



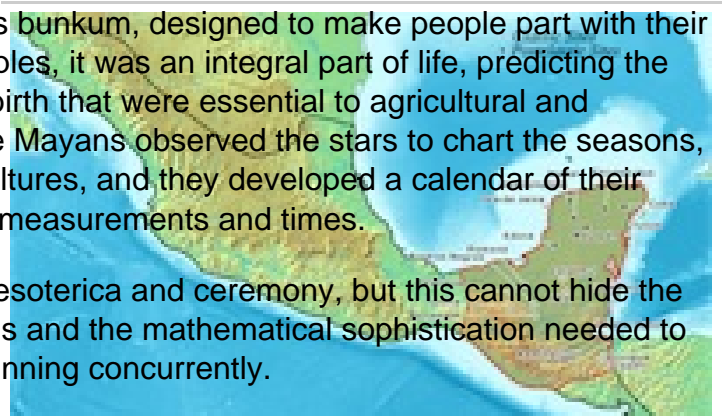
## Ancient Mayan Astronomy

Very few ancient astronomers capture the imagination in quite the same way as the Mayans, perhaps because of the conspiracy theories surrounding the alleged end of the world in 2012, as predicted by their calendar. Their incredibly accurate astronomical calculations and sophisticated mathematics were steeped in religion and omens, their priests discerning the very will of the gods behind the occurrences of natural phenomena.

Perhaps more than even the Egyptian [1] or Indian [2] astronomers, the observations of the Mayan priest-astronomers were wholly dedicated to astrology and this pervaded every single aspect of everyday life. This has created the New Age boom in Mayan books and paraphernalia, where their calendar and numerology is bolted on to Eastern philosophy and Greek wisdom.

Of course, we tend to look at all astrology as bunkum, designed to make people part with their hard-earned cash. However, to ancient peoples, it was an integral part of life, predicting the endless cycles of nature, life, death, and rebirth that were essential to agricultural and nomadic peoples. It is not surprising that the Mayans observed the stars to chart the seasons, in common with most of the world's great cultures, and they developed a calendar of their own, trying to generate ever more accurate measurements and times.

Mayan astronomy was certainly steeped in esoterica and ceremony, but this cannot hide the high degree of accuracy of their observations and the mathematical sophistication needed to devise their complex system of calendars running concurrently.



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## The Beginnings of the Mayan Civilization

The Mayan civilization began at about 500 BCE, their civilization succeeding the Olmec Empire. Gradually, their influences spread to cover much of Central America, including what are now Mexico, Guatemala, Belize and Honduras. They inherited a writing system and a calendar system from the Olmec [3], a culture regarded as the originator of all of the great Mesoamerican cultures.

The first century CE saw the Mayans further refine their culture, introducing the number zero, very rare in Eurasian cultures at this time. Between about 250 and 900 CE, the Mayans began to develop a complex calendar based around accurate observation of the heavens. They began to build some of the great temples that define their civilization, many of which survive today. Most of these were aligned to the sun, especially midsummer, midwinter and the equinoxes, and this allowed them to track the seasons and determine when to plant crops and when to harvest.

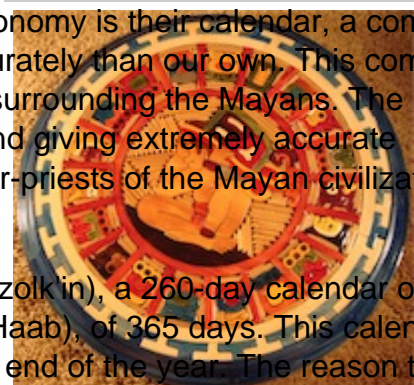
From 900 CE, until the destruction of their empire by the Spanish, they further refined their astronomical techniques, charting the positions of the planets, devising tables for long-term predictions of the movements of these planets, and creating tables to predict eclipses. Their predictions were so sophisticated that they included corrections and amendments, showing that they fully understood that the movement of the planets and precession were complex. Much of these charts were written in the Dresden Codex, a document smuggled out of Central America at a time when the Spanish were destroying Mayan documents, regarding them as pagan.

## The Mayan Calendar

The most enigmatic of all of the Mayan contributions to astronomy is their calendar, a complex system of interlocking cycles that keep time even more accurately than our own. This complex calendar system fueled much of the New Age romanticism surrounding the Mayans. The Mayans used many different calendars, interlocking them and giving extremely accurate dates. The system seems complex to us, but the astronomer-priests of the Mayan civilization understood it perfectly.

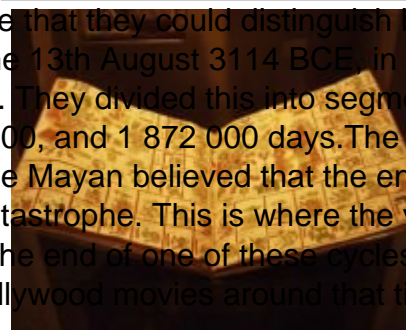
The two main calendars were a ceremonial calendar (The Tzolkin), a 260-day calendar of 13 numbers and 20 day names, and the vague calendar (The Haab), of 365 days. This calendar had 18 months of 20 days, with a 5-day month added at the end of the year. The reason that they used 20 days for a month is largely based upon their vigesimal numeric system, which is a base twenty system as opposed to our base ten decimal system. There is evidence that the Mayans understood that the year was not exactly 365 days long, but they did little about it, probably because that did not fit in with their base 20 system.

These calendars ran concurrently and were meshed together by describing the date by the tzolk'in number and name day, followed by the haab number and name day. This intermeshing gave another unit for measuring time, the calendar round, a 52-year cycle when the dates began repeating themselves (much as in the same way that our Gregorian calendar repeats every 400 years, although there are other repeating cycles within that).



Mayan Calendar (Public Domain)

The Mayans also used a longer-term calendar, to ensure that they could distinguish between the different cycles. This 'Long Calendar' started from the 13th August 3114 BCE, in Gregorian terms, and was simply a count from day zero. They divided this into segments, rather than have a straight count, of 20, 60, 7200, 144 000, and 1 872 000 days. The latter period, of 5125.25 years, is called a Great Cycle, and the Mayan believed that the end of one of these great cycles heralded the end of an age and catastrophe. This is where the various tales of a Mayan prophecy arise, because 2012 will be the end of one of these cycles. Hopefully, we will see nothing more than a few lame Hollywood movies around that time.



## Mayan Astronomy

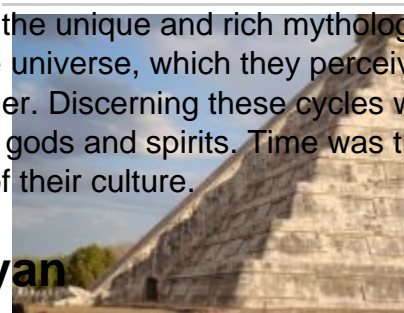
Mayan Codex (Creative Commons <sup>[4]</sup>)

The Mayans did not have any complex instruments for charting the positions of celestial objects, so their observations were with the naked eye. They may have used rudimentary instruments, such as crossed sticks to chart position, but they lacked the armillary spheres or sextants of other civilizations.

However, the Mayans were excellent builders and many of their temples and buildings are aligned to help observers monitor position. For example, many buildings pointed towards the equinoxes or midsummer, whilst other buildings had doorways and windows aligned with the most northerly or southerly rising of Venus, one of the most important celestial bodies to the Mayan culture. So accurate were their observations that their predictions of the orbit of Venus lost only two hours in a 584-day cycle.

## What Drove the Mayan

The Mayan astronomy was driven by the unique and rich mythology of the Mayans and their belief in the structure and order of the universe, which they perceived as made of overlapping cycles, interdependent upon each other. Discerning these cycles was the key to prediction and to understanding the whim of the gods and spirits. Time was the most important factor to Mayans, the most pervading aspect of their culture.



## Footnote - Maya vs Mayan

There is much debate about how to refer to the Mayans. The Spanish, the word 'Maya' (Public Domain) referred to the language, and 'Maya' was the noun and adjective used to describe the people and civilization. However, 'Mayan' is becoming more common, and 'Mayans' is the plural form. This is exactly the same for many of the great Mesoamerican civilizations: 'Aztecs' and 'Olmecs' have replaced 'Aztec' and 'Olmec' in language. Either usage seems to be perfectly fine, except among intellectual snobs!

### Related pages:

[Chinese Astronomy](#) <sup>[5]</sup>

[Egyptian Astronomy](#) <sup>[1]</sup>

[Greek Astronomy](#) <sup>[6]</sup>

[Indian Astronomy](#) <sup>[2]</sup>

## Mesopotamian Astronomy <sup>[7]</sup>

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**Links:**

[1] <https://explorable.com/egyptian-astronomy>, [2] <https://explorable.com/indian-astronomy>, [3] <http://en.wikipedia.org/wiki/Olmec>, [4] <http://commons.wikimedia.org/wiki/User:%C3%89cluzette>, [5] <https://explorable.com/chinese-astronomy>, [6] <https://explorable.com/greek-astronomy>, [7] <https://explorable.com/mesopotamian-astronomy>, [8] <https://explorable.com/users/martyn>, [9] <https://explorable.com/mayan-astronomy>