A Survey of Teopantecuanitlán, Guerrero, Mexico

(The following is a copy of a report submitted to Dr. J. Bharucha, Associate Dean of Social Sciences, Dartmouth College, by V.H. Malmström, Professor Emeritus of Geography, summarizing the results of a field investigation undertaken with Faculty Research Funds during the Winter Term, 1998. Any comments or criticisms you may have will be welcomed.)

Background. The discovery of an Olmec ceremonial center in a remote area of Guerrero state in western Mexico came as a surprise -- one might even characterize it as a 'shock' -- to students of Mesoamerican prehistory when it was announced by Dra. Guadalupe Martínez Donjuán in 1983. The site was called by its discoverer "Teopantecuanitlán", meaning "the place of the temple of the jaguar god", after four monstrous monuments of undisputed Olmec design which surmount the walls of the ceremonial center's central sunken court. Located near the banks of the Río Balsas, Mexico's second-largest Pacific-flowing river, the site is situated in virtually the hottest, driest part of all of Mexico, giving it a climate and vegetation-type bordering on that of a true desert. Although individual Olmec-style artifacts had been found in the same general region several decades earlier -- prompting Miguel Covarrubias, the noted art historian, among others, to surmise that perhaps the long-sought-for "Olmec hearth" lay somewhere in western Mexico -- this was the first time that a bona fide settlement of Olmec origin had ever been discovered in this off-side area. Indeed, all earlier discoveries had pin-pointed the lush rainforests of the Gulf coastal plain as the "Olmec metropolitan area", to use Ignacio Bernal's descriptive label for the region. There, such ceremonial centers as San Lorenzo had been dated to 1200 B.C., La Venta to 1000 B.C., and Tres Zapotes to 800 B.C. However, when the radio-carbon dates became available for Teopantecuanitlán, the shock to cultural historians became even greater, because its 1000-800 B.C. core was found to be synchronous with La Venta, raising the question as to why the Olmecs had ventured into this remote and inhospitable region, so varied from their homeland, at so early a date.

My own interest in Teopantecuanitlán stemmed from the fact that, ever since 1973 when I first published an article in SCIENCE postulating the mechanism which gave rise to the 260-day 'Mayan" sacred almanac, I had been engaged in on-going research into the origins of civilization in Mesoamerica. Used by all the cultures of the region, this strange almanac formed the cornerstone of their intellectual life, for bound up with it were their most basic notions of astronomy, mathematics, writing, and religion. Inasmuch as my studies had pinpointed the origin of this almanac in the Pacific coastal plain of far southeastern Mexico at a ceremonial center known as Izapa, and my computer reconstruction of the almanac's age had placed it in the mid-14th century B.C., I was naturally interested to learn whether this newly discovered site would materially affect the overall structure of my hypothesis.

Though information of the site's precise geographic location was difficult to obtain, by 1996 I had zeroed in on it closely enough to conclude that it might indeed follow a rather standard Olmec "principle" of being oriented to the highest mountain within sight. This practice I had first recorded at Izapa in 1974 and had subsequently found at over 30 other Olmec ceremonial centers scattered throughout the Mesoamerican

region from El Salvador in the south to the Mexican Plateau in the north. Although I attempted to reach the site early in 1997 while carrying out other research in Mexico, the 'impossible' condition of the road prevented me from doing so; ironically, however, at the same time I came into possession of a detailed map of the site prepared by Dra. Martínez in which another Olmec "principle" seemed to be clearly evident -- if the directional arrow on the map signified "true north", rather than "magnetic north", then the internal layout of the entire site was oriented to an azimuth of 285º, or 15º north of west. This is the azimuth of the setting sun on August 13, the day on which the Olmecs believed the world began -- an alignment which I had discovered in literally scores of buildings and ceremonial centers throughout the Mesoamerican region, the most prominent being the layout of the great metropolis of Teotihuacán which I confirmed in 1975.

Even though I could not reach the site, I managed to contact Dra. Martínez by telephone and we set up an interview at her office in Cuernavaca on January 21, 1997. When I indicated to her that it seemed likely that Teopantecuanitlán was solstically oriented to Teotepec (literally, "the mountain of the gods"), the highest peak in the Sierra Madre del Sur, she indicated that the mountain was not visible from the ceremonial center. As early as 1975 I had realized that the metropolis of Teotihuacán was also solsticially aligned with Citlaltépetl, or Orizaba, the highest mountain in all of Mexico, but that an intervening ridge precluded seeing the mountain from the city. This had led me to surmise that something akin to a "relay-station" had been built on this ridge from which the priests could be informed of the winter solstice sunrise over the great volcano, and in 1993, with the help of a global positioning system receiver I managed to locate the ruins of a structure directly in line with both the mountain and the city. (Fragments of ceramics found at the site were examined by Deborah Nichols of the Anthropology Department and identified as being of Aztec ceremonial origin.) Thus, the possibility that a similar "relay station" might have existed between Teotepec and Teopantecuanitlán cannot be ruled out.

My primary question to Dra. Martínez, however, was whether the north arrow on her map designated "true" or "magnetic" north. When she responded that it designated "true north", then I could confirm for her that the entire ceremonial center had been laid out in line with the setting sun on August 13 -- a revelation that she found so exiting that she replied that "we must cooperate further on this matter". Though time constraints prevented me from making a further attempt to visit the site during the 1997 field season, I promised to return the following year, circumstances permitting, to visit it in her company to make further measurements and observations.

In the ensuing year, I sent Dra. Martínez a copy of my newly published book, Cycles of the Sun, Mysteries of the Moon: The Calendar in Mesoamerican Civilization (University of Texas Press, 1997) and early in February, 1998, I informed her that I would be returning to Cuernavaca to contact her in the latter part of the month. When I appeared at her office about noon on February 27, she indicated that she would be happy to drive me down to the site the following day, using an rugged INAH (Instituto Nacional de Antropología e Historia) truck to do so, asking only that I pay the gas, tolls, and associated expenses inasmuch it was a "private" rather than an "official" journey, which I readily agreed to do.

At the same time she presented me with a personal letter from the Director of Archaeology of the Instituto in Mexico City, Dr. Jesús Mora Echeverría, in which he

commended my work on the calendar and described it as "fundamental" to an understanding of the origin and diffusion of Mesoamerican civilization. Coming from one of the country's highest-ranking archaeologists, such an accolade was both totally unexpected and extremely heart-warming. Moreover, he enclosed a research article of his own in which he cites new (and for me, previously unknown) evidence from the ancient site of Cuicuilco on the Mexican Plateau that lends further support to my hypothesis. In the same article he convincingly demonstrates that he has found that the cycle of Venus can also be related to the astronomical interval I first identified at Izapa, which was another exciting discovery of which I had not been aware.

Field Observations at Teopantecuanitlán. An early departure from the INAH headquarters in Cuernavaca the following morning, February 28, brought us down to the site by 11 A.M. (A topographic transect of the highway between Mexico City and Teopantecuanitlán shows, first, the climb out of the lofty basin of Mexico, then the precipitous descent to Cuernavaca (located at 1400 meters) -- the winter abode of both Montezuma and Cortés -- and finally the longer, more irregular descent into the Balsas Depression where the site is located at an elevation of ca. 570 meters (1870 feet). At the time of our arrival, the temperature in the shade was 34º C. (94º F.) and in the sun, 46º C. (115º F.).

One of the first measurements I made at the site was to determine its precise geographic coordinates. Using a Trimble Navigation Scout GPS, I obtained a reading from four satellites which gave me a latitude of North 17º 54' 06.7" and a longitude of West 99º 06' 38.6". (On the Universal Transverse Mercator grid, this location corresponds to 14 488, Q 1979.) The elevation rendered (366 m) was suspect (because of military adjustments to such readings in view of the Iraq crisis), and hence was ignored in favor of the altimeter reading of 570 m. (Both U.S. aeronautical charts and Mexican topographic maps suggest the accuracy of the latter.) Ironically, when this position is compared to that of Teotepec, the dominant peak in the Sierra Madre del Sur, it is found to be at a distance of 123.1 km (76.5 mi.) along an azimuth of 65º from it, the latter mountain precisely marking the position of the setting sun on the winter solstice. The fact that the ceremonial center is backed by a sharply pointed hill (itself a conspicuous landmark in the local region, rising somewhat more than 200 m above the site) obviously precludes any view in the direction of Teotepec, so unless a "relay station" of sorts is located on one of the intervening ridges, this has to be one of the most fortuitous coincidences in Olmec site-location; certainly, it is the oldest known Olmec site which is NOT solsticially oriented to the highest mountain within view. (Because the range of visibility of a topographic feature as high as Teotepec is 234 km, or 145 miles, if there had been a clear line of sight between the site and the mountain, it certainly would have been visible.)

The site's hillside location gives it a free view only northward along a broad structural valley -- most probably the corridor through which the Olmecs originally moved on their way into the Balsas Depression. Although the Río Amacuzac joins the Río Balsas (also known as the Río Mezcala) a couple of kilometers to the west, it is deeply entrenched in its valley and did not afford an easy route of access to the Olmecs in their day any more than it does to modern travelers today. Higher up the slope lie the remains of a pre-Olmec site (dating to 1400 B.C.) which used smaller-sized stones to outline the walls of its modest structures. The Olmec presence is attested by a sunken court outlined by huge, square cut stones lining all four of its walls and entered by two

stairways, one at each of its western and eastern ends, made of yellow clay. Not only are typical Olmec motifs found on the balustrades of the stairways, but the western and eastern walls of the court are surmounted by four gigantic Olmec monuments, each weighing from 3 to 5 tons. Each bears the likeness of a grimacing Olmec jaguar-god and carries one or more depictions of the so-called "St. Andrew's cross", another characteristic Olmec motif (which I have associated in my book with their notion of the annual geographic limits of the sun). Along the front, or northern wall, of the court are a series of sculptures reminiscent of the stela and altar arrangements of Izapa -- especially a large carving of a frog -- and also the pot-bellied sculptures of Monte Alto in Guatemala, the so-called "Fat Boys" whose magnetic properties I describe in my book. The fact that no volcanic rock (containing magnetite) is present in the local area naturally precludes the possibility that either of these monuments possess such properties themselves, so no effort was made to test them in this regard. Near the middle of the north wall are the remnants of La Venta-like altars that Martínez believes were thrown down about 800 B.C., marking a violent end for the period of Olmec occupance.

Also surmounting the front, or north, wall were four blocks of stone through each of which a hole about 15 cm (6 inches) in diameter had been bored vertically in the top surface to intersect with a horizontal hole of a similar dimension in the front surface of the block. (Although the stone that originally occupied the northeastern corner of the court is now missing, the Olmec propensity for symmetry dictates that such a specially carved block was also found there.) Such features, not known from any other site in Mesoamerica, clearly must have been associated with the passages of the zenithal sun, for only on those two days of the year would the inner recesses of the stones be fully lighted, giving them the appearance of four "headlights" when seen from a distance. At the latitude of Teopantecuanitlán, the first, or northward, passage of the zenithal sun occurs on May 11th, and the second, or southward, passage occurs on August 2nd; however, apart from this local solar phenomenon, neither of these dates has any calendrical significance.

Because of the relatively close proximity of the surrounding mountains to the site, horizon-based astronomical observations can only be carried out with any precision in a northerly direction. Thus, it seems quite unlikely that events such as the solstices or equinoxes or, for that matter, the sunset on August 13th, could have been defined with either care or facility at the site. This conclusion, of course, raises a further question: if the alignment between the monuments bearing the likenesses of the jaguar-god do indeed coincide with an azimuth of 285º (as Martínez' site-plan shows), how was this alignment determined? Lacking a reliable horizon marker against which to calibrate this event, the Olmecs would have found nothing in nature to demarcate such an orientation, even though they could have established the date of August 13 with total exactitude by counting 52 days from the summer solstice -- a practice that I have suggested was in use throughout Mesoamerica at least as early as 800 B.C. As mentioned above, however, even determining the summer solstice must have presented some difficulty when distant horizon markers were not available, so if and how the Olmecs actually accomplished this remains open to debate. The only other explanation of the site's internal orientation to an azimuth of 285º is that, like its alignment to the highest mountain in the Sierra Madre del Sur at the winter solstice sunset, it was simply a fortuitous 'accident' or coincidence. On the other hand, the fact that two such coincidences could have occurred in the same place,

despite the difficulties of local terrain imposed by the site's geographic location, seems scarcely credible.

On the reverse of the jaguar-god monument that Martínez has designated as Monument 2, she has identified a calendrical glyph as "10 Flower". If this identification is correct, this means that it is the oldest recognizable numeral glyph ever encountered in Mesoamerica. (Glyphs identified by Lowe at Izapa have also been interpreted as calendar numerals but are not of the usual dot-and-bar variety used in later inscriptions.) If the Olmec "Flower" glyph corresponds to the Aztec "Flower" glyph in occupying the 20th and last position among the calendar day-names (corresponding to the position of Ahau in the Maya calendar), then the fact that it has been carved on a monument which bears an alignment to the August 13 sunset suggests that it may be possible to establish the year in which such a calendrical equivalence occurred.

Using a computer program which makes a day-to-day comparison between the Maya calendar and our own (present-day Gregorian) calendar, I was able to determine that the date "10 Flower" coincided with the August 13th sunset on only two occasions during the supposed occupance of the site by the Olmecs. The first time was in the year -1080 (1081 B.C.), which may be a little too early, depending on the precision of Martínez' initial radiocarbon date) but certainly the second occurrence in the year -996 (997 B.C.) would be a very likely date for such a notation to have been made. If the Olmec occupation of Teopantecuanitlán had actually begun about 1000 B.C., as Martínez' radio-carbon dates suggest, then the construction of their principal temple was no doubt underway at precisely the time the computer correspondence suggests. Indeed, the later the date of such a correspondence, the less likely it would be that it accurately reflected the time of the sunken-court's construction.

Finally, an observation on the environmental setting of Teopantecuanitlán: Inasmuch as the local climate of the region qualifies as tropical semi-desert (having a Warmth Index of 13.47 -- anything over 8.00 qualifies as tropical, so this is probably close to being the highest Warmth Index which can be measured anywhere in Mexico! -- and a Moisture Index of 0.36 (true desert conditions occur at Moisture Indices below 0.25, while semi-desert conditions are found at values below 0.50), the Olmecs clearly found themselves in a region totally unlike anything they experienced in the rainforests of Soconusco (the region in which Izapa is located) or along the Gulf coastal plain where the ceremonial centers of the "Olmec metropolitan area" are situated. Small wonder, then, that the earliest evidence of any major irrigation works ever found in Mesoamerica has also been uncovered here at Teopantecuanitlán. Martínez has located a horse-shoe shaped earthen dam which collects the drainage off of the barren calcareous hillside located to the west of the site and leads it down a carefully engineered ditch lined by immense stone walls into a bend of the Balsas to the northeast of the site. Measurements along the bottom of the irrigation channel reveal a one-cm drop per meter, a value still used locally for modern irrigation channels constructed by the SRH (Secretaría de Recursos Hidráulicos, Mexico's water resources agency).

Why the Olmecs would have ventured into so different and hostile a region from their homeland at so early a date can only have been prompted by a motive of consummate importance to them. Both Martínez and I are agreed that this motive must have been the quest for jade, one of the richest sources of which is known to have occurred in the metamorphic formations that underlie the headwater region of the Río

Balsas. Indeed, it was probably in the river gravels themselves that the first finds were made, as there has never been any evidence uncovered of anything suggesting an extractive quarrying operation of any kind. Ironically, Martínez observes that modern-day residents of the region have lost the ability to recognize jade pebbles in the riverbed; no doubt the knowledge of where the primary outcrops of this prized gem-stone actually were to be found probably died with the Spanish conquest, if, for no other reason, than that the conquistadores had little interest in anything but gold and silver.

(Back to Table of Contents)