Where Time Began

By Vincent H. Malmström

Three thousand years ago, on the narrow Pacific coastal plain of southern Mexico, within the very shadow of the two highest volcanoes in Central America, a priest received a revelation from the Sun God that was to determine the course of human history in Mesoamerica.

At precisely noon on the date we call August 13, probably in the year 1358 B.C., the priest noticed that no tree, no pillar, no post, in fact nothing set vertically into the ground cast a shadow.

Would such a miraculous event happen again? The priest started counting the days. Two hundred sixty days later, it happened a second time. And 105 days after that, on the next August 13, again nothing cast a shadow. As the priest discovered this recurring pattern, he must have felt as though he were communing with the great Sun God himself.

These remarkable events took place at Izapa, a huge ceremonial center on the Mexican-Guatemalan border. Its temple pyramids and mounds are faced with crude cobbles rather than the precisely cut and fitted stonework of similar centers built by later, presumably more advanced, civilizations. And yet, because of Izapa's unique location, new evidence indicates that some scenario such as this must have marked the inception there of the 260-day sacred calendar, probably the first measure of time in the New World.

Variously known as the tzolkin or tonalámatl, this strange almanac represented not only the first fumbling attempt to grasp the seasonal cycles of nature but was also a way of setting the clock for all of life. Once in place, the sacred calendar, a cycle that integrated 13 numbers with 20 day-names, became the basis for religion, art and science in the great Mesoamerican civilizations that followed, including those of the Olmecs, the Mayas and the Aztecs.

The discovery of the 365-day secular calendar may have followed just a few years later, and again it may have been Izapa's unique location that provided the clues about the true length of the year. I came to this conclusion several years ago while standing atop the main pyramid at Izapa. Looking into the distance, I could easily see Central America's loftiest peak, the extinct volcano Tajumulco. Using a sighting compass, a hand calculator and a pocket ephemeris (an astronomical almanac that tabulates the precise location of the heavenly bodies for every day of the year), I figured the angle at which the sun would rise on June 21, the summer solstice, and realized that on that date, thousands of years ago, an Izapan priest might have climbed the steps of the same pyramid and observed a spectacular sight: the sun, almost blinding in the clear tropical sky, seeming to rise directly out of the central crater of the great volcano.
Archeologists have always contended that the sacred calendar was older than the 365-day secular one, for if the 260-day calendar had not been devised before Mesoamericans realized the year actually had 365 days, it would probably never have been used at all. Certainly, since the ritual calendar did not accurately mesh with seasonal, and thus agricultural, cycles, it was of little practical value. But because they had sanctified the 260-day calendar as a religious almanac, the Mesoamericans did not discard it after they discovered the solar year; instead they integrated the calendars into one system.

Sooner or later every advanced culture has realized that the true year has 365 days, but the 260-day calendar never occurred anywhere except in Mesoamerica, where it continues in use today among certain remote tribes of Guatemala. In the more than 3,000 years since it was set in motion, the ancient calendar has not lost so much as a day.

No doubt the Izapans used the sacred calendar to name their chiefs and nobles, as do their latter-day descendants to name their children. Each day was designated by one of 20 animals important to the local mythology, such as the alligator, buzzard, eagle, jaguar, snake, deer or ocelot. Some days on this primitive horoscope were auspicious, while others were unlucky. Those born on inauspicious days petitioned the priest to rename them.

The tzolkin had astronomical as well as historical significance. Priests used the 260-day calendar to predict solar eclipses. And they believed that every 52 years, as the sacred animals resynchronized with their solar positions, history would repeat itself. Later, the Aztecs ceremonially extinguished all their fires on the last day of a 52-year "round" or "Aztec century," starting a new fire from scratch.

Conventional archeological wisdom had held for years that the ritual calendar had been arrived at by the Mayas either as an approximation of the human gestation period (266 days) or as a multiple of the numbers 13 and 20, both of which had magical significance to them. An astronomical basis had been ruled out by none other than Sir J.
Eric S. Thompson, the dean of Maya scholars. For the calendar to have had an astronomical basis, he reasoned, it would have to have been understandable throughout the entire realm. That meant that whatever culture invented it would have had to convince every other culture of its utility. The practical problems of communication in maintaining such a centralized system in a countryside dominated by high mountains, valleys and dense rain forests seemed insurmountable.

But one morning in January 1973 as I sat on the steps of El Caracol, the ancient observatory at the great Maya ceremonial complex of Chichén Itzá on the Yucatán Peninsula, I had a kind of revelation of my own. Here, at the base of a structure once described by Sir Eric as "the ugliest building in the New World," I listened to a Mexican guide describe the intricate interplay of light and shadow on the sides of the center's giant pyramid, El Castillo.

At both the spring and the autumnal equinox, the guide explained, the waning light of the sun captures the balustrades in such a way that the monstrous sculptured serpents, worshiped as gods by the Mayas, seem to undulate and descend from the heavens.

As he spoke, I wondered if some similar sequence of light and shadow might have determined the length of the mysterious 260-day calendar that I had read about as an anthropology student years before. For a primitive sun-worshiping people making a first attempt to measure time, the intervals between the two days each year when the sun stands directly overhead at noon, casting no shadows, would have been fairly simple to measure.

The solar ephemeris told me that the sun passed directly overhead at noons exactly 260 days apart only along a line just south of the fifteenth parallel (15 degrees north of the Equator). According to the ephemeris, that 260-day interval would begin on August 13 each year--a very auspicious date indeed, for according to several experts on Mayan culture, including Sir Eric, Mayas celebrated August 13, 3114 B.C., as "the dawn of time" and began their calendar on that date.

The fifteenth parallel crosses a small part of the Pacific coastal plain of Mexico and then bisects the full width of the highlands in Guatemala and Honduras before running through the eastern lowlands and out into the Caribbean. Along the line, one place in particular piqued my curiosity: Copán. Located in the western highlands of Honduras, Copán was the most important astronomical center of the Mayas, according to archeological literature. No wonder it was so well known, I mused. Copán was the only large Mayan center located at a latitude where priests could have calibrated a 260 day interval between vertical suns. It seemed to be the best candidate for the spot where the sacred calendar of Mesoamerica had arisen.

But this hypothesis had several serious flaws. First, many of the ancient calendar's days were named for animals such as alligators, monkeys and iguanas, which are native to a tropical lowland, whereas Copán, perched at an elevation of some 2,000 feet, lies
amid forests of oak and pine that none of these species inhabit. Moreover, Copán is 200 miles away from the Petén, the center of Maya culture.

Furthermore, while conservative estimates placed the birth date of the Mesoamerican sacred calendar four or five centuries before Christ, the oldest dated inscriptions in Copán went back only as far as A.D. 465.

**Wrong Time Frame**

Copán, then, was not only in the wrong place ecologically but also in the wrong time frame. I went back to my map to look for another site near the fifteenth parallel--but one situated in the lowlands that was at least 1,000 years older. In all of Mesoamerica, only one place met all of these specifications: Izapa.

The primitive hunting and gathering Izapans lived along the seacoast, fishing and hunting deer, peccaries, turtles and birds by the lagoons. Their rudimentary agriculture consisted of cultivating cassava root. The peak of their civilization stretched from several hundred years before to a hundred years or so after the birth of Christ.

If Izapa were the place, the implications were astounding. First, it would mean that the Mayas had not developed the sacred calendar after all but that it was the
invention of the Izapans, who then bequeathed it to the Olmecs and the Mayas. Izapa, then, would have been the true cradle of civilization in the New World.

Though Izapa seemed to be the logical place to calibrate the earliest measure of time, how the 260-day calendar was communicated to the rest of Mesoamerica was still a mystery.

The crucial clue lay in the way the major structures of the ceremonial centers and, in some cases, entire cities were oriented toward the sun. As archeologists were mapping and reconstructing Teotihuacán (near Mexico City), the metropolis of a culture that may at one time have controlled much of Mesoamerica, they realized the city had been meticulously oriented so that its main thoroughfare ran from 15º30' east of north to 15º30' west of south. The dominant structure, the huge Pyramid of the Sun, however, was precisely oriented at right angles to the street. Thus, it faced 15º30' north of west, which meant its azimuth -- the angular orientation clockwise from due north was 285º30'.

As I sat atop the Pyramid of the Sun myself one January day in 1975, armed with my solar ephemeris and a calculator, assuming this gigantic temple had indeed been built to commemorate the sun, and knowing that it faced generally westward, I surmised that it must have been oriented toward some special sunset position. On what day of the year does sunset occur at an azimuth of 285º30'? I asked myself. Moments later, I knew what some Teotihuacán priest had known 20 centuries before me. The day was August 13, the solar anniversary of the Mesoamerican "dawn of time."

At Tikal, often called the "capital of the Mayas," the five impressive skyscraper pyramids appear to have functioned as a gigantic astronomical matrix. A sight line from the doorway of Temple I to that of Temple IV marks the azimuth of the August 13 sunset, while a line between Temples I and III commemorates the equinoxes; another between Temples IV and III defines the winter solstice sunrise.

The Olmecs constructed two of the region's most ancient centers in the rain forests and swamps of Mexico's low-lying Gulf coastal plain—one at San Lorenzo in about 1200 B.C., the other at La Venta some 200 years later. Both locations have always defied archeological logic, but when I tested these sites against "the principle of solstitial orientation," an explanation suggested itself. On the evening of the winter solstice at San Lorenzo, the sun sets "into" Zempoaltepec, the highest peak in sight; and on the evening of the summer solstice at La Venta, it sets "into" the volcano San Martin.

I found that more than 40 of the oldest Mesoamerican ceremonial centers were oriented in relation to a solstitial position of the sun, and one or more key structures in each center were oriented to an azimuth of 285º30'. But since these sites were not along the fifteenth parallel, and thus could not have been used to calibrate a 260-day cycle with the passage of vertical suns, how could the local priests have understood the significance of the sun's position on August 13?
If we assume that only the priests of Izapa knew for certain which day should commemorate "the dawn of time," perhaps travelers moving to the Yucatán or the Mexican plateau from Izapa carried such information with them. It was not, after all, a question of transmitting the information quickly, by runner, but of transmitting it accurately. This they could do by simply counting 52 days from the summer solstice to find the next day when the sun was directly overhead.

Then I began to wonder if the Izapans, who had originated the 260-day calendar, might also have been the first Mesoamericans to discover the true length of the year. It is at Izapa, after all, that the geographical fix point, the volcano Tajumulco, is closest to the ceremonial center. Moreover, if the Olmecs, the oldest high culture in Mesoamerica, were indeed aware of the intervals between solstices (and had oriented San Lorenzo so these could be observed), then the 365-day secular calendar must have been in existence more than 1,000 years before the birth of Christ. The ritual calendar, presumably antedating the more practical solar one, must then be far older than anyone had imagined.

"0 POP" AND "1 IMIX"

That the two calendars began to be used concurrently at some point in time was known, because Mayan date names refer to both systems. The computer told me that the combining probably occurred in 235 B.C. I then asked the computer to tell me when the first day of the secular calendar -- a day the Mayas called "0 Pop" -- would have first coincided with the summer solstice. The answer -- between 1320 and 1323 B.C. -- supported the idea that the secular calendar was far older than originally thought.

I now ran the sacred calendar back to its beginning, a day the Mayas called "1 Imix," and asked the computer when 1 Imix would have first coincided with August 13 -- the date that marked "the dawn of time." The answer: 1358 B.C. Thus, it was likely that the ritual and the secular calendars were instituted within 35 years of each other -- in fact, it was entirely possible that both systems could have been devised by the same person.

But why would the Izapans, who already had a way of keeping time, develop a second system? The impetus seems to have been agricultural. Excavating a few miles west of Izapa, Dr. Gareth Lowe, director of the New World Archaeological Foundation, found, in layers dating to before 1400 B.C., hundreds of small obsidian chips too small to have been used as arrowheads or spear points. Rather, he suggests, they might have been used as graters for manioc, a food crop.

After about 1400 B.C., however, the obsidian chips disappeared and were replaced by implements for grinding corn. This implied that calendrical experimentation in Izapa could have been spawned by a shift from year-round manioc to a cereal crop whose success was dependent on predicting the arrival of the rainy season. Apparently, when the 260-day calendar proved unreliable, another method became necessary.
Izapa, then, must have been the true cultural hearth of Mesoamerica, more ancient and advanced than the later Olmecs and Mayas. The idea revolutionizes our concept of the roots of their civilization.

Had Izapa served solely as the birthplace of Mesoamerican calendrics that would have been reason enough to regard it as the cradle of New World civilization. But there is also evidence that the Izapans were aware of the properties of magnetism and that they were the first Mesoamericans to build pyramids.

That the Izapans were a seafaring people and maintained relatively regular contacts with places as far distant as Ecuador over a long period of time has been shown by several lines of evidence. For example, as I wandered through the ancient grounds of Izapa, I noticed that its entire complex of mounds and pyramids faces toward the volcano Tacaná. This observation puzzled me at first. Why would the Izapans worship the second highest peak, I wondered, when the highest mountain, Tajumulco, was plainly in view?

But as I continued to explore, I came upon a curious clue. In the north wall of Izapa's ceremonial ball court is a bas-relief of a bearded man crossing a wave capped body of water in a boat. Since there are no navigable rivers or lakes nearby, I surmised the water was the Pacific Ocean, 20 miles to the south. Later, as I stood on the Pacific shore, the reason the Izapans revered Tacaná became obvious. From this vantage point, Tacaná appeared higher than Tajumulco. Indeed, I calculated that the lesser volcano could be seen from as far as 110 miles out to sea. It must have served as a fail-safe beacon for early navigators skirting the Mesoamerican coast. And it implied that the earliest settlers may have arrived at Izapa by boat from somewhere on the shores of the Pacific -- from western South America, Polynesia or perhaps even East Asia.

Most archeologists believe it would have been physically impossible for a people to have crossed the 7,000-mile-wide Pacific. But some evidence is very curious and can't be ignored, including many striking similarities between Izapan and ancient Polynesian culture: their cobble studded temple mounds are one example.

There are also some very provocative suggestions of similarities between China and certain Central American cultures, as well. In China, for example, when a noble died, a jade pebble was placed beneath his tongue. When a Mayan priest died, the same custom was practiced. Was it coincidence, or was Izapa the bridgehead of a foreign culture in America?

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OF SAKAS AND WUKUS

Not everyone keeps time by our 365-day, 12-month solar calendar. Every culture does, however, have some method of recording time past, planning the future and determining when sacred days occur. Most of these systems rely on observable natural
events: the earth's orbital path around the sun is our year, the moon's orbital track around the earth is our month.

The Balinese observe a lunisolar saka year (12 months) and a 210-day wuku year of 1-day to 10-day weeks. Calendar keeping is an esoteric art practiced by priests who harmonize saka with wuku and forecast lucky or unlucky days.

Muslims live by a calendar based on the phases of the moon. Its 12 months are either 29 or 30 days and total 11 days less than the solar year. As a result, about every 32.5 years the months have moved through the seasons and start all over again.

The lunisolar Jewish year is of six different lengths. There are lunar years of 353, 354 or 355 days, but leap years of 383, 384 or 385 days occur. The additional days make up an extra month called Veadar.

Although the Egyptians had a reasonably good calendar with 365 days (no leap year), the Romans failed to pick it up. In the early Republic, their year had only 10 months--December is from the Latin decem, 10-and the new year began with March.

Even after January and February were added only the first and third years of the four-year Roman cycle were exactly the same. By the time of Julius Caesar, January was arriving in the autumn. Caesar changed the length of most of the months, dropped a leap-year day into February and produced the Julian calendar. As slightly modified (the real year is six hours longer than the Julian year) by Pope Gregory XIII in the sixteenth century, it is the calendar most of the world uses today.

China's ancient calendar used 10 days as its basic unit; 3 such units made a month, and 6 cycles of 60 days made a year. By the fifth century B.C., however, the solar year had been calculated as 365.2 days and the solar month at 29.5 days, and the calendar was adjusted with intercalary periods. -- Steve Watson

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