

# Calendrical glyphs and their use in the Olmec-style cave paintings of Oxtotitlán

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*A set of six cave paintings from Oxtotitlán in Guerrero, Mexico are re-interpreted as calendrical glyphs associated with the 260-day sacred Calendar Round. An examination of their imagery and their placement within Oxtotitlán cave suggests that these rock paintings were used to denote the calendrical names of local rulers or their divine ancestors.*

This paper presents comparative iconographic data indicating that a series of six Olmec-style rock paintings from Oxtotitlán cave in Guerrero, Mexico, represented day names found in the sacred 260-day Calendar Round (*tonalpohualli* in Nahuatl; *piye* in Zapotec). The importance of such divinatory calendars among the pre-Hispanic peoples of Central Mexico is well documented. The use of the 20 day names and 13 numerical coefficients associated with the 260-day calendar has been observed in Zapotec inscriptions from Monte Albán I through Monte Albán III (100 BC - AD 800) contexts in the Valley of Oaxaca and may date back to the Middle-to-Late Formative period at San Jose Mogote (500-300 BC) (Marcus 1992, 35-37). Similar calendrical dates may have been used in the related Middle Classic period (AD 400 - 900) Ñuiñe script of the Mixteca Baja (Moser 1977, 151-168; Rodríguez Cano 1999, 31).

At Teotihuacán, a number of glyphs with numbers have been identified as possible day names (Caso 1966, 140-141; Taube 2000, 6). By the Late Postclassic period, both Mixtec and Mexica scribes transcribed divinatory day names into various codices in order to forecast the fates of people born on particular dates (for example, Sahagún 1989, 23-24) or to trace the genealogy of various rulers (Caso 1965a, 955-956; Marcus 1992, 234-237). Despite its great antiquity and widespread use in Central Mexico, there has been relatively little information on whether the 260-day divinatory calendar was present among the Early-to-Middle Formative period peoples of the region and associated with Olmec-style art.

To address this question, some scholars have attempted to reconstruct the day names used by Formative period peoples by creating an 'Olmec' sacred calendar using ideal types for the day signs reconstructed from Olmec, early Classic Maya and early Zapotec (Monte Albán I) monuments found in many different parts of Mesoamerica (for example, Edmonson 1986, 81). Besides this attempt, a few examples of calendrical inscriptions using the Maya long count system have been documented in the southern Gulf Coast lowlands and Chiapas but occur primarily in association with the Epi-Olmec or Isthmian script of the Late Formative period (Coe 1957, 1976; Pahl 1981; Piña Chan 1993).

Evidence for the 260-day calendar has also been found on the Gulf Coast at the site of San Andrés, located a few kilometers to the northeast of La Venta in Tabasco, Mexico. Consisting of a cylinder seal and a greenstone plaque dated to the Middle Formative period (c. 650 BC), the San Andrés artefacts seem to bear evidence for the day-sign *ahau* or 'lord' (Pohl *et al.* 2002, 1985-1986). Although these researchers emphasised its close affinity to later Classic Maya day names, Oaxacan cognates for the Olmec glyphs were found as well.

David Grove (1970a, 46-48; 1970b, 19-20) also asserted that Painting 3 from Oxtotitlán cave in Guerrero, Mexico may represent the day name *cipactli* or 'alligator' based on its general reptilian appearance and the presence of numbers rendered as dots. In the absence of any further evidence, however, he was not able to confirm the identity of this possible calendrical glyph or determine its use at Oxtotitlán.

Fortunately, recent examinations of the corpus of Olmec-style rock paintings from Oxtotitlán cave permit the re-assessment of this cave painting and its neighbours as calendrical inscriptions and the interpretation of their potential use, based on Late Formative and Classic period analogies drawn from the Zapotec *piye* and its Ñuiñe counterpart, as calendrical names for rulers or royal ancestors.

Given the geographic proximity of Oaxaca and Guerrero and the relative antiquity of the Zapotec use of day names (Urcid 2001, 278), such a diachronic comparison with Oaxacan glyphs seems to offer the best chance of finding meaningful correspondences. I begin by detailing the setting of the rock paintings within Oxtotitlán cave.

Oxtotitlán is one of three cave sites in eastern and central Guerrero with Olmec-style rock paintings (Gay 1967; Grove 1970b; Gutiérrez and Pye 2008; Villela 1989). Overlooking the Río Atentli valley in the Sierra Madre del Sur, the cave appears to have been a ceremonial site attached to Middle Formative period (900-500 BC) settlements located a few hundred metres away on Cerro Quiotepec (Schmidt 2003, 2005) (Figure 1).



Figure 1: Photograph of Cerro Quiotepec and the Río Atentli Valley (Image Copyright: Arnaud F. Lambert)

Oxtotitlán is a shallow travertine cave and its entrance consists of two large grottos (Figure 2). The north grotto contains fourteen black and black-and-red paintings. These compositions contain many themes (including, for example, jaguar and serpent imagery) and images (such as human figures with physiognomic features like almond-shaped eyes, faces in profile view and bodies in frontal view) which correspond to examples of Olmec-style art from other parts of Mesoamerica and can therefore be traced to the Middle Formative period, 900-500 BC (Grove 1970a, 1970b; Lambert 2012).

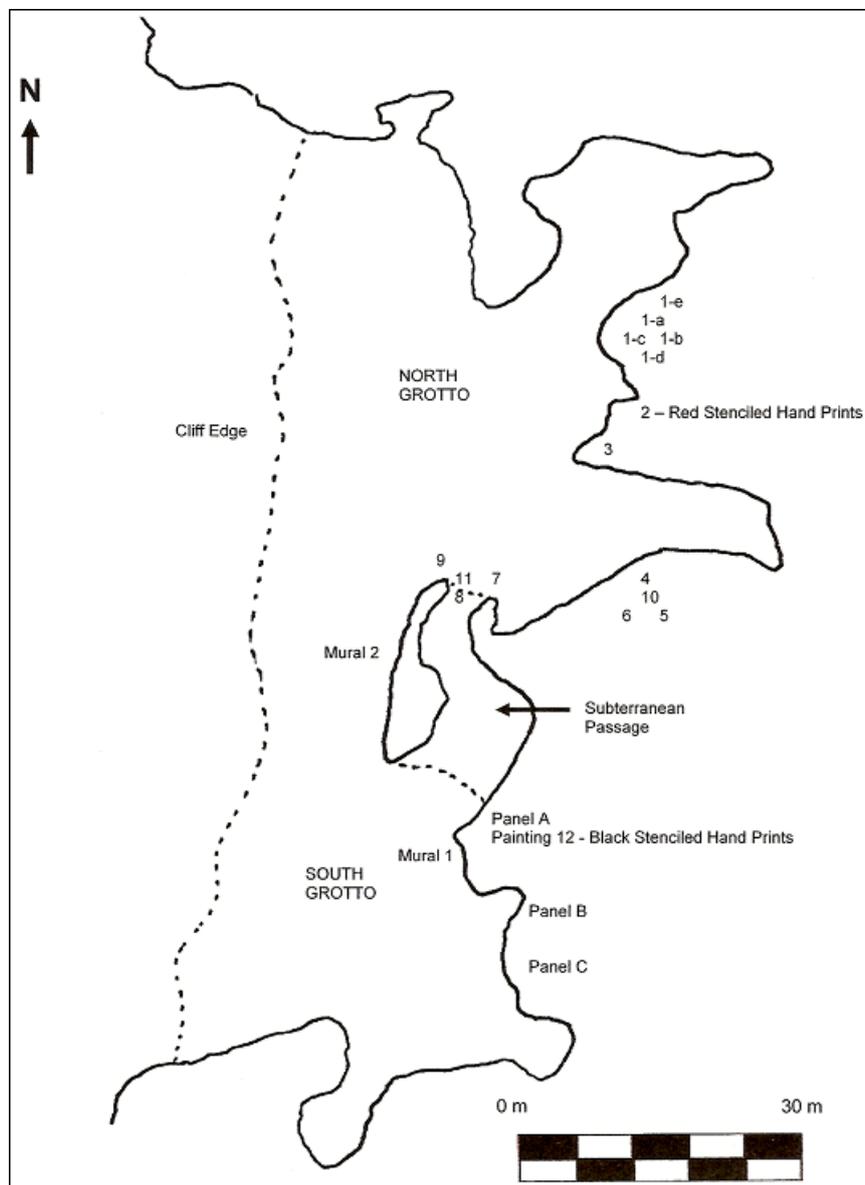


Figure 2: Map of Oxtotitlán cave, showing the location of the different grottoes and various rock paintings  
(Image Copyright: Arnaud F. Lambert)

The two polychromatic murals situated on the cliff face between and above the grottoes are also depicted in the same style (Figure 3). Although some of the red paintings from the south grotto, such as Painting A-3, are reminiscent of Classic and Postclassic period depictions of rain gods (Grove 1970b, 26), the majority of the rock paintings in the south grotto form geometric designs and are more difficult to date. Only one of these red cave paintings, Painting A-1, appears to date to the Middle Formative period and may be a toponymic glyph (Lambert 2013).



Figure 3: *Photograph of Oxtotitlán Mural 1* (Image Copyright: Arnaud F. Lambert)

The six cave paintings under consideration in this paper are all found on a rock outcrop facing the southern wall of the north grotto and consist of five small black paintings which make up the Painting 1 cluster as well as Painting 3 (Figures 4 and 5). They provide evidence for the use of a Middle Formative period variant of the 260-day sacred Calendar Round on the basis of comparisons with both Late Formative period and Classic period Oaxacan conventions regarding the imagery of the day-signs and the depiction of their associated numerical coefficients.

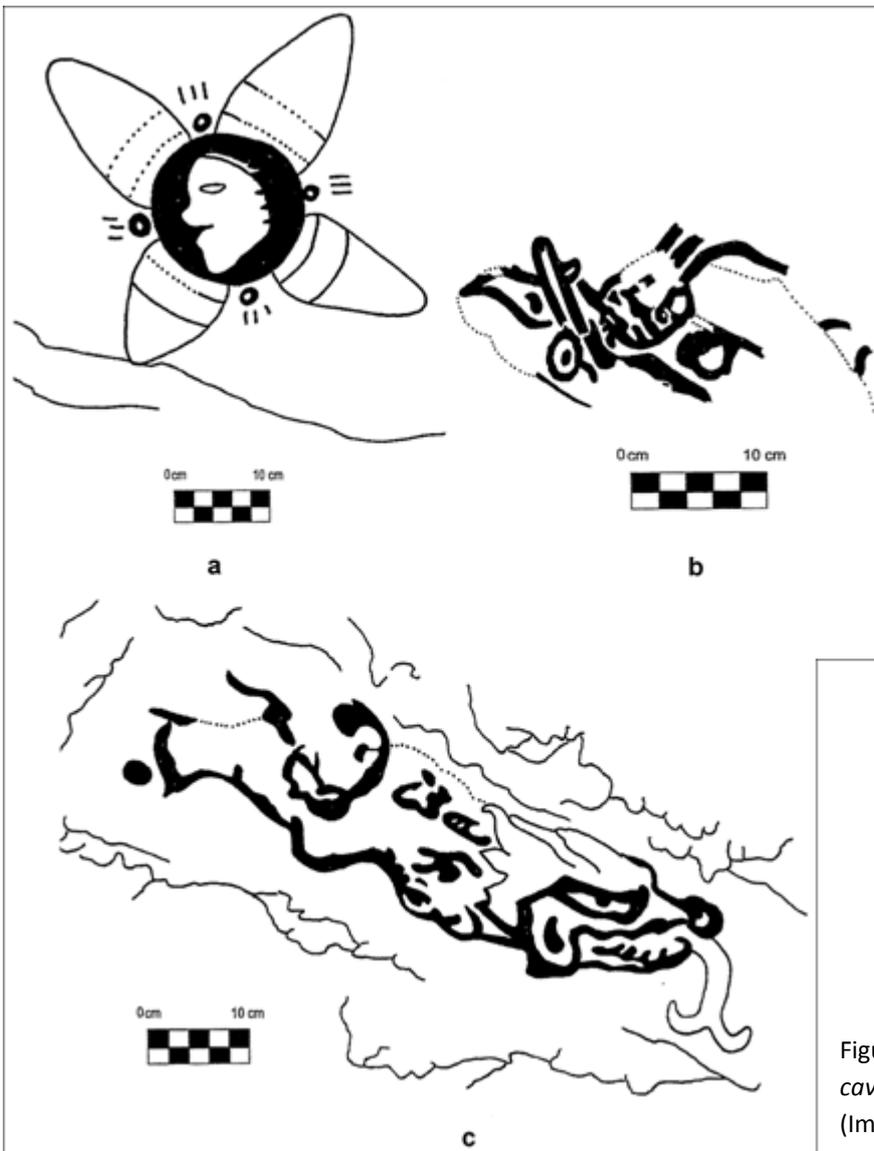


Figure 4: Scale drawings of the Oxtotitlán cave Painting 1-a (a), 1-b (b) and 1-c (c) (Image Copyright: Arnaud F. Lambert)

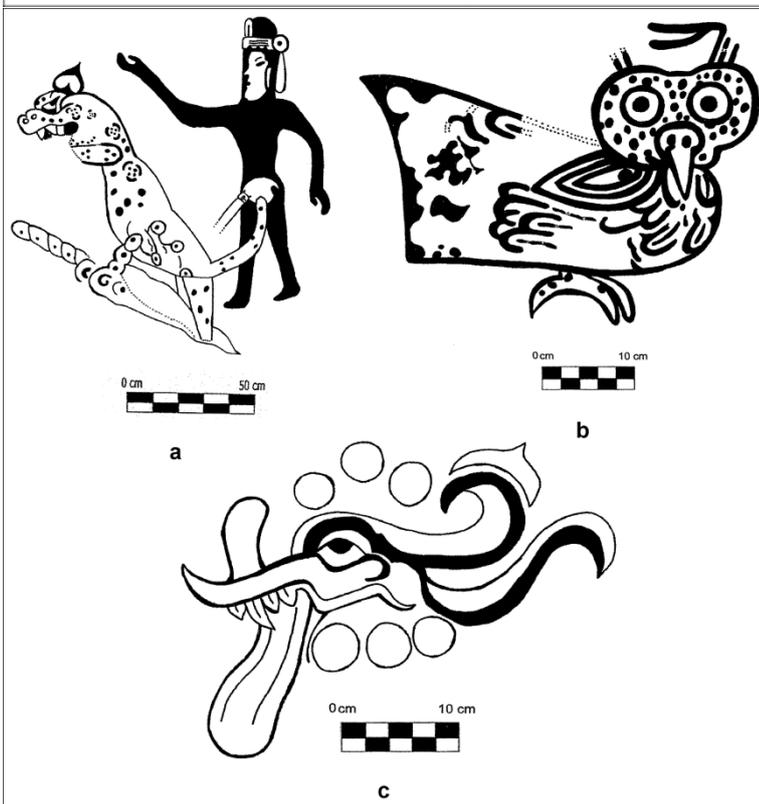


Figure 5: Scale drawings of the Oxtotitlán cave Painting 1-d (a), 1-e (b) and 3 (c) (Redrawn after Figure 15 in Grove 1970b, 19) (Image Copyright: Arnaud F. Lambert)

In addition to the use of ethnohistoric and archaeological analogies, the presence of numerals has historically played a major role in the identification of day names in various Mesoamerican scripts (see Caso 1965b; Marcus 1992; Moser 1977; Taube 2000; Urcid 2001) although there are sculptural contexts in which day signs can occur without numbers (for example, Figure 5 in Caso 1965b, 932-934).

At Oxtotitlán, numerals are present on at least four of the six cave paintings. The four punctate circles in Painting 1-a (Figure 4a) are similar to the dots used to indicate single digits in both the Classic Zapotec and Ñuiñe scripts (Figure 4.18 in Marcus 1992,128; Figure 71c in Moser 1977, 154). Although an exact tally is difficult because of their similarity to the spotted pelage of the jaguar depicted in Painting 1-d (Figure 5a), the punctate circles in this cave painting may represent the numbers seven or eight. A complicating issue with this composition is whether the set of punctate elements near the base of the jaguar corresponds to a bar design, a conventional symbol for representing the number five in early Oaxacan scripts (Marcus 1992, 96).

Painting 1-c (Figure 4c) by contrast is accompanied by a single solid circle near its tail. This figure may denote the number one. As mentioned previously, David Grove first noted that the number six was represented by six outlined circles or dots in Painting 3 (Figure 5c).

A diachronic examination of the imagery associated with each of the cave paintings in relation to the day signs used in the reconstructed ‘Olmec’ calendar (Edmonson 1986), Early and Classic Zapotec scripts (Urcid 2001), the Middle Classic period Ñuiñe script (Moser 1977; Rivera Guzmán 2008; Rodríguez Cano 1999) and the Mexica *tonapohualli* (Caso 1971) also supports their interpretation as day names (Figure 6).

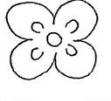
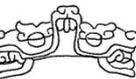
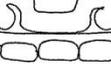
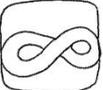
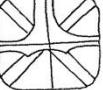
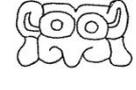
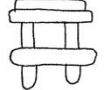
Oxtotitlán Paintings	“Olmec” (Edmonson 1986)	Early Zapotec (Urcid 2001)	Classic Zapotec (Urcid 2001)	Ñuiñe (Moser 1977)	Ñuiñe (Rivera Guzmán 2008)	Mexica (Caso 1971)	English Translation
900-500 BC	600-200 BC	500-100 BC	AD 400-800	AD 400-900	AD 400-900	AD 1350-1550	
							Lord / Flower
							Alligator
							Serpent
							Jaguar
							Night / House
							Lightning / Wind

Figure 6: Comparison between ‘Olmec’, Zapotec, Ñuiñe and Mexica day names and the cave paintings of Oxtotitlán (Image Copyright: Arnaud F. Lambert)

Painting 1-a (Figure 4a; Figure 7), for instance, consists of a circular area painted in black in the centre of which is silhouetted the profiled face of a human figure. Around this circular area, four 'petals' radiate outwards in a manner similar to the petaloid design on an Early Formative period sello from Tlatilco (Figure 2a in Kelley 1966, 745). As noted earlier, this cave painting is accompanied by four small punctate circles located between each of these petals.



Figure 7: Photograph of Oxtotitlán Painting 1-a (Image Copyright: Arnaud F. Lambert)

In both Zapotec and Núiñe writing, the day name 'lord/flower' is depicted with a day sign consisting of either a flower or a human head (Moser 1977, 168; Figure 8 in Rivera Guzmán 2008, 124; Urcid 2001, 225) although over time there appears to have been a general trend towards favouring the use of the flower day sign, especially in the Postclassic Mexica codices. A similar image is found in the reconstructed 'Olmec' calendar but has its origin in Monte Albán II glyphs from Oaxaca (Figure 1t in Edmonson 1986, 82). Oxtotitlán Painting 1-a can therefore be interpreted as representing both meanings of this day name in a single symbol.

Painting 1-b (Figure 4b; Figure 8) may depict a highly stylised zoomorphic face. It consists of a linear upper jaw with two fangs shown in profile. Above the mouth area, a crescent-shaped eye can be discerned topped by a circular motif containing a cross-band and three tassels. These correspond most closely to Central Mexican depictions of the 'alligator' day name as seen in the Zapotec glyph V (Urcid 2001, 218-220), Núiñe glyphs R3 or R23 (Figure 8 in Rivera Guzmán 2008, 123; Figure 10 in Rodríguez Cano 1999, 25) and the Mexica *tonalpohualli* (Figure 1a in Caso 1971, 334).



Figure 8: *Photograph of Oxtotitlán Painting 1-b* (Image Copyright: Arnaud F. Lambert)

By comparison, the closest cognate in the idealised ‘Olmec’ calendar is a cruciform symbol (Figure 1d in Edmonson 1986, 82) which appears to have been based solely on the modern Tequistlatec (Chontal) word for ‘lizard’ (not ‘alligator’) although the author does not provide empirical support for the linkage of this word with the symbol other than noting its occurrence in Olmec art.

Occasionally referred to as a ‘dragon’ (Joralemon 1976; Niederberger 2002), Painting 1-c (Figure 4c) depicts a composite creature with serpentine, saurian and avian attributes. These iconographic elements include feathers, a bifid tongue, flame eyebrows and a multi-fanged mouth. In addition, a single black circle is visible behind the painting. Analogous features are also seen in the Zapotec glyph Y (Urcid 2001:253), Ñuiñe glyph R8 (Figure 8 in Rivera Guzmán 2008, 123; Figure 10 in Rodríguez Cano 1999, 25) and Mexica (Figure 1e in Caso 1971, 334) representations of the ‘serpent’ day name.

While this day name is often shown in its emblematic form as a disembodied head in Ñuiñe art (Moser 1977, 167), there are variants of Zapotec glyph Y which depict the entire body of the serpent (Urcid 2001, 226). Not surprisingly, because it too is based on Oaxacan prototypes, the idealised ‘Olmec’ symbol for the ‘serpent’ day name closely parallels those found in Zapotec art (see Figure 1e in Edmonson 1986, 82).

Painting 1-d (Figure 5a; Figure 9) represents a human figure standing behind a feline zoomorph. The standing figure is painted completely in black except the face, certain elements of the headdress and the groin area. While the figure’s torso is depicted in frontal view its limbs and head are shown in profile. The figure’s face is executed in a manner reminiscent of Painting 1-a and consists of a small slit-like eye and downturned mouth.



Figure 9: *Photograph of Oxtotitlán Painting 1-d* (Image Copyright: Arnaud F. Lambert)

The feline, possibly a jaguar, is shown in a standing position with its right hind leg resting on a series of diagonally-oriented scroll-like designs. The entire jaguar is shown in profile and its body is decorated with spots, some of which arranged in a pattern of four dots and three arcs. The jaguar's head consists of a rounded snout, triangular eye, heart-shaped ear and an open mouth containing three teeth.

Some researchers have posited that there is a sexual connection between the jaguar and the standing figure (Brady 1988, 51; Grove 1973, 134), recalling Stirling's provocative hypothesis (1955) that similar images reflected Formative period creation myths depicting the copulation of human elites and jaguars. Although such mythological origins are suggested by the linear element which seems to emanate from the standing figure's groin, it is equally likely that the jaguar may represent the animal alter-ego of an elite personage

(Foster 1944; Gutiérrez and Pye 2010). From this perspective, the linear element stretching from the human figure towards the jaguar may simply be a graphic device to show a connection between the two beings.

A third alternative, not entirely exclusive of the second, is that the jaguar represents the figure's calendrical name and that the linear element was intended to link the day name to the human figure in a manner reminiscent of the Postclassic Mixtec codices (for example, Figure 7.9 in Marcus 1992, 203). Certainly, the use of a feline head to represent the day name 'jaguar' was common throughout Central Mexico (see Figure 6) but full-bodied representations are limited to rare variants of Zapotec glyph B from the Monte Albán IIIa phase (AD 200-450) (Urcid 2001, 160) and to some Ñuiñe representations of glyph R15 (Figure 8 in Rivera Guzmán 2008, 124). It is therefore likely that Painting 1-d exemplifies a relatively uncommon way to depict the 'jaguar' day name.

Painting 1-e (Figure 5b) is comprised of a naturalistic depiction of an avian zoomorph, possibly an owl. Parts of the body, especially its tail, are difficult to discern but its major features are clear. The head of the zoomorph is shown in frontal view; while the body is rendered in profile. The head is cocked at a slight angle and has two feathered horns. Similar representations of avians occur in Olmec-style sculptures, such as Tak'alik Ab'aj Monument 9 (Orrego Corzo 1990, 85) and Tres Zapotes Monument H (Stirling 1943, Plate 11a).

This cave painting is particularly close to Central Mexican depictions of the day name 'night'. Although sometimes conflated with the day sign for 'house' (for example, Figure 1c in Caso 1971, 334; Figure 1c in Edmonson 1986, 82; Moser 1977, 167), in Oaxaca the day signs for 'night' are most frequently portrayed as owls shown in frontal view. Examples include Zapotec glyph F (Urcid 2001, 176) and Ñuiñe glyph R5 (Figure 8 in Rivera Guzmán 2008, 123; Figure 10 in Rodríguez Cano 1999, 25).

Originally located on the ceiling of the north grotto, Painting 3 (Figure 5c) was subsequently removed and is currently located at the regional *National Institute of Anthropology and History* (INAH) centre in Chilpancingo, Guerrero. This cave painting shows the profile head of a composite creature with a long pointed snout, sharp teeth, a large tongue, an elongated eye and scroll-like designs on the back of its head. Above the head, there is a series of three circles which mirror another set of three circles underneath the head. These circular elements may represent numerals. Although he originally interpreted the cave painting as an example of the *cipactli* or 'alligator' day sign, Grove later suggested a link with Classic period depictions of Quetzalcoatl in Teotihuacán (1970b, 19) but stopped short of a more definitive interpretation.

I believe his second hypothesis was essentially correct. Based on its physiognomic features, it seems that Painting 3 most closely resembles Central Mexican representations of the 'lightning' day name. Often pictured in the form of glyph M (Urcid 2001, 191) and Ñuiñe glyph R4 (Rivera Guzmán 2008, 123), these images detail a zoomorphic face with an oversized maxilla, large fangs and a large nasal stub that points back towards the eyes of the figure. Furthermore, there appears to be a historical relationship between the features of Zapotec glyph M and the buccal mask used to represent *Ehecatl* (an aspect of Quetzalcoatl), the Mexica symbol for the day name 'wind' (Figure 1b in Caso 1971, 334; Urcid 2001, 138, and Figure 4.41 in 144).

Given their overall similarity to Late Formative and Early Classic period Zapotec depictions of day names, it seems reasonable to search the central valley of Oaxaca for archaeological and ethnohistoric analogies regarding the use of these calendrical glyphs. Among Oto-Manguéan speakers, particularly the Zapotecs and Mixtecs, calendrical glyphs for day names and their associated numerals had two separate functions (Urcid 2001, 79). In some contexts, they served as chronological symbols, making reference to a conventional system of time-reckoning like the 260-day sacred calendar (*piye*) or the 365-day solar calendar (*yzā*) (Marcus 1992, 127).

As demonstrated by Monte Albán Stelae 12 and 13, these chronological notations are frequently encountered with short inscriptions and/or year-bearers (Caso 1965b, 933; Marcus and Flannery 1996, 161). In other instances, calendrical glyphs had a nominative value, referring to individuals and/or their ancestors based on their birth date according to the 260-day calendar (Marcus 1992, 125-126; Marcus and Flannery 1996, 214-215). Often calendrical names are found alone or in the context of human figures representing the person being named in the inscription, such as the mural from Tomb 105 in Monte Albán (Figure 7.11 in Marcus 1992, 208).

In addition to the nominative character of the jaguar image in Painting 1-d (Figure 5a; Figure 9), the setting of the cave paintings at Oxtotitlán provides a number of contextual clues regarding their probable function at the site. All of the cave paintings are small, ranging in size from 25 to 40 cm (Grove 1970b, 13-20) and were produced by brushing the designs onto the travertine rock surface of the cave. Although they were produced within the same general area, there were no observed instances of superimposition in this cluster of rock paintings such that an unmarked section of the cave appears to have been selected each time a new composition was added to the rock wall.

The favoured locations for the paintings were either near-vertical surfaces that face west or south toward the entrance of the cave, or the ceiling of the cave. Thus, both the size of the cave paintings and their isolated locations indicates that access to them was restricted to a privileged few.

In addition, each of the cave paintings seems to be self-contained and does not appear to have been part of a larger mural or text, further suggesting that they were not intended to be viewed by large audiences. Taken together, these characteristics of the rock paintings suggest that they were used as calendrical names, possibly referring to either local rulers from the communities on Cerro Quiotepec or, given the sacred locality of the cave, their divine ancestors.

The identification of the six Olmec-style cave paintings from Oxtotitlán as calendrical glyphs in this paper was based primarily on similarities with later Central Mexican writing systems, particularly the Late Formative and Early Classic period Zapotec script. The calendrical glyphs found at the cave include: 4 Lord/Flower (Oxtotitlán Painting 1-a), ?? Alligator (Oxtotitlán Painting 1-b), 1 Serpent (Oxtotitlán Painting 1-c), 7 or 8 Jaguar (Oxtotitlán Painting 1-d), ?? Night (Oxtotitlán Painting 1-e) and 6 Lightning (Oxtotitlán Painting 3).

Although not all of the cave paintings had numerical coefficients, their imagery closely resembled day signs associated with day names in the Zapotec 260-day calendar, suggesting that the cave paintings of Oxtotitlán came from a separate but related Middle Formative period (900-500 BC) iteration of the 260-day sacred Calendar Round.

An examination of the cave context of the rock paintings also bore a number of correspondences to ethnohistoric and archaeological uses of such glyphs as calendrical names in the Zapotec script. These findings implies that the use of calendrics in privileged locations such as caves was one of the means by which Middle Formative period rulers in Central Mexico asserted their social status in the community.

Whether these strategies were analogous to later Classic period practices in which Zapotec rulers referred to their divine ancestors or used calendrical names as part of rituals of royal accession (Marcus 1992, 325-328) has yet to be determined but such intriguing possibilities offer many new areas of research into the relationship between Olmec art, writing and governance.

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