

Paper Title: The Mayans: Religion and Science

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Abstract:

This paper portrays the relationship between science and religion of the prehispanic Mayan culture. The first part introduces a brief panorama of Mayan geography and history. The second part highlights essential religious concepts including cosmology, spirituality and sacrifice. The third part focuses on how the Mayans associated scientific developments in mathematics and astronomy with religion.

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Introduction

The ancient Mayan civilization was comprised of a multitude of separate entities with a common cultural background. Similar to the Greeks, they were religiously and artistically a nation, but consisted of as many as twenty politically sovereign states that occupied the eastern third of Mesoamerica, primarily the Yucatan Peninsula (see Figure 1), from 2000 B.C. to 1697 A.D., including what are now southeast Mexico, Guatemala, Belize, Honduras and Nicaragua. The topography of this area varied from volcanic mountains to lowlands, and included rain forests, scattered savannas and swamps, and the climate ranged from an intensely hot and uncomfortable dry season to a cool rainy season. This terrain enabled the Mayans to develop a lively trade with a variety of crops and animals. Crops produced for their own personal consumption included maize, squash, beans, chili peppers, amaranth, manioc, cacao, cotton for light cloth, and sisal for heavy cloth and rope. Animal trade included deer, turkeys, peccaries, tapirs, rabbits, and large rodents, as well as monkeys and parrots. They also worked with obsidian, jade, and other precious metals like cinnabar and hematite.

An elaborate system of writing was developed in the Mayan civilization to record the transition of power through the generations. The Mayan priests, who followed the ruling class in importance, were instrumental in the recording of history through hieroglyphs, which were formed through a combination of different signs which represented either whole words or single syllables, and inscribed on stone and wood and used within architecture. Furthermore, folding tree books were made from fig tree bark and placed in royal tombs. Unfortunately, many of these books did not survive the humidity of the tropics or the invasion of the Spanish, who regarded the symbolic writing as the work of the devil. Four such books that have provided a great deal of information about the Mayan civilization to the modern world are known today as “Codexes”: the Dresden Codex, the Madud Codex, the Paris Codex and the Grolier Codex.

The Mayan political organization was based on two prevailing classes, the clergy and the rulers. In both the priesthood and the ruling class, nepotism was apparently the prevailing system under which new members were chosen. Primogeniture was the form under which new kings were chosen as the king passed down his position to his son. After the birth of an heir, the kings performed a blood sacrifice by drawing blood from his own body as an offering to his ancestors. A human sacrifice was then offered at the time of a new king's installation in office. This ritual was the most important of a king's life as it was the point at which he inherited the position as head of the lineage and leader of the city. The religious explanation that upheld the institution of kingship asserted that Maya rulers were necessary for continuance of the Universe.

Figure 1. Geography of Mayan territory.



Mayan Periods

Around the year 2000 B.C., in Mexico, Central and South America, a series of rural and fishing villages that were developing original cultures with their own, particular traditions began to observe a great proliferation. There was a great deal of communication among these groups of villages, that is, they established more and more contact and interaction among people, thereby accelerating the exchange of cultures and ideas. This is how the prehispanic era of the Mayan culture came to be, which is divided into three periods: Pre-Classic, Classic and Post-Classic.

Pre-Classic

This period begins in approximately 1500 B.C. and ends in 200 B.C. During this period, places like Yucatán and Quintana Roo already existed as agricultural and fishing periods in full development, in which trade, language and common, non-political cultural characteristics arose. The first, primitive Mayan cities began to make their first stone inscriptions, which the first Mayan king used to engrave his name. Rectangular, vertical stone monoliths called “*estelas*” have been discovered from this period that demonstrate the existence of a calendar with specific symbols for days, months and years. Regardless, characteristics specific of the Mayans were still not free from foreign influence, especially from that of the Olmecas. In terms of utensils, the Mayans worked with different types of seashells, stone rolling pins, mortars and pestles, obsidian knives and jade. Most importantly, the use of ceramics defined the physical Mayan features as portrayed in their small anthropomorphous figurines.

Classic

This formative, Pre-Classic period lasted approximately one and a half millennia. The Mayan culture was clearly pronounced in the southern area, as they were already sculpting *estelas* and altars. A hieroglyphic writing system had begun, pottery and lapidary techniques appeared, and the calendar was well-known, which implied mathematical and technological knowledge, as well as the existence of a stratified society. The first pyramids were constructed in the central and northern areas, and this is considered the period of greatest splendor of the Mayan culture. The villages were very religious, and were characterized as ceremonial and erratic, in which great ceremonial temples were built. The priest caste appeared, which handled science and politics. Actually, the priests were the only ones who carried out these activities. *Estelas* and monuments of different deities were erected.

During this period, places of great importance of the Olmeca culture mixed with many Mayan features and Teotihuacan influence appeared, such as Kamilnaju, Monte Albán, Izapa, Tiltepec, Ocozo, and Chinkutic. Finally, the Mayans freed themselves from this external influence to find their own identity, thereby arriving at their maximum cultural expression as well as a great expansion. Ceramics with polychrome decoration appeared, along with vessels with human effigies and animals. Historical facts and the passage of time were recorded onto *estelas*. In terms of science, astronomy, mathematics and hieroglyphic writing were developed. The “*Tepew*” ceramic technique appeared, which depicted domestic scenes and some rituals. Cities such as Tikal, Piedras Negras, Copán, Tulúm and Chichén Itzá flourished.

Post-Classic

This period begins approximately in the year 900 A.D. and ends in 1697 A.D. During this period, some new, historical events happen in the northern area that change the aspect of the culture. At the beginning of this period, the Mayan decadence began when they lost their spiritual guides, wisemen and true religious teachers. The farmers started to lead the Mayan culture and began to be influenced by other cultures coming from the central Mexican plateau, specifically by that of the Toltecas. Around the year 1000 A.D., an important man named Ce Acatl Topiltzin Quetzalcoatl, governor of the city of Tula, disappeared near Mayan territory. At the same time, various Mayan sources such as the books of the Chilam Balam refer to the arrival of groups of foreigners called “*Itzaes*”, who were lead by a man named Kukulcan, which is the Mayan translation for Quetzalcóatl. Kukulcan founded Mayapán and later, together with other cities such as Chichén Itzá y Uxmal,

formed the League of Mayapán and developed a Mayan-Toltecan culture. While Mayapán flourished, the entire eastern coast of the Yucatan peninsula was occupied by groups that arrived and built many ceremonial centers. One of the most important of these sites was Tulum, which is located in one of the most spectacular points of the Caribbean coast. Tulum survived until it submitted to the Spanish Conquest, which marked the end of the Mayan culture. The Spanish domination was made possible due to the Mayan's cultural setback, aggravated by the continuous quarrels among themselves. The most important characteristics were the infiltration of groups from the north, who consequentially brought an intermixing of cultural groups, linguistics and migration. As a result, the civilization was no longer lead by priests and wisemen.

The Mayan Religion.

With what we say here,

We will form a clear idea of how the Universe was formed,

Of what is still hidden and of what we can see of our world,

And how the Shaper and Creator of all the things made them.

This Shaper and Creator put his essential qualities into action

And his word alone was enough to create things.

Popol Vuh.

Civilization's religious facet always affects other facets, because deeply, the concern about the perennial questions of "Who am I," "Where do I come from," "Why do I exist," and above all, "Where am I going," are ones that ultimately originate from the religious concerns of all humanity. The Mayan civilization was no exception; the Mayans were conscious of their existence, and thus left their mark in their architecture, painting, and writing, which rotated around the common orbit of their religious vision.

Mayan Cosmology and Gods.

The myths of creation according to the Mayans are compiled in a marvelous book known as the *Popol Vuh*, in which the Mayan civilization united the narrations of the successive creations of the universe. The following, for example, are transcriptions of some fragments of the Popol Vuh that are particularly interesting, since they present a surprising resemblance to the narration of the Judeo-Christian Genesis:

7. Everything was in suspense, in complete calmness, in total silence, without movement, with the existence of nothing, neither time, nor space.

12. Only the Creator and Shaper was there, and the seeds of things with all their purity were set into the water by Him.

19. First He told himself: Water, I set you free, and when you have disseminated into the seas and rivers, then Uleu, the Earth, will remain. Thus everything will stay clean and will be sown in Heaven and on Earth, so that the creatures to be born will not have troubles, nor will troubles exist when men are born.

Next, the Shaper God and the assistant gods who accompanied him, decided to create the plants and animals. Unfortunately he was disappointed because he saw that they did not praise him, nor did they remember him or worship him. Therefore, he sentenced them to be food, and to be objects manipulated by another species worthy of its creation. As a result, the gods decided to make other beings, this time of clay, but they were not worthy either, because although they could speak, they lacked intelligence and ability. The gods decided to destroy them with a flood and to create other beings of wood. These new pre-humans were more intelligent; however, since they did not recognize their creators, they were destroyed with another flood. The few survivors were the ancestors of the present-day monkeys.

Finally, the creator gods formed the first four human beings of white and yellow corn, as this commodity was very sacred to the Mayan civilization. In the beginning, these first men had unlimited vision which allowed them to see the whole world with one gaze; however, the gods clouded their eyes so that they would not have such immense knowledge.

According to the Mayans, that ancient world was flat and rough, and in reality was the skin of a square lizard that was divided into three worlds: heaven, Earth and the underworld. Heaven was formed by a type of pyramid of thirteen steps symmetrically distributed, in which the peak represented the highest and noblest of skies. In the underworld, an inverted pyramid of nine steps existed, and in a way analogous to the Hell presented by Dante in his *Divine Comedy*, each descending step corresponded to a gloomy place dominated by a malignant god, with the lowest step being the worst.

The Earth, however, was a square with four corners equivalent to the four directions, to which one symbolic color corresponded: red for the East, white for the North, black for the West and yellow for the South. In each of the four corners there was a god called a *Bacab*, who was a kind of Atlas in that he held up a corner of the sky. In the middle of the Earth, a great *ceiba* tree grew in the center of the world.

The Mayan pantheon consists of a great number of gods that generally present dual attributes. When they act on Earth, they are usually benevolent, like the sun that is good and gives heat. However, when the sun enters the underworld at night, it becomes the fearsome and gloomy jaguar god. Furthermore, the gods are related to four aspects or attributes of its personality, that is, each Mayan god has four forms associated to a specific color and particular direction. Some of the main gods are (see Figure 2):

- Chac, the Rain God
- Kinich Ahau (also known by Oh Xoc Kin, who was associated with writing and poetry), the Sun God
- The Corn God, who was associated with Yumil Kaxob, the god of Plants
- Oh Puch, the God of Death or of the Underworld
- Ixtab, the Goddess of Killing
- Kukulcan, the Wind God, imported by the Aztecs and known as Quetzalcóatl.

Figure 2. The Mayan gods.



Gnosis Samael Aun Weor, Retrieved March 7, 2005,
From www.samaelgnosis.net/imagenes/antropologia/mayas/

Mayan Spirituality

The Mayan world represents a deep spirituality and relates the powers of the divinities to the lifecycles of nature and of man himself. The planting and harvesting cycles are therefore intimately related to the generosity of the Corn God. As a result, corn was not just the main food of Mesoamerica but rather a generous god, a mysterious fruit of the underworld that not only was to be feared but also respected, since its mysterious innards give birth to the miracle of the golden-grained cob with nutritious and curative powers. Corn was the sustenance of life, thus the Corn God was attributed fear, respect, devotion, and gratitude. Since the natural activity of sowing and harvesting corn represented a divine and miraculous gift for the Mayans, they would hold solemn ceremonies of thanksgiving beforehand.

Nevertheless, the duality of the Mayan deities supposes ill-fated consequences for the human development of a civilization that did not escape the terrible custom of carrying out human sacrifices, since the Mayan gods demanded blood in exchange for favors received. Human sacrifices among the Mayans had certain particularities. First, it must be noted that the typical form of sacrifice of the Aztecs was adopted by the Mayans. This consisted of lying the victim down on a stone and having his/her limbs secured by four assistant priests. With a flint knife, a main priest would make an incision on the left side of the victim's chest, cut out the heart and present it palpitating toward the sun and then toward the participants of the ritual, often smearing himself with the victim's blood and rolling the victim's body down the pyramid steps. Other varieties of human sacrifices were evident in the Mayan civilization: being thrown from a cliff, sacrifice by arrow, and being thrown into sacred wells. Self-mutilation was another way to gain the gods' favor. This was done by means of perforations done with thorns to the tongue, limbs or penis, and the blood was either collected in leaves that were then burned, or smeared onto idols (see Figure 3).

Figure 3.

Self-sacrifice: Piercing the tongue and passing it through a rope to drain the blood.



Mayan Culture and Traditions, Retrieved March, 11, 2005 from

<http://playadelcarmeninfo.com/playa-del-carmen-info-mayan-culture-and-traditions.html>

Amidst the understandable horror of human sacrifices one may sense the sacrifice and self-sacrifice of the Mayans. In this civilization, it was believed necessary that someone must pay for the favors received or must purify everybody's sins. The victim was generally pure, virgin, and aware of the value of giving up his/her life in order to achieve the welfare of others. The rites of sacrifice were carried out on special dates, and sacrifices with animals were also offered, along with tributes of fruits and food. Prayer and sexual abstinence were also

practiced among the Mayans on special dates. An example of Mayan spirituality is the following fragment transcribed from a Mayan prayer:

*Keep my son, dear father of mine.
Make all evil end, make all fever cease.
Do not let malicious forces run him down.
Do not let a viper sting my son.
Do not let permit the death of my son while he is playing.
When he is big, he will give you the tribute of posol.
When he is big, he will give you the tribute of tortillas.
When he is big, he will keep you in mind.*

Scientific Knowledge

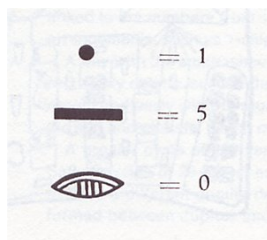
The majority of researchers of the Mayans, lead by their admiration of the Mayan civilization, have attributed certain knowledge that in reality existed in more ancient civilizations, but that the Mayans developed and perfected. For example, it can be said that the Olmecas and the Zapotecas from Monte Alban I registered dates several centuries before the Mayans did, which implicated astronomical, mathematical and calendar knowledge, as well as the use of writing.

Mathematics

Many Mayan researchers do not coincide regarding the fact that the Mayans possessed complex mathematical knowledge. Actually, they only used the Base 20 number system, which was invented and employed by the civilizations mentioned above. This number system is one in which the value of the symbols depends on the position they occupy, which occurs in our decimal system. In such a system, a symbol is needed to indicate that in a determined number set, no unit of a specific order should appear; in the Arabic number system that we use, this symbol is expressed by zero. Until now, the use of zero has been identified in the Mayan number system, but not in the Olmeca or Zapoteca inscriptions; as a result, it has been said that the Mayans invented this symbol in America.

The symbols most frequently used for forming their numerals were a dot and a line, which were also used by more ancient civilizations, such as the residents of the Gulf Coast, Monte Alban and the Pacific Coast in Guatemala. The dot represents a unit, and the line represents five units. Regarding the zero, the painted codexes used a symbol shaped like a small seashell; on the stone monuments, the zero resembled a 4-petaled flower or Maltese cross (see Figure 4).

Figure 4. Basic Mayan number symbols



Tompkins, 1987.

In his “La Ciencia Matemática de los Mayas” Héctor M. Calderón shows how Mayans used a checkboard, lined in nine or sixteen squares, to perform the mathematical operations of addition, subtraction, multiplication, division, and finding square roots with a minimum effort and without having to memorize a complex multiplication table (see Figure 5). An astronomer could plot the centennial motion of stars so as to

Astronomy

It is evident that the Mayans had an enormous interest in studying and recording the path of the stars. Cosmic harmony was represented by the inalterable recurrence of the heavenly bodies as they traveled through the universe. Their instruments were very rudimentary: two crossed sticks or threads whose intersection, seen from an observation point, created a visual sight; a vertical stick on the ground marked the path of the sun at its zenith; topographical elements contrasted the visual sight with the horizon. Some of their buildings were constructed for astronomical reasons, such as *el Caracol*, or Snail Shell, the observatory at Chichén Itzá (see Figure 7).

Figure 7. El Caracol Observatory, Chichén Itzá



León-Portilla, 1978.

In various places at Petén in Guatemala, the location of certain buildings suggests the intention of establishing sights toward certain points of astronomical interest, such as the sunset during solstices and equinoxes. The temples themselves were built on top of the pyramids, which offered the possibility of observation, since they were situated over the other buildings, hills and forests. With such elemental resources, the Mayan astronomers, most probably specialized priests, were able to study and precise the sinodic revolutions of certain stars and planets such as the sun, the moon, or Venus.

Calculating the orbit of the earth around the sun at 365.2420 days, the Mayans marked the year's end by the erection of a stone they called *tun*. They did likewise for a twenty-year cycle called *katun*, a period they considered to be governed by a conjunction of Jupiter and Saturn. They also had a special 260-day calendar that was divided into 13 months of 20 days. Thus, multiples of 13 and 20 became the heart of a chronological computation that was stunning in its simplicity and exactness.

On a monthly basis, twenty different names of days of the month were linked to the numbers 1 to 13 to produce 260 different arrangements. A day with the same name and number could repeat endlessly without regard to the actual movements of the sun and planets, which marked the natural time periods. A cycle of 260 years was comprised of consecutive Jupiter-Saturn cycles of 20 years, each one of which was considered to have a different quality depending on the series of angles formed between Jupiter and Saturn during each *katun*.

The Mayans could also measure the duration of the lunar revolution of 29 and one-half days, plus a fraction of one day. They measured that of the sun as 365 days plus a little less than one-quarter of a day, and that of Venus as 584 days minus a small fraction. Like the Dresden codex, which is a 400-year Venus calendar, the Grolier Codex is clearly a calendar of the phases of Venus, but displays a much more sophisticated system. Though it appears on the surface to be a simple 104-year calendar, it is described as “the world’s first and only known

perpetual calendar of Venus ever produced by any civilization”. The codex predicts the appearance and disappearance of Venus in a great cycle of 845 revolutions, equal to 1,352 years.


It has been calculated that, with its calendar correction, the Mayans’ estimate of the solar cycle was more exact than ours. According to the Gregorian calendar, they came within 1/10,000th of a day, that is, one day every 10,000 years. The Mayans also precisely determined the recurrence of solar eclipse. They established an eclipse prediction table in the Dresden codex that contains 69 susceptible dates of solar eclipse coincidence which covers a lapse of 33 years. They were also interested in various stars such as the North Star, and used its immovable position in the sky with respect to the Earth as a guide for travelers and merchants. They called the Pleiades constellation *tzab*, or “rattles”, for their resemblance to those of the rattlesnake. They also called the Geminis constellation *ac*, or “the turtle”.

Calendar

It is known that the Mayans inherited the knowledge of calendars and the rituals of 260 days and 365 days from other civilizations, because inscriptions from the Olmeca region -that is, Monte Albán and the Pacific coast of Guatemala- reveal the existence of these calendars from previous times. Apart from this, the Mayans created a complex calendar system, adding new elements to the 365-day calendar, the 260-day calendar, and the long computations: longer periods for long calculations, the lunar calendar, the cycle of nine companion gods, and the esoteric cycle of 819 days. They also invented other forms of recording dates, such as the “end-of-period” and the “short count”. The precision of the recording of time seems to have been an obsession of the Mayan priests in charge of calendars.

The calendar ritual, or *tzolkin*, is still used by some Mesoamerican indigenous populations. It consists of 260 days and the result of the combination of the names of 20 days with 13 numbers. Each name is preceded by a number. After the 20th day *Ahau*, the first day *Imix* begins again. After the number 13, the cycle begins again with 1. In this way, no number-day combination repeats until the 260-day cycle has finished (see Figure 8).

Figure 8. The twenty-day Mayan cycle.



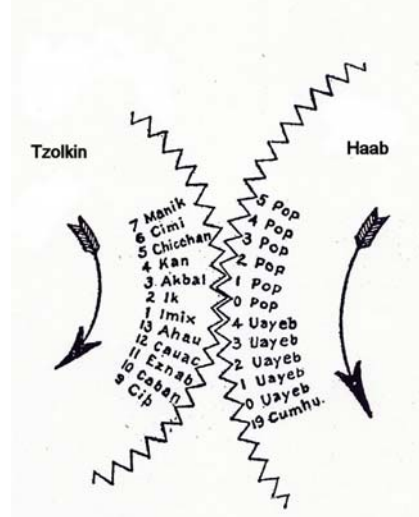
Los veinte días mayas	
Chuen	Imix
Ik	Eb
Akbal	Ben
Kan	Ix
Chicchán	Men
Cimi	Cib
Manik	Caban
Lamat	Eznab
Muluc	Cauac
Oc	Ahau

León-Portilla, 1978.

The 365-day civil calendar, or *haab*, is obviously based on the synodic revolution of the sun. The common year is irregular, with months of 31 and 31 days that sometimes alternate, in addition to one month of 28 or 29 days. The *haab* consists of 18 months of 20 days plus five “extra” days at the end of the year that were considered evil, during which time people stayed in reclusion inside their houses in a mystical retreat in order to avoid the dangers this short period could offer. In order to complete the leftover fraction of the day of the solar cycle, the Mayans did not add one day every four years as in modern times. Instead, when they recorded a date, they would first calculate the sum of the accumulation of the error from the beginning of their calendar era, and then calculate the exact error according to the current date. With the objective of coordinating the ritual and civil

calendars (see Figure 9), the Mayans observed that 52 years of 365 days added up to the same number of days as that of 73 years of 260 days, that is, 18,980 days.

Figure 9. Correspondence of the 260-day ritual year (*tzolkin*) with the 365-day civil year (*haab*).



Arochi, 1984.

With such a long calculation system, the Mayans arrived at a concept of eternity since the succession of periods was longer each time; that is, the fact that each period was 20 times longer than that of the previous one allowed them to increment the limits of time. For example, the day unit was called *kin*, and the different time periods were as followed:

- Uinal = 20 Kines (20 days)
- Tun = 18 Uinales (360 days)
- Katún = 20 Tunes (7,200 days)
- Baktún = 20 Katunes (144,000 days)

Apart from these periods, which were the ones most frequently employed in the inscriptions, sometimes allusions were made to longer periods such as *Pictún*, *Calabtún*, *Kinchiltún*, and *Alautún*, the latter one representing 23,040 million days, or 64 million years.

The Mayans' lunar calendar functioned in a very simple manner. It alternated months of 30 and 29 days, since the lunar month has approximately 29.5 days. However, they observed that after some time their calculations no longer adjusted to the phases of the moon. Consequentially, they would correct the error by counting two consecutive months of 30 days to compensate for the fraction of the day that exceeded 29.5 days, and as a result, their lunar year was divided into two halves, or semesters. Concerned with precisely recording each date, the Mayans would register the following lunar dates: the number of lunar months already lapsed; the number of days of the lunar month (29 or 30 days); and the number of days lapsed since the previous new moon, which would be expressed in different glyphs if the number in question was less than or more than 20 days.

The Mayan calendar system also contemplated a small cycle of nine elements represented by gods, one for each day, and that repeated in the same order without interruption. It is known that the Aztecs included a similar cycle in their ritual calendar that corresponded to nine nocturnal gods. Another esoteric period of the Mayans consisted of one cycle of 819 days, which was a result of the combination of several numbers (for example, 7 x 9 x 13) that corresponded to the respective number of gods associated with the Earth, underworld and Heaven (see Figure 10).

Figure 10. Hieroglyphs of the Mayan months.



Arochi, 1984.

Conclusions.

It is difficult to draw a valid conclusion about the intricate assembly of relationships between the Mayans' religious vision and experience and their technological and scientific advance, due to the fact that we do not fully understand this amazing civilization that time and distance have placed far from us. Because of this, it is only possible to outline a relationship between science and technique and the transcendental vision of the Mayan world, because the nucleus of most civilizations is ultimately religious.

Only thus can one explain the consonant harmony between the scientific advances that were intimately related to the Mayans' vision and to their religious experience. Therefore, the Mayans were advanced in terms of knowledge and the ability to cultivate land. At the same time, they worshipped the creation, their gods, the sowing and harvest of corn, and their food. Due to this, they had to know about the cycles of time, and therefore the perfection of the calendar. Because of their amazing development of the math and their astronomical calculations, they not only predicted eclipses; by doing so, they got to know their gods better. The Mayan civilization hunted animals but recognized them as sacred creatures, so they asked for forgiveness by eating the meat not killing for pleasure or fun. It could be said that the Mayans developed a tranquil, harmonious relationship between science and religion, a permanent dialogue that gives positive fruits, and that instead of separating would unite the searches of men.

Bibliography

Arochi, Luis E.
La Pirámide de Kukulcan: El Simbolismo Solar
Panorama Editorial, México, 1984.

Corso, Miguel Angel
Mayas, Los, El Tiempo Capturado
Bancomer, S.A., 1980.

Estrada Monroy, Agustín (traductor)
Popol Vuh.
Editores Mexicanos Unidos, 2ª reimpresión, 2004.

Krickerberg, Walter
Antiguas Culturas Mexicanas, Las
Fondo de Cultura Económica, 1972.

León-Portilla, Miguel
Historia de México
Tomo 2
Salvat Mexicana de Ediciones, S.A. de C.V., 1978.

Martinez Casanova, Modesto
Serie Obras Mayas
El Chilam Balam de Chumayel (Exegesis)
Editorial, Esenios, 1963.

Reconos, Adrian
Popol Vuh: Las Antiguas Historias del Quiche
Fondo de Cultura Económica, 1974.

Rendón, Silvia y Barrera V., Alfredo (traductores)
El libro de los libros del Chilam Balam
Fondo de Cultura Económica, México, 23ª reimpresión, 2002.

Sterlin, Henri
Living Architecture Mayan
CIPSA, 1976.

Tompkins, Peter
Mysteries of the Mexican Pyramids
Perennial Library, 1987.

Thompson, J. Eric.
Grandeza y decadencia de los mayas
Fondo de Cultura Económica, México, 9ª reimpresión, 2003.

The Mayan Calendar
<http://www.pauahtun.org/cgi-bin/tzpos.py>

The Mayan Astronomy Page
<http://www.michiellb.nl/maya/astro.html>

The Mayan Calendar
http://www.hermetic.ch/cal_stud/maya.htm

Chichen Itza, Sacred City
http://www.locogringo.com/past_spotlights/apr2002.html

Mayan Culture and Traditions

<http://playadelcarmeninfo.com/playa-del-carmen-info-mayan-culture-and-traditions.html>

Gnosis Samael Aun Weor

www.samaelgnosis.net/imagenes/antropologia/mayas/