



Under the dome of the Kika Silva Pla Planetarium at Santa Fe College in Gainesville, Susan Milbrath compares the Codex Borgia eclipse image with a planetarium projection of the solar eclipse in August 1496.

Códex Mōmēñt

SUSAN MILBRATH COMBINES ART AND ASTRONOMY TO UNRAVEL A 500-YEAR-OLD MYSTERY ABOUT AN ANCIENT MEXICAN ARTIFACT

BY DELENE BEELAND



Half a millennium ago, a farmer in central Mexico was tending his crops when suddenly the summer heat beating down on him lessened. He looked to the sky, expecting storm clouds. But what he saw filled him with fear and wonder. The sun's familiar disk was disfigured, as if something was swallowing it.

Day gave way to night and a new light shone brightly — Venus. The farmer's mind raced, confused. To his people, Venus was an important god who traveled in a carefully measured way between the heavens and the underworld, and at this time of day he was supposed to be in the underworld.

He dropped to his knees in awe. Venus — resurrected from the underworld — was attacking the sun!

Ancient people all across central Mexico witnessed this epic sky battle. In fact, the event made such a deep impression that the Aztecs later told their Spanish conquerors it was the single-most important eclipse event during their reign, which spanned nearly 200 years from 1325 to 1519.

It was so important that the farmer's people recorded it for posterity in an elaborate book. For centuries, that book —

known as the Codex Borgia — has fascinated and frustrated scholars like Susan Milbrath, a curator of Latin American art and archaeology at UF's Florida Museum of Natural History.

A codex is a painted manuscript, made in pre-Conquest Mexico of bark paper or plaster-coated deerskin with pages that connect end-to-end, like a folding screen. Scholars say that most codices are similar to farmer's almanacs, and were likely used for tracking seasonal cycles, agricultural festivals and religious rituals.

The Codex Borgia is unique because it is one of the few codices from central Mexico known to have survived the Spaniards' massive book burnings and destruction. But it is also enigmatic. Though most of its 76 pages of pictographs and glyphs have been decoded, the middle section from page 29 to page 46 has defied logical explanation ever since the codex was rediscovered in Rome in 1805 among the possessions of Roman Catholic Cardinal Stefano Borgia and acquired by the Vatican.

"Everybody recognizes that it is a unique narrative sequence," Milbrath says, flipping through a life-size replica of the 11-inch-

by-11-inch codex. “That is why it has been difficult to interpret. There is simply no other codex to compare it to.”

But now Milbrath — an archeoastronomer who studies astronomical imagery embedded in archaeological artifacts — thinks she has solved the riddle of the Codex Borgia.

MISSING PIECES

At first glance, the Codex Borgia is a visual delight. Reds, greens, blues and oranges leap off the centuries-old pages. Beautiful and grotesque expressions adorn humans and gods who appear to be characters in a narrated story. Elaborate and colorful counting systems frame certain pages, documenting time. Even the untrained eye can immediately appreciate that only a sophisticated culture with a complex belief system could have created such an inventive work. But which culture and when?



Milbrath has been fascinated with the Codex Borgia for most of her professional life. In 1989 she published a chapter in an academic book, “Imagination of Matter: Religion and Ecology in Mesoamerican Traditions,” suggesting that pages 29 to 46 documented real seasonal and astronomical cycles within their intricate imagery.

“At that time, I suggested that we were looking at a year sequence,” Milbrath says, “and that Venus was very important in the imagery, and that the people who created it were tracking a Venus cycle over the course of a solar year.”

Milbrath sought to link that Venus imagery to the planet’s known astronomical cycles, but at the time she was missing two key elements: the time frame the codex documented, and which central Mexican culture had made it.

These pieces of the puzzle were necessary in order to search data for what the night sky would have looked like at a certain point in time, from a certain vantage point on Earth. Back then, scholars disputed which central Mexican culture had produced it. And though they knew it was created before the Spanish Conquest, they weren’t sure of the exact years it was meant to represent.

In the intervening decades, new evidence has mostly settled these questions. In 1991-1992, a team of archaeologists working in Ocotelolco — in the state of Tlaxcala, Mexico — uncovered murals containing artwork identical to the Codex

Borgia. Even better, they were dated to the same pre-Conquest time period as the codex.

“I think the murals provide irrefutable evidence that the Codex Borgia originated in Tlaxcala,” Milbrath says. She visited the murals in 1993 and said she was immediately convinced that the same people who had produced them had also painted the Codex Borgia. She said that most scholars today agree on this point.

Historically, the Tlaxcala nation-state was surrounded by the Aztec Empire. The Tlaxcala endured periodic raids by Aztecs who captured their warriors and dragged them to Mexico City for ritual sacrifice, which they believed would relieve famine. The Tlaxcala and Aztecs shared the same nahuatl language and used similar calendars for agricultural festivals and cycles of religious rituals, but the neighboring groups held starkly different beliefs, Milbrath says.

When the Spanish arrived, the Tlaxcalans struck an alliance with the invading Europeans. The Spanish burned and sacked the Aztec empire, but left the Tlaxcala unmolested. It was this alliance that ultimately led to the Codex Borgia surviving the Spanish Conquest, whereas Aztec codices did not.

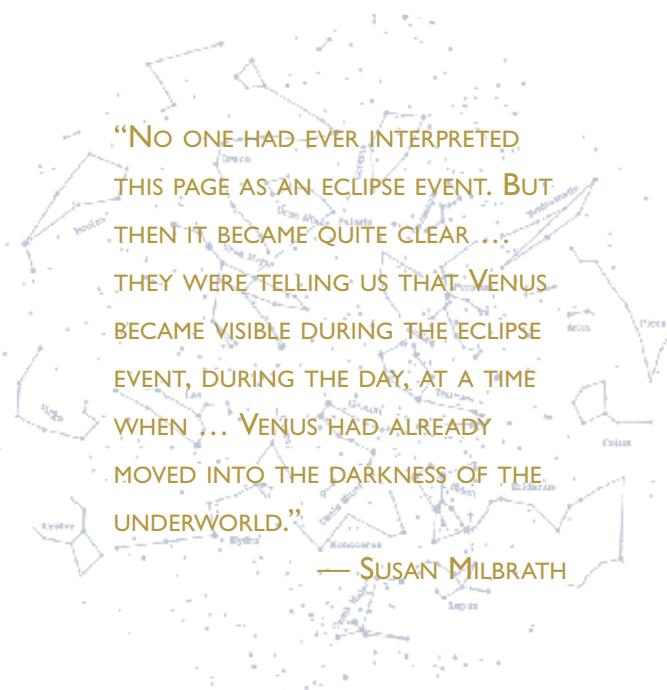
While Tlaxcala gave Milbrath a place and a cultural context for her theory, it wasn’t until 1999 that a leading scholar identified the time frame the Codex Borgia represented. Tony Aveni — an astronomer and anthropologist from Colgate University who is considered a founder of Mesoamerican archaeoastronomy — determined that the manuscript documented the 52 years between 1467 and 1519.

The new, widely accepted contextual information — a time frame and a location — gave Milbrath the missing data needed to revisit the Borgia’s cryptic meaning.

Careful examination of the glyphs and images in the Codex Borgia — and Milbrath’s years of work with Mayan codices — led her to believe each of the 18 pages in the narrative sequence corresponded to one of the 18 festival periods the Tlaxcalans and the Aztecs used to track their solar years. These ancient cultures had an agricultural calendar called the “xihuitl” that was based on 18 “months” of 20 days, with each month corresponding to a festival.



CAREFUL EXAMINATION OF THE GLYPHS AND IMAGES IN THE CODEX BORGIA — AND MILBRATH'S YEARS OF WORK WITH MAYAN CODICES — LED HER TO BELIEVE EACH OF THE 18 PAGES IN THE NARRATIVE SEQUENCE CORRESPONDED TO ONE OF THE 18 FESTIVAL PERIODS THE TLAXCALANS AND THE AZTECS USED TO TRACK THEIR SOLAR YEARS.



VENUS RISING

Venus is an easy target to spot. The planet shines so brightly in the night sky that it is clearly visible to the naked eye. From Earth, Venus seems to disappear from the sky when it passes in front of or behind the sun, and these two phases of seeming invisibility are known to modern astronomers as inferior and superior conjunction. But the ancients would not have known this. In their cosmology, Venus passed from the sky to the underworld and back.

Venus was very important to the Aztecs and Tlaxcalans alike, Milbrath says, and scholars know from multiple lines of evidence that its astronomical cycle was often shown pictorially as a male Venus god acting out different scenes.

When the ancient Tlaxcalan's depicted Venus's absence from the sky, they showed him in a skeletal form, undergoing death, and passing into an underworld. When Venus reemerged in the morning or evening sky, the god emerged from the underworld, refreshed and alive once again.

Using these accepted interpretations of the Venus cycle, Milbrath carefully tracked the astronomical imagery on pages 29 through 46, mapping them under her hypothesis that each page represented one "month" in the Tlaxcala solar calendar. She was particularly intrigued by the imagery on page 40, which depicted nine different incarnations of a Venus god in the sky around a ray-studded disk cut by red wedges that spurted blood. Milbrath remembered seeing a similar depiction on a later Aztec codex showing a series of eclipses.

"There it was all this time, and we just didn't know what it meant," Milbrath says. "No one had ever interpreted this page as an eclipse event. But then it became quite clear ... they were telling us that Venus became visible during the eclipse event, during the day, at a time when ... Venus had already moved into the darkness of the underworld."

Milbrath next designed a test for determining exactly which year the 18-page sequence documented. She created a list of six astronomical events she'd identified in the codex: the solar eclipse and various transitions in Venus's cycle. She arranged these in a rough chronology based on the premise that each page in the sequence represented a month and then compared this chronology of events against astronomical data spanning from 1350 to 1521, but paying special attention to the years within Aveni's 52-year time frame of 1467 to 1519. She needed to find one year within this framework where the historical astronomical data matched the rough chronology of astronomical events she'd extracted from the Codex Borgia.

The Tlaxcalans started their calendars during the month of the winter solstice, so Milbrath used this as a starting point to test key years known to contain solar eclipses. Only one year matched the eclipse event's chronology precisely. Beginning the 18-page calendrical sequence of the Borgia in the month of the winter solstice of 1495 led the August 8th eclipse of 1496 to land squarely on page 40, which contained the eclipse imagery Milbrath had decoded. The intervals of the Venus cycle within the year 1496 also matched the pictorial transformations of the Venus god depicted in Borgia's chronological imagery.

Her results strongly suggest that the most cryptic section of the Codex Borgia is a pre-Conquest month-by-month documentation of the year during which the most important solar eclipse of the era is known to have occurred.

"It's an elegant solution because it's simply so logical," Milbrath says, reflecting on the strength of her findings. "Page 40 was the key. No one had previously interpreted it as an eclipse."

Only time will tell if scholars will embrace this newest interpretation. But Aveni, the esteemed Mesoamerican archaeoastronomer, has already given it his stamp of approval.

"I have great respect for Susan Milbrath's work," Aveni said in an e-mail. "Her interpretation of B29–46 appeals to me for two reasons. First it is a real-time study, which I believe is the proper framework for many of the almanacs and tables in the codices. Second, it works. The Venus/eclipse references fit the iconographic/calendrical data. Will it hold up? Who can really answer that one? I think it's solid work. She has thought about, explored and expanded on it for a long time. Presentations of it have generally been well received. That's about all one can ask."

In modern times, it's difficult to conceive of living in such intimate connection to the natural rhythms cycling around us. Most people probably don't know the current moon phase, much less when or where Venus will next rise. But to the ancients, like the farmer in the field, such celestial details were the marrow sustaining human and spiritual life. And they painted it all in their marvelous, mysterious books. ☀

Susan Milbrath

Curator, Florida Museum of Natural History

(3352) 392-1721

milbrath@flmnh.ufl.edu

