2	K'ank'in	12	19	11	15	19	G4
Thursday, December 23, 2004	9	Ajaw	3	K'ank'in	12	19	11	16	0	G5
Friday, December 24, 2004	10	Imix	4	K'ank'in	12	19	11	16	1	G6
Saturday, December 25, 2004	11	Ik'	5	K'ank'in	12	19	11	16	2	G7
Sunday, December 26, 2004	12	Ak'bal	6	K'ank'in	12	19	11	16	3	G8
Monday, December 27, 2004	13	K'an	7	K'ank'in	12	19	11	16	4	G9
Tuesday, December 28, 2004	1	Chikchan	8	K'ank'in	12	19	11	16	5	G1
Wednesday, December 29, 2004	2	Kimi	9	K'ank'in	12	19	11	16	6	G2
Thursday, December 30, 2004	3	Manik'	10	K'ank'in	12	19	11	16	7	G3
Friday, December 31, 2004	4	Lamat	11	K'ank'in	12	19	11	16	8	G4

Appendix 3.

Haab Patrons for Introductory Glyphs

Pop		Yax	
Wo		Sak	
Sip		Keh	
Sotz'		Mak	
Sek		K'ank'in	
Xul		Muwan	
Yaxk'in		Pax	
Mol		K'ayab	
Chen		Kumk'u	

Online Resources

http://research.famsi.org/date_mayaLC.php

- Calculator for Maya dates, distance numbers, and missing date parts and current month calendar.

http://www.famsi.org/research/vanstone/2012/index.html

- Information and an explanation of the 2012 phenonmenon.

http://hermetic.ch

- Calculator for Maya dates

www.michielb.nl/maya/

- Calculator for Maya dates

www.okma.org

- Calculator for Maya dates

www.xoc.net/maya

- Calculators for Maya dates

http://aa.usno.navy.mil/data/

- Calculator for phases of the moon

Bibliography

- **Michael D. Coe & Mark Van Stone:** *Reading the Maya Glyphs*

- **Covo** *Calendario Maya*

- **John F. Harris and Stephen K. Sterns:** *Understanding Maya Glyphs*

- *Agenda 2004,* **published by Médicos Descalzazos**

- **John Montgomery***: Cycles in Time: The Maya Calendar*

- **John Montgomery:** *How to Read Maya Hieroglyphs*

- **Sylvanus Griswold Morely:** *An Introduction to the Study of the Maya Hieroglyphs*

- *Aprendemos a Escribir Los Numeros Mayas*, **published by Nojib'sa**

- **Damian Upún Sipac** *La Cuenta Maya de los Días*

Sources of Illustrations:

Title Page:

- *Maya Designs*, by Wilson G. Turner

Table of Contents:

- *The Maya Design Book*, by Caren Caraway

Chapter 1:

- Title Page: *Maya Designs*, by Wilson G. Turner
- Glyphs for number zero and decorative bar and dot glyphs for six, ten, twelve, and fifteen: by the author after Mark Van Stone in *Reading the Maya Glyphs*
- Maya God of the Number 9: Blood of Kings, p.51

Chapter 2:

- Title Page: *The Maya Design Book*, by Caren Caraway
- Head variants for numbers 0 thru 19: John Montgomery, adapted by the author
- Numbers 20, 29, and 30 by author after Mark Van Stone
- Vision at the end of Chapter 2: Linda Schele, Blood of Kings, p.47.

Chapter 3:

- Title Page: *Maya Designs* by Wilson G. Turner

- Except as noted, all individual day glyphs, month glyphs, calendar round glyphs, and all single glyphs by Mark Pitts
- Calendar Round Schematic: adapted from Tracy Wellman's adaptation of Schele and Friedel, *A Forest of Kings*
- Winal drawing – Sylvanus G. Morley en *An Introduction to the Study of the Maya Hieroglyphs,* p. 71.

Chapter 4:

- Title Page: John Montgomery: *Cycles in Time*, p12
- K'in glyphs – simple glyph by author, head variant and full figure by John Montgomery
- Winal glyphs – simple glyph by author, head variant after Montgomery, full figure by Slyvanus G. Morely
- Tun glyphs – John Montgomery
- K'atun glyphs – simple and head variants by John Montgomery, full figure by Wilson G. Turner, *op.cit.*
- Bak'tun glyphs – simple by author, head variant and full figure by John Montgomery
- Drawing of piktun, kalabtun, and kinchiltun from Inga Calvin: *Guia de Estudio de Jeroglificos Mayas*, from www.famsi.org .
- Date of Apr-12-1997: adapted by the author from Harris and Stern: *Understanding Maya Inscriptions*
- Stela with 9.15.10.00.00 3 Ajaw   John Montgomery from www.famsi.org

- Stela with 9.01.00.00.00 6 Ajaw 13 Yaxk'in, Harris and Sterns, *op.cit.* p. 154
- Stela with 9.16.01.00.00 11 Ajaw Montgomery, *op.cit.*, p102
- Stela with 9.12.02.00.16 5 Kib John Montgomery, from www.famsi.org
- Stela with 13 Kalabtuns.13 Piktuns.13.00.00.00 4 Ajaw Montgomery, *op.cit.*, p.82
- Stela with 9.09.00.00.00   3 Ajaw 3 Sotz' © Michael D. Coe in *Reading the Maya Glyphs*, p143
- Stela with 9.02.15.09.02 9 Ik   Michel Zabé, in *Courtly Art of the Ancient Maya*, p169
- Stela with 9.14.03.08.04   2 K'an   Year = 715 A.D. from *Courtly Art of the Ancient Maya*, p141 © St. Louis Art Museum, Gift of Morton D. May
- Stela with Date 9.17.00.00.00 from Morley, *op.cit.,* p. 236
- Stela with 9.16.10.00.00   1 Ajaw 3 Sip   Morley, *op.cit.*, p221
- Stela with 1.18.05.03.06 Harris and Stern, *op.cit,,* p 99
- Stela with 9.16.05.00.00 by Mattew Looper in *Lightning Warrior*, p102
- Jun Ajaw: Linda Schele in *Blood of Kings*, p51
- Moon Goddess and Rabbit: by the author after Linda Schele
- Piedras Negras Stela 3 by Linda Schele

- Stela with Date of 13.00.00.00.00 by Linda Schele from www.famsi.org

Appendix 1:

- Title Page: by Linda Schele from *The Blood of Kings*, p309
- Glyph signifying zero winal by Wilson G. Turner, *op.cit.* p.13.

Appendix 3:

- Harris and Sterns, *op.cit.*

Endnotes

Endnote 1:

Illustration and example for April 12, 1997: John Harris and Stephen K. Sterns, Understanding Maya Inscriptions.

In this book we are using the GMT (or Goodman-Martínez-Thompson) correlation to match Maya dates to Gregorian dates. Another method, used by Harris and Sterns, known as the Loundsbury correlation is different, but only by two days. To change from one correlation to the other, you can use this formula:

Loundsbury Maya Date = GMT Maya Date – 2 Maya Days
or
GMT Maya Date = Loundsbury Maya Date + 2 Maya Days

Thus, for example, we calculated April 12, 1997 using the GMT correlation and got the Maya date of *5 Lamat 6 Pop* with a Long Count of 12.19.4.1.8 . To get the Maya date for April 12, 1997 using the Loundsbury Maya date, we just subtract 2 days. This would give a Maya date of 3 Kimi 4 Pop and a Long Count Date of 12.19.4.1.6 to correspond with April 12, 1997.

The GMT seems to agree more closely with cosmological events that can be compared in both calendars, and it is the correlation used by most modern Maya people today.

Endnote 2:

Dates on stelae in the same order they appear in the text are

9.15.10.00.00 3 Ajaw

9.01.00.00.00 (It happened on) 6 Ajaw 13 Yaxk'in

9.16.01.00.00 11 Ajaw

9.12.02.00.16 5 Kib

13 Kalabtuns.13 Piktuns.13.00.00.00.00

9.09.00.00.00   3 Ajaw 3 Sotz'

9.02.15.09.02 9 Ik

9.14.03.08.04   2 K'an

9.16.10.00.00   1 Ajaw 3 Sip

1.18.05.03.06   13 Kimi (an unusual sign for 13)

9.16.05.00.00 8 Ajaw