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POSSIBLE REPRESENTATIONS OF CONSTELLATIONS IN THE ROCK ART OF THE BASIN OF MEXICO

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RESUMEN

En este trabajo se plantea la función y el significado posible de petrograbados con forma de pocitas en rocas, la metodología utilizada es la consideración de elementos arqueológicos presentes en grandes rocas naturales inmersas en el paisaje cultural y en sitios arqueológicos con relevancia ceremonial en varios sitios de Mesoamérica. También se considera su presencia en grandes esculturas desde la época olmeca, se analiza brevemente las cruces punteadas del período Clasico de la época teotihuacana y su uso asociado a piedras donde se asocian a eventos astronómicos y cronográficos, se deduce y plantea que algunas tuvieron una connotación astronómica y otras se utilizaron tal vez para recrear elementos ceremoniales en ciertas fiestas prehispánicas.

ABSTRACT

In this paper it arises the function and the possible significance of petroglyphs shaped pocitas rocks arises, the methodology is the consideration of archaeological features present in large embedded natural rocks in the cultural landscape and archaeological sites ceremonial significance in several Mesoamerican sites. It is also considered its presence in large sculptures from the Olmec period, we briefly discuss the dotted crosses the classical period of the Teotihuacan era and its use associated with stones which are associated with astronomical events and chronographs, is clear and states that some had a connotation astronomical and other they used perhaps to recreate pre-Columbian ceremonial under certain parties.

Key Words: archaeoastronomy

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The system of representation of ancient graphic works on rock, ceramic, wood, paper and skin, seem to have been in many cases a product of the mapping, as systems of permanent orientation and records of space arrangements, where important events were represented, such as: information of hunting limits, disposition of irrigation systems, location of water fountains, or of necessary resources, or important places of cult. Locations on the cosmology and cosmovision were also represented, such as *Tlalocan* or *Ilhuicat*. Also sometimes, some constellations were represented like *Xonecuilli*, *Colotl*, *Mamalhuaztli*, the Sun (Fig. 1), associated to events like the mythical birth of the suns, foundation dates, calendaric names of the days, deities, numerals, historical important events, feet, hands, portraits and real emblems.



Fig. 1. Stone of the sun with constellations.

1. INTRODUCTION

The rocks where were worked as model miniatures; they could be considered metaphors of hills with representations of agricultural terraces and hydraulic systems (Zimbrón, 1992; Rivas Castro, 2006). I propose that this group of rocks were signs that established circuits, where the periodic ceremonies were carried out according to the diverse moments of the agricultural Meso-American calendar; in addition they were used as "offering tables", where all the elements for the petitions and the investitures that were placed upon them. On the other hand, I recapture the proposal that some groups of xicallis and small canals could also serve as mirrors where

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Fig. 2. Temantla dotted cross with a possible representation of a supernova explosion. Picture: Francisco Rivas Castro.

probably the reflection of stellar groups and stars could be observed at night upon pouring water on them. The observation of these astronomical elements could be used to predict storms or even for other predictions type related to the recovery of the tona and the return of the energy of people.[2]

2. AGRICULTURAL TERRACES AND HYDRAULIC SYSTEMS

Another proposal is that which considers that perhaps the *xicallis* that contain some engraved prehispanic rocks perhaps represent in a metaphoric way hydraulic systems composed by springs, eyes of water, wells, and other bodies of water united by small canals that interconnect them.

On the other hand we know that they were developed in the whole basin of Mexico from the Formative epoch (1500-100 a.C) (Palerm 1990), in Teotihuacan during the Classic period (100 a.C-600 d.C) continuous with the practice of handling the hydraulic systems since there have been detected sistems of well defined channels embedded on *tepetate* related with the San Juan river which supplied the vital liquid to the city. Petrogliphs that indicate directions, exist and perhaps they were used to indicate lines for the urban construction of Teotihuacan, these are the dotted crosses (Fig. 2). Among the interpretation that have been proposed there is the

[2]There exist data that there are certain rocks with symbols associated to eagles and jaguars; both animals being emblems of the two miliatry orders more prominent in Prehispanic societies. They were represented as diverse animals and even as rays, winds or fireballs that run at high speeds and move in wide spaces at will.



Fig. 3. Rock engraving of a miniature model, Tezcutzinco, Edo. México. Picture: Francisco Rivas Castro.

one made early by Mateo Wallrath, who identified the possible representation of the disintegration of a star supernova; that of 1054 A.D. Studies made by the archaeoastronomer Daniel Flores (2008) seem to confirm that these type of events may have been marked on those large basalt and andesite blocks.

These dotted crosses have a very wide distribution in all Mesoamerica and they continue to be studied by the archaeoastronomers.

During the Toltec time reception of water systems and hydraulic groups related with the river Tula that supplied water during centuries to this city have also been detected. On the other hand, other examples of the Postclassical period exist in Texcoco, in the hydraulic complex that constitutes the hill of Tezcutzingo, where water of these springs was brought from Metecatl hill, by means of the channel today known as *Caño quebrado al Tezcutzinco*. The group of terraces that surrounds to hills has been studied by Jeffrey Parsons (2002:54-59); it is interesting to mention that in fact on the periphery of Tezcutzingo, several engraved rocks with staggered elements associated were found, that can

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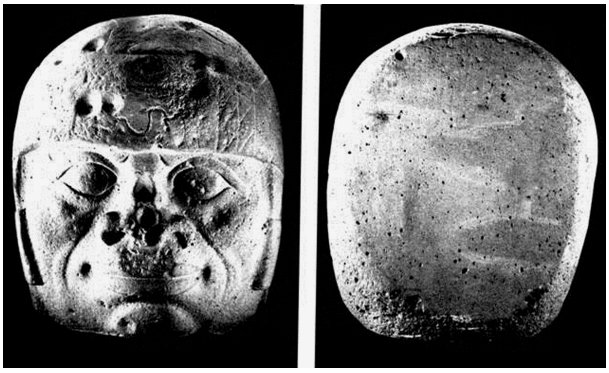
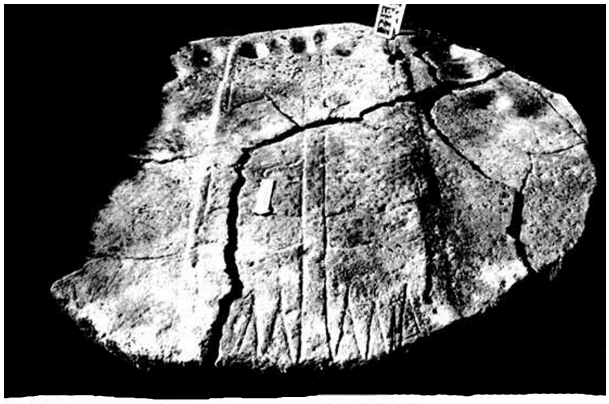
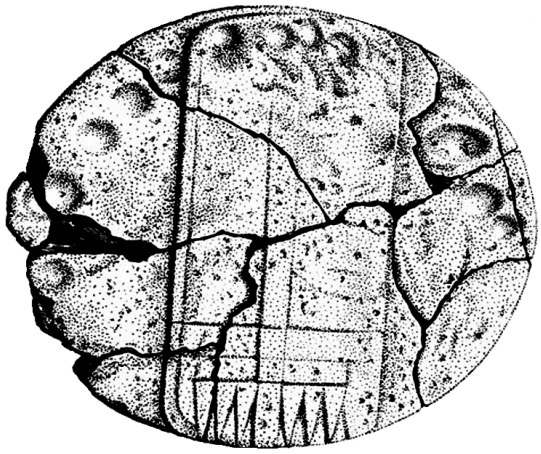


Fig. 4. Olmec head with *pocitas*.



77. Monumento 64 de San Lorenzo. Fotografía cortesía de Marie-Areti Hers.

Fig. 5. Olmec rock with engraved *pocitas*. On it a torch was further engraved. Monument 64, San Lorenzo Tenochtitlan, Veracruz. Picture: Marie-Areti Hers.



Monumento 64 de San Lorenzo.

Fig. 6. Drawing of Olmec rock with engraved *pocitas*. Monument 64, San Lorenzo Tenochtitlan, Veracruz.

be metaphoric representations of the terrace systems that surround the hills Metecatl and Tezutzingo (Fig. 3).

In Mesoamerica, the agricultural terraces and hydraulic systems had very early precursors as well as the use of both complementary techniques; this practice extended throughout historical several periods. Soon after the these practices for the agriculture, he/she always associated with the ritual and petition of fertility and abundance of water, I consider that the chronology of the appearance of engreved rocks with *pocitas* or *xicallis* and small canals exists from hunters' recollection times and in towns agricultural storms or sedentary.

The presence of engraved rocks with *pocitas* or *xicallis*, staggered terraces and small canals, apparently is more common during the Postclassical period (1100-1521 d.C) among the mexicas who copied many elements; they conserved and reutilized many elements of old origin, where dotted crossings of the teotihuacan time possibly existed. These examples need to be to analyzed carefully, since "dotted crossings" exist as the examples in situ of the archaeological place of Calvario on the hill of Cocotitlan reported by Melendez (2007:98-99).

3. CHRONOLOGY OF THE CANALITOS OR XICALLIS

The analysis of the circular puddles made in model miniature engraved on rocks, is very relevant for its constant relationship with the petiton of water and rain. These rocks from the time of the Olmecas (Early Preclassic period 1500 A.D.) once were related to the rulers, ball players and the priests, because they are found associated to several monumental heads and also isolated on basalt blocks in the contexts of cities of this period (Figs. 4, 5 and 6).

The pocitas or xicallis were also used as instruments (gnomons) to measure the positions of the sun in the horizon calendar like it has already reported it Broda and Galindo, the most tacit example is in the trail of Cuicuilco, which has a pocitas or xicallis in its higher portion (Fig. 7).

There are many engraved rocks associated to Prehispanic structures, in groups of terraces, not only associated to farming of corn, beans or pumpkin, but also there are recorded examples near places for the recollection of salt, as those studied thoroughly by Hernandez (1989;2008). On the other hand they have also been found forming a group or accompanied with other small designs in stone (Fig. 8).

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Fig. 7. Rock with engraved pocitas, San Lorenzo Tenochtitlan, Veracruz.



Fig. 8. Stela (gnomon) at Cuicuilco, D.F. Picture: Francisco Rivas Castro 2008.

4. CALENDARIC AND ASTRONOMICAL FUNCTION

As Zimbrón has already reported "...On the most southern part of the American continent, there is a place known as El Encanto at La Serena, Chile. There is a group of flat stones on which several conical puddles were sculpted that fill with rain water; some of them are united by small canals, in one of them, it appears that some investigators have identified a tail of the Scorpio constellation and the Southern star..." (2008:400).

In Peru, in the well-known place as Chavin of Huantar, the archaeologist María Scholten (1982, Vol III: 23), mentions "the existence of a rock, recovered a long time ago near the Southwest corner of the Main square of Chavin. On it, seven 'wells' have been carved, of which we reproduce an 'aerial picture' taken by Germán Costa. If one speaks of 'seven', and of enigmatic things, it is possible to think of the relationship of these wells with the 'Seven Nanny Goats', name given by the Spaniards to the Pleiades. Most surely that is the reason that in the town of Chavin they designate this rock as *Chinchay*, name that is used to refer to the Pleiades constellation." (Zimbrón 2008:400) (Fig. 9).



Fig. 9. Stairway with engraved *pocitas* in its upper section. Tejupilco, Estado de México. Picture: José Isabel Rivero Hernández, 2008.

5. THE ENGRAVED ROCKS *POCITAS* AS MIRRORS TO OBSERVE THE FIRMAMENT IN PERU AND COLOMBIA

The same as many cultural elements that their use and symbolism have not been understood, "the stones with tacit so extended in the whole Andean area from the norcolombian territory to the Argen-

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Fig. 10. Choque Chincay, Chavin de Huantar, Perú.

tinean south, and whose intrinsic relationship with water has not yet has been clarified, different proposals exist... as those of Raphael Girard... who says that the natives conceive them as source of magic attraction of rain, or as mirrors with astronomical purposes. Both proposals do not exclude each other, but they are not yet well based. As Granda says: It is "in my judgement, it is probable the two forms exist, and some rocks with tacit were bound to the petition or request of water and others much more elaborate and located in very strategic places served as mirrors to analyze the firmament" (1998:12)[3].

In South America puddles of this type, were also carved in the rocks denominated as: Moyitas in the archaeological place of Lavapatas located in San Agustín, Colombia. They are also located in figured rocks of Sayhuite and Abancay, Peru.

> "These sources, composed by numerous ponds or cisterns, cascades, small channels traced in diverse directions and wells or '*moyitas*' in the borders, through them water runs forming a group of extraordinary beauty, they are *pacchas* carved in the rocks."

In the Peruvian east, the sacred utensil or water pitcher is known as paccha *mama*, or *patcha* that means: Moon, jet or stream of water according to Carrion (1955: 56 and 89) (mentioned by Zimbrón 2008:390) (Figs. 10 and 11).

6. ROCKS WITH PETROGLYPHS AND POCITAS OR XICALLIS IN THE BASIN OF MEXICO

On the hill of the Grua, in the outlying region of the sanctuary of the virgin of the Remedies, we report the existence of a petroglyph that represents the constellation of *Xonecuilli* curved knife of obsidian - that perhaps represents the constellation of the Seven Little Nanny Goats (Rivas Castro and Leticia Garcia 2002:61-72). This same constellation was represented on the edge of the stone of the sun, to-

[3]Granda tells us that these hypotheses "Are in the work by Raphael Girard: History of the Civilizations Antigua of America, T.II., page. 76. However, when consulting the mentioned text, the page numbers do not correspond with the volume II of the 1976 edition.



Fig. 11. Spring and engraved rocks at Lavapatas, San Agustín, Colombia.



Fig. 12. Rocks with moyitas and channel, Kenko, Perú.

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Fig. 13. Petroglyph at cerro del Cabrito, Naucalpan, Estado de México.

gether with the Pleiades and the constellation of *Mamalhuaztli* that perhaps represent the constellation of Orion and that of Santa Cruz Acalpixcan, where is associated to nightly aspects and with Venus like the star that also announced the rains to propitiate the emergence of corn, the relationship: Venus-rain-corn has been broadly documented in the works of the archaeoastronomer Iván Sprajc (1996) (Figs. 12 and 13).

In the Moctezuma hill, located in Naucalpan de Juarez, State of Mexico, a great petroglyph exists, where it possibly represented Venus, and the 104-year count (Rivas Castro 1997) (Figs. 14 and 15).

The iconography that this petroglyph imply, refers to other examples of Xochicalco, related with sea stars, emblems of Venus in several contemporary graphic contexts, such as the Venus glyph of the masculine and feminine characters, painted in two jambs of the red temples of Cacaxtla, where the association of Venus with the scorpion can be clearly seen (Fig. 16).

It is probable that also the count of the numerals that were carved in this example -52- twice, allude to the Venus 104 years synodic cycle (Fig. 17).

In the Judío hill (in prehispanic times called Mazatepetl), of San Bernabé Ocotepec, in Magdalena Contreras' region, also exist two elements



Fig. 14. Xonecuilli, petroglyph at Santa Cruz Acalpixcan, Xochimilco, D.F. Xochimilco Archaeological Museum. Picture: Daniela Peña Salinas, 2015.



Fig. 15. Petroglyph of Moctezuma hill, Naucalpan, México. Picture: Fernando Botas Vera, 1998.

that refer to astronomical observations: the double scroll and ilhuitl, the glyph of the day (Fig. 18).

7. THE GLYPH OF THE DAY

This glyph is designated in Nahuatl with the word *ilhuitl*, translated by Molina like: a religious festivity or any day of the week. The glyph is composed by two long scrolls that end up in a circle; each

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Fig. 16. Sea star, Xochicalco, Morelos. Cuahucnahuac Museum. Casa Cortés Museum. Picture: Francisco Rivas Castro.

one in oppsing the other, which denotes constant motion. Vega Sosa explains that this symbol is a more complex variant of the unfolded double spiral which divided in two sections establishes the relationship of the movement of the sun and the earth that generate the day and night (Vega 1979).

8. THE E DOUBLE SCROLL GLYPH

About this glyph, Charles Ross, denominates the double spiral "the shape of the year", he considers the above due to some petroglyphs located in the Fajado Butte site, belonging to the Chaco culture and that it represents the solstices and equinoxes, according to the following ethnographic information

- "... The year Shape, Reversing its spiral from winter (left) to summer (right) and straightening around the beginning of spring. The difference in the curvature of the two spirals is drawn by the apparent seasonal drift of the sun and the change of speed of the earth in its orbit". (Cited by Vega, 1984:156-157)

Vega, in turn also establishes that this glyph of the spiral double is the abstract representation of the movement that defins the relationship of the movement of the sun and the earth to generate the day and the night (op.cit 1984) (Fig. 19).

Another interesting aspect of this archaeological site, is that in it a sculpture was engraved in the



Fig. 17. Venus scorpio pair, Cacaxtla, Tlaxcala.

basic rock, in front of the main temple; this element refers to the relationship that exists between the turtle and the jaguar like the surface of the earth, represented by the shell of this animal and the characteristics of the jaguar, since it has tail and jaguar claws. We know that the jaguar skin was a metaphor of the starry sky, and this why this iconographic and symbolic association is interesting. In front of the jaguar-turtle sculpture of the hill Mazatepetl, I observed a small pocitas or xicallis; for its size, of 10 cm diameter, I consider that it was used as recipient to place selfsacrifice blood, or to pour another sacred liquid, like water, or pulque, as offerings. On the other hand, from the data of the orientation of this sculpture, and the chronology of the place, and from a computer program that deploys the sky toward the year of 1500 A.D., indeed it is possible to recognize the constellation of Orion as it appeared on early June on the west of the archaeological site.

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Fig. 18. Petroglyph of the twins, Bilbao, Santa Lucía Cotzumahuapa, Guatemala. (600 d.C). From de Duverger.



Fig. 19. Ilhuitl (the day) glyph, Judío hill, San Bernabé Ocotepec, D.F. Picture: Francisco Rivas Castro.

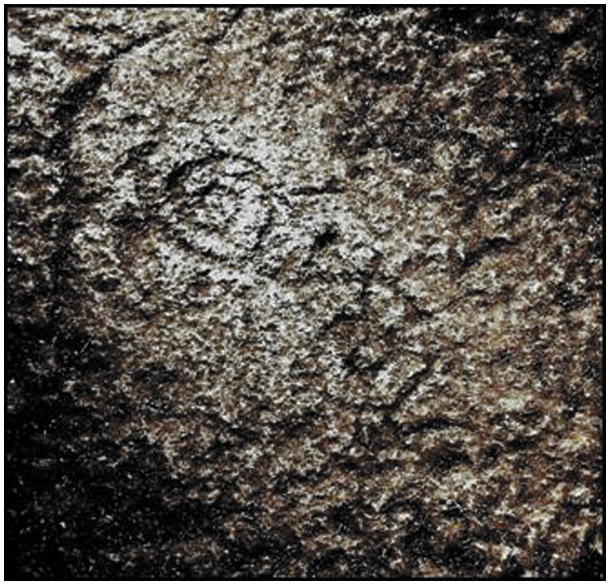

Fig. 20. Petrogglyph de of double scroll, Judío hill, San Bernabé Ocotepec, D.F.



Fig. 21. Jaguar-turtle sculpture at Mazatepetl hill, D.F. Picture: Francisco Rivas Castro.

Finally, it should be mentioned that it is in fact June 11 when patron saint in the region where the Mazatepetl hill is located, San Bernabe Ocotepec, is worshipped. Evidently there is a relationship between the cult to the jaguar-turtle with San Bernabe and the turtle, a metaphor of the earth, mother of the corn, with Maria Magdalena, another patron saint of the region; because formerly the region was named Santa Maria Magdalena Atlitlic, and the observation

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Fig. 22. Engraved Pocita under the head of the jaguar-turtle sculpture at the Judío hill (Mazatepetl), San Bernabé Ocotepec, D.F. Picture: Francisco Rivas Castro.



Fig. 23. Petroglyphs of pocitas with little channels, Judío hill.

of the constellation of Orion that announced the full escalation of the rains, that allowed the corn and the useful plants of the cornfields to mature fully (Cfr. Rivas Castro, 2001; 2005) (Figs. 20 and 21).

On the other hand, upon observing the drawing on the rock with most puddles of the Mazatepetl hill (located behind of the main mound of the site), we find certain similarity with the stars of the Orion belt; let it rest as a working hypothesis that requires to be checked with direct observations in the water mirrors that form in these *pocitas* or *xicallis*, a probable observation of the Orion belt, at the beginning of June (Figs. 22 and 23).

9. SOME PETROGRAPHY REFLECTIONS AND THE STARS

The previous examples that are present in petrographs of the basin of Mexico indicate us that those symbols were important part of the practices of astronomical observation, because they were worked in specific places where constellations and bright stars like Venus or Orion belt were observed. These elements were of supreme importance for the daily life, and for those that held the knowledge and the priesthood, because they indicated special events for the



Fig. 24. Drawing of a group of pocitas on an engraved rock at Judío hill, San Bernabé Ocotepec, D.F. by Miguel Pérez Negrete, 2000.

agricultural practices of the seasons; as well as to cultivate useful plants to the men.

There are more proposals such as those that indicate that other important events were recorded in the petrographs, such as the explosion of supernovas (Flores Gutierrez 2008) and perhaps eclipses that related radical changes in the life of the humans and the animals and that also were omens of famines or misfortunes for wars and conquests. It is interesting to mention that still in the codex's of the early XVI century (*Telleriano Remensis* for example), the *tlacuilos* continued painting comets, eclipses and astronomical events associated to military displacements, to famines and to epidemics, which is the reason why we can infer the importance that had for these towns the astronomical observations associated to the prediction and prevention of disasters.

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REFERENCES

Duverger, Christian. 2000, "Mesoamérica. Art and Anthropology". Banks Inverlat and Scotiabank, Mexico, form in France

Flores Gutierrez, Daniel J. 2008, "The supernova of 1054", in Review of Mexican Archaeology, No. 89, Tlatelolco, their history and Archaeology, January-February of 2008, pp.14. CNCA-INAH, Editorial Raíces, Mexico

Hernandez Rivero, José. 1989, "The Prehispanic monolithic scale model of Tejupilco". Article published by autor, Melchor Ocampo, Tepotzotlán, Mexico

Granda Peace, Osvaldo. 1998, "Myth and Prehispanic Art in Andes". Latin American Institute of Aesthetic Investigations, University of Nariño, Ability of Arts, Mexico

Melendez Garcia, Adan. 2007, "Cocotitlan of Prehispanic of sanctuary of The landscape of high rail of in of permanency", Ritualidades of and of party in. Archaeology read Anthropology of religions, vol II, and. Patricia Fournier Walburga Whiesheu of and, coordinators, ENAH, Mexico, pp.93-108

Palerm, Angel. Hydraulic Prehispanic "works in the lacustrine system of the valley of Mexico", in Carmen Viqueira, publisher, Prehispanic Mexico, tests have more than enough evolution and ecology (Regions), National Council for the culture and the arts, General Address of publications, Mexico, pp. 185-243

Parsons, Jeffrey. "Hydraulic Engineering in Acolhuacan", in Mexican Archaeology, Vol., Not.58. Nezahualcoyotl. Huey Tlatoani of Texcoco to 600 years of their birth. Series History of the Archaeology in Mexico, VII, Mexico

Rivas Castro, Francisco. 1997a, "A petrograbado with astronomical possible significance in Otoncalpulco, Naucalpan, State of Mexico", in Review Cuicuilco of the National School of Anthropology and History, New time, vol. 5, Not 12, January-April, pp.109-126

_____. 2001. "Discovery of a monolithic sculpture in the hill Mazatepetl (The Jew), Magdalena Contreras, D.F", In Review of Archaeology, second time Not 28, pp. 131-135. Archaeology Coordination, INAH, Mexico

_____. 2006, "The ritual landscape of the occident of Mexico, VII-XVI century: An interdisciplinary analysis". Doctorate Thesis in Anthropology, ENAH, Mexico

Rivas Castro, Francisco and Lechuga García, Carmen. 2002, "Representation of a constellation in a petrograbado of the hill of the Kid, Naucalpan, Mexico", in Mexican Iconography III. The representations of the stars. Scientific collection, No. 442, pp. 61-72. Beatriz Barba de Piña Chan, Coordinator, Mexico

_____. 2005. "Syncretism of th e deity ocelot-turtle (Prehispanic), with San Bernabe (colonial), Magdalena Contreras, D.F". In Anthropology of the Religions. Patricia Fournier and Walburga Whiesheu (Coordinators). CONACULTA-INAH, CONACYT, ENAH, Mexico, pp. 93-114

Ross, Charles. "Sun Light convergence, solar burn" in Arcahaeoastronomy, Vol, III, number I, pp.43

Sprajc, Iván. 1996, "Venus, rain and corn: symbolism and astronomy in the Meso-American cosmovision", Mexico, INAH, scientific Collection 318

Vega Sosa, Constanza. 1979, "Analysis and interpretation of some glyphs of Aztec style vessels" in Symposium has more than enough problems in the iconography of the Meso-American art Postclassical, XLIII International Congress of Americanistes

_____. 1984, "The course of the sun in the glyphs of the Aztec late ceramic" in Studies of Culture Nahuatl, No. 17, UNAM, Institute of Historical Investigations, Mexico, pp.125-170

Zimbrón, Rafael. 1992, "The crosses dotted in Santa Cruz Acalpixcan, Xochimilco" In: Notebooks of Meso-American Architecture, Not 19, pp. 59-74. Mexico, UNAM, Graduate Degree in Architecture and Architecture Ability

Zimbrón Romero, Rafael. "Replicas in miniature Of the landscape and pocitas carved in stone of Xochimilco and High Cornfield. The sacred of region of with looseness Xochimilcas". Thesis of Master in History-Etnohistória, National School of Anthropology History, SEP., Mexico