

Comets

In Pre-Hispanic Mexico

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Water color by Jesús Galindo Trejo

Motecuhzoma observing the comet that appeared the year 10 *caña*.

From time immemorial, the peoples of Mesoamerica were captivated by the heavens. Mesoamerican mythology abounds in passages and descriptions about the identities and activities of different celestial beings.

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Astronomers —*ilhuicatlaminime* in Nahuatl— were part of the ruling strata of Mesoamerican societies; the emperors themselves were required to watch the night sky to try to establish a direct link to the gods. At his coronation, Mexica emperor Motecuhzoma Xocoyotzin (1466-1520) was explicitly urged to observe different specific constellations at midnight and Venus at dawn. While the pre-Hispanic astronomers certain-

ly had religious motives, their observation techniques and precision also developed to a great degree. The astronomer-priest was in charge of bringing the heavenly order to his own society. One materialization of this was the development of the calendar, which regulated religious rites, agricultural activities and people's daily lives. The meaning of this very practical instrument, the result of astronomical obser-

vation, conferred great prestige and influence on the *ilhuicatlamatinime* in pre-Hispanic society.

Most of the Mesoamerican peoples conceived of the area above the Earth as divided into different levels or heavens. For example, the nineteenth century document known as *Historia de los mexicanos por sus pinturas* (History of the Mexicans Through Their Paintings) informs us that the Fifth Heaven, situated above the heaven which holds the Sun, was occupied by fire snakes made by the fire god, and that from there emanated comets and other heavenly signs.¹

Comets have an important place among heavenly bodies. In many of ancient Mexico's languages, comets are called "the smoking star": *citlalin popoca* in Nahuatl, *budz ek* in Yucatan Maya and *ifuo'nganotzo'* in Otomi or Ñañhu.

The appearance of a comet was traditionally taken as the portent of a coming catastrophe. Sixteenth century chroniclers tell us as much. One of them, Friar Bernardino de Sahagún says, "These people called the comet *citlalin popoca*, meaning 'smoking star.' They took it as the prophesy of the death of a prince or king, or of war or hunger. Common people would say, 'This is our hunger.' These people called the blaze of the comet *citlalin tlamina*, which means 'arrow-hurling star.'" And they said that whenever that arrow fell upon a living thing, a hare or rabbit or another animal, and wounded it, a worm would grow and make that animal unfit for eating. For that reason, these people made sure they were well covered up at night, to make

sure the blaze of the comet did not fall upon them."² By "arrow-hurling star" Sahagún may mean here a shooting star, a small meteorite that upon entering the Earth's outer atmosphere at considerable speed becomes incandescent. In this same work by Sahagún, it is clear how the pictorial representation of the comet evolves, changing from a clearly indigenous image to a frankly Western one.

Despite their fatalistic connotation, the word for "comet" was very often given as a proper name. The best known case is that of Citlalpopocatzin (the suffix *tzin* is honorific), one of the four Lords of Tlaxcala upon the arrival of the Spaniards. Mestizo chronicler Diego Muñoz Camargo, from Tlaxcala, says that this lord had been named that "because when he was born, a great, horrific comet with a great tail was seen



The comet in Michoacán which predicted the Spanish conquest. Friar Jerónimo de Alcalá, *The Michoacán Account*, sixteenth century.

Photos by Jesus Galindo Trejo

in the sky spewing smoke.”³ Carlos María Bustamante, a nineteenth century historian, says that his name alludes to the fact that Citlalpopocatzin trusted his military enterprises to the Sun, symbolizing them with the star which received its courage from the Sun, infused into it when the star exhaled smoke.⁴ In the so-called *Tlaxcala Canvas*, which describes events related to the Spanish conquest, the representation of this per-

sonage appears often with his name glyph.

Part of the history of the Mesoamerican peoples has come down to us through the different kinds of documents they made themselves, from the pictographs in the form of codices, to writing, done just before the European conquest. These sources also give us clues to many occurrences in the heavens, including many examples of co-

met sightings. The noble chronicler of Amecameca, Chimalpahin, tells us in the year 1 *técpatl*, or 1064, “Twenty-five years have passed since the great settlement of Tullan was lost, since the *Tultecas* dispersed when a smoking star passed over them.”⁵ This comet could be the same one which was observed in December 1063 in Korea⁶ and in 1064 in Europe.⁷

The *Mexicanus Codex*, a pictographic chronology illustrating different events year by year, says that the appearance of two comets in the years 1 *ácatl* and 2 *técpatl* (1363 and 1364) was associated with the death of a personage called Chimalli.⁸ Chinese observers reported a comet sighting on the first day of the Moon, March 16, 1363.⁹ On March 30 of the following year, the Koreans observed a reddish colored comet with a tail that spanned over one degree in longitude.¹⁰

The chronicler who wrote the so-called *Telleriano-Remensis Codex*, an ear-



Representation of a comet observed in the year 10 *calli*, or 1489, depicted here as *xihuitli* in the form of a multicolored serpent with barbs. *Telleriano-Remensis Codex*, Paris, sixteenth century.

The Fifth Heaven, situated above the heaven which holds the Sun, was occupied by fire snakes made by the fire god, and that from there emanated comets and other heavenly signs.



Mixpamiltl, a bank of clouds, a nocturnal radiance observed in Mexico in 1509 and 1510. Friar Bernardino de Sahagún, *Florentine Codex*, sixteenth century.

ly colonial document now in Paris, reports, “Year of Ten Houses and 1489, a very large comet crossed the skies that they called *xihuitli*.”¹¹ In this case, the pictorial representation of the comet is a multicolored serpent with barbs. It should be noted that *xihuitl* is another way of saying “comet” in Náhuatl; it also means “turquoise,” “grass” and “year”. Chinese observers recorded a comet in the constellations of Hercules, Aquila (the Eagle), Serpens (the Serpent) and Ophiuchus (the Serpent Holder) from November to December 1489.¹²

This tradition of recording events in the heavens in historical documents continued for some years during the colonial period. A remarkable case is illustrated beautifully in the *Telleriano-Remensis Codex*: the double phenomenon of an eclipse of the Sun and the appearance of a comet in 1531. Without a doubt this celestial spectacle impressed the *tlacuilo*,¹³ who took it down on paper in a way which was already culturally hybrid. Next to the Sun, still partially darkened in the pre-Hispanic

style, a star—clearly represented in a Westernized fashion—is shown with curls of smoke emanating from it. On March 18, 1531, a partial eclipse of the Sun was visible from Mexico’s high central plain. In addition, many comet catalogues in Europe and Asia record sightings of Halley’s Comet from the end of July until the end of September of the same year, in the constellations of Gemini, Leo and Virgo, with a tail as long as 15 degrees.¹⁴ Only one Japanese source, on the other hand, reported a comet seen from February 5, 1531, on.¹⁵

One of the most famous comets of pre-Hispanic Mexico is Motecuhzoma’s Comet, mainly because of a drawing depicting the Mexica emperor observing a long-tailed comet. The drawing is by Dominican Friar Diego Durán who describes its appearance as one of the events foretelling the coming of the Spaniards. In fact, in different parts of the high central plain, different phenomena were interpreted as predictions of a major catastrophe. For exam-

ple, then, Friar Jerónimo de Alcalá, the Franciscan who gathered the *Relación de Michoacán* (The Michoacán Account), tells us, “They also say that they saw two great comets in the sky and thought that their gods needed to conquer or destroy another people and they should go to destroy it.”¹⁶

According to Friar Durán, the first sighting was by a youth serving as the living representation of the god Huitzilopochtli in his temple. One night the young man awoke and, as he watched the sky, saw a great comet in the East that left a long shining tail in its wake. His attendants and guards continued to observe the comet until dawn, when it reached its zenith. The next morning the youth went to see the Emperor Motecuhzoma to tell him what he had seen in the sky. The frightened and incredulous emperor asked if it might not have been a dream, but the witnesses confirmed the youth’s story. That night Motecuhzoma went up to an observation platform on a rooftop and very attentively watched the heavens.



Motecuhzoma’s comet. The emperor on the roof of his palace watches in wonder the comet that foretells the end of his reign. Friar Diego Durán, *History of the Indies of New Spain*, sixteenth century.

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At midnight, he saw the comet with that beautiful, glittering train; it filled him with amazement and he sank into a profound melancholy. The next day, he called the youth and asked him what the meaning of this comet could be. The youth, the image of Huitzilopochtli, ignorant of heavenly things, suggested only that the emperor send for the astrologers since things of the night were their affair. When the astrologers came before Motecuhzoma, he asked them if they had seen the new sign that had appeared in the heavens. When they answered that they had not, the emperor became enraged, reproaching them the scant care they were giving to the things of the night; he ordered they be locked up in cages without food so that they might die of hunger. The astrologers wept and pleaded to be put to death instead.

Motecuhzoma summoned Nezahualpilli, the king of Texcoco, famous as a dedicated astrologer. Nezahualpilli had been observing the sign in the skies for many nights, but, thinking that the

emperor's astrologers would already have explained its meaning, had not been concerned. The king of Texcoco said, "And you should know that its prophesy comes down upon the head of our kingdoms, throughout which there are to be astounding and wondrous things; in all our lands and domains there are to be great calamities and misfortune; nothing will remain untouched; there will be deaths without number; our domains will lose everything and so it shall be by permission of the lord of the heights, of the day and of the night and of the air. Of all of this you will be a witness, and you shall see it; it shall come to pass in your time. Because I, taking leave of you, shall go to die, and I know for certain that you shall see me no more and this will be the last time we shall behold each other in this life, because I want to run and hide, to flee the labors and afflictions that await you. Do not falter nor grieve nor despair. Make your heart broad and show spirit and a virile breast to the labors of fortune." Motecuhzoma began to weep bitterly, lamenting that his should be the destiny to be the one dispossessed of all that the Mexicas had won with their powerful arm.

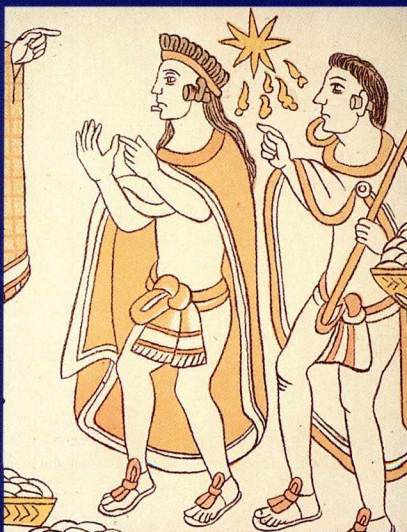
He did not know what to do: hide, become a stone or a staff, perhaps become a bird to fly toward the most rugged of all the mountains. After they bid farewell, Motecuhzoma called upon the dispensers of justice and the Principal Lords to admonish the priests and the astrologers who had been careless in their vigilance. He ordered the astrologers be slain, their houses sacked and razed to the ground so no memory would remain of them. He also con-

demned the astrologers' women and children to perpetual slavery.

A cruel punishment, ordained for those who had mocked him, for the scant care they had put into the occupation entrusted to them. Motecuhzoma visited this retribution on the traitors who had pretended to be astrologers, deceiving with their falsehoods and lies, so that others would not dare to pretend to be what they were not. Then, he sent for new astrologers who took up the task of the judged and exhorted them repeatedly to take care in observing the night stars and prophesy about the comet. It is said that when the news reached other kingdoms, the people, filled with fear, came together to cry out to the heavens, because they believed that the world would soon end.¹⁷

The noble chronicler Hernando Alvarado Tezozómoc describes the same events, adding that the comet could be seen coming out of the East and that it was of a great whitish brilliance that increased in length during the night.¹⁸

A particularly important piece of information in this narrative is the reference to the death of Nezahualpilli. Although the same Friar Durán establishes that the king of Texcoco died ten years before the Spaniards arrived, placing their arrival in 1519, several authors have associated Motecuhzoma's comet with the observation of a *mispamitl* or banner of clouds mentioned by several chronicles between 1509 and 1510. Father Sahagún left us one such report, where he says, "Ten years before the Spaniards came to this land a marvelous and wondrous thing appeared in the sky which seemed to be a very large and



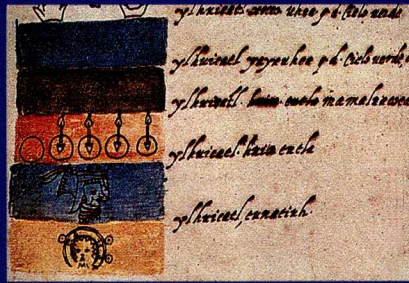
The Tlaxcalan lord Citalpopocatzin with his birthday glyph representing a comet as a smoking star. *Tlaxcalan Canvas*, sixteenth century.

brilliant flame. It seemed to lie in the heavens themselves. It was wide in its nether regions and sharp in its upper parts, as when a fire burns. It seemed that its point reached to the mid-heavens. It rose in the East after midnight and came out with such brilliance that it seemed like day. It lasted until morning and then it was lost from sight.”¹⁹

It was a great nocturnal brilliance that seemed to surge upward from the earth and become more and more slender as it rose; it had the form of a pyramid of fire. Apparently, this celestial flame could be seen for a year. Judging by its form —though not by the length of time it was observed— it may have been what is called the zodiacal light, caused by the reflection of the Sun’s rays on the dust particles that surround the Sun.

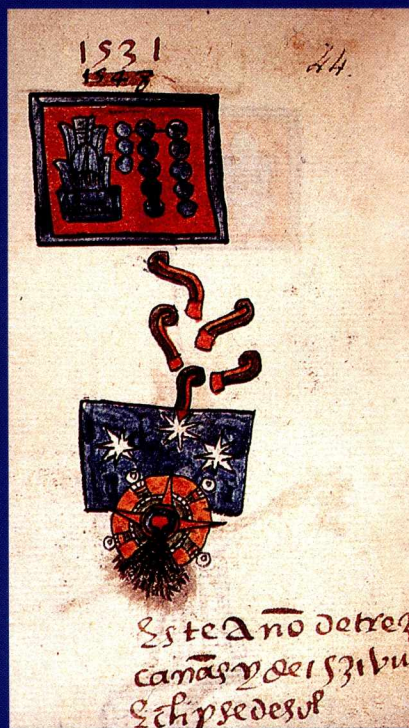
Another possibility is that it was an aurora borealis, light from atoms in the Earth’s outer atmosphere when they are excited by the particles of energy given off by the sun in periods of heavy activity. This brightly colored phenomenon usually looks like the continual movement of huge curtains. However, its time variation and form bears little resemblance to the description of the *mixpamitl*. Aurora boreales appear in the northern part of the sky and last only a few hours.

Several authors think that the luminous intensity of the zodiacal light increases as solar activity decreases.²⁰ Accordingly, the greatest intensity of zodiacal light occurs a couple of years before the lowest levels of solar activity. According to Lefus,²¹ the lowest level of solar activity in the period of the appearance of the *mixpamitl*, recorded



Comets crossing the sky: the *Ilhuicatl Mamalualoca* or sky of fire, perhaps an allusion to the constellation Mamalhuaztli, a tool for making fire. *Rios Codex*, sixteenth century.

Below: Eclipse of the Sun and a comet observed in Mexico in 1531. *Telleriano-Remensis Codex*, Paris, sixteenth century.



“They also say that they saw two great comets in the sky and thought that their gods needed to conquer or destroy another people and they should go to destroy it.”

so insistently by the chronicles, was in August 1513. It is also well known that in the past, solar activity has gone through periods of severe decline.²²

There was a notable decline in activity between 1460 and 1540, a period known as Spörer’s Minimum. Through historical sources that report an almost total absence of aurora boreales and an abundance of radioactive carbon in the rings of thousand-year-old trees, it has been possible to prove the existence of Spörer’s Minimum. Therefore, we might propose the hypothesis that the *mixpamitl* seen in the first decade of the sixteenth century was an extraordinarily intense zodiacal light associated with Spörer’s Minimum.

The zodiacal light as an alternative explanation of what some have identified as Motecuhzoma’s comet is consistent with any date given for the death of Nezahualpilli, taking into account the chronicles’ uncertainty. This gives the zodiacal light explanation an advantage over the comet hypothesis, which is tied to a particular date for Nezahualpilli’s death.

The association of Motecuhzoma’s comet with the *mixpamitl* has led some authors to doubt the feasibility of the phenomenon illustrated by Friar Durán since it little resembles the triangular form reported for the celestial glow so insistently described in the chronicles for the years 1509 and 1510. However, numerous indigenous chroniclers say that Nezahualpilli died in the year 10 *ácatl* (1515),²³ which would make it necessary to reconsider the identification of the comet. Although Asian sources report no comet in that year, after studying the numerous cata-

logues of comets observed in Europe, French astronomer M. Pingré reports that a comet burned for many days during 1516 in Europe and was considered the portent of the death of King Ferdinand the Catholic on January 23 of that year.²⁴

Although this comet also appeared during the period of Spörer's Minimum, the low intensity of the relative maximum around that year was sufficient to allow the comet to develop a tail visible from the Earth. So, Wittmann²⁵ determined the maximum for

June 1515 and Letfus for September 1517.²⁶ Therefore, both dates are consistent with the fact that the 1516 comet was perceptible to the Earth-bound observer.

It should be pointed out that the pre-Hispanic year was not synchronized with the Western year given that, depending on local tradition, the beginning of the new year might vary.²⁷ However, in most cases, by January 23, it was still the year 10 *ácatl*, thus making it highly probable that the Motecuhzoma comet and the comet reported

by Mather and Pingré were one and the same.

The apocalyptic prophecy was inevitably fulfilled for Motecuhzoma and his people. The implacable wave of destruction generated by the ambition of the Spanish conquistadors swept away the great cultural achievements of the Mesoamerican civilization. The observers of the heavens, enthralled by the captivating beauty of the night tried to cheat fate. That firmament—part of their gods—had to help them untangle the mysteries of time. ■■■

NOTES

¹J. García Icazbalceta, ed., "Historias de los mexicanos por sus pinturas," *Anales del Museo Nacional* 2 (1882): pp. 83-106.

²Friar Bernardino de Sahagún, *Historia general de las cosas de Nueva España*, eds. Alfredo López Austin and Josefina García Quintana (Mexico City: Ministry of Public Education, 1989), pp. 483.

³Diego Muñoz Camargo, *Historia de Tlaxcala*, annotator Alfredo Chavero (Mexico City: Innovación, 1978), p. 90.

⁴Carlos María Bustamante, *Historia de la República de Tlaxcallan* (Mexico City, Imprenta del Aguila, 1826), pp.15-16.

⁵Domingo Francisco de San Antón Muñón Chimalpahin, *Memorial breve acerca de la fundación de la ciudad de Culhuacán*, trans., paleographer and study by Víctor Manuel Castillo Farreras (Mexico City: UNAM, 1991), p.35.

⁶Ichiro Hasegawa, "Catalogue of Ancient and Naked-eye Comets," *Vistas in Astronomy* 24 (1980): pp.59-102.

⁷M. Pingré, *Cométographie ou Traité Historique et Théorique des Comètes* (Paris: n.p., 1783), p. 373.

⁸"Mexicanus Codex," *Journal de la Société des Américanistes* 41 (Paris: n.p., 1952): plate LI.

⁹Ho-Peng Yoke, "Ancient and Medieval Observations of Comets and Novae in Chinese Sources," *Vistas in Astronomy* 5 (1982): p. 198.

¹⁰Ho-Peng Yoke, op.cit. p. 198.

¹¹"Códice Telleriano-Remensis," *Antigüedades de México*, vol. 1, researcher José Corona Núñez (Mexico City: Secretaría de Hacienda y Crédito Público, 1964), p. 299.

¹²Donald K. Yeomans, *Comets: A Chronological History of Observation. Science, Myth and Folklore* (New York: John Wiley, 1991), p. 410.

¹³The word *tlacuilo* comes from the Nahuatl verb *tlacuiloa*, meaning "to paint" or "to write." *Tlacuilos* were Indian scribes who wrote about history, religion, mythology, etc. [Editor's Note.]

¹⁴Ho-Peng Yoke, op.cit., p. 209.

¹⁵Ho-Peng Yoke, op.cit., p. 209.

¹⁶Friar Jerónimo de Alcalá, *La Relación de Michoacán [1538]* (Mexico City: Secretaría de Educación Pública, 1988), p. 281.

¹⁷Friar Diego Durán, *Historia de las Indias de Nueva España, 1570-1581*, ed. Angel Ma. Garibay (Mexico City: Porrúa Editores, 1976), pp. 467-471.

¹⁸Hernando Alvarado Tezozómoc, *Crónica Mexicana*, annotator M. Orozco y Berra (Mexico City: Porrúa Editores, 1980), p. 653.

¹⁹Friar Bernardino de Sahagún, op.cit., pp. 817-818.

²⁰A. S. Asaad, "Decrease of the Zodiacal Light with Increasing Solar Activity," *The Observatory* 957

(1967): pp. 83-87; G. Weill, "Variation de la brillance de la lumière zodiacale au cours d'un cycle d'activité solaire," *Compt. Rend. Acad. Sci.* 263 (1966): pp. 943-946; R. Robley, "Change in the Zodiacal Light with Solar Activity," *Solid Particles in the Solar System*, Nintieth International Astronomical Union Symposium (Dordrecht, Holland: Reydell Publishing Co., 1980), pp. 33-36.

²¹V. Letfus, "Solar activity in the sixteenth and seventeenth centuries," *Solar Physics* 145 (1993): pp. 377-378.

²²R. Kippenhahn, *Discovering the Secrets of the Sun* (New York: John Wiley, 1994), pp. 30-32.

²³Rafael García Granados, *Diccionario Biográfico de Historia Antigua de México*, vol.2 (Mexico City: UNAM, 1952), pp. 51-64.

²⁴M. Pingré, op.cit., pp. 483-484, and I. Mather, *Kometografía or A Discourse Concerning Comets* (Boston: S.G. for S.S. and fold by F. Browning, 1683), p. 95.

²⁵A. Wittmann, "The Sunspot Cycle Before the Maunder Minimum," *Astronomy and Astrophysics* 66 (1978): pp. 93-97.

²⁶V. Letfus, op.cit., p. 382.

²⁷J. Tudela de la Orden, *Códice Tudela* (Madrid: Cultura Hispánica, 1980), p. 62.