REPORTS

CUEVA LA CONGA: FIRST KARST CAVE ARCHAEOLOGY IN NICARAGUA

Suzanne M. Baker and Ruth Ann Armitage

Cueva la Conga, recorded in June 2006, is the first limestone cave in Nicaragua reported to contain prehistoric rock paintings, culturally modified natural formations called speleothems, and artifacts. Located in northcentral Nicaragua in the Department of Jinotega, Cueva la Conga is the farthest south on the Mesoamerican periphery that a cave of this type has been reported, and it extends our knowledge of ritual cave use, including cave painting and speleothem modification, to include Nicaragua. Radiocarbon analysis of charcoal in five samples of the paint, the first such dating of Nicaraguan rock art, yielded calibrated dates from cal A.D. 680–905 to cal A.D. 1403–1640. The baseline data provided by Cueva la Conga are of great importance for regional rock art analysis and for our growing understanding of regional and Nicaraguan prehistory. More archaeological survey and excavations in the area will be key in establishing a firm cultural context for the rock art and ritual cave use found at Cueva la Conga.

Cueva La Conga, registrada en junio de 2006, es la primera cueva de piedra caliza encontrada en Nicaragua con pintura rupestre de tiempos prehistóricos, formaciones naturales culturalmente modificadas, llamadas espeleotemas, y artefactos. La Conga, ubicada en el departamento de Jinotega, en la parte centro-norte de Nicaragua, es la cueva de este tipo que se ha encontrado más al sur, ya en la periferia mesoamericana, y el sitio amplía nuestros conocimientos sobre una tradición de rituales en cuevas al incorporar Nicaragua, incluyendo las pinturas rupestres y espeoletemas. El análisis de radiocarbono en el carbón hallado en cinco muestras de la pintura, la primera datación de arte rupestre en Nicaragua realizada con este método, arrojó fechas que abarcan desde 680- 905 cal d.C. hasta 1403-1640 cal d.C. Los datos de línea base obtenidos de la cueva La Conga son de mucha importancia para el análisis del arte rupestre y para nuestra creciente comprensión de la prehistoria en la región y en Nicaragua. Es fundamental que continúen las investigaciones y excavaciones arqueológicas en el área de La Conga para establecer un sólido contexto cultural del arte rupestre y el uso ritual de cuevas.

Cueva La Conga is Nicaragua's first reported limestone cave in karst formation that has not only numerous pictographs in ochre and charcoal paints, but also four culturally modified natural limestone formations, called speleothems, two of which are carved and two, painted.[1] Radiocarbon analyses on five charcoal samples have produced the first dates for pictographs and, indeed, the first radiocarbon dates for northern Nicaragua, which range from cal A.D. 680–905 to cal A.D. 1440–1520. The greatest intensity of painting seems to have occurred in the earlier period. Other physical data and images provide some social information about the ancient people who utilized the cave in a region about which virtually nothing else is known archaeologically.

Whereas prehistoric ritual cave use, involving paintings and modified speleothems, has been widely reported in karst regions in Mesoamerica, Cueva la Conga extends southward the known distribution of sites representing ritual use of underground caverns. It is the farthest south that such a cave has been found on the Mesoamerican periphery. This discovery and accompanying radiocarbon dates are thus of considerable importance to Nicaraguan and to regional prehistory and rock art studies.

Archaeological and Ethnographic Background

Cueva la Conga lies in the north–central part of Nicaragua, about 50 km south of the Honduran border in the Department of Jinotega (Figure 1).

Suzanne M. Baker ■ Archaeological/Historical Consultants, 609 Aileen Street, Oakland, CA 94609 (suzannebaker@ahc-heritage.com)
Ruth Ann Armitage ■ Department of Chemistry, Eastern Michigan University, Ypsilanti, MI 48197 (rarmitage@emich.edu)

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Figure 1. Regional map with location of Cueva la Conga.

This is a rugged, mountainous region forming a part of the northwest to southeast trending highlands running through the center of the country. The region is cut by many rivers and was once heavily forested. There has been no previous archaeological work in the immediate region of the cave, and, in general, the north-central and eastern portions of Nicaragua have seen very little substantive archaeological or ethnographic research. Until recently, virtually the only study in northern Nicaragua had been that of Fletcher et al. (1993), conducted between 1990 and 1992 along the Honduran frontier in the departments of Estelí and Madriz (to the west of Jinotega). Their survey recorded 90 sites and found a complex settlement pattern exhibiting a "hierarchy of sites," including possible regional centers, local centers, smaller villages and hamlets, as well as petroglyph sites (Fletcher et al. 1993:103). They also constructed a ceramic typology that suggested that there was "a greater influence or interaction with groups to the north than with those to the south or with Pacific Nicaragua" (Fletcher et al. 1993:103).

The National Autonomous University of Nicaragua (UNAN) undertook the most recent archaeological work in northern Nicaragua from 2006 to 2009 (Balladares and Rivera 2011). An archaeological survey in the Departments of Matagalpa and western Jinotega recorded 126 sites of various types from mounds to petroglyphs. Site descriptions indicate a similar range of complexity and site types as those found by Fletcher et al. (1993). The Jinotega portion of the survey, located 50–100 km to the southwest and west of the Cueva la Conga area, found 19 sites, encompassing mounds, a rock shelter, and ceramic and lithic scatters. The predominant diagnostic ceramic was the Sulaco or Segovia Naranja Type (A.D. 300–1430) (Balladares and Rivera 2011:17–67). No rock art was reported.

Linguists include the Jinotega region within the northern area of speakers of a small family of languages called "Misumalpan" for the Miskitu, Sumu, and Matagalpan languages and various dialects, which, along with Rama, a Chibchan language or dialect in southeastern Nicaragua, are the main languages of eastern and central Nicaragua. Misumalpan speakers extended somewhat north of the present Nicaraguan-Honduran border into eastern Honduras (Constenla 1991:16, 22–23). Speakers of the Misumalpan languages are located between the Rama and the Paya of Honduras, who speak another Chibchan language. Misumalpan languages generally have been considered con-

nected to Macro-Chibchan and thus affiliated with Chibchan languages and populations found mostly in more southerly parts of Central America (Campbell 1979:944; Constenla 1991:16, 32, 1994; Healy 1974; Holt 1975). Early chroniclers also mention a people in the northwest mountains of Nicaragua in today's Departments of Estelí, Madriz, and Nueva Segovia (west of the Department of Jinotega) called the Chondal or Chontal. Although some researchers believe that the Chondal were affiliated with the Matagalpa or Lenca (now mainly in Honduras), there is evidence that some of these people may have been Putun Maya (Fowler 1989:57; Werner 2000:12–13, 17–18).

In general, there is considerable ambiguity about Nicaragua's overall cultural affiliations. The country lies in a region between Mesoamerican peoples to the north and Chibchan-speaking groups to the south. One source has placed the approximate eastern boundary of Mesoamerica at a north–south line running roughly through central Honduras, with Pacific Nicaragua to northwest Costa Rica sometimes included in this division (the Greater Nicoya Archaeological Subarea). Eastern Honduras and most of central and eastern Nicaragua, the rest of Costa Rica, and Panama are included within Lower Central America (Stone and Künne 2003:196, Figure 1).

The general lack of archaeological data for northern Nicaragua, as opposed to southwest Nicaragua, where much of the significant previous archaeological research has been conducted, leaves little room for posing or answering questions about cultural affiliation.[2] The Cueva la Conga region is in a now grey area near the hypothetical border of the two cultural traditions, and the archaeological and ethnohistoric affiliations of Cueva la Conga and its surroundings are simply uncertain at this point.

Rock Art in Nicaragua

Nicaragua has abundant and often impressive rock art, which has been at least briefly reported in many regions of the country (see Baker 2003, 2010; Matilló 1965; Stone and Künne 2003). Only a few formal rock art studies have, however, been conducted, most concentrated in Pacific Nicaragua or Chontales (Baker 2010; Matilló 1973; Navarro 1996; Rigat 1992). The north and north-central parts of the country have been particularly devoid of formal rock art research, with only brief mention of rock art in most archaeological studies (Balladares and Rivera 2011; Fletcher et al. 1993). Previous reports have emphasized petroglyphs, which are ubiquitous in Nicaragua. Paintings or pictographs have only been reported in eight locations, including Cueva la Conga, the first site in a karst cave. The other seven were found in rock shelters or on ravine walls. These include the Icalupe site, near Somoto in the Department of Madriz; Cueva de los Ladrones in the municipality of Matagalpa; locations near the town of Chagüitillo in the Sebaco Valley; at Laguna Asososca in Managua; and three other sites in the Pacific zone—Montelimar, Los Sanchez, and Cueva de los Negros (Baker 2010:16; Balladares and Rivera 2011; Navarro 1996:24; Squier 1856:402–405; Nestor Dávila, personal communication 2009).

Cueva La Conga Site Description

Site History

Cueva la Conga was first reported in 2004, when Pablo Yoder, a local Mennonite missionary, and a friend, Paul Kaufman, visited the cave. They contacted one of the authors, Suzanne Baker, who visited the cave with Yoder and Kaufman and two other colleagues, Jerry Doty and Karla Kaufman, in June 2006, when the site was formally mapped and recorded (Baker et al. 2006). Unfortunately, two weeks before initial recording in 2006, a group of young people led by a local teacher visited and vandalized the cave during Easter week, leaving various carved and inked grafitti on the walls, although none covered the paintings. The original carving and pecking on Speleothem 1 was also marred by new abrasion or scratching. A second episode of graffiti, resulting in a carved name, presumably of the grafitti maker, occurred sometime between 2006 and 2008.

Because of the unique nature of the rock art at Cueva la Conga, Suzanne Baker and Dr. Ruth Ann Armitage of Eastern Michigan University, a chemist specializing in rock art dating, returned to the cave in January 2009 to take paint samples for radiocarbon dating and for determining the chemical composition of the pigments. Eleven paint samples—five charcoal and six ochre—as well as eight background substrate samples were collected

Table 1. Description of Samples from Cueva La Conga.

Sample	Location and Description	Material
1a	Panel 6, "anthropomorph," first sample	Charcoal
1b	Panel 6, "anthropomorph," second sample	Charcoal
1c	Substrate for 1a and 1b, from small pocket in rock to left of anthropomorph	Limestone
2a	Panel 9, upside-down anthropomorph	Charcoal
2b	Substrate for 2a, very dirty	Limestone
3a	Panel 3, fragmentary charcoal images, removed from scratches on wall	Charcoal
3b	Substrate	Limestone
4a	Panel 7, torch smudges (?)	Charcoal
4b	Substrate removed from lower vesicle without charcoal	Limestone
5a	Panel 6, red circle, fragment isolated in vesicle	Purple-red paint
5b	Substrate for 5a	Limestone
6a	Panel 4, enlaced cruciform	Orange paint
6b	Substrate for 6a	Limestone
7a	Panels 2 and 3, red line	Purple-red paint
7b	Substrate for 7a	Limestone
8a	Panels 2 and 3, orange handprint	Orange paint
8b	Substrate for 8a	Limestone
9	Panel 12, red handprint	Red paint
10	Panel 14, red handprint	Red paint

for radiocarbon and other chemical analyses at Eastern Michigan University (Table 1).

Description

Cueva La Conga is in a remote area that has a convoluted topography of low mountains (between 400–900 m in elevation) interspersed with small valleys and perennial and seasonal drainages. The cave itself is at an elevation of approximately 380 m at the north end of a double-peaked hill. Two small valleys, formed by the El Tigre River, part of the Río Bocay watershed, flank the cave location to the northwest and southeast. Until relatively recently, the region was heavily forested, but the agricultural frontier has been advancing rapidly. The immediate environs of the cave are still in forest, but small agricultural holdings are now found at lower elevations.

La Conga, a horizontal limestone cave, is in an area of karst formation. Karst is a limestone landscape, characterized by caves, fissures, and, often, underground streams. Such geological formations are well known in Eastern Mesoamerica, especially within the Mexican States of Yucatán, Quintana Roo, and Chiapas, in Belize, and in the Petén of Guatemala, as well as in eastern Honduras, and many karst caves with evidence of ritual use have been reported in those areas (Brady and Prufer 2005; Kueny and Day 2002:Figure 1; Stone and Künne 2003). The presence of karst in the Jinotega area was itself a surprise in that most of the geological maps available show the Cueva la Conga region with volcanic formations or as unmapped. A recent study of karst landscapes in Central America does not include the Cueva la Conga area, although it does show some karst to the south in east-central Nicaragua (Kueny and Day 2002:Figure 1).

The cave is moderately active geologically, with active drip and formation building in some areas; this may become more active during the rainy season. The majority of the cave is, however, quite dry and, the floor is covered with very fine dry dirt. Formations include dripstone (stalagmites, stalactites, and pillars), flowstone, small curtains, soda straws, and a number of eccentric shapes located on walls, ceilings, or floor of the cave.

The cave has two entrances (Figure 2). The larger entrance leading to the cave's main chamber is approached via a steep uphill climb and is partially screened by vegetation and large boulders. This entrance opens into the main chamber, which is approximately 20 m x 16 m in size and is divided by a long, curved hanging wall. A very small side chamber, measuring 1.5 m x 1.5 m in area, is found behind the hanging wall. An approx-

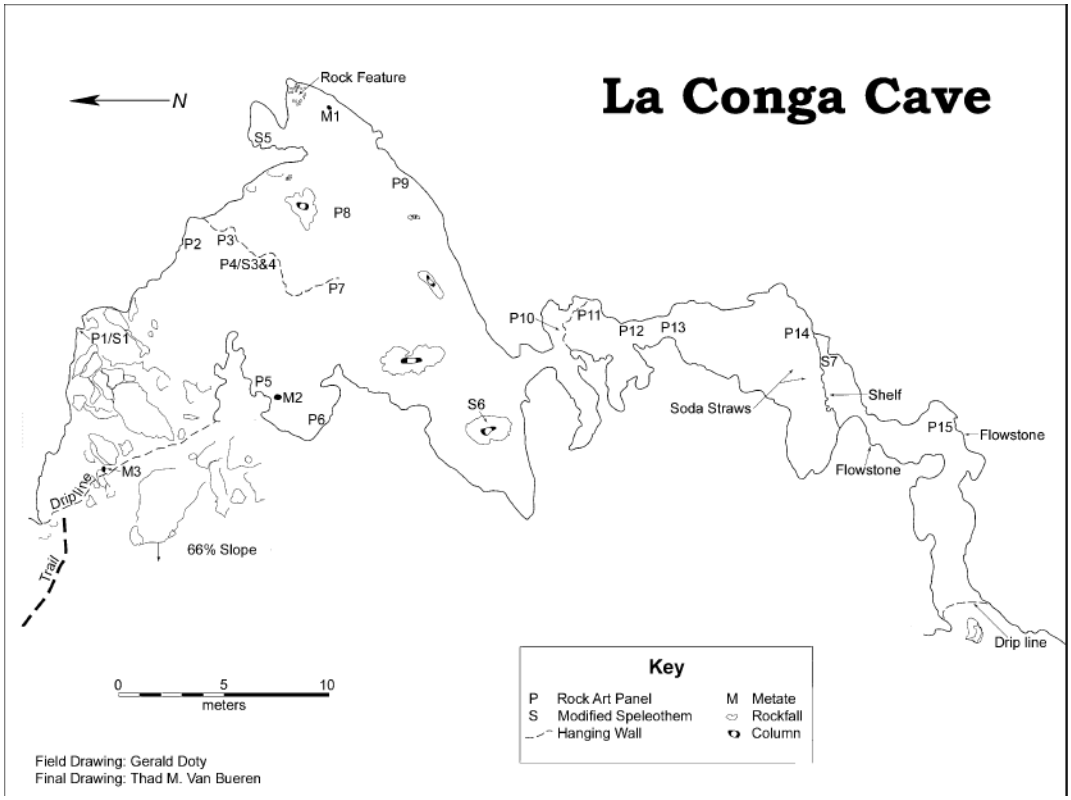

Figure 2. Map of Cueva la Conga.

imately 35 m long tunnel, which varies in width along its length, leads roughly southward from the south side of the main chamber to a second, smaller, entrance that overlooks a steep slope.

The cave contains 14 pictograph panels with motifs drawn in ochre or charcoal, as well as four culturally modified speleothems; the modified speleothems and a majority of the paintings are in the main chamber. Two unmodified speleothems (Speleothems 2 and 6) were also given numbers because of their close association with pictographs or other cultural remains. The tunnel contains only painted handprints and charcoal smudge marks.

The Entrance and Main Chamber

Just inside and to the left of the main entrance is Speleothem 1, an animal-like formation, covered with an eye-catching blue-green algae (Figure 3). Its "head" was modified with pecked eyes and parallel curving grooves on top, and natural dripping has created claw-like "feet". There is a faded ochre abstract pictograph on the wall above the formation.

The hanging wall of the main chamber is located 6 or 7 m from the entrance (see Figure 2). The side that faces the entrance is the location of the majority of pictographs and receives a little ambient light (the "twilight zone"). A series of three small speleothems, resembling small crouching animals or animal-like heads, also hang high on the wall in close proximity to paintings. Although difficult to inspect closely because of their height above the ground, photographs show that at least two of these are modified with paint (Figure 4).

Most of the paintings on this wall are quite high; either the painters would have required scaffolding or the floor was much higher at one time, which seems less likely. The wall is extensively and densely painted with motifs in predominantly orange ochre, as well as some in red and reddish purple ochre and charcoal. Both positive and negative (or stenciled) ochre handprints are located here, while only positive handprints are in other locations. For recording convenience, the side of the hanging wall facing the entrance was divided

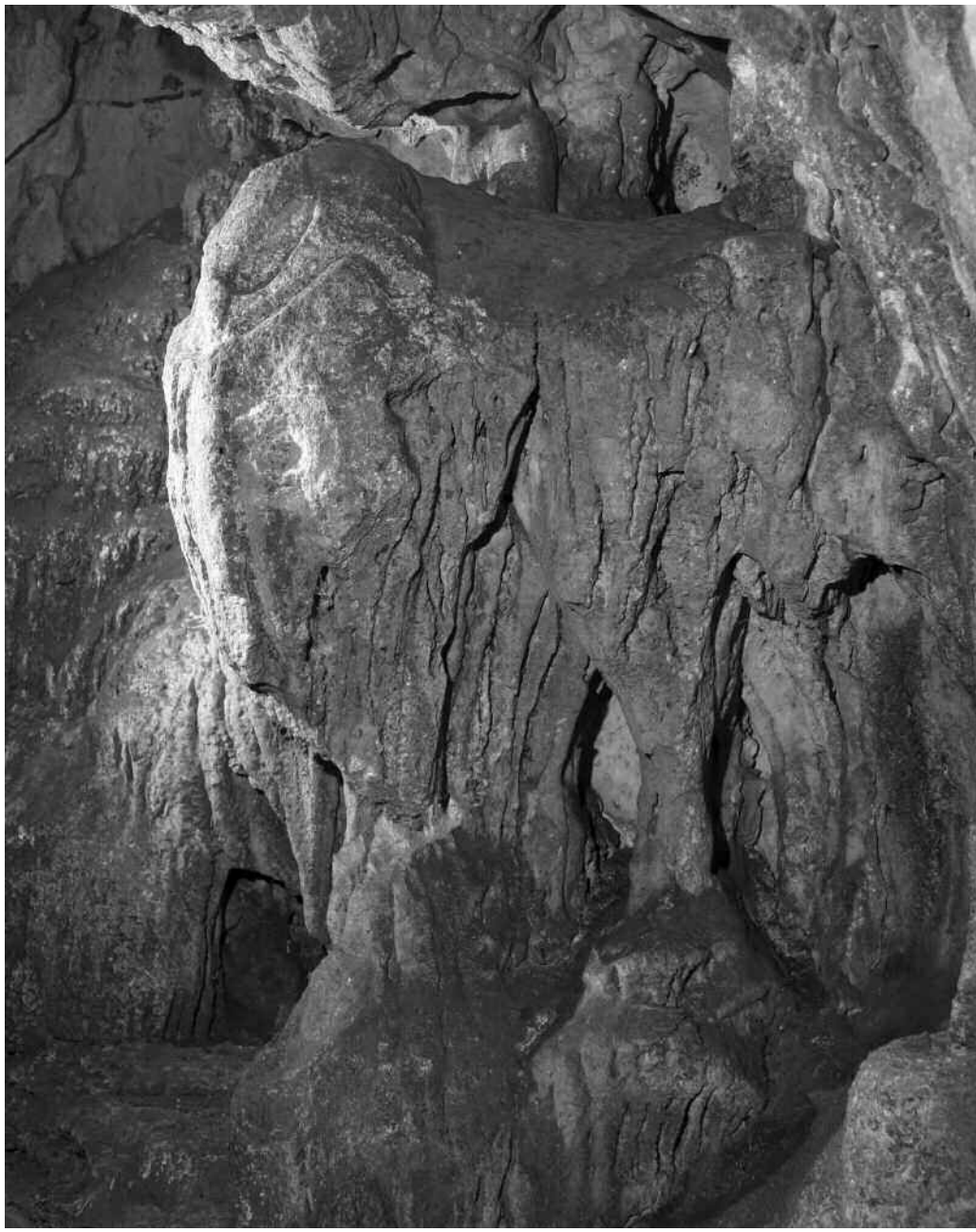

Figure 3. Modified Speleothem 1 near main entrance (eye is pecked but scratching around eye is recent; note pecked and abraded lines on head) (Cueva la Conga Project, photo by Suzanne Baker 2009).

into three panels (Panels 2, 3, 4). The most elaborate motifs include six or seven sunburst-like designs, associated with an impressive group of at least six stenciled handprints in roughly the same ochre color in Panel 2 (Figure 5) and five orange ochre circle and dot or ring and dot motifs in Panel 3 (Figure 6). At least two horizontal red or reddish purple ochre lines cross the panels. Panel 4 has a cluster of three or four positive handprints under one of the speleothems (Figure 4), a faded spiral, and an interesting, very faded ochre image, possibly an upside down bat, as well as other abstract

Figure 4. Portion of Panel 4 with Speleothem 4 (modified with paint) and handprints (Cueva la Conga Project, photo by Paul Kaufman 2006).

images and large areas with faded ochre and charcoal paint motifs. While specific motifs are sometimes difficult to discern, indistinct remains are evident. It is unfortunate that no organic binders for radiocarbon analysis were found in the ochre paints in this area during chemical analysis (Li et al. 2012), but we believe that these motifs are probably the oldest since much of the ochre on this wall tends to be well-bonded to the surface, evidence of considerable time depth. This is supported by the fact that the earliest date obtained—cal A.D. 680-905—is from a faded charcoal image in Panel 3

Figure 5. Panel 2 (Cueva la Conga Project, photo by Paul Kaufman 2006).

(Sample 3, Table 3). Some of these bonded paints may be well be older than the charcoal sample. Another orange ochre image—an interlaced cruciform—on the right of Panel 4 is, however, distinct, unfaded, and has thicker paint. It seems to be superimposed on a lighter, more purplish red horizontal line, indicating a later addition to the panel (Figure 7). The intensity of painting and its complexity in this part of the cave, as well as its early dating, indicate that the first and main focus of

Figure 6. Portion of Panel 3 (Cueva la Conga Project, photo by Paul Kaufman 2006).

painting and, perhaps, of ritual activity at Cueva la Conga took place in this area.

Deeper into the main chamber, both behind the hanging wall and to the right of it, there is no ambient light (the "dark zone"). Not far to the rear of the wall is the small side chamber where Speleothem 5 is located, just inside and to the left of the entrance. It consists of a head-like formation that has been modified with pecking to create eyes and a mouth. It measures ~18 cm long, 10 cm wide

Figure 7. Panel 4, possible mat motif (Cueva la Conga project, photo by Paul Kaufman).

across the eyes, and ~41 cm tall.

On walls in this dark zone are found a variety of mainly small and isolated individual paint markings. Panel 5 contains a positive handprint in orange ochre, while Panel 6 includes two motifs that could be radiocarbon dated. One is an elaborate, but faded, hour-glass shaped, charcoal figure, a possible anthropomorph, dated to cal A.D. 1260–1300 (Sample 1, Table 3; Figure 8). A second motif is a small finger-painted ochre circle that contained charcoal inclusions in the paint that were dated to cal A.D. 1440–1520 (Sample 5, Table 3; Figure 8).

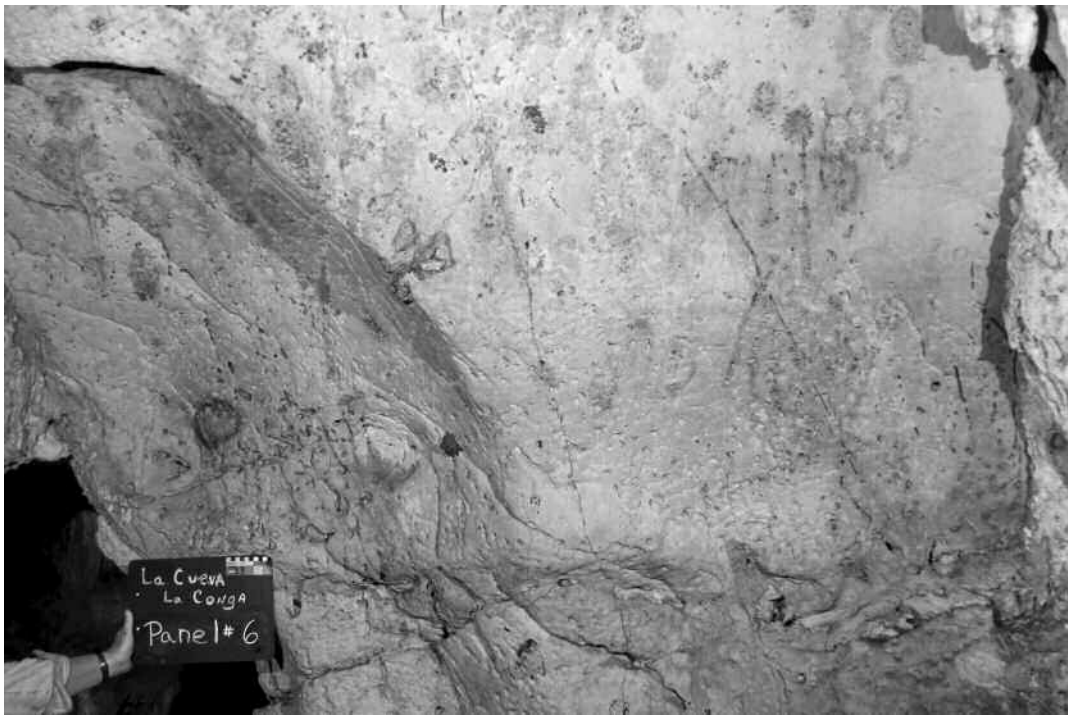

Figure 8. Panel 6 (Cueva la Conga Project, photo by Paul Kaufman 2006).

Panel 9 had a simple inverted anthropomorphic image in charcoal that yielded a date of cal 1403–1640 A.D. (Sample 2, Table 3), as well as three areas of charcoal smudges.

At the south end of the large chamber and near the interior entrance to the cave tunnel is Speleothem 6, a large natural formation that resembles a bison-like beast. It measures approximately 3 m long and 1.5 m high and has a column that connects the back of the formation to the ceiling. Although the speleothem itself evidences no modification, around its base were 10 to 15 small, undecorated ceramic sherds and one with incising, which suggests that there was some cultural practice associated with this formation. Unfortunately, none were diagnostic.

The Tunnel

The narrow tunnel leading from the main chamber to the second and smaller entrance contained 16 positive handprints in orange or red-orange ochre in five different areas on the walls or on stalactites, as well as three charcoal smudges, possibly from torches, near the tunnel entrance. Most of the handprints faced south and are visible when progressing through the tunnel from the small south entrance. Most of the tunnel has no ambient light except quite near the small south entrance. A red handprint located in the tunnel in Panel 12 yielded a date of cal A.D. 1440–1520 (Sample 9, Table 3). Since both Sample 9 and Sample 5 (discussed above) were dated based on charcoal inclusions mixed in the ochre paint and were similar in color, it seemed conceivable that they were made in the same episode. X-ray fluorescence results, however, show that the trace components of the paint differ somewhat (Li et al. 2012:83).

Artifacts and Other Features

Unlike many ritual caves reported in Mesoamerican sites, there were few surface artifacts in the cave that would assist with chronological or cultural placement. While some caves were used primarily as ossuaries, such as the Talgua Cave in northeast Honduras (Brady et al. 1995), no surface human or other faunal remains and no lithic debitage or flaked tools were noted at Cueva la Conga. The few sherds around the base of Speleothem 6, discussed above,

were the only ceramics noted, although the foot of an undecorated ceramic vessel was found on the trail leading up to the large entrance to the cave. When Yoder and Kaufman first visited the cave in 2004, a number of large undecorated pottery fragments were observed and photographed in the main chamber, but these had disappeared by 2006. None of the ceramics observed has yet proven diagnostic. Three unshaped slab metates were found in the cave, one clearly not in situ at the main entrance. Finally, in a far corner of the dark zone of the main chamber was a roughly circular feature of small angular cobbles, which may have been a hearth, although no charcoal was evident on the surface. The feature was, however, very dusty and fine sediment could have obscured any charcoal.

The general paucity of surface artifacts may indicate that ritual vessels were not routinely cached in caves in this area; however, looting may also be a possible explanation for the lack of artifacts. It is unknown if buried artifactual materials exist that could provide additional chronological and social data.

Rock Art Analyses

Technical Results

Laboratory analyses of paint samples were undertaken at Eastern Michigan State University. They have yielded interesting data about the chronological position of Cueva la Conga and social practices of the people who made the rock art at Cueva la Conga.

Radiocarbon Analysis. Eleven paint samples—five charcoal and six inorganic pigmented paints (ochres)—and eight background substrate samples were studied (Table 1). The analytical methodology has been detailed in Li et al. (2012), and only a summary of results will be presented here. Thermally assisted Hydrolysis/Methylation-Gas Chromatography-Mass Spectrometry (THM-GC-MS) was used to test and compare the chemical compositions of both the ochre paints and substrate samples to determine if organic binders that could be dated were present; unfortunately, none were found. Although binders were not present, during scanning electron microscopy, ochre paint samples 5, 9, and 10 were observed to contain charcoal inclusions in the ochre pigment. The charcoal did not appear to be soot from torches or otherwise isolated at the surface of the material. Instead, the charcoal was intimately mixed with the pigment. The photomicrograph image of a fragment of Sample 9 (Figure 9) clearly shows the cellular structure of the charcoal protruding from the surrounding mineral material. Plasma-Chemical Oxidation-Accelerator Mass Spectrometry (PCO-AMS) radiocarbon analysis was then conducted on five samples, including three charcoal paints and two samples of charcoal found in the mineral paints. The results, ranging from cal A.D. 680–905 to cal A.D. 1440–1520, are summarized in Table 2 with calibrated dates provided in Table 3. To our knowledge, this is the first time that carbon within an ochre pigment has been radiocarbon dated.

Pigment Preparation. We propose that the charcoal inclusions found within the ochre paint became incorporated as the paint was prepared for use through calcination. Calcination is the process of heating the iron oxide mineral in a fire to change its color; the longer the mineral is heated, the darker and more intense the color becomes due to dehydration and oxidation (Cornell and Schwertmann 2003:463). Yellow ochre, for example, contains goethite, which when dehydrated by prolonged heating, forms hematite, anhydrous ferric oxide, which has a deep red color. We believe that, after pieces of mineral were heated in a firepit to change their color, the charcoal and mineral pigment would have become intermixed during removal and subsequent grinding to prepare the paint. Charcoal inclusions were observed in three of the samples that were of the deepest red color, which tends to support the heating hypothesis as an explanation for their inclusion in the ochre samples. The use of calcination to change paint color suggests long experimentation and the work of specialists.

Carbon Identification. Charcoal from paint samples was submitted for carbon source determination to Caroline Cartwright, a microscopist and wood anatomist at the British Museum. Charcoal found in the pictographs was identified as coming from three different trees. Most were from *Hymenaea courbaril* (Guapinol or Jatobá tree), a "huge canopy tree, growing to 30 m in height" that is indigenous to parts of Central America and the Amazon rainforest (Raintree Tropical Plant Database 1996). Smaller amounts of charcoal were from *Pithecellobium arboreum* (Quebracho), a tree often used

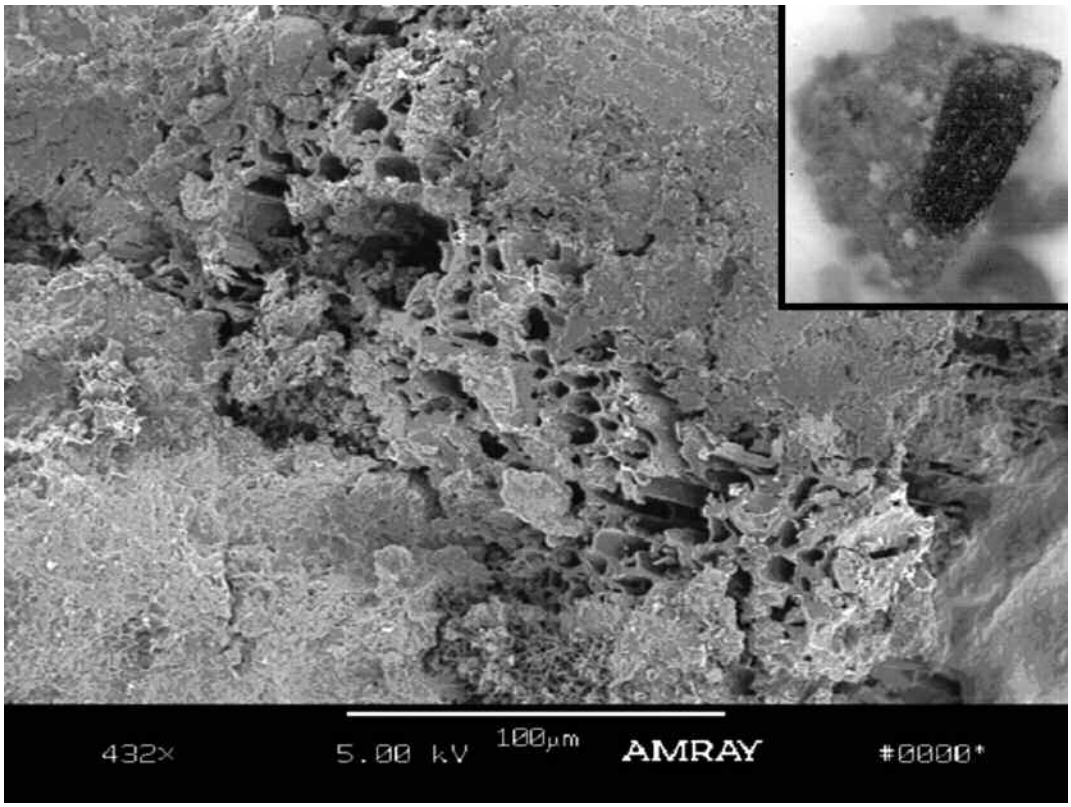

Figure 9. Electron photomicrograph of a fragment from Sample 9, showing charcoal (center) in the mineral paint (inset at 45x).

today for local charcoal production and in high quality carpentry, and from *Pinus* sp. (Caroline Cartwright, personal communication 2010; Forster et al. 2003:139, 145). Nicaragua is the southernmost limit of the natural distribution of pine forest in the western hemisphere, and three pine species are endemic in the north-central highlands where Cueva la Conga is located (Howell 1965:438). Perhaps of most significance to this study is *Hymenaea courbaril*, which produces an aromatic resin called copal, known to have ritual uses in Mesoamerica and probably Central America (Duke 1983; Fowler 1989:87; Stross 1997). Stross (1997), in his study of Mesoamerican copal use, notes that it was considered a "food for deities. Its main employ was as incense offerings to the deities," as well as an avenue for divination and, perhaps, for inducing shamanic trance. In Mesoamerican Indian communities at Spanish contact and in contemporary times, sacred items were and are "ritually censed" (Stross 1997). At the very least, the presence of *Hymenaea courbaril* indicates access to copal and possible use in such rituals at Cueva la Conga. It is also possible that wood from the copal tree could have been deliberately utilized in the ochre heating process to add a sacred quality to the pigment.

The Rock Art Images

A study of rock art should include "understandings of imagery, iconography, and ideology" (Atkinson 2009:42), and Hays-Gilpin (2004:10) has noted that iconography consists of "images with shared meanings, and the presumption of their power in particular cultural contexts." Determining the meaning of particular images in a prehistoric context, however, is an endeavor fraught with difficulty, particularly in a region where the cultural context is unclear and ethnographic information is limited or non-existent. We can, nevertheless, often make useful analogical reference to similar features in other nearby regions for comparison and potential interpretations. As Stone and Künne (2003:197) have noted in regard to cultural contact between lower Central America and Mesoamerica:

Table 2. Plasma-Chemical Oxidation Results and AMS Radiocarbon Dates for Cueva la Conga.

Sample	Pretreatment	Plasma Conditions	Results, μg C	Radiocarbon results, CAMS ID and date (in years before present, B.P.)	Comments
1a	3x NaOH	100 W, 45 min	180	143261	Dates are statistically indistinguishable. Combined age = 710 ± 25 B.P.
				750 ± 35 B.P.	
1b	9x PO4	50 W, 39 min	260	142211	
				675 ± 30 B.P.	
2a	5x PO4	50 W, 52 min	90	142210	None
				345 ± 35 B.P.	
3a	ABA/combustion	n/a	n/a	142212	NaOH-treated sample is best estimate.*
				1455 ± 35 B.P.	
3a	10x PO4	50 W, 35 min	275	142209	
				900 ± 35	
3a	3x NaOH	100 W, 60 min	70	143035	
				1200 ± 60	
5a	None	50 W, 41 min	200	143515	Significant surface contamination; obtained age is likely minimum.
				modern	
5a	2x PO4	100 W, 60 min	200	145948	
				390 ± 30	
9	None	50 W, 40 min	250	143514	Significant surface contamination; obtained age is likely minimum.
				modern	
9	3x PO4	100 W, 60 min	110	145949	
				385 ± 30	

* Three portions of Sample 3 were dated. Previous studies have shown that the ABA standard pretreatment can leave small amounts of carbonate in charcoal samples from rock paintings (Armitage 1998); this may explain the significantly older date for the ABA/combusted portion of Sample 3. Conversely, this sample was extremely contaminated with the earthy-smelling contaminant. Even after 10 washes with the phosphate buffer, the sample had an easily detected odor, suggesting that the anomalously much younger age of this sample may be due to residual contamination. The NaOH-washed portion yielded a date between the two extremes and should be considered the best estimate of the radiocarbon age of Sample 3. Further discussion of sample pretreatment is found in Li et al. (2012:80–81, 86–87).

"Central American rock art is an important barometer of ... cross-cultural contacts, and a continuing goal of rock art research is identifying sources of influence from either direction." This is particularly true in Nicaragua, which seems to have been a nexus between the two regions.

The Paintings. The painting of images on rock walls clearly accompanied and was part of ritual action in caves. There are, however, only a few motif studies available and almost no ethnographic information for Nicaragua relevant to the pictographs at Cueva la Conga. Any foray into the meaning of the cave's motifs must be tentative at best. Clear stylistic, as well as chronological, differences among the paintings suggest that there must have been multiple occurrences of pictograph manufacture over time and perhaps more than one cultural group involved, each bringing its own motifs and significance.

Certainly, the numerous and often superimposed paintings at the front of the main chamber are the most impressive. Distinctive rayed circles or sunburst-like motifs (Figure 5) like those found in this area are very often interpreted as solar images, and it is perhaps plausible that they, accompanied by major circle and dot motifs (Figure 6), could make up an array of astronomical images, representing, for example, the sun and stars, but certainly the interpretation is speculative. Based on current reporting, rayed circles are quite rare in more southerly areas of Nicaragua. Only three rayed circles have thus far been found among the numerous petroglyphs on Ometepe Island in Lake Nicaragua to the southwest (Baker 2010:68, 87, 100), and a rough variant has been reported in the Estelí watershed (Gámez and Cruz 2004:72–73).

The circle and dot or ring and dot motif is widespread from the southwest United States into at

Table 3. Calibrated Age Ranges for Radiocarbon-Dated Rock Art Samples from Cueva la Conga.

		Calibrated Dates*
Charcoal pigments		
1	Panel 6, "anthropomorph"	cal A.D. 1260–1300 (94.3%)
		1370–1380 (5.7%)
2	Panel 9, upside-down anthropomorph	cal A.D. 1403–1640 (95.4%)
3**	Panel 3, fragmentary charcoal images	cal A.D. 680– 905 (87.3%)
		910–970 (12.7%)
Inorganic pigments with charcoal inclusions		
5	Panel 6, red circle	cal A.D. 1440–1520 (68.8%)
		1570–1630 (29.9%)
		1558–1564 (1.3%)
9	Panel 12, red handprint	cal A.D. 1440–1520 (72.8%)
		1570–1630 (26.6%)
		1559–1562 (0.6%)
Inorganic pigments requiring binder for dating		
6a	Panel 4, interlaced cruciform figure	not dated
7a	Panels 1 and 2, red line	not dated
8a	Panels 1 and 2, yellow handprint	not dated

*Calibrated using Calib 6.0, online (2 sigma ranges with % probabilities) (Stuiver and Reimer 1993). The IntCal04 dataset (Reimer et al. 2004) for terrestrial samples was utilized for the calibration curve. Because all of the samples dated were charcoal, the $\delta^{13}C$ was presumed to be –25‰.

** The date for Sample 3 given in Li et al. (2012:87) is in error (Ruth Ann Armitage, personal communication, September 2012).

least the Guanacaste–Nicoya region of Costa Rica (Schaafsma 1980:236; Snarskis et al. 1975:35), and there is some suggestion that it is associated with a manifestation of Tlaloc, the rain god of Central Mexico, who is often portrayed as goggle-eyed. Tlaloc and his variations are also associated with lightning, mountains, and caves (Stone 1995:34). The combination of circle and dot motifs and negative handprints in the main chamber bear striking resemblance to similar motifs from a cave site called "La Nevada," recorded in the early 1990s near the town of Talanga, north of Tegucigalpa, Honduras. Some of the precursors to the contemporary Lenca group, the Proto-Lenca, are believed to have settled that area (Alejandro Figueroa Calderón, personal communication 2006). In Nicaragua, a few circle and dot motifs are found on petroglyphs on Ometepe Island, but they are scarce (Baker 2010:98, 114). In Pacific Coast sites, such elements tend to be integrated into stylized zoomorphs (Navarro 1996:68, 75, 109). The circle and dot or ring and dot motif is also found on Costa Rican petroglyphs and on anthropomorphic and zoomorphic Costa Rican jade images (Snarskis et al. 1975:91; Fonseca and Acuña 1986:249; Zilberg 1986:352). The cultural associations for this motif at Cueva La Conga are at this point equivocal.

The enlaced cruciform motif in orange ochre on the right of Panel 4 (Figure 7) may be a variation of a widespread design found from Mesoamerica to Costa Rica. The design is generally portrayed as hatchwork or as intertwined strands or guilloché. Robicsek (1975:292), in a major work on this symbol, says "the mat-design was one of the most important power-symbols among the ancient Maya. The honor of being distinguished with this sign was reserved for those with noble birth, high office and supreme authority." Stone (1995:68–70) reports mat symbols at the Actun and Tixkkuytun caves in Yucatán and notes that in the Maya area the mat symbol may have a late to Terminal Classic dating for certain caves. A similar enlaced cruciform is found on a few petroglyphs on Ometepe Island (Baker 2010:108–109), as well as at the site of Cañas on nearby Zapatera Island in Lake Nicaragua (Navarro 1996:84, 129). Navarro (1996:42, 152) has identified the enlaced motif as an Aztec symbol associated with gold and the sun god. In one variation or another, it is also found on figurines at least as far south as Guanacaste and Nicoya in Costa Rica (Snarskis 1981:35). A well-known ceramic figurine from Nicoya, thought to represent a female shaman, is lavishly decorated with several versions of this motif, including linear intertwining, as well as an enlaced cruciform

(Tillett 1988:55). The Nicoya figure is of Carrillo Polychrome, which is thought to date to A.D. 500–800 (Abel-Vidor et al. 1987:117; Tillett 1988:55). The association of the symbol with power, if not its equivalent meaning, could have been partly responsible for its widespread use. Its exact significance at Cueva la Conga may never be known.

A faded image, interpreted as an upside-down bat, was the only zoomorphic motif found at Cueva la Conga. Vampire bats, hanging head down, were noted nesting in the cave on our second visit. The bat image is common in various forms in precolombian art. Bats have obvious association with caves, and in Mesoamerica were linked with the underworld and with deities of night and death and with ritual bloodletting and, sometimes, human sacrifice (Benson 1997:52–55; Cajas 2009:3). The bat has also been identified as an important figure in Chibchan iconography, associated with shamanistic flight (Hoopes and Fonseca 2003:74–75). Engraved bat-like images have been found in at least two sites in Pacific Coastal sites in Nicaragua—in a rock shelter at the El Acetuno site and on a boulder at the Las Torres site—but both are right side up and have outspread wings, and are stylistically quite different from the Cueva la Conga image (Navarro 1996:48–49, 66–68, 123).

Anthropomorphic images, apart from handprints, are also rare at Cueva la Conga. Three anthropomorphs have been identified, consisting of a simple face in ochre, a barely discernible hourglass-shaped charcoal image (Figure 8), and a roughly drawn upside-down charcoal anthropomorph. In some areas, inverted figures are sometimes interpreted as representing a death or a dead individual or as part of an upside-down spirit world (Marriner 2002). Such an interpretation cannot yet be confirmed ethnographically in the region, but it would not be unusual for death-associated figures to be present, given the fact that caves were often viewed as portals to the underworld.

Twenty-four positive handprints were found within the cave, including 16 in the tunnel leading to the small entrance. Eleven of these 16 handprints were discernible as to handedness, and at least nine of these are definitely or probably left hand prints. One clear set of hands was crossed, in that the left print was on the right wall and the right print was on the left wall just above the passageway. Within the main chamber, six stenciled handprints were observed in a grouping in Panel 2, at least five of which are discernibly right hands. There seems to be some variation in size, and more than one individual may well have made these prints in one episode. Major groupings of handprints are also found in the front chamber below Speleothem 3 and just below the main sunburst figure (Figures 4 and 5), perhaps indicating that some special attention was given to these elements. Handprints in caves and rock shelters are widespread throughout the world and are a common phenomenon in Mesoamerican caves (Stone 1995). In Nicaragua thus far, besides Cueva La Conga, two rock shelters have been reported with handprints—Cueva de Los Negros in the Pacific Zone with two sets of negative or stenciled handprints in red paint and Cueva de los Ladrones in the Department of Matagalpa with 11 negative handprints in white or pale pink (Balladares and Rivera 2011; Navarro 1996:52-54). The handprint may have associated the individual with the sacredness of the cave and announced his/her presence.

Speleothems. Both modified and unmodified speleothems have been documented in ritual contexts in Mesoamerica; they were often venerated and imbued with ritual importance (Awe et al. 2005; Brady et al. 1997; Fitzsimmons 2005; Rincón 2005; Rissolo 2005). Speleothems were used as bases for two-dimensionally incised or pecked petroglyphs or were carved in bas relief. Cueva la Conga is notable for Speleothem 1 (Figure 3) and Speleothem 5, which are modified by pecking and/or abrasion. These are otherworldly figures that appear to emerge from stone—and it is very likely that they were iconic. Although the ambience of a dark cave can give much leeway for imagination when viewing cave formations, the three small head-like speleothems on the wall of Panels 3 and 4 and their proximity to densely painted pictographs make it likely that they were also seen as icons or focuses of veneration. At least two were modified with ochre paint, and Speleothem 3, a long beak-like shape (Figure 4) and Speleothem 4, which is head-like, are also both accompanied by nearby handprints, indicating that these formations attracted particular interest or even veneration. Speleothem 6, although not modified, may also have been an iconic element and featured in ritual activity, accounting for the broken ceramic frag-

ments found around its base. There are certainly analogues in Mesoamerica that suggests that some unmodified natural formations had ritual identities, attracting worshipers and accompanying artifacts and painted decoration (Awe et al. 2005).

In the Maya region, broken speleothems, particularly stalagmites and stalactites, were also used as "monuments outside of caves, cached at surface sites, and used in altar construction within caves themselves ... [They] were imbued with sacred qualities and likely functioned as portable symbols of the cave's power" (Rissolo 2005:358). In this context, it is of interest that several broken stalagmites were observed on walls at Cueva la Conga. Breakage did not appear to be fresh because of the subsequent mineral accretion on the break and could be coeval with the use of the cave.

Significance of Cultural Feature Distribution. Brady (1989) first proposed a distinction between twilight zone and dark zone activities in cave sites, suggesting that these zones may have been used differentially for public versus private rituals, respectively. At Cueva la Conga, the most elaborate and the densest occurrence of pictographs and three modified speleothems were in the relatively large space at the front of the main chamber and illuminated by low ambient light (the "twilight zone"). It is likely that these features were meant to be approached and seen easily, perhaps in some sort of public or group ritual. The unusual speleothems in this area would have added to a sense of awe in visitors.

In dark zones, which often consist of small alcoves and tunnels, the lack of space "would have limited ceremonies to one or a few participants" (Brady et al. 1992:77). This certainly would have been true of the small alcove where Speleothem 5 is situated; the space is too small for more than one or two people. Access to the figure is by way of hands and knees, and, once inside, an adult cannot stand upright, but must kneel or sit in close contact with the image in an area of deep darkness. This may have been deeply affecting and perhaps frightening to the people who had to view it by torchlight. The image's location points to its association with a very private and individualized activity. Other very dark spaces at the back of the main chamber contain small, usually single and relatively simple images, indicating multiple individual and perhaps quick visits to the cave. The pictographs in these locations are stylistically very different from the gallery of paintings at the front of the cave.

The handprints and smudges and the absence of other motifs in the tunnel may mark individual passage to and through what must have been an often-frightening experience in a very dark environment. Stone (1995:37–38) has discussed the transformational aspect of caves in Mesoamerican lore—"what passes through is recognized as having undergone a profound transformation," and, relative to rites of passage, "caves provide the perfect setting for separating, spatially and psychologically, the individual from his or her former social existence" (Stone 1995:38). Cave tunnels, such as that at Cueva la Conga, must have seemed a literal, as well as metaphorical, passage to another world. Handprints could have thus marked some personal rite of passage.

Discussion and Summary

Investigation regarding the ritual use of caves, especially in Mesoamerica, has come into its maturity in the last 20 years. New information and considerable nuance have been added to previous understanding regarding use of space and landscape and the integration of ritual into many facets of daily life, and has allowed a reinterpretation of artifact and settlement patterning in and around caves (e.g., Brady and Prufer 2005). Numerous limestone caves used for rituals (many with rock art and modified speleothems) have been well documented archaeologically among pre-Columbian peoples to the north of Nicaragua, including especially the Maya of the Yucatán Peninsula, Belize, and Guatemala, other groups of Central Mexico, and in non-Maya areas of eastern Honduras (Awe et al. 2005; Brady et al. 1995; Fitzsimmons 2005; Moyes 2005; Rincón 2005; Rissolo 2005). A number of authors have explored the importance of the cave-ritual complex (e.g., Brady 1989; McNatt 1996; Stone 1995), and Brady and Prufer (2005:8–9) have concluded that for Mesoamerican people "the use of caves is and has been a fundamental part of their social life."

Caves were not just places where certain rituals took place, but were themselves hallowed spaces, filled with sacred meaning. Morales and Quesenberry (2005:38) note that caves act as

"sacred portals to the underworld ... through which the different levels of existence could be traversed. These are liminal spaces where the various planes—including temporal planes—of the world merge and are thus accessed via carefully orchestrated ritual." In Maya life, for example, "[R]itual specialists mediated the relationships between earth-focused spiritual forces and society," both for political authority and in daily life, and caves "represent the principal locations that reinforced the ability of ritual specialists to negotiate power relationships within communities in a variety of ways" (Prufer 2005:215). As portals to the underworld, caves were frightening places inhabited by fearsome supernatural entities and sometimes associated with sorcery (Prufer 2005:198; Vogt and Stuart 2005:176-177).

Caves were also often seen as places of creation, the origin of certain indigenous groups and gods (Heyden 2005:22-23). Vogt and Stuart (2005:156) have also pointed out the conceptual link in the Maya region between mountains and caves and a community's essential connection to the earth. In Mesoamerica, caves generally were and are associated with fertility. Among the contemporary Nahua, "mountains and caves appear to be metaphorical sexual organs closely linked to crop and human fertility (Sandstrom 2005:55). Caves were also conceived of as sources of rain and thus associated with fertility in a different way (Fitzsimmons 2005; Vogt and Stuart 2005).

There is thus ample evidence in nearby regions that caves were sacred ritual spaces. While we do not yet know the exact cultural or archaeological affiliation of Cueva la Conga, we can reasonably postulate that local people attached similar, if not identical, significance to the cave and that painting and speleothem modification, perhaps by ritual specialists, were integral to local cave ritual.

While karst caves with rock art have been widely reported in Mesoamerica, as well as in eastern Honduras, Cueva la Conga is the first karst cave with pictographs and modified speleothems recorded in Nicaragua, thus extending our knowledge of such ritual use of karst caves to the southernmost point yet found on the Mesoamerican periphery. The analyses presented here have also produced the first dates for pictographs in Nicaragua, ranging from cal A.D. 680–905 to cal A.D. 1440–1520, and are the first, to our knowledge, to produce dates produced from charcoal intermingled with ochre as part of the paint matrix. Both the range of radiocarbon dates and the stylistic variations in pictographs at Cueva la Conga evidence intermittent visitations to this cave for almost 1,000 years from at least the seventh century A.D. until just before and perhaps shortly after the time of Spanish contact. More intensive and perhaps public rituals may have occurred during the earliest period, as evidenced by more extensive and elaborate motifs in the front of the cave, where the oldest dated pictograph is located. Later visitations were probably more punctuated individual enterprises, given the relatively simple nature of the motifs located in the dark zone toward the rear of the cave, as well as the numerous handprints in the tunnel.

The motifs and features recorded at Cueva la Conga attest to a fairly complex ritual life for the people of this locale, although, because of the scant artifacts found at the site and the lack of nearby archaeological survey, little more can now be said about local community patterns or material culture. While individual motifs found within the cave are equivocal at this point with regard to specific cultural affiliations, the karst/pictograph/modified speleothem complex, its geographic location, some iconographic similarities with paintings in Honduras, and Fletcher et al.'s (1993) ceramic evidence all indicate that we may want to first look to the north for the closest cultural influences or connections for Cueva la Conga, although much more research is necessary. In any case, given the long timeframe of use and stylistic differences in the motifs, it is likely that more than one cultural group used or visited the cave during its history. The rock art at the cave also adds to an increasing database of images in Nicaragua that may in the future help to distinguish cultural influences from the north and south and/or distinctive local and regional styles. Cueva la Conga has provided baseline information that, hopefully, will contribute to our growing understanding of regional and Nicaraguan prehistory, but more archaeological survey and excavations in the area are badly needed to provide the comparative and concrete data to establish a firm cultural context within which to place the rock art and cave use found at Cueva la Conga.

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Data Availability Statement. A complete digital copy of the data presented in this article is available upon request to the authors: suzannebaker@ahc-heritage.com or rarmitage@emich.edu.

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Notes

1. Speleothems are a generalized term for natural limestone formations. They have been defined as "any secondary mineral deposit formed by water" (Gary et al. 1972:679).

2. Much of the significant previous archaeological work conducted in Nicaragua has focused on Pacific Nicaragua, especially the Rivas peninsula, a part of the Greater Nicoya Archaeological Subarea (Healy 1980; Lange et al. 1992; McCafferty 2011; Steinbrenner 2010). Because of this and because there were relatively late-arrived, Mesoamerican-derived populations inhabiting that area at the time of Spanish conquest, the question of Mesoamericanization and Mesoamerican influence has been an important focus of study (Lange 1984; McCafferty 2011; Steinbrenner 2010). Although parts of precolombian Nicaragua appear to have absorbed influences from both south and north, archaeological evidence also indicates that there have been highly varied local cultural developments (Lange 1984; 1986). Recent research is also calling into question assumptions about the intensity and impact of Mesoamericanization and revealing considerable cultural continuity from earlier periods (McCafferty 2011; Steinbrenner 2010).

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