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Cross Circles
A case of Northern Mexico

Ironically, this volume serves more to commemorate our ignorance of "Native American Astronomy" than it does to provide any substantive additions to our knowledge of it…". (Anthony Aveni, Native American Astronomy, 1977: xvii).

The archeology of northern Mexico has revealed several peculiarities of the prehispanic societies that occupied that region for a long time. As compared to groups in Nuclear Mesoamerica, these are very significant differences. It has been proven that the northern region was, by no means, an insurmountable desert, and that the societies dwelling there were part of a very complex interaction system from very early times in their Pre-Columbian History (Foster and Gorestein 2000).

One of the identified characteristics of the region is its "rock art" (petroglyphs and paintings), which was usually attributed (not exclusively though) to bands of hunter-gatherers; their interaction with other groups is clearly seen in the archeological evidence through the *pecked cross circles*[1].

These representations owe their name to their cruciform design that is traced through a series of dots drilled or pecked on rocks or stucco. They are about 2 centimeters in diameter and they are placed at 3-4 centimeters intervals, measured at the center of each point; however, this is not a standard measure.

The *pecked cross-circles* are found in several sites, from northern Mexico to Guatemala, such as: Cerro Chapín (Aveni et. al. 1982: 326-335; Gamio 1910: 477), Tuitlan near Durango (Aveni et. al. 1982: 329), Purépero (Aveni and Hartung 1985) and Chiringüicharo (Nicolau and Cárdenas 2010) in Michoacán, Teotihuacán, Uaxactún (Smith 1950), among others. However, the most famous *pecked cross-circles* in the archaeoastronomical literature are the ones in Teotihuacán, Uaxactún and Alta Vista, Zacatecas (Kelley and Kelley 2000).

In most of the cases they were carved into rock and only very few crosses were engraved on floors or buildings.[2] Aveni and Hartung (1985:6) have reported 14 crosses carved into floors; three of them in Uaxactún, Group A, and 11 in Teotihuacán (Sergio Gómez, personal communication, 2009).

The *pecked cross-circles* usually consist of two concentric circles with a radiating cross dividing the circle into four quadrants. However, there are *pecked cross circles* formed by one, two or even three concentric circles. Sometimes circles and squares can be part of the same design; and at least in one case the cross can be a Maltese cross (Aveni, Hartung and Buckingham 1978; Aveni, Hartung and Kelley 1982; Aveni y Hartung 1985; Kelley and Kelley 2000). Considering all occurrences we can say it is not common that the *pecked cross circles* have more than two circles; and it is even less common that the circles are substituted by squares (Aveni 1980: 228).[3]

Aveni and Hartung (1985: 5) have classified the pointed crosses into three categories and their respective differences. These categories are based on the number and shape of the pointed lines, as well as the

place where they are found. They proposed the following classification:

- Category 1(a): a simple, double or triple circle with a cross, pecked on the floor of a building.
- Category 1(b): a simple, double or triple circle with a cross, pecked on a rock.
- Category 1(c): a triple and dotted *Malta cross* on the floor of a building (exception).
- Category 2(b): a simple or double square with or without diagonals, pecked on a rock.
- Category 3(b): dotted lines that are crossed straightly or pecked on the rock.

It has not been possible to count the number of points of a complete line to calculate the total number of points in all the pecked cross figures. However, a copy was traced so that the segments were completed by placing the missing points at similar intervals to the ones of the existing points; this process permitted to get a reliable estimate. It is interesting to point out that the hypothetic restitution resulted in 365 points/dots; this restitution may not be correct but the addition or subtraction of some points would result in a very similar number.

According to Grazioso (1985), the pointed crosses design was actually found during the Terminal Preclassic in Teotihuacán; thus, the diffusion and development of all other pointed crosses are attributed to that culture.

The explanations for those designs that have been discussed in the literature include astronomical observation points, points of reference for the layout of urban development, devices to determine astronomical orientations, calendars for divinatory purposes, or even board games. It is true that these explanations can work for some of the pointed crosses but given that they are located in different contexts and that their shapes and sizes differ much from one another, it is not possible to attribute a unique function to all of them. A cross might have had one or more functions apart from the ones that have been pointed out. Aveni and Hartung have given some examples and have also studied in-depth the calendar hypothesis (1985:6), the explanation as architectural reference points and the possibilities of astronomical orientation (1985: 8) as well as the board game theory (1985:11).

The most important interpretations and explanations stated by Aveni and Kelley and their supporters see the cross-circle as an element of calendric usage, because numerical values manifest in the motifs are apparently similar to the various calendar periods; moreover, its design might indicate mantic functions. However, in addition to these explanations, we believe there are other interpretive possibilities.

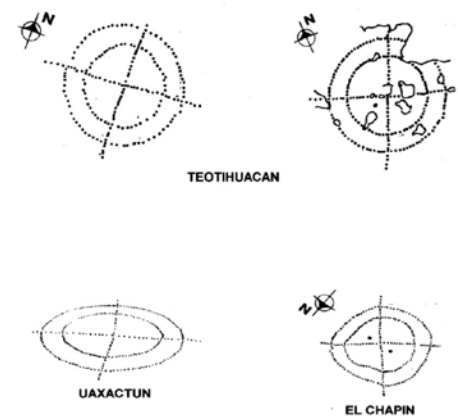
It should be considered that the crosses mentioned by Aveni, Hartung, Kelly, among others, in Teotihuacán, Uaxactún and Chalchihuites are located on rocks on the highest point of the mountains and hills, and they are found outdoors, it is important to mention that the surface of such rocks, on the design section, is tilted (in some cases the surface is totally vertical though). However, the circles that were made on the structure floors were found in closed spaces, so the astronomical observations are not feasible from these points; besides, they are horizontal surfaces which allows different applications. There are other crosses in the caves (Sergio Gómez personal communication 2009), which is another important information to locate such crosses.

Pecked cross-circles as usable devices may have served different functions. They could have been used to count time and demarcate ritual or urban space (Aveni 1989: 113), but they might have been integrated also in different types of activities with practical purposes or in rituals.

It is not easy to attribute a specific function to these pecked cross-circle motifs. Due to their frequency of appearance, their similar characteristics and their wide distribution, it may be assumed that across diverse Mesoamerican cultures they reflect a set of shared knowledge and probably are associated to a very peculiar trait of how Mesoamericans viewed their world: According to Aveni (1978), the cross symbol in the *pecked*

Fig. 1. Pecked cross-circle, Quiringüivharo, Michoacán.

Fig. 2. Pecked cross-circle in Teotihuacán, Uaxactún and El Chapin.



cross-circles evokes a quadripartite division of the universe, which is a fundamental aspect of Mesoamerican cosmology, still preserved among several indigenous groups in Mexico and Central America. On the other hand, the circle can have several symbolic meanings as a territorial framework and confinement of recurrence and seasonality; as well as the image of a mandala (Aveni 1989: 73; Kelley 2000: 190).

The designs on rocks that are located on the hills are almost certainly related to astronomical orientations; however, there are doubts about this when they appear in enclosed spaces because according to Grazioso (1985) in that case, the location, type and inclination of some surfaces must be taken into account.

There are several reasons to believe that the Mesoamerican pointed crosses could have worked as a counting device. In fact, a proposal was made to count days in the calendar outline (Aveni 1989: 103). Some holes are big enough to contain a moveable marker. In some of the crosses, the holes are so close that it seems they were closed trying to compensate some lost elements that should have been included in a previous specific element.

The numbers of pecks in some of the crosses are related to the Mesoamerican ritual calendar and in others to the solar year (Aveni, Hartung y Buckingham 1978: 276; Aveni 1989: 104). Among Mesoamerican societies, the cross is essentially a symbol of celestial and earthly geometry, the cosmic cycles as well as the *axis mundi* of the cosmos itself.

The representations where quadripartite shapes appear are plentiful in diverse media throughout Mesoamerica in all periods. Prominent examples are the first page of the *Codex Fejérváry-Mayer*, a very similar depiction in the Maya *Codex Madrid*, as well as in major sculpture, wall and vase painting, etc. Indeed, the quadripartite division of the universe is an essential part of Native American cosmology and was extensively recreated in calendars, rites, belief systems, and some hieroglyphic expressions.

Fig. 3. Altavista (Chalchihuies), Zacatecas, Mexico.

The north of Mexico: The case of Alta Vista

Alta Vista is an archaeological site (Medina and García 2010), located in northwestern Zacatecas, Mexico, at 23° 28.8′ north latitude and 103° 56.7′ west longitude, only 0°2.3′ north of the present Tropic of Cancer (Aveni et. al. 1982: 316). The site covers the apex and eastern slope of a minor ridge on the outwash plain of the mountains that bound the Río Colorado on the west, at an elevation of over 2,260 m above sea level (Kelly and Kelly 2000: 181).

Alta Vista is the major pre-Columbian ceremonial center of the Suchil Branch of the Chalchihuites cultural tradition in northwestern Mesoamerica and was occupied from around A.D. 400/450 until ca. A.D. 900/925. The Chalchihuites cultural tradition, in the Río Suchil area of northwestern Zacatecas is thought to have existed from ca A.D. 200/300 through A.D. 950/1000.[4] The Alta Vista site is situated on a low ridge among cultivated fields on a wide flood plain, the nearest river is 3 km to the east, and the location offers no obvious defensive advantages. This is one of the reasons to believe that the site itself was established by an astronomically oriented group from a Mesoamerican core center or region, probably Teotihuacán, searching for the place where there was only one zenith passage of the sun, at the Tropic of Cancer.

A prominent mountain range on the Eastern horizon, in clear view from Alta Vista, is neatly bracketed by the summer and winter solstice sunrises, and a central peak isolated by lateral mountain passes forms a distinctive landmark for the equinox sunrises. About 7 km SSW of Alta Vista is the high fortress site of El Chapin, a plateau (mesa hilltop site) occupied by groups affiliated with the sub-Mesoamerican Loma San Gabriel culture and, at least, by people of the Canutillo and Alta Vista phases of the subsequent Chalchihuites culture (Kelley 1971:768-801). Large circular petroglyphs are pecked into solid rocky outcrops on the eastern end of the summit of El Chapin overlooking the same horizon, with the ruins of Alta Vista in the distant foreground. These petroglyphs resemble some specimens found at Teotihuacan, Uaxactun and others mentioned above.

In this particular aspect, the general East-West direction marked by the cross circle found on the top of the hill of El Chapín points almost precisely to the direction of

Fig. 4. Geographic and cosmogonic distribution of the Pecked cross-circle og Teotihuacán, Uaxactún and El Chapín.

the summer solstice, on the hill of Picacho Pelón in the Sierra of Chalchihuites (Kelley Kelley 1987: 189). It is considered that the choice of the location of the Ceremonial Centre of Alta Vista and the petroglyphs on the line of the Tropic of cancer may have been for astronomical reasons, as indicated by Aveni and Hartung (1985).

Observations made during fieldwork by Kelley and associates at Alta Vista during the 1970s noted that some concepts of the Mesoamerican cosmovision could be identified at this site in the design, spatial distribution, and orientation of the cardinal points related to corners of the architectural elements that allowed to observe the sunrise and sunset at special dates of the solar year, as well as the stars and their relation to the surrounding landscape (Aveni, Hartung, Kelley 1982; Kelley and Kelley

Fig. 5. Sacred geography of the Altavista, Chalchihuites site.

Fig. 6. Pecked cross-circle of El Chapin Hill.

2000: 183). It was clearly demonstrated that the Sierra de Chalchihuites (part of the Sierra Prieta) formed an eastern horizon calendar, neatly bracketing the solstices as seen from Alta Vista. When the structure named the Labyrinth, or Observatory (Figure 11.2), was excavated during the 1975-76 season, it was observed that the equinox sunrise over the small isolated peak of Picacho Pelón in the horizon calendar, viewed from the Labyrinth, sent light rays into that structure, illuminating the Temple of the Suns. On summer solstice, the single zenith passage of the sun, in the Labyrinth was displayed when the included gnomon would cast no shadows at noon. It was noted also that the site was situated virtually on the Tropic of Cancer and that survey stakes integrated into the walls of the building indicated that its location and layout had been carefully planned. The aid and advice of archaeoastronomer Anthony Aveni was sought. After visiting the site, he confirmed previous observations and verified both the existence of the horizon calendar and the fact that original constructions at Alta Vista had their diagonals oriented to the cardinal directions, apparently a unique orientation in Mesoamerica (Aveni et al. 1982). At the suggestion of Aveni, Kelley and associates watched the summer solstice sunrise from the fortified site of Cerro el Chapín. Observed from one of the two large pecked cross-circle petroglyphs on the Eastern edge of Chapín (Chapín 1), the sun was seen to rise directly behind the same Picacho Pelón, confirming a prediction made by Aveni. Later Aveni returned to Chapín on the summer solstice and confirmed this sighting (Aveni et al. 1982). Still later they viewed the winter solstice sunrise from the high fortified site of Cerro Pedregoso, located north of Alta Vista, and observed that at that time the sun rose over the same Picacho Pelón (Figure 11.3). Thus, it was determined that Alta Vista was the planned center of a three-site astronomical complex, anchored on the pecked cross-circles on Chapín. These pecked cross-circles indicate a significant relation of the local system with Teotihuacán, where, as we mentioned, they occur in considerable numbers (Aveni 1988;

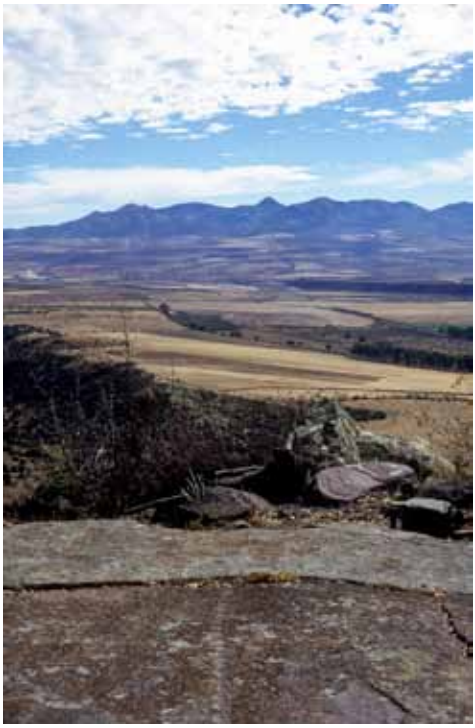


Fig. 7. View of El Picacho Pelón from the Pecked cross-circle of El Chapin Hill.

Fig. 8. View of El Picacho Pelón from the astronomic site of Altavista.

Aveni and Hartung 1985; Aveni et al. 1978; Millon 1973).

In the last article published by J. C. Kelley and Ellen Abott (2000: 183) they presented their latest hypothesis about the use of this pecked cross-circles as follows:

The hypothesis here advanced is that these figures are:

(1) Individual mnemonic devices for esoteric, calendric, ritualistic data, in effect numerical "anagrams." It has been suggested that the calculations were made by placing pebbles in the holes (Worthy and Dickens, Jr. 1983).

(2) The figures may have been used for prognostications, demonstrations, or predictions of astronomical calendric events, and perhaps as heuristic devices for novices.

(3) They may be regarded as individualized substitutions for actual codices, encoded by their markers, who alone, together with assistants or novices, can decipher them, and, as such, are records of calendric and astronomic events.

(4) They may have been created and maintained over long periods of time by religious societies dedicated to keeping day counts, the *veintenas* (20-day "months"), the *trecenas* (13-day ritual periods), and the calendar rounds (52-year "centuries"); and to making the routine astronomical observations necessary for keeping the calendar updated and corrected.

It has been mentioned that pecked cross-circles might also have served as calendars (Aveni et al. 1978), as is the case of the Cerro El Chapin, near Chalchihuites. Aveni, Hartung and Kelley (1982: 329) describe these as:

The two pecked cross-circles, averaging 2 m in diameter and about 50 m apart on a roughly S-N line that align with the direc-

tion of the ruins, were hammered into the rock with a device. Holes 2 cm wide, about 4 cm apart, comprise most of the design, except that exhibits a pair of eccentric depressions in the southeast and northwest quadrant from the crossing point of the two axes. The irregular nature of the circular portion of this design and the sharp bending of the axes had led us to wonder if deviations from symmetry were deliberate or whether precision in the spacing of the points comprising the design simply was not a factor in the mind of the artist. We have examined, with inconclusive results, the possibility that the pair of eccentric holes could have functioned as postholes for gnomons, and that their placement could be related to the misshapen structure of the pair of circles. A similar pair (eccentrically located on the design of the petroglyph at Tuitan, 130 km north of the et al. 1978: Figure 1), where they appear in the northeast and southwest quadrant much wider and deeper than either of the cuplike depressions on the Chapin circles a those comprising the rest of the design on the Tuitan petroglyph. A pole of 5 cm diameter and could easily be stood within the latter. The tally of depressions in various portions of petroglyphs is given in Table 2; it is these numbers that give us the strongest evidence of a relation between the designs and the Mesoamerican calendar.

In the description of these pecked cross-circles the element in common that comes to mind is the division in 4 segments or quadripartition and the use of the pecks or the marks as numbers in calendric devices, common in the Mesoamerican cultural tradition.

A marker placed at the center of the petroglyph was possibly used for solar horizon observations, considering the link between the ritual calendar and the seasons.

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Notes

1 The information used for this presentation was obtained from other investigations that were carried out by several researchers, but mainly from the works of J.C. Kelley, Aveni, Hartung and Jiménez Betts, among others.

2 In the site of Teotihuacan there are also other types of designs and petroglyphs within the city and in the mountains nearby. Aveni (1989: 77) reported 22 designs that included spirals, circles, lines and others.

3 Square pointed crosses have been found in the sites of Tlalancaleca, Puebla (Aveni, Hartung y Buckingham 1978: 270), Tepeapulco, Hidalgo (Aveni 1989: 91), Poncitlan, Jalisco (Aveni, Hartung and Buckingham 1978: 271), Seibal (Aveni, Hartung y Buckingham 1978: 271) and in Teotihuacán (see Grazioso 1995 for a better description).

4 This is essentially based on 51 radiocarbon determinations carried out by Southern Illinois University at Carbondale in the 1970s.

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