Between Water and Sky Astronomy and Calendars in *Edzná*

Jesús Galindo Trejo*

Elsie Montiel

The Building of the Five Stories is Edzná's most emblematic construction. Its astronomical orientation was achieved using the basic principles of the Mesoamerican calendar.

Introduction

Located 50 kilometers southeast of the port of Campeche, the Mayan city of Edzná covers about six square kilometers of a vast valley flanked on the east, west and north by low hills. The valley is a plain bordering on the Champotón River. Because the lowlands were prey to flooding for large parts of the year, from pre-classical times, Edzná residents had to build an ingenious radial system of canals around the city for drainage and to harness the water for irrigation. Particularly noteworthy is a 12-kilometer canal that allowed them to store large quantities of water for use during drought.

The first human settlements in the area date from 600 B.C. to 300 B.C. Between A.D.200 and A.D.550, building activity increased, and numerous great platforms were created

* Researcher at the UNAM Institute for Aesthetic Research.

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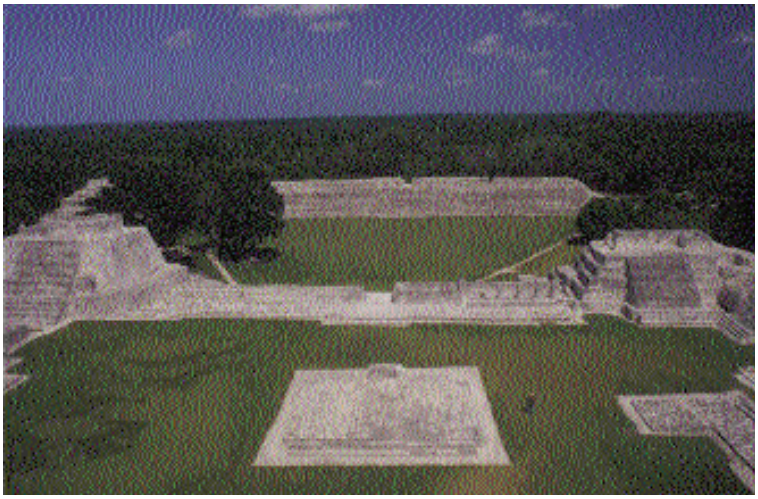
where buildings were erected, some in the style of the Petén region in Guatemala.

At the center of the city, inhabitants built a square platform measuring about 150 meters on each side around what is called the Great Acropolis. On top of the platform are no fewer than nine sumptuous buildings arranged around a central plaza reached by a broad stairway. The main structure of this impressive ceremonial acropolis is the Building of the Five Stories, a 40-meter-high pyramid with a quadrangular base and four staggered bodies made up of galleries of vaulted rooms. The upper sanctuary, with its cross shape, narrow roof combs and spacious portico, makes up the fifth floor, reached by a broad central stairway that runs along the length of the front of the building. To the west, toward the front, the portico has partially lost its vault, and only two rectangular columns remain of the façade. The central opening leads to a narrow room connected to transversal rooms at each end. On the east side of the sanctuary is another room without internal access from the west.

There is no longer any mural paint inside the sanctuary, except for the central piece made up of a string of stones that closes each vault in both transversal rooms. Part of the frame and the lower extremities of the so-called God K, richly attired, can still be seen on the stone of the south room. This is thought to be a depiction of Itzamná, the Great Lord of the Sky. A few calendar and numerical glyphs, 7 Ahau 12 Mac, can also be seen. All the designs are done in fine red lines. Unfortunately, given their state of preservation, on the stone of the north room, only the frame is discernable, also in fine red lines.

Roof combs on the western facade of the upper sanctuary of Edzná's Building of the Five Stories.



Edzná from the east, from the upper sanctuary of the Building of the Five Stories. On the extreme right (the north) is the Pyramid of the Old Sorceress.

The Calendar-Astronomical Function of Edzná

The geographer Vincent Malmström has suggested that Edzná was one of the most important centers for Mayan astronomy. Following up on information from Bishop Landa in the sixteenth century and the philologist Pío Pérez, he thinks that the beginning of the Mayan year may have been calculated considering the zenith of the Sun in a specific place. This implies that there is a fixed correlation in the Mayan calendar. Fixing that beginning at July 26, Malmström makes it coincide with the second time the Sun reaches its zenith in

The eastern facade of the upper sanctuary of Edzná's Building of the Five Stories, which suggests the importance of watching the sunrise on the days of alignment.

Edzná on that same day. He also points out that Edzná's latitude is 19º 35', close to that of Teotihuacan (19º 41'), suggesting that the two cities may have shared the same calendar-astronomical knowledge.

However, it should be pointed out that the Sun's zenith is actually reached on July 25 in both cities. Malmström explains this precisely because several scholars believe that Bishop Landa's date was off by one day. As proof that the Sun's zenith in Edzná was fundamental for calculating time, Malmström proposes that the thick circular column situated until recently on the small platform of the Grand Acropolis's Main Plaza, in front of the Building of the Five Stories, could have acted as the gnomon for registering the exact moment that the Sun reached its zenith.[1] He also determined the date when the building aligns with the sunset.[2] He found that the deviation from the axis of symmetry of the upper sanctuary with regard to the sky is similar to that of the Pyramid of the Sun in Teotihuacan, although the horizons are very different at the two sites. Therefore, he observed that the Sun lines up at sunset on August 13, revealing a direct correlation with what is called the creation date of the Mayan Long Count.[3] Scholars place the date of creation in the year 3114 B.C., which Mayan tradition cites as the beginning of the current cycle of creation and time, making it one of the most important dates on the Mesoamerican calendar.

Also, Malmström suggests that the Building of the Five Stories should be considered one of the oldest lunar observatories in Mesoamerica, since, from its sanctuary, the position of the structure known as the Old Sorceress to the northwest of the site, coincides with the point at which the moon reaches its extreme northern position every 18.6 years. This position is called the major standstill and is analogous to the extreme position of the Sun on solstice.

Using the measurement of the orientation of the sanctuary *vis-à-vis* the northern sky and taking into account the height of the local horizon, it can be proven that on April 29 and August 13, the Sun aligns with the sanctuary, coinciding with the dates of solar alignment in the Pyramid of the Sun in Teotihuacan. The importance of these two dates is that they harmoniously divide the solar year: 52 days after the first alignment of the Building of the Five Stories, April 29, is summer solstice. Taking this date as the starting point, the 260th sunset occurs precisely on April 29 of the following year. The year is therefore divided in a 104/260 ratio. These numbers are very important for the Mesoamerican calendar, based on two different parallel ways of counting: one, based on the Sun, which gives us a 365-day year, and the other is the ritual one, made up of only 260 days. Both forms of counting began at the same time and coincided again after 52

Stela 1 shows a richly clothed Mayan sovereign holding a scepter which represents the God K. It also includes a Long Count date: A.D. October 13, 721.

Calendar and astronomical glyphs carved on the staircase of the Building of the Five Stories.

years, which is when the Mayans celebrated the arrival of new fire with grand ceremonies. That is, 52 is the number of 365-day years that must pass for the solar and ritual calendars to coincide so that fire can be celebrated again. In that same time period, the religious calendar will have gone through 73 260-day cycles. This system for measuring time was used for more than 2,000 years.

It is particularly noteworthy that this way of dividing the year is used equally for the dates that the Sun is aligned in the early morning, when the Sun comes up and lines up with the Building of the Five Stories. The fact that there is a room on the eastern side of the upper sanctuary shows the importance of observation. On February 12 and October 29 the Sun lines up with that room in the mornings. Here, the division of the solar year has the same 104/260 ratio, but in reference to the winter solstice.

This underlines the determination of the Mayan astronomer-priests to give this peculiar structure a great symbolic, sacred value, since everything related to time, like the calendar, was necessarily an attribute of the gods.

Taking into consideration the existence of the two painted stones in the sanctuary's vaults, we have studied the situation, to try to propose a probable additional meaning of the orientation of the stones in relation to the mural.

Historian Mercedes de la Garza describes God K, or Bolom Dz'acab, as a serpentine, usually anthropomorphic, figure commonly represented in the figure-topped scepter that many important Mayan individuals carved on the stelas hold. The name given them in Yucatán, Canhel, is used in colonial texts for a large heavenly dragon that is a creator; this shows that God K and Canhel are one and the same. De la Garza indicates that the god seen on the scepter, one of whose legs is a serpent, seems to be Hurricane, or "lighting bolt of a leg," the Quiché god also known as "Heart of the Sky," which can be understood as "center or axis, essence of the heavens." The close link between God K and the deity Itzamná can be seen in the many images where God K is emerging from the two-headed heavenly serpent's maw. De la Garza concludes that God K is one more facet of the supreme deity.

Taking into account that God K appears on most of the vault closing stones, we should inquire whether the two painted stones, placed inside the sanctuary of the Building of the Five Stories, might suggest some important event in the night sky in the direction the sanctuary faces.

For this search, we have selected the year A.D. 652, written in hieroglyphics on the stairway of the Building of the Five Stories, which preserves several signs with obvious astronomical significance. The appearance of the sky throughout that year has been analyzed. The celestial regions that become visible when the Sun goes down correspond in general to brilliant, attractive constellations.

Interior of one of the Building of the Five Stories rooms. Through the columns, some of the other buildings of the Great Acropolis are visible.

Eastern facade of the Building of the Five Stories.

The axis of symmetry from the sanctuary crosses the Milky Way in two places: in the constellations of Orion and Gemini and in the Eagle. While in the first case the Milky Way is homogeneous, in the second, we can see a great bifurcation. Before lining up with it, the axis almost coincides with the position of the brightest star in the constellation Ophiuchus. David Friedel and his collaborators, on the other hand, think that the Milky Way represents the Cosmic Monster or Tree of the Crocodile (in accordance with the representation on Stela 25 at the Mayan archaeological side of Izapa in the what is today the state of Chiapas), where the great bifurcation makes up the monster's jaws delineated by the pale light of our galaxy.

From all of this, we can deduce that the direction indicated by the sanctuary's symmetrical axis points to the place in the heavens where God K emerges from the jaws of the fabulous celestial reptile, as can be seen in many representations of the ceremonial bars the Mayan sovereigns wore as a symbol of power. When we analyze the sanctuary's layout —and although we do not know for certain if the stone located in the north room also displayed the God K— we might tentatively propose that the arrangement of both figures, at the extreme north and the extreme south of the sanctuary, may correspond to God K himself, which can normally be seen on each end of the ceremonial bars. Another thing that shows Edzná inhabitants' worship of the heavens is the presence on the lower part of Structure 414 in the southern area of the city of two beautiful, giant multicolored stucco masks representing the Sun god Kin. Both have elaborate ear-plugs and elegant headdresses and are flanked on each side by stucco bands, the glyph representing the sky.

These giant masks are located on both sides of the structure's main stairway facing north, meaning that the Sun would never shine directly on them. However, twice a year, for a few seconds, they are illuminated from the side at a 90-degree angle. The Sun thus illuminates its image on Earth. This happens at sunset on two days close to when the Sun hits its highest point in the sky. However, it is difficult to calculate exactly which days this will happen because the structure is semi-hidden by foliage.

The House of the Moon in the Great Acropolis does not seem to actually be related to the Moon.

Near the southwestern tip of the Great Acropolis is a ball-game court flanked by two elegant parallel buildings that probably originally had vaulted rooms. The remains of two stone rings built into the two sides of the ball court are still visible, with their sculpted images of five rectangles next to each other on both faces that seem to radiate from a rectangle containing yet another rectangle. Some scholars have identified these designs as the glyph "*ollin*" or "movement". However, its shape —a star with five rectangular points— is more reminiscent of representations of the planet Venus found in Mexico's Central Highlands.

I would not like to conclude without saying something about the astronomical signifi-

cance of the name Edzná. Several meanings have been attributed to it: "House of Gestures," "House of the Echo" and even "House of the Itzá." But, if we take into account that in Yucatecan Mayan, the word "*edz*" means "to make fast or settle something," plus what has been explained in this article, we can contribute another meaning, translating the name as "The House Where Time Is Settled," or the place where the ancient priest-astronomers made things fast in the heavens.

Giant, multicolored stucco masks on Edzná's Structure 414 represent the Sun god Kin.

The ballgame court, with its classical proportions and vaulted rooms along its side walls.

In conclusion, the study of advances in calendars and astronomy achieved by the city of Edzná illustrates how Mesoamericans, particularly the Mayans, were able to masterfully merge aesthetic values with concepts developed from careful observation of the heavens, leading to admirable manifestations of religious exaltation and of the domination of their natural surroundings, both earthly and celestial. The innumerable Mesoamerican archaeological sites whose creations are comparable to still-functioning clockworks testify to this. Sites like Edzná are cosmic clocks that untiringly mark the passage of man through time toward eternity. VM

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Notes

[1] A gnomon is the arm that registers the Sun on a sundial. It casts a shadow that changes position throughout the day and the year. In the case of a vertical gnomon in Mesoamerica, it will not cast a shadow at all twice a year when the Sun reaches its zenith, the shadow coinciding with its base.

[2] The alignment of a celestial body with a building can be defined at the time it rises or sets on the horizon, when the celestial body, some part of the building and the observer are all on the same line of sight.

[3] The Mayan variation on the Mesoamerican calendar during the classical period is known as the Long Count. This system calculates the date in terms of the days passed since a mythical moment in the remote past. This beginning of the calendar, known as the creation date, corresponds to August 13, 3114 B.C. on the Gregorian calendar.

Further Reading

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