

Living

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INTERVIEW: CHARLIE GOFF



●● Imagine the Xochicalcan astronomers making multiple star charts of the focused image of the night sky for each night of the year.●●

CHARLIE GOFF
Cuernavaca Anthropologist

The movie *2012* draws attention to the 5,125-year long cycle in the Mesoamerican Long Count Calendar. The Calendar gives identity to a day by counting the number of days passed this year zero. Thirteen cycles of 400 years will have passed before the next cycle begins, which is Dec. 27, 2012.

How did the Mayans select Aug. 13?

The Maya didn't choose August 13, it just works out to be that date when working backwards in time to the first day. August 13 is the anniversary of the laying of the three hearth stones – just like the hearth is the center of the home, they are the center of the cosmos. Even though our humanity didn't exist before then, gods were born or created before then who laid the hearth stones which was to be the center of creation.

Why was time so important to the pre-Hispanic Mesoamericans?

In addition to their gods of wind, water, earth and sun, during the Classic period they had gods of time: gods of the hour, day and night, gods of days, months, years and periods of years. And a major difference between Mesoamerican religions and those of today is that their gods were only approachable when they

IN THE BEGINNING... AUGUST 13, 3114 BC

Many archaeologists claim the Maya began counting time as of August 13, 3114 BC. Anthropologist and long-time Cuernavaca resident Charlie Goff sheds some light on Mayan timekeeping.

BY MARY CODAY EDWARDS • PHOTO COURTESY OF RUBEN BALDERAS • THE NEWS

were in counsel, when they were accompanying the sun in the counsel of time on its trip through the sky.

Mayan scholar J. Eric S. Thompson used a date when he was writing his book to make this concept easier to understand. We can use today's date and time, 5:00 p.m., Friday, August 6, 2010. We can say it's called that because today at dawn the sun started the progression of time accompanied by the god of August and the god of six, now it is joined by the god of 5:00 (p.m.), but after an hour 5:00 will drop out and be replaced

by 6:00. And Friday is in the procession, and two is carrying millenniums and zero is probably upset at carrying centuries and years, and the god of one is carrying decades. At the end of the day there will be a pause and Friday will be replaced by Saturday, six will be replaced by seven.

If you want to give a gift to those gods you have to do it when they're in counsel, because at other times they are in retreat and don't want to be bothered by our petty problems. That's why the calendar's accuracy is important – to know when to make the offerings.

And if they (the gods) didn't get them at the right moment in time, it might have been worse than not having done anything. Imagine if you invite all the gods that are in the counsel of today to dinner: "We're going to give you offerings, come to over Xochicalco," and then you give offerings to the year and to the month and to the hour of the day and then you give it to the wrong god of the week, because your calendar's off by one day ... you still got the year and the month right, and those gods were all pleased but imagine how embarrassing it would



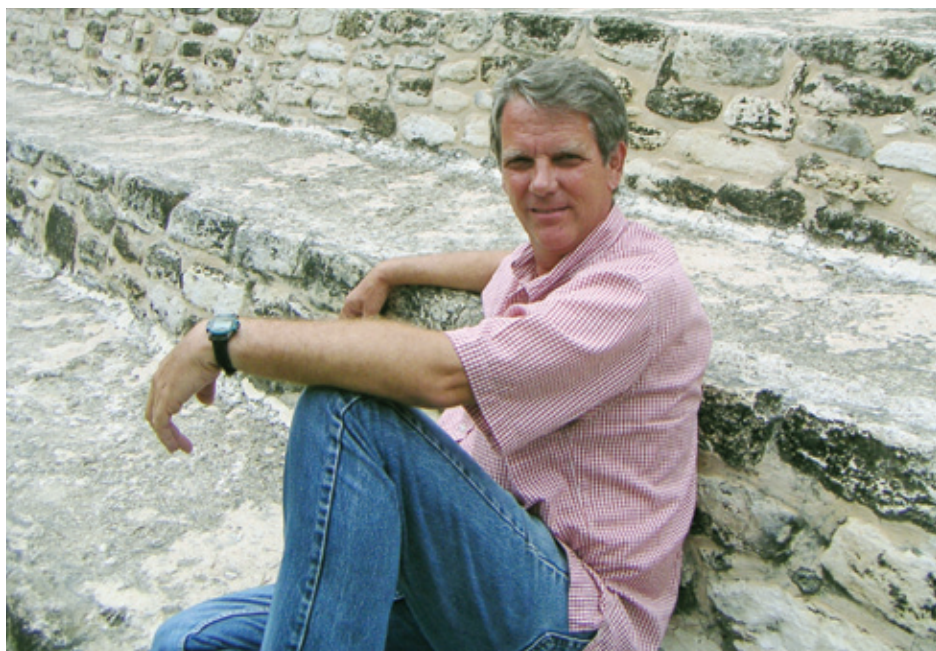
COURTESY OF MARCO POLO GUZMÁN HERNÁNDEZ

The Caracol tower in Chichen Itzá retains three of its windows, looking out various directions.



COURTESY OF DAYANA BATEMAN

Early visitors made drawings of Palenque's observatory (R), each different from the present-day tower.



COURTESY OF CHARLIE GOFF

Anthropologist Charlie Goff sits on the temple steps at Mayan archaeological site Lamanai, Belize

be for the god that didn't get anything, to be sitting there at the banquet, everybody else is being served, and there is an extra offering, but that god knows it was for another god that was here yesterday it's not for him. Imagine what trouble you can get into with the gods if your calendar is but one day off.

How did the ancient Mesoamericans check the accuracy of their calendars?

Most observations were probably made on the horizon, watching the stars, planets, sun or moon rising and setting between peaks or landmarks on the horizon. (See drawings at top of pg 18, Ed.) The height of pyramids at various archeological sites seem to be determined by how high the buildings needed to be to get a clear view of the horizon. For example, in Guatemala's Tikal, where the forest is 150 feet high, the temples seem to be perched on the treetops. In the northern part of Mexico's Yucatan peninsula, where the trees are 40 feet high, the temples are also "perched" on the treetops.

Mexico is home to at least three ruins which each boast an observatory: Chichen Itzá in the Yucatan and Palenque in Chiapas both have observatory towers, and Morelos' Xochicalco has a chamber with a hole in its roof. In both Chichen Itzá and Palenque, the stairways on their towers start from the second floor, not the ground floor.

Astronomers probably climbed a rope ladder and pulled it up after themselves. This made it difficult for others to get in and distract them as they waited for the astronomical event they were watching for through the windows in the observation chamber.

While Palenque's tower has been lost with no accurate way to restore it, Chichen Itzá's tower still conserves three of its windows looking out at different directions and each is approximately two feet high by two feet wide, with windowsills about eight feet deep.... There are two sight lines through each window allowing for great accuracy. I was in the observation chamber on a spring equinox and half the windowsill was a triangular shadow, the other was in light - spectacular - just as Sylvanus Morley's (Mayan scholar) drawing suggests it would be.

And Xochicalco?

The Xochicalcans were not content with merely observing the horizon and wanted to record accurate observations into the center of the sky. They did this by creating an underground observatory and making the ceiling so thick that you can only see out through what I will call a chimney. The shaft of this chimney is about 20 feet high, and there are another 10 feet from the ceiling to the floor so the total distance from the top of the chimney to the floor is about

30 feet. The chimney isn't perpendicular to the floor; it angles slightly north towards where the sun is at noon on the summer solstice, on or about June 21st. Since the aperture is wide the sun shines directly into the underground room for 52 days before the solstice and for 52 days after it. Plus the solstice itself this makes 105 days a year that the sun shines in, and 260 days that it does not. Perhaps not a coincidence; there is a 260-day Mesoamerican ritual calendar.

During daylight hours there is a three-foot diameter circle of diffused light on the floor of the observatory chamber. But on the 105 days that the sunlight hits the floor, a needle point of light appears on the west side of the circle and makes its way across the circle from west to east.

The fact that the direct sunlight makes its way across the floor from west to east as the sun moves through the sky from east to west always made me think of a pinhole camera in which light rays from an object pass through a small hole to form an inverted image. I decided to try and focus it and see if we'd be able to see the focused image of the sun. In 1991 there was going to be a total eclipse of the sun at midday in July - during the time of day that the sun shines into the observatory. I needed to know if the image of the sun could indeed be focused.

In May of that year I along with two others went to Xochicalco midweek hoping that there would be no other visitors in the observatory. I told the lantern-carrying duty caretaker that I wanted to focus the image of the sun on the floor of the observatory and I would need two things: first her permission, and then I'd need to go up on top of the chimney and block out almost all the sunlight entering the chimney. She courteously withheld her laughter and only smiled. There are no shortage of wack-o ideas carried out in the observatory at Xochicalco. The caretaker told me I could do whatever I wanted to do.

My two enlisted volunteers went into the observation chamber; they placed a piece of white posterboard on the floor in order to create a smooth white surface. I went up on top and covered the chimney

with a piece of cardboard and cut a four-inch diameter hole that I covered with aluminum foil taped to the cardboard. I had several diameters of wire with me. The narrowest was a needle, followed by a pin, a paper clip and a coat hanger. When I enlarged it to the diameter of the wire from the paper clip, I heard the excited cry from below, "It's in focus!" I raced down to the tunnel entrance to the observatory. I wasn't in the chamber to hear the woman who had carried the lantern shout "¡Madre de Dios!" But we did pass each other in the tunnel as she ran out and I ran in. There on the floor was a five-inch diameter image of the sun in such perfect focus that we could see the sunspots on it as it moved across the floor from west to east. We later confirmed that we were indeed seeing the sunspots by checking the web page of the Solar Observatory in New Mexico.

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Instead of moving the telescope... did the Xochicalcans move the astronomers? ••

CHARLIE GOFF
Anthropologist

And were you able to return and record the July solar eclipse?

Unfortunately, no. On leaving the observatory, we ran into the archaeologist who was in charge of the site - not the same as today's. I told him what we had done, that the eclipse was coming up and asked if he would allow me in so I could videotape it on the floor of the observatory. He refused; I told him he could use the camera and record it, that it didn't have to be me. This went on for some time, before he let loose declaring the stupidity of it all, saying the Xochicalcans didn't have scotch tape, aluminum foil, paper clips or cardboard. I said they had other ways of doing the same thing, such as with cactus thorns, bark, smooth white lime plaster ... gold foil.

Not only did he not want to use the camera, he barricaded the entrance with rocks so no one could get in. The point is that it could have been done. Imagine the Xochicalcan astronomers making multiple star charts of the focused image of the night sky for each night of the year. In the tunnel leading to Xochicalco's observation chambers there are a number of passageways which branch off in other directions, but they are filled with rubble. Do they lead to other chambers?