

# FAMSI Final Report: Cliff Paintings of Parangaricutiro, Michoacán, México

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1.1 Cliff Paintings: Panel A  
Photo: © Gabany-Guerrero

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## ABSTRACT

Central–West Mexico, perhaps best known for the Late Postclassic Tarascans, has long been an anomaly in Mesoamerica. This region has frequently been omitted from classification within Mesoamerican patterns of material culture (Chadwick, 1971). Still a region of intense volcanic activity and sparsely documented biodiversity, the temperate rainforests in the highlands of Michoacán have harbored few archaeological studies in the more than 75,000 km<sup>2</sup> once under the territorial control of the Late Postclassic Tarascans. Studies of this region have concentrated on the border with the Aztecs to the east (Pollard, 1993), the Teuchitlan complex to the northwest (Weigand, 1996), the ancient center of Zacapu (Carot, 1996) and the core Lake Pátzcuaro basin (Pollard, 1993). With the majority of studies focused on Maya (Miller, 1997; Stone, 1995) and Aztec civilizations (Smith, 2001), there is an unmistakable gap in information regarding the Tarascan civilization and its predecessors in scholarly work on Mesoamerica. This study provides documentation for iconographic and material remains for a site in the highland region of Michoacán and has the potential to provide evidence for long-term shared cultural and material systems with Mesoamerica.

Although several early colonial codices exist from the Tarascan region, pre-Columbian codices and Mesoamerican iconography in paintings are unknown. This research project focused on a highland cliff painting site in the foothills of the Tancítaro volcanic range, near the volcano Parícutin (eruption, 1943). An interdisciplinary team of researchers studied a series of layered cliff paintings and accompanying artifacts located in a caldera in this highland volcanic region. Located at approximately 2500 m asl., the paintings found on eight of the inner cliffs of the caldera present examples of Mesoamerican iconography. Mesoamerican motifs (including personages and deities) predominate on the principal panel. In addition, archaic motifs (hunters/dancers and animals) are distributed throughout the cliff walls.

Lithics, a small number of ceramics, and human and animal remains, were excavated from test pits beneath the cliff paintings. The discovery of a burial in a test pit below one of the cliff paintings suggests that this site was of ritual importance. The stratigraphy of the site indicates two principal periods of ritual use: 1) a deer antler tool, on a cliff shelf buried beside paintings demonstrating Classic Period iconography, was dated to the Classic Period (calibrated BP 1610 to 1530); and 2) three bone collagen samples from long bones of human remains returned Late Archaic Period dates (calibrated BP 4520–4290, 4510–4480, and 4440–4260). Dating of human remains from this site would place it as the oldest known burial from Central–West Mexico, predating El Opeño burials by approximately one thousand years (Noguera, 1931; Oliveros, 1975).

Arnould, Metcalfe, Petrequin (1992) have discussed climatic changes resulting in drier climates for the Late Holocene in lowlands of Zacapu, Michoacán. Their results coincide with studies documenting similar conditions during the same period in the Central Basin of Mexico (Buckler, Pearsall, Holtsford, 1997). The results to-date from the Alberca research project suggest a hypothesis that high-altitude environments in Michoacán, such as calderas rich in aquatic resources, could have served as critical habitats for humans and wildlife during the Late Archaic, when dry environmental conditions persisted in the Western Hemisphere. Thus, the sparse data for the Late Archaic in Central–West Mexico may be due to the lack of research in appropriate ecological zones.

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FAMSI Final Report:  
La Alberca, Nuevo Parangaricutiro, Michoacán, México

Project Director  
Tricia Gabany-Guerrero, Ph.D.

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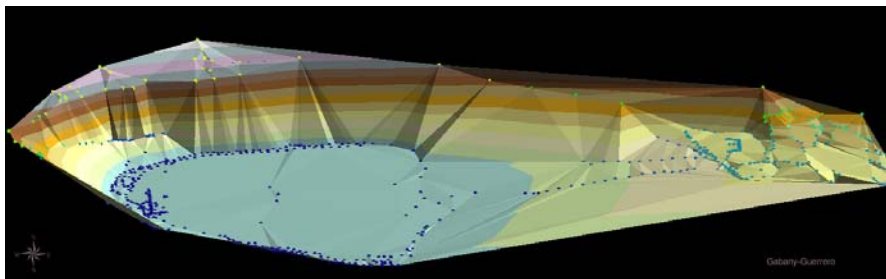
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## Research Summary

### Description of La Alberca

This research project focused on a highland cliff painting site in the foothills of the Tancitaro volcanic range, near the volcano Parícutin (eruption, 1943). An interdisciplinary team of researchers studied a series of layered cliff paintings and accompanying artifacts located in a caldera in this highland volcanic region. Located at approximately 2500 m asl., the paintings found on eight of the inner cliffs of the caldera present examples of Mesoamerican iconography. Mesoamerican motifs (including personages and deities) predominate on the principal panel. In addition, archaic motifs (hunters/dancers and animals) are distributed throughout the cliff walls.



### 1.2 Map of La Alberca (3D)

Graphic: Guerrero-Murillo, © MEXECRI, Inc.

According to the geologists' reports, Dr. Wendy Bohrsen and Dr. Lisa Ely (Central Washington University), the caldera, La Alberca, was formed approximately 10,000 years ago (BP) during the Holocene. In the Meseta Purépecha (or Tarascan Highlands), volcanoes are very common, but until this study calderas have been poorly documented. The caldera Alberca is a basin where water accumulated during the annual rainy season to create a temporal pond that every five years could have been semi-permanent. The caldera is bordered by high basalt cliffs where lava can clearly be seen.

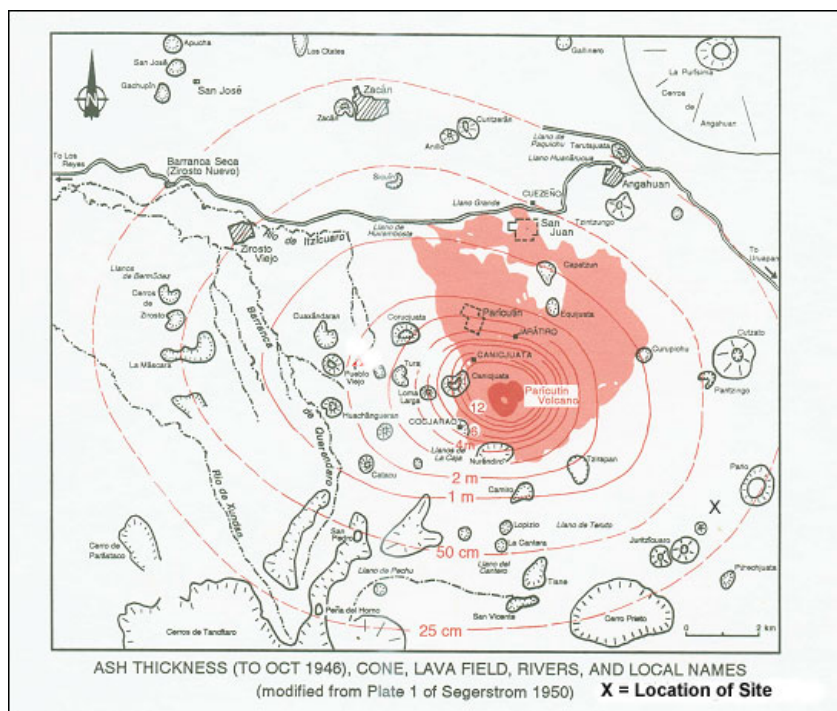
The cliffs rise more than 40 meters surrounding the basin. There is only one accessible area for human entrance on the east side of the caldera. On this east side, there is a natural spring issuing from the cliffs. Currently, the cliffs surrounding the basin contain vegetation typical of the area after the eruption of the Parícutin volcano (1943).



### 1.3 La Alberca

Photo: © Hernández Cotera

The eruption of the Parícutin volcano had a more severe impact on this site than the researchers expected. A report published by Foshag (reproduced by Luhr and Simkin, 1993) described the accumulation of volcanic ash deposited by Parícutin between 1941-1945 and estimated that less than one meter accumulated in La Alberca. This excavation was planned based on Foshag's report, regarding the ash depth at the site, in order to project the timeframe. Once test pits were excavated in the caldera basin and beneath the cliff paintings, we discovered a very different depositional and sedimentation history.



#### 1.4 Parícutin Ash Predicted on Site in 1946

Source: Luhr and Simkin, 1993

The lowest part of the basin located directly in front of the cliffs containing the paintings is extremely flat, with less than .25 meters of variation in elevation. The two test pits (3m x 3m x 3m) in the basin revealed an extremely fast rate of sedimentation caused by the flow of Parícutin ash into the basin.



#### 1.5 Dr. Bohrson in basin test pit

Photo: © Ely

This permitted the researchers to observe, with great detail, the record of depositional layers formed in the past 60 years because they were not destroyed by plant roots or animal tunnels. According to Dr. Ely, this record provided a good sample of how frequently and how deeply the basin filled with water, because the thin layers were buried and preserved before they were destroyed by later water flows. One objective of the test pits was to document the paleoenvironmental record of the caldera, but after 3 meters of excavation we were unable to reach below the Parícutin ash layer in the timeframe allotted. At this point, we stopped the basin excavation and took ash samples from each layer to confirm that the ash pertained to the Parícutin volcano. Given the conditions of the caldera, Drs. Ely and Bohrson formed the hypothesis that La Alberca represented a stable and semi-permanent source of water from the Holocene to the present that could have provided an ideal habitat for wildlife including migratory birds. The study by Arnould, Metcalfe and

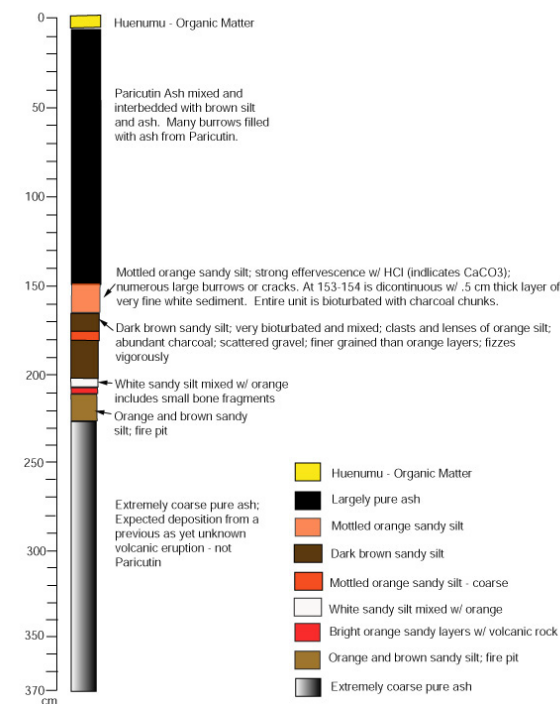
Petriquin (1992) illustrates that severe drought plagued human settlements in the lowland Bajío of Michoacán (extending to the Colorado River in the U.S.) during the Holocene. This project proposes the hypothesis that humans may have searched for more humid climatic conditions in high-altitude calderas of Michoacán in order to survive.

Dr. Christine Hernández (Tulane University) trained the *Comunidad* workers in excavation techniques, selected excavation methods most appropriate for the site (based on Flannery, 1986), examined ceramics from other sites in the local region and participated in the first phase of the excavation in test pits 19-22.

Dr. Helen Pollard (Michigan State University) provided expert consultation regarding test pit strategies under the cliff paintings and potential settlement sites within the study area. Based on her recommendations, surface surveys and test pits are planned at several of these locations in order to determine if they are residential zones affiliated with the ceremonial/ritual cliff painting site.

The stratigraphy of the test pits beneath the paintings revealed a more complex history than expected. Test pit 27, located directly beneath the principal panel of paintings, revealed two volcanic ash (tephra) layers. The first layer extended to a depth of 1.5 meters. Beneath this ash barrier several layers of soil demonstrated elements of human occupation (indicated by obsidian flakes and faunal remains). Beneath these layers we found a large-grained volcanic ash layer of approximately 1.5 meters. Samples from both ash layers were sent to Dr. Anthony Newton, geophysicist at the University of Edinburgh, Scotland. He analyzed the samples and determined that the first layer of volcanic ash pertained to Parícutin and the second layer of ash pertained to another eruption which is currently undocumented. There is no known historical record (Spanish or Tarascan) regarding volcanic eruptions in this region of Michoacán; our hypothesis is that the second layer of ash represents an unknown prehistoric volcanic eruption in the Alberca region. Dr. Newton plans to finish the tephra studies of the region during the 2003 field season.

**Quadrant 27 - Adjacent to Cliff Paintings**

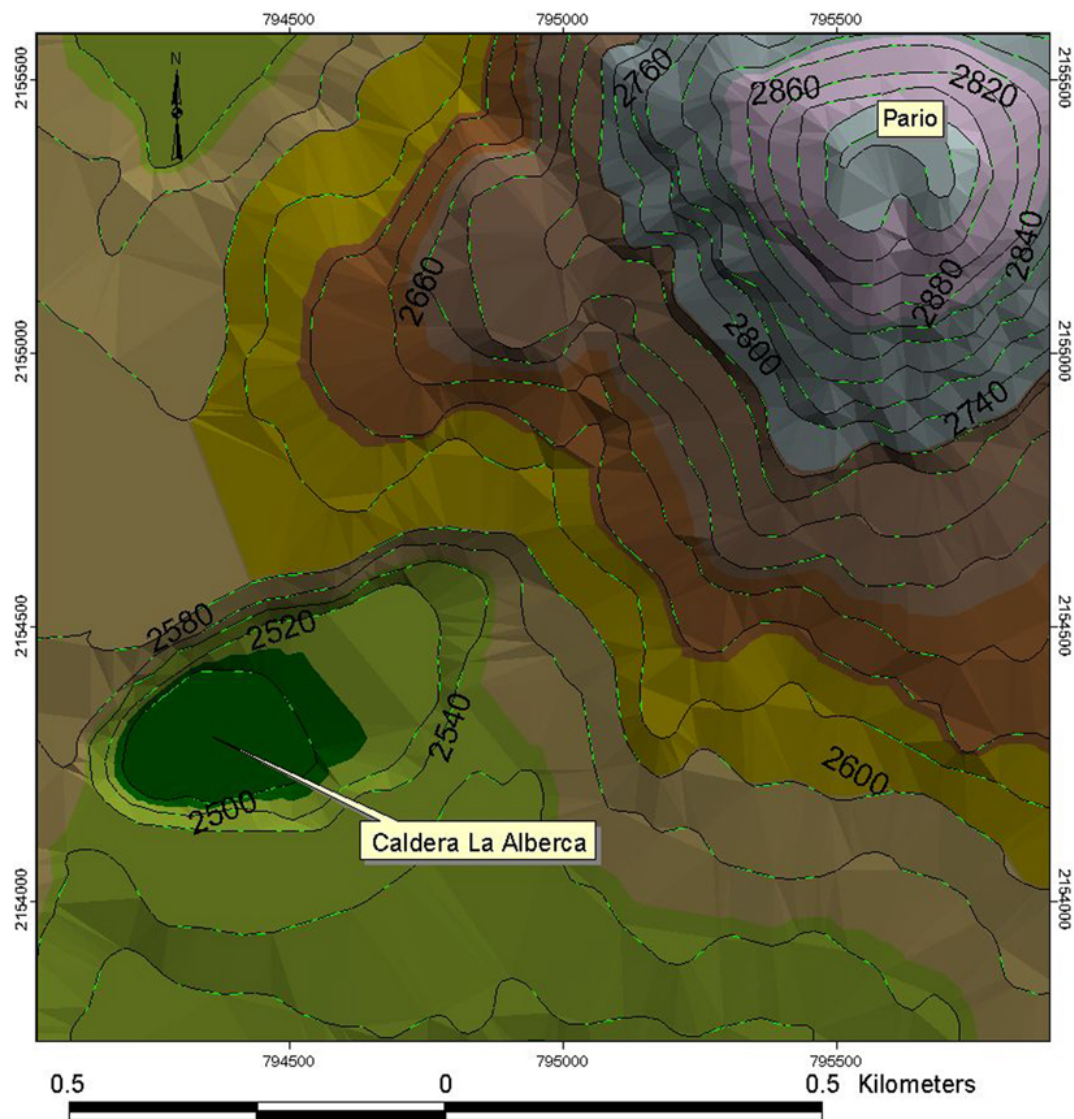


**1.6 Detail of Test Pit 27**

© MEXECRI, Inc.



### 1.7 General Map of La Alberca



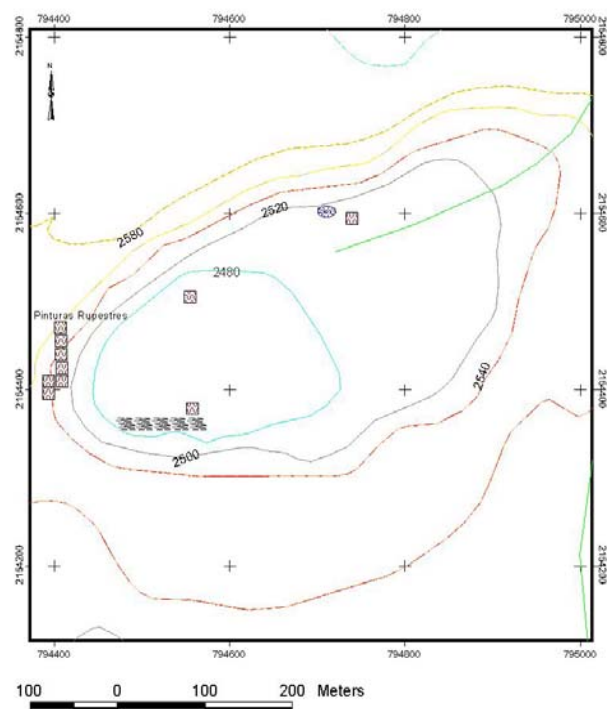
## Sitio La Alberca

Localizacion en  
El Municipio de  
Nuevo Parangaricutiro  
Michoacán, México



Diseño: Dra. Gabany-Guerrero





### 1.8 Excavation Plan 2002

Graphic: Gabany-Guerrero, © MEXECRI, Inc.

### Human Occupation of the Cliffs

The cliffs on the north side of the caldera formed a cliff overhang, which could have protected humans from the climate. For example, in the high-altitude temperate rainforest this formation provided an area that remained practically dry due to the position of a rock overhang.

In contrast to the rest of the caldera, the cliffs with paintings are extremely smooth. The natural properties and protection of the cliffs facilitated their use for paintings and probably ritual practices. At this point, it seems

### Plano General del Sitio La Alberca Excavación 2002

- Fosa de Prueba
- Charco Temporal
- Nacimiento de Agua

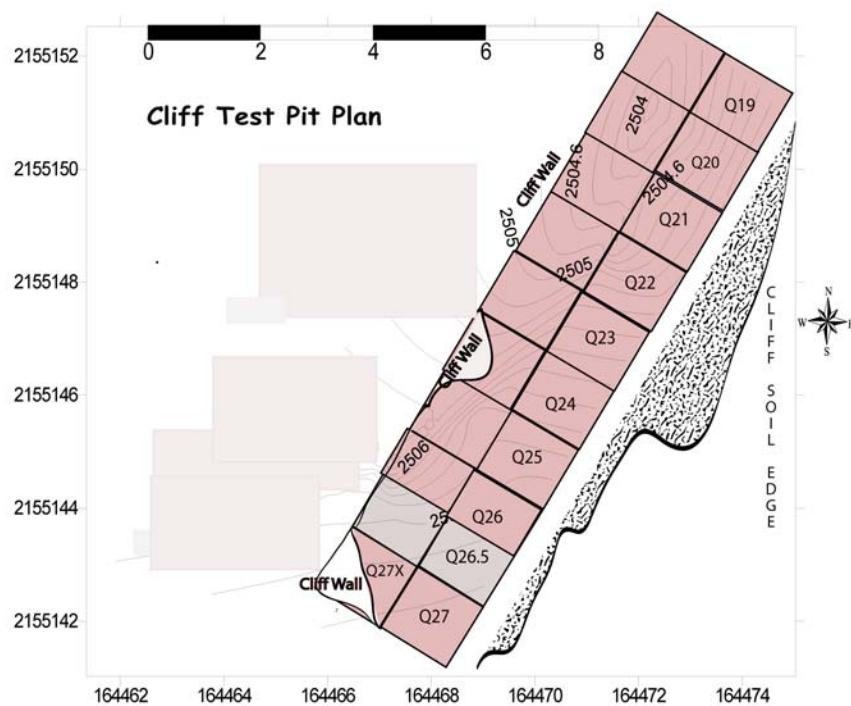
Diseño: Dra. Gabany-Guerrero



### 1.9 Test Pits at Cliff Paintings

Photo: © Hernández Cotera

improbable that prolonged prehistoric human settlements will be found in the caldera due to frequent flooding documented in the basin test pits. In addition, the research team conducted a detailed mapping survey in the caldera basin in order to search for probable settlement areas. More likely, perhaps, are settlements on the outskirts of the caldera where there was less risk of flooding. The timeframe for this field season prohibited a more general field survey outside the caldera de determine possible sites associated with La Alberca.

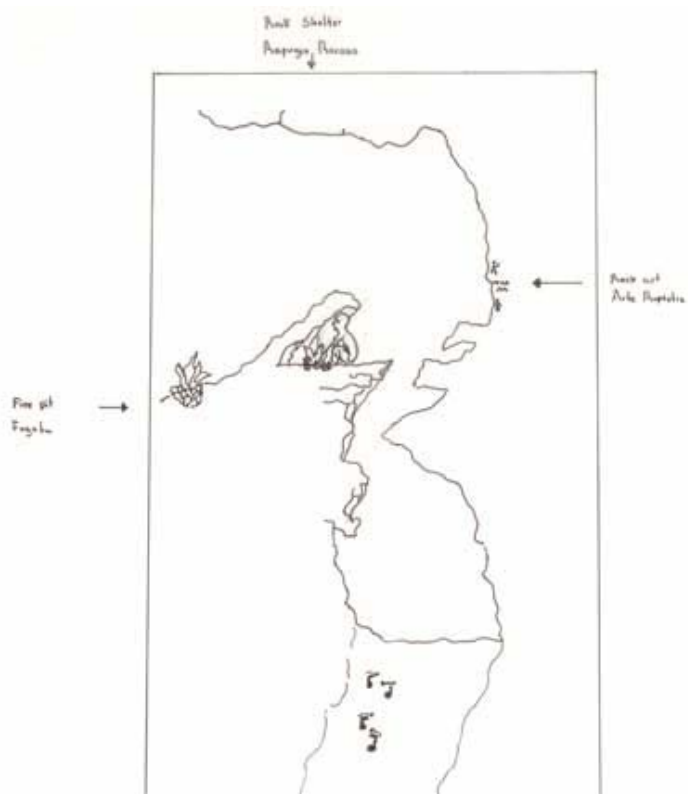


2.1 View of the Cliffs

Photo: © Ely

## 2.0 Test Pit Plan at Cliff Paintings

Graphic: Gabany-Guerrero, © MEXECRI, Inc.



2.2 Artistic Representation of the Cliff Painting Panel A Quadrant approximately 4500 years ago.

Illustration: Minea Armijo Lasso, © MEXECRI, Inc.

beneath the paintings. Further DNA and chemical studies of potential paint remains on artifacts have yet to be conducted.

As part of the survey, a detailed map was created of the cliff paintings. This map can be combined with detailed photographs using standard lenses, color filters, infrared filters and infrared film. A digital camera was also used in to document the paintings. The results of these photos are still being analyzed and cataloged in order to create a master plan line drawing of all the paintings on the cliffs. In order to confirm these results it will be necessary to return to the site in 2003 as the 2002 study was interrupted by severe rains in the caldera.

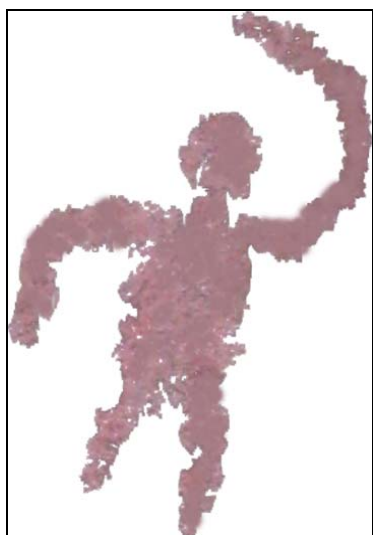
The iconographic analysis will include a reproduction of the painting orientations and distribution along the cliff walls. In addition, the pigments will be studied once permission is received for this analysis from the Consejo Nacional de Arqueología. Up to this point, the research has revealed two types of paintings that differ both in style, color and perhaps, materials. The “white” paintings appear to be produced from a mixture of lime with other pigments; the “red” paintings appear to be of red ochre or cinnabar. The “red” paintings illustrate a more archaic style, while the lime-based paintings display Mesoamerican motifs. Before further conclusions can be drawn, it is necessary to complete the biochemical and iconographic studies planned for 2003.

### Iconography

Based on the findings from this first field season, the cliff paintings could not yet be directly associated with the artifacts found in the test pits



2.3 Vista a la caldera desde Los Riscos  
Photo: © Hernández Sánchez



2.4 Sample of red paintings (Photoshop analysis)  
Graphic: Armijo Lasso, © MEXECRI, Inc.



2.5 Samples of lime-based paintings (Photoshop analysis)  
Photo: © Gabany-Guerrero



2.6 Line drawing of lime-based paintings  
Illustration: ©Gabany-Guerrero

## Test Pits at Cliff Paintings

The test pits located at the cliff paintings revealed information critical for beginning to understand the site. The Parícutin eruption was clearly revealed as a demarcated and dense layer of ash during the excavation. Above this 1943 ash fauna remains indicated that this site was more recently occupied by eagles, falcons and rodents. Surprisingly, we also found an obsidian arrowhead, close to the surface, in the first layer of Parícutin volcanic ash; this discovery led to the conclusion (by Dr. Christina Hernandez) that the obsidian artifact had most likely fallen from the cliff above.



2.7 Francisco Barajas Pascual (member of La Comunidad Indígena de N.S.J.P.) displays an obsidian arrowhead.

Photo: © Hernández Cotera

In the test pits beside the largest panels of cliff paintings, below the level of Parícutin, fire pits and charcoal were found. Several natural rock shelves on the cliff face would have provided support for artists to paint the cliff walls. In the corner of Panel A cliff painting we excavated a round lithic with a thumb orifice that could have served as a tool in creating the paintings. Di Peso, Renaldo y Fenner (1974) described a similar lithic and

described it as a smoothing or polishing rock. This rock was found beside a deer bone on the cliff shelf. The results of a C14 study dated the deer bone to between AD 480-520 (calibrated).

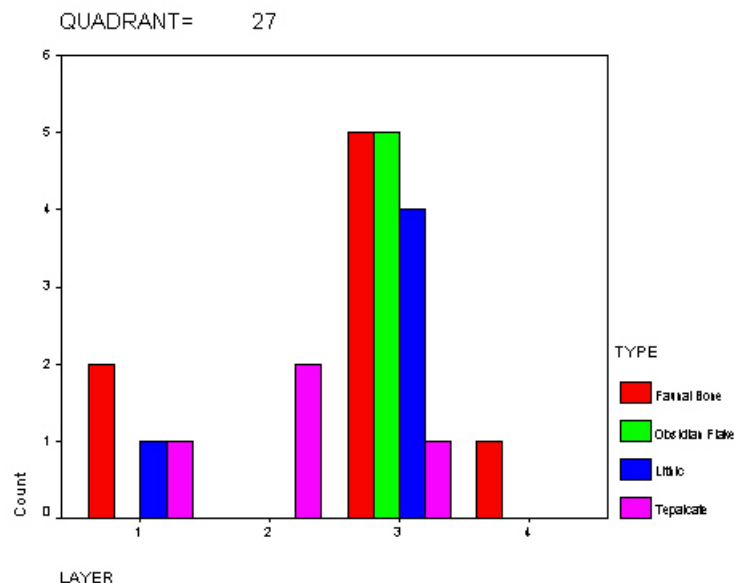


2.8 Round basalt lithic

Photo: © Armijo Lasso

The artifacts (virtually all lithics), human and faunal remains were registered and cataloged. The final report was provided to the Consejo Nacional de Arqueología in addition to a request for permission to continue studying the artifacts with other chemical studies.





### 2.9 Sample Results for Quadrant 27

© MEXECRI, Inc.

#### Burial

In the test pits in front of Panel A two large boulders were discovered (more than five tons each), which prohibited further excavation. Upon attempting to remove the upper boulder in order to close the excavation securely, a fractured human cranium was uncovered directly in front of Panel A; the burial was located directly above the second large boulder. Once the cranium was exposed it was decided to excavate the skeleton to prevent further damage and to avoid natural disintegration caused by the impending torrential rains during the rainy season. The discovery of the burial and its orientation (head-west; feet-east) in front of the paintings provoked the hypothesis that this was perhaps a more important ritual or ceremonial site than previously considered. A small obsidian chip was found the soil where the spinal column would have been located. No

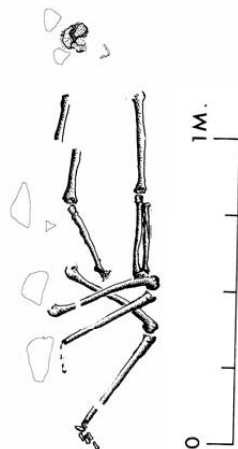


3.0 Burial Location

Photo: © Gabany-Guerrero

ritual objects were found with the burial. Presentation of results are pending osteological studies. The skeleton was supported by rocks behind the neck, spine and feet so that the body would not roll back on the boulder below (the skeleton was placed directly on the boulder below at an angle). Also, the rocks were part of small fire pits probably used as ritual fires. Carbon samples were collected from within the jaw and from the thin layer of soil between the skeleton and the boulder. Because the bones were extremely delicate, only the long bones, bone fragments and the complete set of teeth from the lower mandible were recovered.





3.1 Illustration of Burial

Dibujo: © Gabany-Guerrero

Soil samples from the burial and burial area were collected for flora and fauna analysis. These studies are still pending. Nevertheless, the results of C14 dating (AMS) have revealed that the long bones are approximately 4500 years old (see chart).

The obsidian samples from test pits were analyzed by MURR lab to determine their provenience. The results indicated that the obsidian artifacts from the burial test pit correspond to Pénjamo, (Guanajuato), Cerro Varal (Michoacán), Zinaparo (Michoacán) and Ucareo (Michoacán). The diversity of provenience and antiquity of the site may lead to further studies regarding the obsidian exchange in this area during the late Holocene.



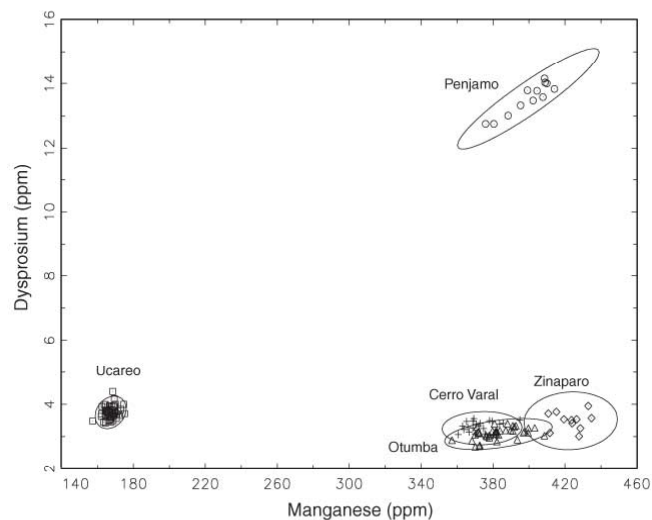
3.2 Lower Mandible

Photo: © Gabany-Guerrero

Sample	Measured Radiocarbon Age	Conventional Radiocarbon Age	2 Sigma Calibration
177072	3780 +/- 40 BP	3960 +/- 40 BP	Cal BC 2570 to 2340 (Cal BP 4520 to 4290)
177073	3760 +/- 40 BP	3940 +/- 40 BP	Cal BC 2560 to 2530 (Cal 4510 to 4480) and Cal BC 2500 to 2310 (Cal BP 4440 to 4260)

### 3.3 Radiocarbon Dating (AMS) Results for Bone Collagen from Burial Long Bones

Source: Testing by Beta Analytic, Inc.



3.4 MURR Laboratory results for provenience of obsidian from La Alberca cliff test pits.

The principal researcher and Narcizo Guerrero Murillo made a final presentation to approximately 90 *Comunidad* elders who requested the information (See Figures 23 & 24). The result of this meeting was to approve the temporary storage of artifacts in a temporary museum curated by the *Departamento de Ecoturismo* and to invite the principal researcher and research team to continue the study in collaboration with the *Comunidad*.



3.5 Comunidad Authorities Visit Site  
Photo: Guerrero Murillo



3.6 Comunidad Elders Examine Sample Artifacts  
Photo: Guerrero Murillo



3.7 Archival Storage Construction by C.I.N.S.J.P.  
Photo: Gabany-Guerrero

non-profit research and education organization. The team would like to especially thank The Comunidad Indígena de Nuevo Parangaricutiro, Dr. J. Benedict Warren and Patricia Warren, the Narciso Guerrero Martínez family in San Juan Nuevo Parangaricutiro, and Dr. Leticia Fernández, Guillermo Rodríguez, Victoria Vásquez at the University of Texas at El Paso. Dr. Russell Chianelli (University of Texas at El Paso) facilitated administrative support for processing FAMSI accounting records through the assistance of Diana Gutierrez.



3.8 María Martínez and Guillermo Ortiz Hermenegildo (Members of the C.I.N.S.P.) Prepare Artifact Catalog  
Photo: Gabany-Guerrero

These are the current results from the research conducted during 2002. This report was prepared by Dr. Tricia Gabany-Guerrero (responsible for errors and omissions). The laboratory studies were funded by National Geographic, Committee for Research & Exploration under sponsorship by The Mexican Environmental and Cultural Research Institute (MEXECRI), a

## Bibliografía

- Arnauld, Charlotte, Sarah E. Metcalfe and Pierre Petrequin  
 1992 "Holocene Climatic Change in the Zacapu Lake Basin, Michoacan: Synthesis of Results", *Quaternary International*. Vol 43/44:173-179.
- Avila, Ricardo, Jean P. Emphoux, Luis G. Gastelum, Susana Ramirez, Otto Schondube, Franciso Valdez (editores)  
 1998 *El occidente de México: arqueología, historia y medio ambiente*. Guadalajara, Mexico: Universidad de Guadalajara, Instituto Frances de Investigación Científica para el Desarrollo.
- Blanton, Richard, Gary M. Feinman, Stephen A. Kowalewski and Peter N. Peregrine, (Editors)  
 1996 "A Dual-Processual Theory for the Evolution of Mesoamerican Civilization". *Current Anthropology*, Vol. 37, Issue 1 (Feb., 1996), 1-14.
- Buckler IV, Edward S., Deborah M. Pearsall and Timothy P. Holtsford  
 1997 "Climate, Plant Ecology, and Central Mexican Archaic Subsistence". *Current Anthrologology*.
- Carot, Patricia  
 1999 *Le site de Loma Alta, Lac de Zacapu, Michoacan, Mexique*. Oxford, England: Archaeopress, Publishers of British Archaeological Reports.
- Caso, Alfonso  
 1966 *Los Calendarios Prehispanicos*. Mexico City, Mexico: Universidad Nacional Autonoma de Mexico, Instituto de Investigaciones Historicas.
- Ciliberto, Enrico and Giuseppe Spoto, Editors  
 1999 *Modern Analytical Methods in Art and Archaeology*. New York, NY: John Wiley & Sons, Inc.
- Cooper, Eben Shackleton  
 2000 *Softcopy Photogrammetry and the Development of Field Methodologies Applied to the Recording and Analysis of Rock Art*, Master of Arts Thesis. University of Arkansas.
- Di Peso, Charles C., John B. Rinaldo and Gloria J. Fenner  
 1974 *Casas Grandes, A Fallen Trading Center of the Gran Chichimeca*, Vol 7. Flagstaff, AZ: The Amerind Foundation, Northland Press.
- Feinman, Gary M. and Price, T. Douglas, Editors  
 2001 *Archaeology at the Millennium, A Sourcebook*. New York, NY: Kluwer Academic/Plenum.
- Flannery, Kent .V., Editor  
 1986 *Guila Naquitz, Archaic Foraging and Early Agriculture in Oaxaca, Mexico*. New York, NY: Academic Press, Inc. (Harcourt Brace Jovanovich, Publishers).
- Foster, Michael S.  
 1998 *Greater Mesoamerica: The Archaeology of West and Northwest Mexico*. Salt Lake City, UT: The Univ. of Utah Press.
- Gabany-Guerrero, Tricia  
 1999 *Deciphering the Symbolic Heritage of the Tarascan Empire: Interpreting the Political Economy of the Pueblo-Hospital of Parangaricutiro, Michoacán*. Doctoral Dissertation in Anthropology. University at Albany, State University of New York.

Guerrero Murillo, Narcizo

2000 *The Indian Community of the 21st Century: Sustainable Forest Management in the Tarascan Community of Nuevo San Juan Parangaricutiro, Michoacán, México*. Master's Thesis in Natural Resource Management. Central Washington University, Ellensburg, WA.

Harbottle, Garmin

1975 "Activation Analysis Study of Ceramics from the Capacha (Colima) and Opeño (Michoacan) Phases of West Mexico," *American Antiquity*, Vol.40, Issue 4 (Oct., 1975), 453-458.

Henderson, Julian

2002 *The Science and Archaeology of Materials*. New York, NY: Routledge.

Johnson, Frederick

1972 *The Prehistory of the Tehuacan Valley, Vol Four: Chronology and Irrigation*. Austin, TX: Univ. of Texas Press.

Justeson, John S.

1986 "The Origin of Writing Systems: Preclassic Mesoamerica", *World Archaeology*, Vol.17, Issue 3 Early Writing Systems (Feb., 1986), 437-458.

Kelly, Isabel

1947 *Excavations at Apatzingan, Michoacan*. New York, NY: Viking Fund Publication in Anthropology, Number 7.

Luhr, James F. and Simkin, Tom (editors)

1993 *Parícutin: The Volcano Born in a Mexican Cornfield*. Geoscience Press, Inc.: Phoenix, AZ.

MacNeish, Richard S., Nelken-Terner, Antoinette and Johnson, Irmgard W.

1967 *The Prehistory of the Tehuacan Valley, Vol Two: Nonceramic Artifacts*. Austin, TX: Univ. of TX

Marcus, Joyce

1996 *Mesoamerican Writing Systems, Propaganda, Myth, and History in Four Ancient Civilizations*. Princeton, NJ: Princeton University Press.

Mays, Simon 2000 *The Archaeology of Human Bones*. New York, NY: Routledge.

Medina, Eugenia Fernandez-V. and Efraín Cardenas Garcia

2001 "Jihuatzio, La Casa Del Coyote: Un Estudio de las Relaciones de Poder en la Cuenca de Patzcuaro" Ponencia, no publicado.

Meighan, Clement W. and Leonard J. Foote

1967 *Excavations at Tizapan El Alto*.

Noguera, Eduardo

1931 "Exploraciones arqueológicas en las regions de Zamora y Pátzcuaro, estado de Michoacán," *Anales del Museo Nacional de México* 4(7): 88-104.

Odegard, Nancy, Carroll, Scott and Zimmit, Werner S.

2000 *Material characterization tests for objects of art and archaeology*. London, England: Archetype Publications.

Oliveros, José Arturo

1975 "Arqueología del estado de Michoacán," In *Los Pueblos y Señoríos Teocráticos*, Vol. 7:207-14, *Mexico: Panorama histórico y cultural*, Mexico City: INAH.

Pollard, Helen Perlstein

1993 *Tariacuri's Legacy: The Prehispanic Tarascan State*. Norman, OK: University of Oklahoma Press.

- Sease, Catherine  
 1997 *A Conservation Manual for the Field Archaeologist*, Third Edition. Los Angeles, CA: Archeological Research Tools 4, Institute of Archaeology, University of CA, Los Angeles.
- Sejourne, Laurette  
 1968 *Arqueologia de Teotihuacan, La Ceramica*. Mexico City, Mexico: Fondo de Cultura Economica.
- Sejourne, Laurette  
 1966 *Arquitectura y pintura en Teotihuacan*. Mexico City, Mexico: Siglo Veintuno Editores.
- Serrano, Javier Urcid  
 1999 *Zapotec Hieroglyphic Writing*. Washington, D.E.: Dumbarton Oaks, Trustees for Harvard University.
- Smith, Michael  
 1996 *The Aztecs*. Cambridge, MA: Blackwell Publishers.
- Smithers, Salvador, Constanza Vedga Sosa and Rodrigo Martinez Baracs, (editors)  
 1997 *Codices y Documentos sobre Mexico, Segundo Simposio, Volumen I*. Mexico City, Mexico: Insittuto Nacional de Antropología e Historia.
- Thompson, J. Eric S.  
 1996 "Maya Hieroglyphs of the Bat as Metaphorgrams", *Man*, New Series, Vol I, Issue 2, 176-184.
- Voorhies, Barbara, Douglas J. Kennett, John G. Jones, and Thomas A. Wake  
 2001 "A Middle Archaic Archaeological Site on The West Coast of Mexico", *Latin American Antiquity*, 13 (2):179-200.
- Warren, J. Benedict  
 1985 *The Conquest of Michoacán: The Spanish Domination of the Tarascan Kingdom in Western México, 1521-1530*. Norman, OK: University of Oklahoma Press.
- Williams, H.  
 1950 "Volcanoes of the Parícutin region," *U.S. Geological Survey Bulletin*, 965B: 165-279.