The Mayan Calendar, The Solar - Agricultural Year, and Correlation Questions

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It is generally accepted by Mayanists today that the Mayan calendar was a "floating" calendar, in which no attention was given to keeping the calendar in sync with the solar - agricultural year. As Michael Coe in his book *The Maya* puts it, the Maya had "a 'Vague Year' of 365 days, so called because the actual length of the solar year is about a quarter-day more, a circumstance that leads us to intercalate one day every four years to keep our calendar in march with the sun, but which was ignored by the Maya."[1] Earlier Thompson wrote that "The Maya made no attempt to intercalate days in the count of the years to bring the year of 365 days into conformity with the solar year. Such a correction would have played havoc with the whole orderly plan of the calendar and would have disorganized the elaborate system of lowest multiples of different time cycles, which were of the highest importance for divinatory and ritualistic purposes."[2]

However, while working with the Yucatecan Mayan Colonial literature such as the Books of Chilam Balam one gets the distinct impression that the Mayan scribes who originally wrote this material were well aware of how their calendar worked. Among the various points about their calendar there are two assertions in particular which stand out:

1) that the first day of **Poop** fell on July 16th of the Julian calendar (= July 26th of the Gregorian calendar in the 1500's and 1600's), and

2) that the katun which they were using, often called an **Ahau Katun**, was composed of 24 years. It is the purpose of this paper to look at these two assertions with the hope that other people thinking about the calendar question will have this additional material to work with.[3]

From various indirect references throughout the Books of Chilam Balam it seems that much of the original material incorporated in the various Books of Chilam Balam was first written between 1593 and 1629. Furthermore, the scribes would from time to time note that the material they were writing

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[1]Coe, 1980, page 44.

[2]Thompson, 1960, page 121.

[3]Throughout this discussion references are made to line numbers. These lines numbers are from the book *Post Conquest Mayan Literature* in which parallel texts from the various Books of Chilam Balam are transcribed in parallel so that they could be more easily compared in preparation for an effort to get back to an original reading of the texts. By consulting these line numbers in this book the various source texts can be located, and if need be the exact location of the original text from which these lines came can be found and compared with what is given here.

down in Latin script was transcribed by them from hieroglyphs. In reading through the various Books of Chilam Balam one finds such phrases as **lay bin u hokzah tu uooh anahte bin** (thus it was said that he took it (that is, the passage in which this line appears) out of the hieroglyphs of the book[4]), **tin hokzah ti uooh** (I took this out of the hieroglyphs[5]), and **ca ix u xocahoob tu uoohil** (and thus they read it in the hieroglyphs[6]). It would thus seem to be a reasonable assumption that the person or persons who originally wrote the Yucatecan Mayan Colonial texts from which the various Books of Chilam Balam were formed were able to read hieroglyphs and in fact were often transcribing hieroglyphic texts when writing down the material in Latin script. From these statements a conjecture can be made that while these scribes were active a half century or more after the conquest, the fact that they could still work with hieroglyphs would indicate that they still retained enough of their Mayan culture to also be knowledgeable of how their calendar worked.

A look at two particular texts from this Yucatecan Mayan Colonial literature would help to illustrate the point of view of these Mayan scribes concerning how they thought their calendar worked. The first text, **U Kinil Uinaloob** (the days of the uinals), illustrates assertion 1, and the second text, **U Buk Xoc Ahau Katun**, (the count of the **Ahau Katun**) illustrates assertion 2.

Assertion 1

Assertion 1: that **1 Poop** fell on the 16th of July, Julian calendar.

The text called **U Kinil Uinaloob**[7] is a list of the uinals or 20-day months in the year. There are six sources from which the composite edited version given below is derived: the Códice Pérez, Na, and Kaua sources, which in almost all essentials are the same, and the Tizimin, the Ixil, and the Chumayel sources. While these last three sources are each distinct in their presentations of this material from the first three, all with the exception of the Ixil, which gives no christian dates at all, agree with each other and with Landa on when each of the uinals should begin according to the Julian calendar.

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[4]Line C435.

[5]Line C560.

[6]Line J431.

[7]Lines A030-054.

U Kinil Uinaloob

U yax chun licil u naatabal u kinil uinaloob
cu cultal ichil u xoc kinoob ichil u tuliz haab.
Hun hunkal kin u cuch hunppel :U:.
He u tzolaanoob cabal lae:[8]

Poop	16 julio	oc nal kin[9]
Uoo	5 agosto	oc nal kin
Zip	25 agosto	yoc buul[10]
Zodz	14 septiembre	
Zec	4 octubre	
Xul	24 octubre	licil u yalancal cayi[11]
Dze Yax Kin	13 nobiembre	ti cu uadzal nali[12]
Mol	3 diziembre	
Cħeen	23 diziembre	
Yax	12 enero	u kin hoch utz[13]
Zac	1 febrero	licil u lolancal zacoob[14]
Ceh	21 febrero	
Mac	13 marzo	licil u yalancal aci[15]
Kan Kin	2 abril	
Muan	22 abril	licil u mumtal u nak u caanil kini[16]
Paax	12 mayo	oc nal kin
Kayab	1 junio	oc nal kin, yoc chicam[17]
Cum Ku	21 junio	
U Uayab Haab	11 julio	ca tun culac hoppel cħic haban kin, ixma kaba kin, u tich kin[18]

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[8]Translation: To start with it is to be understood on which days the uinals / are seated in the count of the days during the whole year. / One twenty day period is the burden of one month. / They are given here below:

[9]**Oc nal kin** = corn planting time, from **oc** = to plant, **nal** = corn, and **kin** = time. This is not to be confused with **ocnal kin**. (Motul Mayan-Spanish dictionary, page 342v: Ocnal kin: a puestas del sol.)

[10]**Yoc buul** = plant beans.

[11]**Licil u yalancal cayi** = fish spawn.

[12]**Ti cu uadzal nali** = corn plants are bent over.

[13]**U kin hoch utz** = good time to harvest.

[14]**Licil u lolancal zacoob** = white (plumeria flowers) blossom.

[15]**Licil u yalancal aci** = turtles give birth.

[16]**Licil u mumtal u nak u caanil kini** = there is a halo around the noonday sun. As pointed out the in Motul Mayan-Spanish dictionary, p. 313r, this is a sign of approaching rain.

[17]**Yoc chicam** = plant jicama.

[18]**Ca tun culac hoppel cħic haban kin, ixma kaba kin, u tich kin** = "Then are seated five **cħic haban kin**, nameless days, the extra days." The meaning of **cħic haban kin** is unclear:

There are three points which emerge from this list which concern the Colonial Yucatecan Mayan view of how the Mayan calendar worked: 1) that **1 Poop** falls on July 16th, 2) that several month names are descriptive of the uinal which they name, and 3) that certain agricultural and natural events occur in specific uinals. These points are supported throughout the colonial literature. The implication of these points is that the Maya had some method of intercalating for the solar year. Unfortunately, in all the material presented in the Books of Chilam Balam and in all the other source material for Yucatecan Mayan Colonial literature there is not one clear reference to a leap year system, although such terms as **ixma kaba kin**, **lamay tun**, and **mol box katun** are imperfectly understood and may hold the key to how and when leap years were accomplished, if in fact they were. In particular, in the calendar discussions given in **U Uichoob u Uoohil u Zanzamal Kin Xocoob**[19] and **Zac Patay Haabil**[20] there are discussions of how the calendar worked, but no definite discussion of a leap year system is to be found.[21]

Before considering how and when the intercalating day was added, let us consider why such an event must have occurred based on the evidence given by these three points.

The first point is that **1 Poop** falls on the 16th of July in the Julian calendar. Rarely is a date given throughout the Yucatecan Mayan literature in which this point is not substantiated, even in texts in which the primary purpose is not related to working with calendrical material. For example, at the end of the text called the **Cuceb**[22] there is the statement **lay tun u kinil tu bulucte Chuen, tu holahunpiz kin febrero 1544 haab** (thus then on the day 11 Chuen, on the 15th day of February in the year 1544). Two lines above the day is given in relationship to the uinal date: **tu uaxaclahunte Zac ti bulucte Chuen** (on the 18th of Zac on 11 Chuen). Given the intercalating mechanism alluded to by Solís Alcalá on pages 365-366 of his edition of the Códice Pérez, and which will be discussed below,[23] this would be the

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perhaps **u chic haban kin**, from which Roys gets a meaning "Festival of the Pisote and branches." (Tozzer, 1978, p. 157, note 802) or **u chicahaan kin**, which would be "impaled days", is meant. However, if this name is related to the fiesta **Chic Kaban** which Landa placed in the last five days of **Xul**, then either Landa has misplaced this fiesta or the scribes who placed **chic haban kin** with **ixma kaba kin** / **u uayab haab** are mistaken.

[19]Lines A320-428.

[20]Lines A600-650. See Endnote 1 for a transcript and translation of lines A600-614 of this text.

[21]Roys in his "The Ethno-Botony of the Maya", page 348, makes a similar observation: "Some note must also have been taken of intercalary days, although these do not ostensibly figure in the Maya calendar; otherwise hardly a generation would pass before a calculation based on the year-bearer would begin to be out of accord with the seasons."

[22]Line C568.

[23]See below in the discussion entitled "An Apparent Contradiction: July 16th Julian does not always fall on a recognized **Ah Cuch Haab**."

correct correlation of the Christian and Mayan dates.

The second point is that certain uinal names are related to the solar - agricultural year. Thompson in *Maya Hieroglyphic Writing*[24] gives an extensive review of the names of the uinals in the various Mayan languages and their meanings. Concerning the Yucatecan names and their relation to the calendar let me review the ones which are pertinent to the question of whether or not the Mayan calendar and the solar - agricultural year were interrelated.

Uoo means "frog", and from evidence of usage today in particular means bull frog. The Motul Mayan-Spanish dictionary is not very precise in this case: "Uo: unas ranas de mucho unto y manteca, buenas de comer." Today the animal is called **uoo much** or **becerro much**, and it becomes common and vocally active in the henequen fields during the month of August.

Xul means "end"; the end of the rainy season is in October.

Dze Yax Kin, or at times **Yax Kin**: **yax kin** is the term used today for "dry season". **Dzedz** means "little". When a noun is commonly combined with **dzedz** the second **dz** is frequently dropped.[25] **Dze Yax Kin** literally translated would be "little dry season". November is the beginning of the dry season. Incidentally, the hieroglyphic representation of this month has always been **yax-kin** or in some instances **yax-kin-il**, without an indication that there should be the syllable **dze**. In any case, at the time the Motul Mayan-Spanish dictionary was written, that is about 1580-1620, the term **yax kin** had much the same meaning as it does today: "Yax kin: el estio y otoño desta tierra en que no llueve y se secan y agostan los campos; tiempo de seca." It seems reasonable to assume that the term **yax kin** = "dry season" is of long standing and extends back into the pre-Columbian era. Furthermore, the uinal **Yax Kin**, or variants thereof, and the meaning of **yax kin** = "dry season" is to be found in several other Mayan languages.[26] This wide acceptance of the term **yax kin** in the month of November fits the weather for that month throughout the Mayan area.

Mol means "gather", and December is the time when the corn harvest gets underway.

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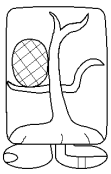
[24]Thompson, 1960, pages 107-119.

[25]Some examples: **dze na** gives "little mother", meaning "aunt", and **dze yum** gives "little father", meaning "uncle".

[26]Thompson, 1960, pp. 106, 110.

Ceh means “deer”. Because of a lull in the slash and burn process, namely during the time that the newly cut forest is drying out so that it burns well, there is time for alternative activities. Today during the month of March one of the various alternative activities is deer hunting. Aside from the increased amount of time which can be allotted to this alternative activity, it should be noted that deer hunting is made easier at this time of the year because most of the deciduous trees have lost their leaves, thus giving the hunters a better view of what is in the forest.



Kan Kin means “yellow day” or “yellow sun”. April is the time for burning the slash in the gardens plots in preparation for the new planting season. During April the sky turns orange from the smoke and everything one looks at has an orangish tinge. Some examples of the hieroglyph for this month are significant in this case. These show what looks like a leafless tree, sometimes with the sun in the branches. The trees at this time of year are in fact generally leafless because of the drought. The sun which is represented in the hieroglyph is cross-hatched, and conveys the feeling one gets about the sun at this time of the year, since it is somewhat obscured by the smoke. Incidentally, the implication of this hieroglyphic representation is of course that even during the classic period the Yucatecan Mayan calendar was tied to the solar - agricultural year.

Muan, often spelled **Moan**, is by all accounts a bird which announces the beginning of the rainy season. There is some confusion as to what this bird actually is. Thompson (1960, 1972) and Barrera (1980) list the bird as being an owl, in particular the Yucatecan screech owl (Otus choliba thompsoni). Some people though have considered that some of the hieroglyphic representations of **Muan** is not owl-like, and that the bird being represented is of the macaw or parrot family. The word **moo** is the Mayan word for “macaw”, and there may be a relationship between the words **moo** and **Muan** / **Moan**. In Quintana Roo, where there are a considerable number of parrots, when a rain shower begins these birds do make a lot of noise. In any case, whether the **Muan** is in fact an owl or a parrot, it seems that the function of the bird in part is to announce rain. In this context, since late April or early May is when the rainy season begins, the uinal **Muan** is properly placed as the uinal which announces the coming of rain.

Cum Ku, or occasionally **Hum Ku**: the derivation of this name is unclear, although in this context **Ku** means “god”. However, **Cum Ku** / **Hum Ku** could be parallel to the name of the lord of the underworld, **Hum Ahau** / **Cum Ahau**, in which **hum** / **cum** means a loud noise and **Ahau** means lord, ruler. **U hum chac**, literally “the noise of the rain god Chac”, means thunder. If **Cum Ku** / **Hum Ku** is parallel in meaning to **Hum Ahau** / **Cum Ahau** and **u hum chac**, then **Cum Ku** / **Hum Ku** would also mean “the noise of god”, and by extension thunder. June and July are the months when thunder is most frequent.

Aside from the meaning of specific uinal names cited above, in the Motul Mayan-Spanish dictionary there are two entries which specify the time in which a milpa is planted. These entries are **Macil te** and **Poopil te**. In both instances, the time is specified by giving the uinal name in which the planting occurs.

Macil te: On page 283r of the Motul Mayan-Spanish dictionary there is this entry: "Macil te: milpa temprana, que siembran en el mes de março llamado Mac." The fact that the early planting of a milpa is tied by name to the month in which it is planted would seem to indicate that this month comes at a specific time of the year, and is not a movable event. Note that the dictionary specifies that **Mac** is in the month of March, which is in line with the colonial calendar.

Poopil te: On page 381r of the Motul Mayan-Spanish dictionary there is this entry: "Poopil te: milpa tardia que se siembra despues de sanct Juan en el mes llamado Poop. ¶ In poopil te lo: esta milpa mia es tardia." As noted above for **Macil te**, the fact that the late planting of a milpa is tied by name to the month in which it is planted would seem to indicate that this month comes at a specific time of the year, and is not a movable event. Note that the dictionary specifies that **Poop** comes after the feast day of Saint John (June 24), which is in line with the colonial calendar.

Because the above uinal names, or in these last two instances activities which carry the names of these uinals, are linked to the solar - agricultural year, it would seem difficult to imagine that the uinals wandered throughout the solar year for lack of some intercalary system to keep them synchronized with the seasons and seasonal activities which are related to their names. Further, it would seem quite coincidental that the European calendar should be introduced into Yucatan and fix the Mayan calendar at a time when the uinals happened to be in the position to correspond with their namesakes. From the foregoing it would seem that contrary to the common belief of Mayan scholars, based on the meanings of the uinal names the uinals should be tied to the solar - agricultural year.

The third point raised in **U Kinil Uinaloob** is that certain corn planting dates and other corn farming activities, and also certain natural events are linked with certain uinals. Corn planting dates (**oc nal kin**) among some of the present day Maya vary widely and depend in part upon the variety of corn being planted. The length of growing season for different varieties of corn varies considerably. Some varieties require one and a half months to reach maturity (**nal thel**), others two months (**x-mehen nal**), and still others as long as four to five months (**x-nuc nal**). The Mayan farmers with whom I have talked on the subject of variety selection say that ideally the corn should be fully developed when the rainy season stops. Earlier ripening in constant rain results in moldy corn, and ripening after the rain has stopped

yields drought stricken corn. The good farmer, they say, will recognize the type of weather the growing season will bring through the use of a **U Xoc Kin**.[27] He will plant the appropriate varieties to take advantage of the predicted weather. The planting dates in **U Kinil Uinaloob**, while not specific about the varieties of corn to be planted, do fall when the planting is being done. These planting notes are supplied by three of the six sources: Códice Pérez, Kaua, and Na. The Chumayel, which is different from the other sources in its presentation of the material on the uinals, has among other notes these two notes: "dzeyaxkin = 13 Nobe = ti cu uadzal nali" (Dze Yax Kin, 13th of November, this is when the corn is bent) and "yaax = 12:hemero u kin hoch utz" (Yax, 12th of January, a good time for harvest). The bending of the corn stalks is still an important part of corn growing in Yucatan, and takes place as the corn dries, usually in October or November. The harvest begins any time after the corn dries, which may be any time after November. However, recently a friend of ours in Piste mentioned that he usually starts to harvest in earnest on January 12th, which matches the note in Chumayel. How it is that he chooses this date is something which we have not been able to determine.

Again, just as above where a floating calendar would render the uinal names useless, so too would a floating calendar render these agricultural notes useless. The implication again is that the Maya had some way of intercalating.

As was noted in the opening paragraph of this paper, it is generally assumed by Mayanists that there was no system for intercalating days. However, in the colonial sources written by Spanish friars, one from Yucatan and the others from the Mexican highlands, state that a leap year system did exist. Relating to the Yucatecan Mayan calendar, Landa, not necessarily an impeccable source,[28] states that the Maya added a day every four years, although he does not write exactly how this was done: "Otra manera de meses tenían de a 20 días, a los cuales llaman *Uinal Hunekeh;*[29] de éstos tenía el año entero 18, más los cinco días y seis horas. De estas seis horas se hacía cada cuatro años un día, y así tenían de cuatro en cuatro años el año de 366 días."[30]

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[27]"Count of the days", a tabulation of cloud formations during the month of January with the first 12 days being the months counted forwards, the second 12 days being the months counted backwards, the next 6 days being the months counted forwards every half day, and the last day of January being the months counted forwards for each hour from 6 a.m. through 6 p.m. This **U Xoc Kin** is not to be confused with the pre-Columbian **U Xoc Kin** or calendar round of 260 days, often called by Mayanist **U Tzol Kin**.

[28]Coe, 1980, page 21, not withstanding.

[29]Probably **U Kinil Uinaloob** is meant here. Landa is not very precise about the spelling of Mayan words and in fact is frequently quite far off the mark.

[30]Landa, 1966, page 61.

Both Sahagun and Duran, in writing about the Aztec calendar, a system which while not exactly the same as the Mayan calendar is parallel in most aspects, corroborate Landa's statement. Sahagun has this to say about the extra days at the end of the year following the 360 days of the regular year (i.e. 18 months of 20 days each): "The five remaining days of the year, which are the four last of January and the first of February, they named Nemontemi, which meaneth barren days. And they regarded them as unlucky and of evil fortune. There is conjecture that when they pierced the boys' and girls' ears, which was every four years, they set aside six days of Nemontemi, and it is the same as the bissextile which we observe every four years."[31] Duran agrees that a day was added every four years, and gives the following rather vague description of the leap year mechanism: "These people observed the leap year much as we do. If we look closely at the illustration (for the month Izcalli), we shall see that the dominical symbol is on top of a small hill, thus beginning the new month. Even though the last day fell under the sign of Flower, this other sign was added in order to pass from Flower to Head of Serpent. It is similar to the way in which we change the a to g in our leap year."[32]

Diego Muñoz Camargo, who wrote a description of Tlaxcala in the 1580's, gives a similar explanation of the leap year system.[33]

In a more recent description of the Mayan calendar as used by the Tzeltals during the 1930's and 1940's, Villa Rojas has this to say about the leap year: "Por lo que respecta al día que se intercala en los años bisiestos, es cosa que ninguno de mis informantes ya citados pudo explicar; parece probable que no existan años bisiestos en este calendario y que el día que corresponde a ellos se pase sin contar, logrando así que no se altere la equivalencia con

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[31]Anderson and Dibble, 1981, Book 2, page 35. See also Book 4, page 144: They observed another feast every four years, in honor of the fire [god], during which they pierced the ears of all the boys and girls; and they called it Pillauanaliztli. And during this feast it is likely, and there are conjectures, that they held their leap year, reckoning six [days] of Nemontemi.

[32]Duran, 1971, page 471-472.

[33]Muñoz Camargo, pp. 170v-171r: Del Bisiesto. Para que este calendario no caresca de bisiesto, como no es razón, ase de notar que siempre será bisiesto en el año Tecpatl Xihuitl, de quatro en quatro años, y no en otra de las quatro figuras, pues los años de Tecpatl Xihuitl, son bisiestos en esta man[er]a: El año de 1552 fue Ocho Tecpatl Xihuitl, y fue bisiesto el primer dia de aquel año, y fue Tepatl Xihuitl, que fue a 24 de Feb[e]ro que es ansi mismo çinquenta y çinco <171r> dias del año que fue á 15 de su terçero mes sobre la figura Malinalli, y ansi siempre sera en este dia de Malinalli bisiesto. Exempli gratia: el año de 1552 fue su año de Ocho Tecpatl Xihuitl, fue bisiesto aquel año á los 15 dias del terçero mes sobre la figura Diez Malinalli que cayo á 24 de Febr[er]o, y sobre esta figura se haran dos Dies diziendo oy Diez Malinalli, mañana Diez Malinalli, y luego proceder el dia sig[uent]e Onze Malinalli. El año de 1560 fue el primer dia del año Doze Tecpatl Xihuitl, fue el bisiesto a los 15 dias de su terçero mes, y ansi de todos los otros años sobre la misma figura Malinalli, Çe Malinalli, que es el quinzentro dia del terçero mes, y ansi de todo los otros años de bisiesto yran por esta forma regulado...

ciertas fechas católicas en las que se efectúan las fiestas de los santos patronos de cada municipio."[34]

Possible Methods of Intercalating
Leap year Days

If indeed the Maya had a true solar year as the above information would indicate, then of course there must have been a method in intercalating leap year days. Landa gives us one option which would require an interruption of the **U Xoc Kin** (the 260 day sacred round) once every four years. A more specific description of the mechanism of intercalating has been suggested by Ermilo Solís Alcalá in his book on the Códice Pérez. He suggests that there were in fact two alternative methods of intercalating. For the official count, such as that found on monuments, he states that a day was added in every **Cauac** year, which clarifies Landa's statement somewhat. For the short count however he states that the intercalating days were allowed to accumulate during the 52 year cycle called **U Bubukil Haaboob** in the colonial texts,[35] and then at the end of the year **13 Cauac** thirteen nameless days (**ixma kaba kin**) are counted before the seating of **1 Kan** on **1 Poop**. Solís contends that the first method is called **U Box Katun** and the second method is called **U Mol Box Katun**.[36] In fact, in the colonial literature the term **U Mol Box Katun** is applied to two of the **Ahau Katunoob** in which the year **13 Cauac** appears: **2 Ahau Katun**[37] and **11 Ahau Katun**.[38] This would lend support to Solís' statement.

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[34]Villa Rojas, 1990, 756.

[35]Endnote 3, lines A440-A480.

[36]Solís, 1949, pages 365-366. See below in the discussion entitled "An Apparent Contradiction: July 16th Julian does not always fall on a recognized **Ah Cuch Haab**."

[37]Tizimin, pp. 19r-19v.

[38]Line D509.

An Apparent Contradiction: July 16th Julian does not always fall on a recognized **Ah Cuch Haab**.

Despite the insistence that **1 Poop** falls on July 16th Julian, this fact is not always born out by the various texts in the Books of Chilam Balam. A very good example of this is that the various copies of **U Xoc Kin** given in the Books of Chilam Balam[39] all show that July 16 = **1 Poop** which falls on **11 Cimi**. The fact that all the sources show the same set of dates means of course that they are all derived from the same original source, written in a particular year within the **U Bubukil Haaboob**. If we make the assumption that the **Kan**, **Muluc**, **Hiix**, and **Cauac** years were still in fact the year bearers or **Ah Cuch Haaboob** when this **U Xoc Kin** was written, since from various footnotes in the Tizimin it is clear that this **U Xoc Kin** had to be written in or before 1627, then it seems that the **Ah Cuch Haab** was **9 Kan**, which is two days before **11 Cimi**, and the year **9 Kan** fell in 1589.[40] [41] [42]

In the **Cuceb** we can see a similar discrepancy between the idea that the **Ah Cuch Haab** ideally falls on July 16th, Julian, and the date that it really falls on. As was noted above, in the final lines of the **Cuceb**[43] Ah Kauil Ch̓el writes that he wrote the **Cuceb** with Ah Na Puc Tun in the Mayan date of **18 Zac 11 Chuen**, which he equates with the Julian date of February 15, 1544. This Mayan date of **18 Zac 11 Chuen** happens only in the year **2 Hiix** when

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[39]Pérez pp. 2-24, Pérez pp. 51-64, Pérez pp. 140-150, Ixil pp. 36v-40v, Tizimin pp. 22r-27v, Kaua pp. 54-71, and Na/Tekax.

[40]The previous year **9 Kan** was 1537 and the next one was 1641, neither of which are possible for various reasons: 1537 being too early because it was before the final conquest, and 1641 being later than the footnotes given in the Tizimin. See Endnote 5 for further information.

[41]There is however an alternative choice, but not a likely one. It has to be asked is how quickly did the people of New Spain adopt the Gregorian calendar. The people of northern Europe were rather slow in adopting it, with the English, for example, waiting until 1751, and of course the Russians until 1917. Did the adoption of the Gregorian calendar by Spain in 1582 immediately carry weight in New Spain, or was there some delay of its adoption in Mexico? If New Spain adopted the Gregorian calendar quickly, could it thus be possible that the christian calendar part of the **U Xoc Kin** given in the Books of Chilam Balam be based on the Gregorian calendar while the notations about the Mayan calendar be hold-overs from a Julian calendar correlation? If that is the case, perhaps the year in question is **Uacil Hiix** = July 24. **Uacil Hiix** happened to fall in the years 1547 and 1599.

[42]To illustrate the kind of problems we would get ourselves into if we are to take the colonial literature literally all the time, if we were to take the **U Xoc Kin** at its face value then we would have to accept that at the time it was written the **Ah Cuch Haaboob** were **Cimi**, **Chuen**, **Cib**, and **Imix**. Since there is no other indication in the Books of Chilam Balam that the **Ah Cuch Haaboob** during the colonial period were anything but **Kan**, **Muluc**, **Hiix**, and **Cauac**, then taking the **U Xoc Kin** as it is would be difficult to do. For other information about **U Xoc Kin** see Endnote 4.

[43]Lines C566-568.

the year bearer set is **Kan**, **Muluc**, **Hiix**, **Cauac**. Now the year **2 Hiix** fell in the years 1543-1544, but it also fell in the years 1595-1596 which is the year in which the material given in the Códice Pérez, pp. 100-101 was written.[44]

If we take **1 Poop** = July 16 as being an absolute, then as Tozzer points out,[45] February 15th is in error, and this should read February 18th. However, if Ah Kauil Chel is in fact correct, then the year **2 Hiix** began on July 13th.

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[44]There is a calendar commentary which is to be found in the Códice Pérez (pp. 100-101) and Kaua (pp. 275-276), which reads in part:

Hase de notar que en acabándose los diez y ocho meses y uinales después del postrero día de Cum Ku se han de contar los cinco días de una Yail Haab por su nombre, y al sexto numero cae el Cuch Haab que entran y succeden como fue este año de 1595,(1) que fue Ah Cuch Haab Ca Hiix.(2) Que el primer dia de Cum Ku del año de 1596 será Can Hiix que cae el 21 de ju[n]io(3) del d[ic]ho año. Del postrero dia de Poop(4) será Oxil Cauac para del dicho año de 1596 y parte del año de 1597, al cual le succedera Canil Kan, succediendo por su orden los Ah Cuch Haabes sin interpolacion de Buk Xoc como parece, de manera que aunque los d[ic]hos cinco dias se dicen mal dias ó Ixma Kaba no se entiende en acabando al nombrarlos por sus nombres sino en cuanto que no entran por algun Uinal ó mes.

1) The Kaua gives 1796, 1797, and 1798 respectively for this and the following years.
2) The Kaua gives **2 Kan**, **3 Muluc**, and **4 Hiix**, respectively.
3) The ms. read "21 de julio". Kaua reads "12 de Julio".
4) The text possibly should read "El primer dia de Poop", or alternatively "Del postrero dia de Yail Haab".

[45]See Tozzer, 1978, p. 151, footnote 748.

In fact, there is the following table from Solís Alcalá, pp 365-366, which gives the day of the Julian calendar on which **1 Poop** would fall, depending on the **Ah Cuch Haab**: [46]

	1 Kan,	2 Muluc,	3 Hiix,	16 de julio.
4 Cauac,	5 Kan,	6 Muluc,	7 Hiix,	15 de julio.
8 Cauac,	9 Kan,	10 Muluc,	11 Hiix,	14 de julio.
12 Cauac,	13 Kan,	1 Muluc,	2 Hiix,	13 de julio.
3 Cauac,	4 Kan,	5 Muluc,	6 Hiix,	12 de julio.
7 Cauac,	8 Kan,	9 Muluc,	10 Hiix,	11 de julio.
11 Cauac,	12 Kan,	13 Muluc,	1 Hiix,	10 de julio.
2 Cauac,	3 Kan,	4 Muluc,	5 Hiix,	9 de julio.
6 Cauac,	7 Kan,	8 Muluc,	9 Hiix,	8 de julio.
10 Cauac,	11 Kan,	12 Muluc,	13 Hiix,	7 de julio.
1 Cauac,	2 Kan,	3 Muluc,	4 Hiix,	6 de julio.
5 Cauac,	6 Kan,	7 Muluc,	8 Hiix,	5 de julio.
9 Cauac,	10 Kan,	11 Muluc,	12 Hiix,	4 de julio.
13 Cauac,				3 de julio.

Terminado el 13 Cauac dejaban pasar, pues no los incluían en sus cuentas, trece *días sin nombre* que correspondían con los días 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 y 15 de julio. Al día siguiente, 16 de julio, comenzaba otro Katún de 52 años con el 1 Kan.

Note that, whether coincidentally or not, the two problems we have been looking at above, that of why **1 Poop** does not fall on a recognized **Ah Cuch Haab** in **U Xoc Kin**, and that of why **18 Zac 11 Chuen** is equated with the Julian date of February 15, 1544, are resolved of by this table. In the first instance it is clear that, using the above table, the **U Xoc Kin** should have

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[46] For introductory comments on this table Solís Alcalá has the following on page 365:

Breves explicaciones de algunos puntos históricos y cronológicos del "Códice Pérez", hechas por el traductor.

El año maya romano descrito en las varias copies sacadas del archivo de la iglesia de Mani, decimos que es el 1589, porque en el 14 de julio anota el día maya 9 Kan. Cuando Montejo llegó a Thóo a fines del año 1541 se contaba el año maya 13 Kan. Retrocediendo cuatro años encontramos un año 9 Kan, en 1537. Los años mayas se repiten cada 52 años, por lo cual, otros años 9 Kan cayeron en 1589, 1641, 1693 y 1745.

No puede ser el 1537 porque es anterior a la conquista, y estos papeles fueron escritos después. De los otros cuatro solamente pudo ser el 1589, porque es el único de ellos que comenzó en domingo, como lo indica la letra dominical puesta en la copia que aparece en el folio 87 del manuscrito de Tizimin.

Los mayas tenían dos maneras de contar sus años bisiestos: agregando un día en cada uno de los años Cauac de los Ahau Katunes; y dejando pasar 13 días al fin de cada Katun de 52 años. En la cuenta general que anotaban en sus monumentos usaban del primer modo; y en su cuenta pequeña, la del uso común, empleaban el segundo. Esto último es la causa de la variación de la fecha del calendario romano para el principio de los años mayas. Aunque el P. Landa asegura que empezaban el 16 de julio, en realidad no era así, pues solamente los años 1 Kan, 2 Muluc y 3 Hiix comenzaban en 16 de julio. Con motivo de nuestros bisiestos, cada cuatro años adelantaba un día la fecha, como se verá en el siguiente cuadro que hemos venido formando en el que están anotados los 52 años del Katun.

read July 14 = **9 Kan**, **1 Poop**, and that all other Mayan month notations in the **U Xoc Kin** should be advanced two days. In the second instance it is clear that Ah Kauil Chel is correct in giving **18 Zac 11 Chuen** = February 15. If this table is in fact correct, then Landa may be in error by showing **12 Kan** = July 16, when in fact he should have shown **12 Kan** = July 10. However, Solís Alcalá has an explanation for this discrepancy.[47] [48]

Assertion 2

Assertion 2: that the **Ahau Katun** consists of a cycle of 24 years, and thus that the complete cycle of 13 **Ahau Katunoob** is 312 years.

The Yucatecan Mayan scribes are very insistent that the major calendrical cycle which they used, the **U Uudz Katunoob**, is composed of 13 **Ahau Katunoob** of 24 years each, making a complete cycle of 312 years. As the calendrical discussion given in the **Zac Patay Haabil** notes, **Hun hunkal haab u cuchoob hun huntul Ahau Katun, he tun canppel ixma kaba haaboob**. ("Twenty years is the burden of one **Ahau Katun**, but then (there are) four nameless years.")[49] Notice that the scribe is talking about a **haab** which is the 365 day year versus **tun** which is at times, but certainly by no means always, taken to mean a period of 360 days. Given that the scribes of the colonial texts used the term **katun** rather indiscriminately to talk about any cycle,[50] as for example the 52 year cycle called **U Bubukil Haaboob**,[51] it is entirely possible that the **Ahau Katun** of 24 years talked about by the Mayan scribes of the colonial period is quite distinct from the **katun** of 20 tuns (i.e. 360 days times 20) which pertains to the long count.

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[47]See the remarks given on page 365 of his Códice Pérez, shown in note 46 above.

[48]What is obvious, no matter what else one can conclude from the **U Xoc Kin** and the above discussion, is that we have eight available copies of the **U Xoc Kin**, and not one of the scribes thought to set the record straight and make changes to it according to when he was making his copy. For example, while it is clear that the dates correlating the Mayan calendar to the Christian calendar are from the Julian correlation, all of the copies we have of the **U Xoc Kin** are from the Gregorian era. Thus, if the scribes had considered this factor, we should have seen July 26th rather than July 16th being equated to 1 Poop. See Endnote 6.

[49]Lines A607-608. See Endnote 1 for lines A601-A614 in which this statement is incorporated.

[50]There are two meanings for the word **katun**, "war" and "twenty tuns". A conjecture has been made that **katun** meaning "twenty years" is actually derived from **kal** meaning "20", "closure", and **tun** meaning "360 day cycle". It appears that at some point the word **katun** lost its precise meaning of "20 tuns" and began to be applied to cycles of years (**haab**) and to cycles of the period of 360 days (**tun**) without distinction.

[51]Endnote 3, lines A440-A480. See in particular line A480.

The following table[52] is the basis for how the colonial scribes correlated Mayan and Christian dates:

U Buk Xoc Ahau Katun

tu haabil 1392 ca culhi 8 Ahau -- 7 Cauac
tu haabil 1416 ca culhi 6 Ahau -- 5 Cauac
tu haabil 1440 ca culhi 4 Ahau -- 3 Cauac
tu haabil 1464 ca culhi 2 Ahau -- 1 Cauac
tu haabil 1488 ca culhi 13 Ahau -- 12 Cauac
tu haabil 1512 ca culhi 11 Ahau -- 10 Cauac
tu haabil 1536 ca culhi 9 Ahau -- 8 Cauac
tu haabil 1560 ca culhi 7 Ahau -- 6 Cauac
tu haabil 1584 ca culhi 5 Ahau -- 4 Cauac
tu haabil 1608 ca culhi 3 Ahau -- 2 Cauac
tu haabil 1632 ca culhi 1 Ahau -- 13 Cauac
tu haabil 1656 ca culhi 12 Ahau -- 11 Cauac
tu haabil 1680 ca culhi 10 Ahau -- 9 Cauac
tu haabil 1704 ca culhi 8 Ahau -- 7 Cauac
tu haabil 1728 ca culhi 6 Ahau -- 5 Cauac
tu haabil 1752 ca culhi 4 Ahau -- 3 Cauac
tu haabil 1776 ca culhi 2 Ahau -- 1 Cauac
tu haabil 1800 ca culhi 13 Ahau -- 12 Cauac

The colonial scribes were very consistent in using this scheme of correlation, even in instances where the Christian and Mayan dating systems are given in an off-handed way in relationship to one another. An example of this is from the section named **Zuyua Than yetel Naat**, called "The Interrogation of the Chiefs" by Roys in his translation of the Chumayel.[53] According to the Tuz Ik version of this text, this interrogation occurred on September 4, 1628,[54] which according to both the Tuz Ik and Chumayel texts is three years before the end of **3 Ahau Katun**.[55] This correlation between the Mayan and Christian calendars is in keeping with the calendar correlations generally presented throughout the Yucatecan Mayan Colonial manuscripts. Another example of this cross-correlation is given in the Chumayel in reference to the landing of Cortés at Cozumel: **tu uucpis tun Buluc ahau u katunil tiix hoppi xpnoil lae, tu habil quinientos dies y nuebe años Do 1519 as.**:[56] "It was in the seventh tun of Katun 11 Ahau that Christianity then began; it was in the year A. D. 1519."[57]

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[52]Lines A730-A755.

[53]Roys, 1967, page 88.

[54]Line I002. See Endnote 2 for the complete introductory text in which these statements are made.

[55]Lines I020-I023.

[56]Lines G292-G293.

[57]Roys, 1967, page 143.

Conclusion

As a result of examining the above facts, and the consistency with which they are presented throughout the colonial literature, there seems to be little doubt that the Colonial Yucatecan Maya viewed their calendar as being a fixed solar year calendar, and that their major calendar cycle was a 24 year **Ahau Katun** cycle. Scholars vary in their interpretation of how this came about. Most claim that the Colonial Yucatecan Maya were mistaken about their calendar, and of this group some have gone so far as to say that some Mayan writer of the 17th, 18th, or even possibly the 19th century reorganized the calendar system to keep it in tune with the European calendar so that **1 Poop** would fall on the 16th of July of the Julian calendar. As can be seen by a thorough review of the Books of Chilam Balam, this latter possibility seems quite remote, as this writer would have had to have been extremely thorough in finding all the various references to dates found throughout the material presented in these books and then would have had to have changed these dates to conform with his new calendar. In as much as not one of the source books for the material of the Books of Chilam Balam is a complete collection of dated literature, it seems hard to imagine, especially at a later date, how this writer would have had such a pervasive influence over the dating system in the colonial manuscripts.

Other scholars claim that the Yucatecan Maya were in fact either in the process of a calendar reform as the Spanish arrived, or had gone through such a reform shortly before their arrival, but that in any case the Mayan calendar had become a fixed solar year calendar and that the 24 year **Ahau Katunoob** resulting in a 312 year katun cycle had been established by the time that the Mayans had been conquered. There is no evidence which I have seen in the colonial literature which would either confirm or deny this claim.

Finally, it must be said that almost no one makes a claim that the Mayan calendar with a fixed solar year and with 24 year **Ahau Katunoob** is of long standing.

My own view is that the Mayan calendar as presented by colonial sources was firmly established by the end of the 16th century and that there is evidence that it was already in use when the Spanish were making their first landfalls on the coast of Yucatan. Furthermore, based on the names and in a couple of instances the hieroglyphic representations of certain uinals it would seem that a fixed solar year calendar was already operating during the classic Maya period. Beyond that I can make no judgments at this time.

Endnote 1: The complete text on lines A601-A614:

a600 Zac Patay Haabil
He ix Ahau bin tac te lae tu uudz katun lae.
Lay licil u naatabal u cumtal katun lae;
Cauac tu hunte Poop u ah cuch haab
yahal cab tu caten u kinil haab lae.
a605 U cultal Ahau Katun lae
tu pach u kinil Cauac tu kaba ix cu cultal.
Ma tuzbili.
Hun hunkal haab u cuchoob hun huntul Ahau Katun,
he tun canppel ixma kaba haaboob.
Licil u baxal hoppel haabi yetel Cauace,
a610 bacac ix ti lic u cultal katunie tu kin Kan.
Licil u yalic u kaba yetel u than tulacal.
Bay hoppel kin ixma kabae amal haabe.
Bay ix amal u hidzil katunoob lae
hoppel haab u baxal u mol box katun lae.

Translation:

a600 Zac Patay Haabil[58]
Here is Ahau which will come at the fold of the katun.
Thus is to be understood the seating of the katun;
Cauac on 1 Poop is the Ah Cuch Haab
which dawns again as the day of the year.
a605 The Ahau Katun is seated
(the day) after the day which is called Cauac is seated.
This is not a lie.
Twenty years is the burden of one Ahau Katun,
but then (there are) four nameless years.
The fifth year comes into play with (the year) Cauac,
a610 even though the katun is seated on the day Kan.[59]
Its name and all its power is called upon.
Thus there are five nameless days every year.
Thus every time there is the end of the katuns
five years come into play with the U Mol Box Katun.

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[58]The meaning of this phrase is unclear. **Zac** means "white" but can also mean "false" or "imperfect". **Patay** is unregistered, but **pat** can mean "to declare", "to even accounts", and "to invent", among other meanings. **Haabil** means "year". There are four examples of this phrase in the Books of Chilam Balam. Barrera translates **Zac Patay Haabil** as "años esteriles". I am inclined to think that at least here in this context **Zac Patay Haabil** means "false / imperfect year reckoning".

[59]There is no justification for this statement given the rest of the information provided here. Perhaps reference is being made to **U Bubukil Haaboob**, which does begin with the year 1 Kan.

Endnote 2: Lines I001-I032 from Zuyua Than yetel Naat.

i001 Zuyua Than yetel Naat utial c' yum gobernador mariscal.
Helelae tu canppel kin yuil Septiembre, tu haabil 1628,
lic yutzcintah u yanal maya than
lay chicbezahaanil caanal
yoheltoob uinicoob himac yan u uilal
i005 ti u huunil dzibaanil u Zuyua Than yetel Naat.
Bin u naatabal tumen u batabil cahoob yetel halach uinicoob
manahantacoob ti alcaldesil yetel regidoresil.
Lay uchic u cahtal ti Tzuc Uaxim lae tu lakin Ichcaanziho.
Ti yan u luum uchic u yantal u pakali yetel u solar,
i010 uchic u cahtal lae.
Bin ix kuchuc tu kin u holol u bel xan.
Talel u than u halach uinicil, chac u than.
Ca bin uluc chac ix u buc xan.
Helelac tu Zuyua Than.
Lay bin u than,
i015 lay bin u kat u halach uinicil cah lae.
Ca bin u kuchuc tu kin u dzocol u than ah Ox Ahau Katun lae.
Ca bin culac u yanal katun, Hun Ahau Katun.
Lay tun bin yanac ichil u yanal katun lae.
Bay alanil lae.
i020 He ix katun helelae, Ox Ahau Katun.
Oxppel haab u binel ca lukuc tu tepal.
Dzoc ix u kuchul u kinil u dzocol yahaulil yetel u tepal.
Halilibe; manahan ix u yanal katun, Hun ahau Katun lae,
culaan ichil yotoch ah Ox Ahau Katun lae.
i025 Yulate, tan u dzabal u chaan tumenel ah Ox Ahau Katun lae.
Zubultzil bin bin baloob tu cahaloob.
Kat naat cu talel ichil u katunil licil u dzocol helelae.
Ti kuchul tu kinil u katabal u naatoob u batabil cahoob ua yoheloob
uchic u taleloob u uiniciloob yahauliloob,
i030 lacaloob camac u than tulacal u ch̓ibaloob talicoob
ua tzolaan u talel u batabiloob, u halach uiniciloob
ua ch̓ibaloob ahau ua ch̓ibaloob batab;
ti u hah canticoob.

Translation:

The language and understanding of Zuyua[60]
for our lord the military governor.
Here on the fourth day of the month of September in the year 1628,
the unusual Mayan language was composed
so that it appeared written in the heaven
known to the men whoever will see it in the written book
of the Language and Understanding of Zuyua.
It will be understood by the chiefs of the towns and the head chiefs,
passed on to the mayors and aldermen.
Thus it happened that he came to live in Tzuc Uaxim
which is to the east of Merida.
There is the land where his orchard and private land
was built, where he came to live.
The day will come he shall finish also.
The word of the head chief comes, his word is vigorous.
Then will arrive his great cape also.
Here is the Language of Zuyua.
Thus will be the word, thus
will be the interrogation of the head chiefs of the towns.
Then will arrive the day of the end of the rule of Three Ahau Katun.
Then will be seated the other katun, One Ahau Katun.
Thus therefore will happen in the other katun.
Thus it is said.
He is the katun today, Three Ahau Katun.
There are three years to go so that his reign will be taken away.
The time has arrived for the end of its rule and its reign.
Anyway; it happens that the other katun, One Ahau Katun,
is seated in the house of Three Ahau Katun.
Alleluia, it is being given a feast by Three Ahau Katun.
Shame they say will be hidden in the town.
The examination which comes in the katun ends today.
The time has arrived for the chiefs of the towns
to be asked about their knowledge,
if they know how the ruling men came,
whether or not it is true that all come from lineages,
whether they come from chiefs, from head chiefs
whether they are from lineages of kings or lineages of captain;
to this they speak the truth.

[60] It is not clear where the site of Zuyua was located. However, there was a port named Holtun Zuyua (Port Zuyua) which appears to have been on the island of Ciudad del Carmen on the coast in southern Campeche. As is common along the Yucatecan coast where towns some 20 km or more from the coast have a port on the coast with the same name, there probably was a site Zuyua somewhere inland from Holtun Zuyua.

Endnote 3: U Bubukil Haaboob.

U Xocaan u Bubukil Haaboob

a440 U tzolaan u xocol haab u lubul tu can titzil caan:
Kan ti lakin,
Muluc ti xaman,
Hiix ti chikin,
Cauac ti nohol.
a445 Bay bin u ximbal lae.

	hunil Kan	hunil Hiix
	cabil Muluc	cabil Cauac
	oxil Hiix	oxil Kan
a450	canil Cauac	canil Muluc
	hoil Kan	hoil Hiix
	uacil Muluc	uacil Cauac
	uucil Hiix	uucil Kan
	uaxac Cauac	uaxac Muluc
a455	bolon Kan	bolon Hiix
	lahun Muluc	lahun Cauac
	buluc Hiix	buluc Kan
	lahca Cauac	lahca Muluc
	oxlahun Kan	oxlahun Hiix
a460		
	hunil Muluc	hunil Cauac
	cabil Hiix	cabil Kan
	oxil Cauac	oxil Muluc
	canil Kan	canil Hiix
a465	hoil Muluc	hoil Cauac
	uacil Hiix	uacil Kan
	uucil Cauac	uucil Muluc
	uaxac Kan	uaxac Hiix
	bolon Muluc	bolon Cauac
a470	lahun Hiix	lahun Kan
	buluc Cauac	buluc Muluc
	lahca Kan	lahca Hiix
	oxlahun Muluc	oxlahun Cauac

a475 Lay u xocaan u bubukil haaboob tin ualahe:
hun hunppel haab u cuch, lay tzolaantacoob lae.
Lay tu pak u dzocol u xocol lay oxlahun Cauac lae,
ca tun hoppoc u xocic hunil Kan tu caten.
Layli cu zute bay dzaanil caanal lae.
Hun dzit katun u yalabal tu canppelil; lay hah lae.

Endnote 4: The Two Parts of **U Xoc Kin**:

An interesting facet of the **U Xoc Kin** is that it is clear that it is composed of two separate parts. One part is the actual **U Xoc Kin**, more commonly called **U Tzol Kin** by Mayanists, which is clearly copied from a 260 day almanac. The other part is the correlation of a bear bones Christian calendar with the Mayan calendar. Thus, the first part is:

Lahun Oc	utz	u hoppol kak ah toc
Buluc Chuen	utz	
Lahca Eb	utz	
Oxlahun Ben	utz	
Hun Hiix	lob	licil cimil uinicob, u xul ti

etc...

After 260 days the day **10 Oc** appears again on September 18th, and the cycle of good and bad days and also of day prognostications, with some minor variations, begins again for the remaining 105 days, showing that the basis for this material is a 260 almanac.

The second part is:

Enero 31
1
2
3
4
5
6
7
8
9
10
11
12 licil u cultal Yax
13
etc...

It should be noted that the original writer of this combined calendar set **10 Oc** equal to January 1 whereas Landa set **12 Ben** equal to January 1. It is thus clear that the writer of this material was not working from the Landa calendar.

Endnote 5: The Relationship between the **Ah Cuch Haaboob** and the Christian Year

While the Books of Chilam Balam show some confusion concerning the relationship between the **Ah Cuch Haaboob** and the Christian year, when all the various pieces of data are taken together it is clear, and has been clear for some time, that the **Ah Cuch Haaboob** as given above in the table **U Buk Xoc Ahau Katun** are the correct ones. Thus, for example, according to the table the **Ah Cuch Haab** 6 Cauac fell in 1560. It follows from the 52 year cycle, **U Bubukil Haaboob**, that the next year, 7 Kan, fell in 1561, that the year after, 8 Muluc, fell in 1562, etc. through 52 years, at which point the **Ah Cuch Haab** 6 Cauac would come again in the year 1612. Of course, this information is only good to place **U Bubukil Haaboob**, and thus the **Ah Cuch Haaboob**, within the context of the Christian calendar, but does nothing to fix such things as the katuns to the Christian calendar.

Endnote 6: Julian versus Gregorian Calendars and the Correlation Question

There is the correlation question as it relates to the question of Julian versus Gregorian calendars. In 1582 the Catholic church, under the guidance of Pope Gregory, updated the intercalary system of the calendar in order to keep the Christian calendar in sync with the solar year. It was determined that there was a ten day difference between what the Julian calendar showed and what it should show. Not only was the intercalary system reformed, but the calendar was also readjusted to realign the solstices and equinoxes of Christian calendar with what were considered to be the correct dates and 10 days were added to the Julian date to arrive at the new Gregorian date. Thus, for example, the day July 16th in the Julian calendar became July 26th in the Gregorian calendar.

The fact that the Books of Chilam Balam equate July 16th with **1 Poop** would show that the origin of this idea is pre-Gregorian, since this correlation agrees with Landa. However, as one works with the various works which have survived from the colonial era, it is very apparent that scribes generally put very little thought into what it is that they are transcribing, and thus if they were working on a text which equated July 16th Julian with **1 Poop** even though they are working in the Gregorian era, it apparently did not have occurred to them to make the proper adjustment and rewrite the text to show July 26th = **1 Poop**.

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