

ASTRONOMY, LANDSCAPE, AND IDEOLOGICAL TRANSMISSIONS AT THE COASTAL MAYA SITE OF CERROS, BELIZE

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The Maya site of Cerros, located on the Caribbean coast of Belize, was part of an early coastal trading network that linked the New River with Chetumal Bay and regions beyond. This site situated directly on the coast included a port and very early architecture that probably was used to formulate an early horizon calendar by observing the sun as it moved from the land to the lagoon, much like island to island alignments that helped people of the Caribbean navigate and make astronomical observations. This analysis uses the architectural history and landscape features to understand the development of the ideological system that began around the time one of the earliest pyramids was constructed at the site of Cerros, Belize between 50 BC and AD 150. Structure 5C marks a key point of the lagoon where an important agricultural date, the solar zenith, would have been naturally observed with the combination of the rising sun and the coastline. In a later building episode, Structure 4 was built with an orientation toward the solar equinox which suggests a new interest in calendrical precision, and an establishment of hierarchy at Cerros.

Le site maya de Cerros, situé sur la côte caraïbe du Belize, faisait partie d'un réseau de cabotage anticipé lié Que le New River avec la baie de Chetumal et les régions au-delà. Ce site est situé directement sur la côte inclus un port et l'architecture très tôt que, apparemment, a été utilisée pour formuler un calendrier d'horizon rapide en observant le soleil pendant qu'il se déplaçait de la terre à la lagune, un peu comme l'île des alignements insulaires qui ont aidé les gens des Caraïbes naviguer et faire des observations astronomiques. Cette analyse utilise l'histoire et les paysages caractéristiques architecturales de Cerros de comprendre le développement du système de expresaron idéologique construit au début des pyramides Entre 50 BC et AD 150. La première pyramide sur le site, Structure 5C, marque un tournant dans le paysage C'était idéal pour observer le lever du soleil au bord de la lagune sur le zénith du soleil, une date agricole important associé à la saison des pluies et les semis. Images sur les masques de décoration de ce bâtiment témoigne de l'importance des idées des observations du soleil dans leur religion et le calendrier. Dans un bâtiment de l'épisode plus tard, Structure 4 a été construit avec une orientation vers le soleil équinoxe, suggérer un nouvel intérêt pour la précision calendaire, et l'augmentation croissante des idées importance de la hiérarchie politique à Cerros.

El sitio maya de Cerros, ubicada en la costa caribeña de Belice, era parte de una red de cabotaje temprana que unía el Río Nuevo con la Bahía de Chetumal y de las regiones más allá. Este sitio situado directamente en la costa incluye un puerto y arquitectura muy temprano que al parecer se utilizó para formular un calendario de horizonte temprano observando el sol, ya que se trasladó desde la tierra a la laguna, al igual que la isla a isla alineaciones que ayudaron a la gente del Caribe navegar y realizar observaciones astronómicas. Este análisis utiliza las características de la historia y de arquitectura paisajística de Cerros de entender el desarrollo del sistema ideológico expresado en las primeras pirámides construidas entre el 50 aC y 150 dC. La primera pirámide en el sitio, la Estructura 5C, marca un punto en el paisaje que era ideal para observar la salida del sol en el borde de la laguna en el cenit solar, una fecha agrícola importante asociado con la temporada de lluvias y la siembra. Las imágenes proyectadas sobre las máscaras que adornan este edificio da fe de la importancia de las observaciones del sol en su religión y calendario. En un episodio posterior del edificio, Estructura 4 fue construida con una orientación hacia el equinoccio solar, lo que sugiere un nuevo interés en la precisión del calendario, y la creciente importancia de la jerarquía política de Cerros.

Introduction

The site of Cerros in Belize lies on a peninsula that served as an ideal location for fishing and travel during the late Preclassic (200 B.C. - A.D. 200), when the site achieved regional prominence. This ancient site was characterized by monumental ritual architecture, elaborate stucco masks, and a landscape composed of coastal terrain, lagoons, and a vast sky. Situated between Mexico, Guatemala, and the Caribbean Sea, coastal Belize has land features projecting along the coast, evoking comparison with the Caribbean islands, where the horizon is punctuated by land masses seen across a maritime water-dominated environment. Here, we argue that at Cerros the Corozal lagoon landscape led to the creation of architecture that was integrated in a ritual landscape that incorporated observations of the sky in the context of the local landscape. Over time, the subjective experience of this landscape would likely have played a large role in developing the ideological system associated with individual sites.

For a broader understanding of how the coastal setting of Cerros may have influenced development of their ideology, we turn to a brief discussion of astronomy in the tropical setting of the Caribbean islands. Studies made in the Caribbean area have demonstrated the important role astronomy plays in navigating from island to island, as well as the importance of observations of the sun and stars in the seasonal cycle of the tropics. For example, Charlotte Kursh and Theodora Kreps (1974) explored the starpaths formed by linear constellations in tropical navigation. And, Anthony F. Aveni (1981:161) points out that in the tropics, native astronomical systems have the horizon as a reference circle with the zenith overhead. The Island Caribs navigated by the sun and stars, as noted by an early source, Du Tetre (1667, II:399), who remarks that "...they never venture too far

away from the islands. If they cannot see the islands, they use the stars for orientation at night and the Sun during the day" (translation by Magaña 1996:245). Among the Carib of Surinam, Edmundo Magaña (1996:248-250) points out that stars used in navigation have declinations that fall within the solstice extremes and their positions are linked directly with the solstices. Magaña (1996:249-250) notes that the surinamian Carib conceptualized the sun's journey north and south along the horizon and the zenith passage of the sun in a similar fashion to the Island Caribs. The most important reference points for the Carib calendar were the solstices, marking the sun's seasonal passage between the extreme horizon positions in December and June, and the zenith passage of the sun, when it moves directly overhead at noon.

Early on, Raymond Breton (1666:365, 409) reported that the Island Caribs had numerous terms for the position of the solar zenith, indicating the seasonal passage of the sun directly overhead at noon (twice a year) was especially important. This can be seen on the day the sun casts no shadow at noon, which can also be marked by the horizon position of the sun at sunrise or sunset on that date. In an island setting, this may have been recorded by observing the sun's position along the horizon in relation to a landscape feature such as a distant island, or using an architectural structure designed to view the horizon position of the sun on the solar zenith. Evidence for such alignments among the Maya indicates that the architectural constructions allowed the sun's seasonal position to be marked with precision, even to the east where the sun rises over the Caribbean Sea.

The large island of Cozumel (20°41'N), occupied by the Yucatec Maya right up to the Spanish conquest in 1541, has a number of different sites that exhibit

architectural alignments for observing the sun at the solstices, and here the site of Buena Vista has an orientation that coordinates with the horizon position of the sun at the onset of the rainy season, falling about two weeks before the solar zenith (Šprajc 2009:Table 1). More precise zenith orientations are found inland at Chichen Itza (20°40'N; Milbrath 1999:65-70), a regional capital that controlled trading ports during the Terminal Classic period (A.D. 800-1000) at Cozumel. At both sites, the zenith orientations can be linked with an interest in the onset of the rainy season, which shows a similar pattern in northern Yucatan, where the rainy season runs from May through October, followed by a lengthy period November through April with very little rainfall. Since latitude determines the solar zenith date, it is noteworthy that a number of important Maya sites cluster just north of 20° latitude, where the first solar zenith in May most commonly coincides with the onset of the rainy season (Milbrath 1999:65-66, Pl. 1). At the latitude of Cerros (18°21'N), the solar zenith falls on May 14 or 15, and May shows the greatest increase in rainfall when compared with previous months. Data compiled on the web site of www.worldclimate.com (accessed March 15, 2014) for the area of Chetumal, very near Cerros, indicates that Chetumal exhibits a dramatic increase in May, when compared with previous dry-season months. The averages for a period of 197 months from 1961-1990 show that the average rainfall in March was only 19.9 mm and 26 mm in April, but in the month of May the increase was almost four-fold to 92 mm.

On the Caribbean coast of Yucatan at the site of Tulum (20°21'N), the solar zenith in May was also a focus of one of the most prominent structures directly on the coast constructed during the late Postclassic period (A.D. 1300-1500). The Temple of the Diving God (Structure 5), a small temple on a promontory overlooking the Caribbean,

faces the setting sun on the solar zenith, marking the beginning of the planting season in May. The east face has a window that channels a beam of light at sunrise to the interior on the winter solstice, illuminating the area directly below the diving god (Milbrath 1999:66-69). This window to the sea also could be used to view maritime transit that was synchronized with the seasonal cycle, for there is evidence of heightened trade during the dry season (November-April) when storms were less likely to disrupt long-distance transit (Milbrath 1999:62). Certainly there is abundant evidence indicated by the presence of non-local artifacts that the Maya traded along the coast via merchant canoes (McKillop 1996). Heather McKillop (2010:98) points out “control of the sea by the coastal and island Maya would have given them control of the production and distribution of maritime resources (such as salt, stingray spines, shells and seafood) and trade good from farther away.” She notes that there is evidence of early Maya canoe trade along the Caribbean coast, dating back well before the foundation of Cerros around 300 B.C. in the Late Preclassic. The coastal location of Cerros presents an interesting parallel with the landscape of the Caribbean islands, for the horizon is often marked by places where the water meets the land. The Preclassic Maya probably used astronomical observations for navigation along the Caribbean coast of Yucatan early on, and this may have developed out of an early interest in using astronomy to align their calendar rituals. Among the Maya, astronomy was important in developing their calendar. Evidence for early astronomical calendars is most notable at sites with Preclassic constructions known as “E-Groups” aligned to the equinoxes and solstices at a number of inland Maya sites (Aveni 2001:288-292), and here we present the first evidence of a similar focus on solar observations from a Preclassic site on the

coast. An E-Group may also be found along the coast at Cerros, but these structures have not been adequately studied to determine the precise alignments (Debra Walker, personal communication 2013). Measurements of other structures at Cerros by the lead author indicate significant astronomical orientations that may have been used in constructing their early calendar. One orientation to be discussed in greater detail below, involves the zenith sunrise over a distant landscape feature on the lagoon. This alignment over water to a land mass evokes comparison with zenith orientations in the Caribbean islands, used in seasonal calendars in the area.

Cerros was strategically located for far-reaching trade along the New River and Rio Hondo, leading out to Chetumal Bay and the Caribbean Sea. With direct coastal and river access, Cerros was ideally situated to act both as a seaport and a river port, allowing Cerros to become a dominant trading force during the Late Preclassic period (Reese 1996:1-3). Previous research focusing on the architectural landscape has incorporated natural features as important elements (Reese 1996), however, a unified cultural/natural diachronic landscape has not been considered at Cerros (see Barret 1999 and Gillespie 2008, for example). Kathryn Reese (1996) and David Friedel (2005) assumed that powerful kings controlled their subjects by enacting ritual activities in an architectural setting, giving power to this architecture by staging dramatic ritual events mirroring creation myths and celestial activity. How did Cerros become the center for such practices?

We take the perspective that the landscape was both cultural and natural, as opposed to a "Cartesian view" of the world that divides nature from culture. The landscape should be seen as mutually constituted of both cultural and natural features, without actual categorical divisions.. In most cases either nature or

culture is given analytical priority from a theoretical point of view (Latour 2004, 2013; Stengers 2011). A false division between nature and culture has been noted by early theoreticians, such as Alfred North Whitehead (1920:29-30). Analyzing both in tandem, informs our perspective, significantly modifying the approach presented in previous interpretations of the site of Cerros (Friedel et al. 2002; Scarbrough 1989; Walker 1990). Because natural landscapes are modified by cultural activities, and cultural activities are shaped by natural landscapes, we will explore the link between natural and cultural features through a materiality-based landscape perspective (Barret and Ko 2009; Hutson 2010). Our perspective focuses on the analysis the changing relationships between people and objects but also the phenomenological experience of objects, surfaces and landscapes (Ingold 2007). A materiality based perspective must consider how people make objects, but also how objects dialectically create social subjects (Barrett 1999; Miller 2005).

In our analysis, we consider the changing relationships between: Cerros' elite and non-elite inhabitants, the large public architecture at Cerros, the sky overhead, the land on which Cerros was built, and the encircling lagoon that positioned Cerros as a large and influential trading city. As we will see, imagery related to archaeoastronomy played an important role in defining the symbolic qualities of certain buildings, but there are also specific orientation features related to the landscape that determined the placement and orientation, and social significance of certain structures.

Site History

Cerros is located in northern Belize within Corozal District. The site lies on a small peninsula called Lowry's Bight in the eastern area of the Corozal Bay (Figure 1).

Cerros was primarily occupied during the Late Preclassic era, also known as the Late Formative (beginning 400 B.C.). Kathryn Reese (1996:3) notes that *Melongena melongena* mollusk remains found in the residential areas of the site show that a slow-moving lagoon characterized the Late

Preclassic environment. The presence of a Preclassic dock indicates the shoreline once lay only slightly further out. Lagoon resources were enhanced by the direct access to two nearby rivers: the New River and Rio Hondo, and the mouth of the Corozal Bay leading out to the Caribbean.

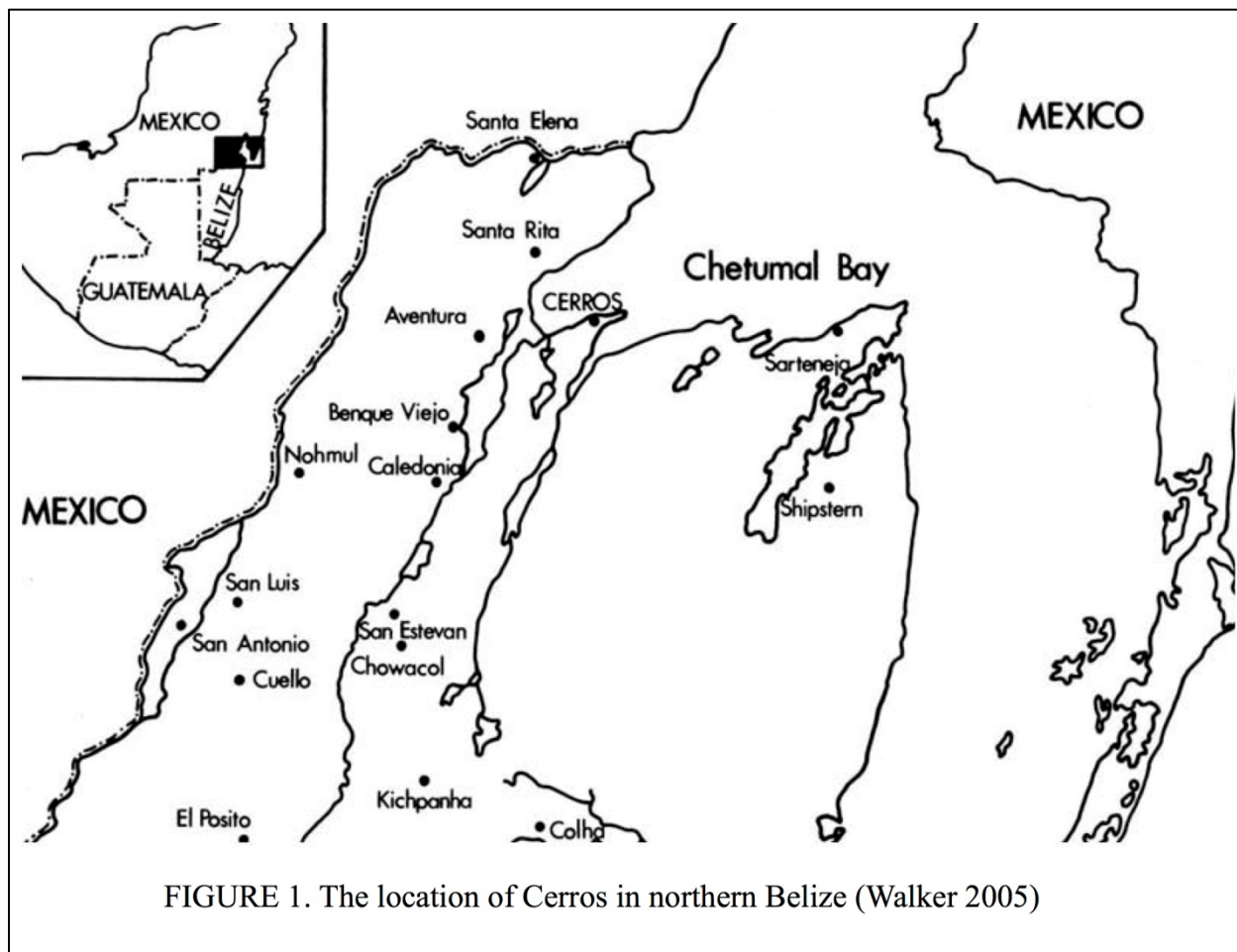


FIGURE 1. The location of Cerros in northern Belize (Walker 2005)

During the Late Preclassic period, Cerros was one of the largest settlement areas in the region. Scarborough and Robertson (1986) recorded 108 structures in a .69 square kilometer area. Intense occupation of Cerros began in the middle part of the Late Preclassic period (50 B.C.) and lasted until abandonment at the end of the Late Preclassic around 150 A.D. (Walker 2005). The site of Cerros covers an area of around one square kilometer. Although it

was large for the period, Cerros is generally considered a small regional center when compared to later Maya settlements. It is composed of a site core on the peninsula with pyramids, civic architecture, and a residential zone that encircles the core to the south. The residential zone consists of a built environment characterized by mounds lying upon a low flat terrain cut by an ancient canal that delimits the densest portions of the residential zones

(Scarborough 1991; Scarborough and Robertson 1986; Reese 1996:1-9). The residential area contains some large mounds that David Freidel (1986:105) describes as elite residences, as well as large publicly utilized monumental platforms (Reese 1996:5).

The civic center of the site was built over an earlier village. This area lies in the northern extreme of the site. This civic zone contains the largest architectural constructions and the highest density of structures at Cerros. The plaza area is characterized by four large masonry pyramids and associated platforms and plazas. The monumental architecture in this area of the site had exotic offerings found in caches, indicating elaborate ritual activities. Some of these large masonry structures were symbolically charged by the presence of elaborate stucco masks, which remain well preserved on one structure (5C-2nd).

Despite the site's seemingly short occupation, it has had a complex history. Debra Walker (2005:Fig. 12) illustrates that the monumental architecture at Cerros was built relatively quickly, over a span of 200 years, but not in a single episode. Two different building episodes are important for the astronomical analysis presented here. As the site was built up over this 200-year period, the astronomical orientations and symbolism associated with architecture were apparently transformed over time. These changes in the built environment must be considered in relation to the entire corpus of architecture and the general landscape.

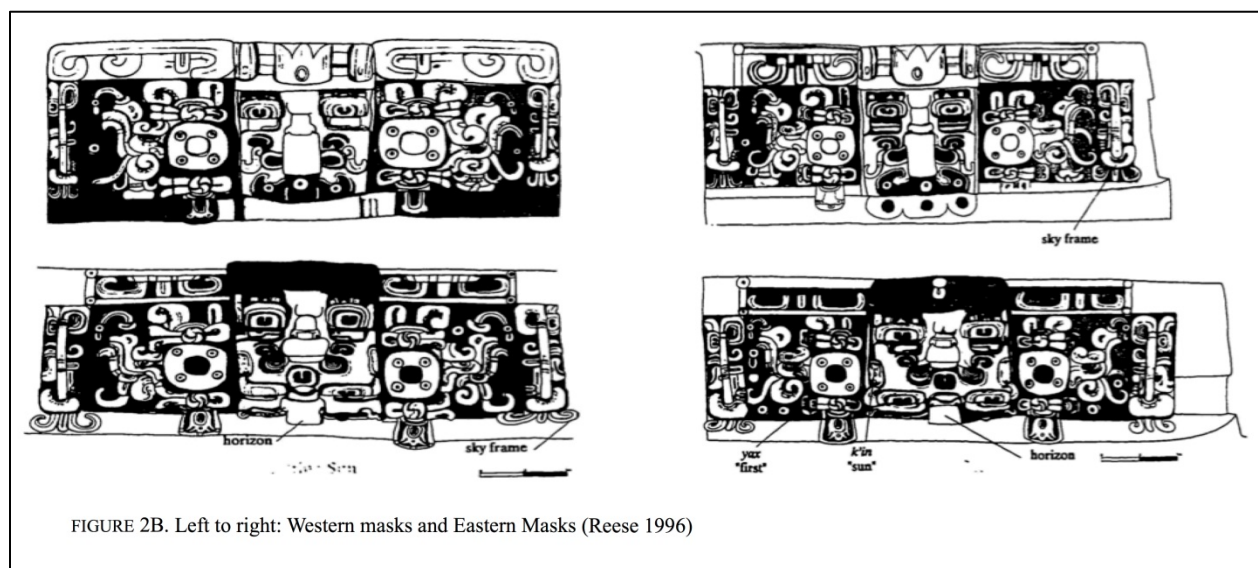
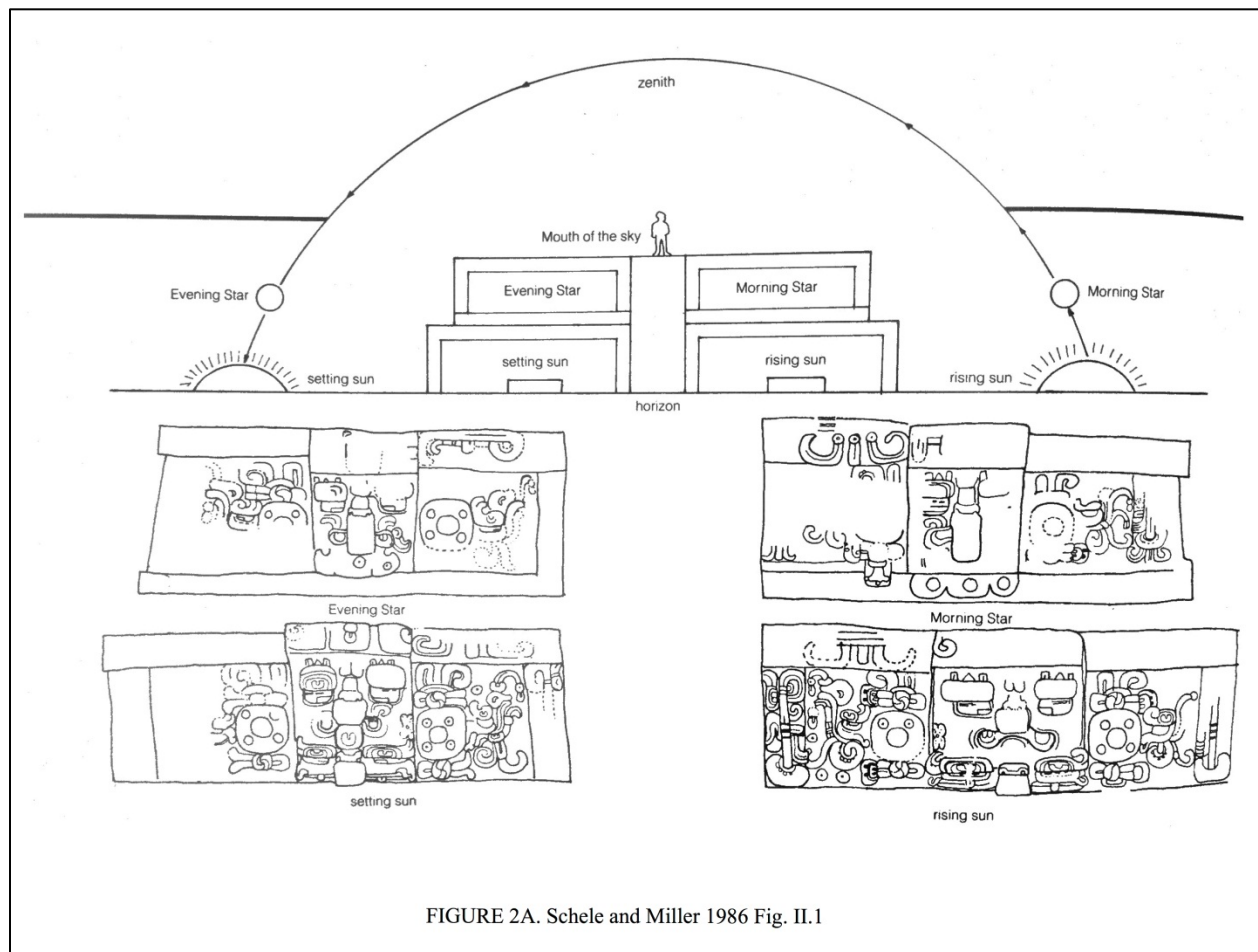
Stucco Masks and Structure 5C-2nd

The earliest major construction at Cerros is Structure 5C-2nd, best known for its dramatic stucco mask facades still visible today (Figure 2, now preserved under

reconstructed masks). This construction will be the focus of iconographic analysis, because it is the best preserved artistic program at the site, and it also overlies a substructure that may have been the first temple at the site, one that shows the importance of landscape in astronomical alignments at a very early time.

Glyphs and iconographic imagery often become the focal point for interpretation of ideology in the context of Maya architecture. In the case of Cerros, the large stucco masks played a different role than glyphic texts found on architecture. Reese (1996:98) notes: "In the Maya lowlands, architectural facades are distinct from stelae that display information about specific events. The masks primary function is to provide a contextual environment for an event." Architectural positioning can provide additional context, but it can also serve as a grander backdrop, such as a cosmic stage for the generation of local social-historic meaning. The Cerros masks can be compared with those at sites such as Kohunlich, and Nak'be which both contain similar large stucco masks framing the main staircase (Hansen 1992: Fig. 3.6).

As background to a more detailed discussion of the monumental reliefs and their astronomical significance, we begin by summarizing previous interpretations of the stucco masks, dating to the Tulix phase (50 B.C.-A.D. 150). In 1982, the excavation reports suggested that the lower masks depict the jaguar sun (night sun) and the upper masks represented Venus, with Venus shown as both morning and evening star accompanying the sun at dawn and dusk (Freidel and Scarborough 1982). As will be seen, the prominence of the solar deity on the façade may relate to the pattern of solar alignments detected at the site.



In the *The Blood of Kings*, Linda Schele and Mary Miller (1986:106-108: Fig.II.1) also describe the masks in terms of the horizon positions of the Sun and Venus (figure 2A). They note that the masks on the two tiers depict Venus and the Sun in their relative positions above the horizon (the morning star precedes the sunrise, while the sun sets before the evening star). They suggest a relationship to the landscape because Structure 5C-2nd is seen against the backdrop of the Caribbean so that the masks appear against of the sun rising from the sea in the east and setting into the sea in the west, with Venus in its dual aspect as the morning and evening star assuming a similar position (compare Figures 2A and 2B). They link the upper masks with Venus, with the eastern mask representing the Morning Star and the western mask the Evening Star, and the lower masks are identified as representations of the sun over the course of its daily journey from east to west. Schele and Freidel (1990:114, fig. 3.13) suggest that Structure 5C-2nd symbolizes the sun's path with the apex at the solar zenith, but here they are alluding to the daily trajectory of the sun, rather than its seasonal position. The solar imagery is very clear, for both the lower masks have a Kin ("sun" or "day") glyph on their cheeks, symbolic of the Sun God.¹

Schele and Miller (1986:108) and Schele and Freidel (1990:113) also note that the upper and lower masks represent the Hero Twins of Maya creation lore, and they allude to the creation of the world by this divine pair of brothers linked with the divine origin of the royal lineage (Schele and Freidel 1990:116-117). In this construct, the Hero Twins are equated with the Sun and Venus (see also Iwanaszewski 2002:508-59). These studies propose that Venus is the twin of the Sun, equating Hun Ahaw with Venus and Xbalanque with the Sun. Nonetheless, this pairing is contrary to ethnohistorical

accounts of the colonial period that indicate the Maya Hero twins represent the sun and moon, and more specifically that Hun Ajaw ("one lord") became the Sun and the jaguar deity, Xbalanque, became the moon (Milbrath 1999:96-100, 130).

Moving to the larger question of the role the masks play in pageantry, Schele and Miller (1986:106-110) note that the masks on the architecture and the associated celestial events provided a stage for ritual performance, projecting symbolically charged messages tied to the cosmic order. Through this performance, they argue that elites could have an impact on the ideological transformation of the community. They note that the ear-flares on all the masks indicate kingly attire that can be linked with rituals on the architectural stage, where the king of Cerros would have worn similar adornments.² They further propose that the architecture formed a backdrop that allowed the king to "sit at the pivot of the sky." Interpreting imagery on the masks in a wider context, they point out that the "Jester God head band" and ear flares on the stucco masks are symbolic indicators of kingship.³

Along similar lines, Reese (1996:82) argues that Structure 5C-2nd served as a political stage that marked and illustrated seasonal cycles to enhance local political control, by allowing the ruler to charismatically embody cosmic cycles for those who watched the performance of seasonal rituals. Reese (1996:98) further describes the architectural dimensions of this political/cosmic stage as a "cyclical architectonic program." She reads the masks and the associated glyphs as a symbol designating a directional starting point on the eastern part of the architectural program.

The masks also contain framing elements that are interpreted as providing contextual information about where the zoomorphic masks are conceptually located.

Freidel and Schele (1988b:550) describe this contextualization as “iconographic syntax,” which conceptually deconstructs iconographic depictions, according to key iconographic elements. They noted that “In essence, there are three primary positions in Maya iconographic composition: the central agent, the objects with which the agent (usually the king) communes with the supernatural, and the framing supernatural powers and beings” (Freidel and Schele 1988b:550).

Three masks have a framing element representing a sky band, symbolically denoting a celestial location for the masks. Except for the uppermost western panel, all the masks have upper panels or frames have been described as J-bands that symbolize the sky. These J-bands are similar to the sky bands with outward curving scrolls at Izapa (Norman 1976: Figs. 3.1, 3.10, 3.12). The upper left mask, has differently formed frame, with an inward curving scroll brackets that Reese (1996:99) identifies as earth band (Figure 2B), comparing them to earth bands identified by Garth Norman (1976: Fig. 3.16) on monuments at Izapa.⁴

In combining the stucco masks with the architectonic program, Reese (1996) notes that the architecture would have been used as a theatrical setting for cosmic rituals that reinforced political power. Structure 5C-2nd 's staircase channeled the action thereby focusing on a narrative related to imagery of jaguars and birds. The lower masks are interpreted as representations of jaguars, whereas the upper set are said to represent images of birds. Reese (1996:107) compares the jaguar to Capricorn and the bird to Cassiopeia, and by linking the masks to seasonally changing constellations a celestial narrative would be conceptually tied to the architecture (see also Freidel et al. 2002:76).⁵ Imagery of the Milky Way is also important in Reese's interpretation. The stairs would have acted as “a white path” between the symbolically linked panels,

according to Reese (1996:120). This path would have provided performance space for the ruler of Cerros that highlighted the king's ability bringing divine order to the human world. Ritual performances of this kind may have occurred biannually on August 13th and February 5th (Reese 1996:25).⁶ Reese notes that these dates may have been seen as “creation nights,” due to the astronomical alignments of the Milky Way, Ursa Major, Cassiopeia and Capricorn at these times (Reese 1996:120).

More recently, Freidel et al. (2002:41-86) provide further analysis of the imagery on the masks, despite the somewhat eroded condition. The quincunx-patterned ear-flares are described as symbolizing offering plates that may have acted as symbolic portals (see also, Reilly 1994, 1995; Freidel and Schele 1988a, 1988b). Freidel et al. (2002) describe the upper masks from left to right as the principal bird deity and a divine water fowl, pointing out that the “bird masks” are adorned with *Spondylus* imagery that relates to royal imagery and divine status. The earth maw identified by Reese in the upper portion of the western panel is reinterpreted as an incurving gum bracket that is phonetically tied to the Maya world Witz (mountain). Friedel et al. (2002) note this mountain can be linked to the concept of the “water birds” that dive beneath the water, into what was conceptualized as the underworld. Furthermore, they say that the masks celebrate the Maize God associated with the north to south alignment of the Milky Way on August 13 and February 5, dates aligned with “creation cosmology.”⁷ Narrative reenactments combined with the effect of constellation alignments, specific dates of divine creation and resurrection, and the association of the north-south alignment of the Milky Way, would symbolically represent world tree imagery (Friedel et al. 1993; Freidel et al. 2002:41-86). Milbrath (1999:291) points out, however, that “the

tree stands “up” only if you consider it in relation to modern sky maps that show north as up, and the top of the tree is actually quite low on the horizon (see also Tedlock 1995:119)

Most recently, Freidel (2005:53) has argued that lower masks represent funerary masks of the bundled bones of the maize god and his twin brother. The upper masks are interpreted as Itzamnaaj and Chaak, creator gods who caused the death and resurrection of the Maize God, with the king impersonating these gods as he performed as “a lord of creation” (Freidel 2005:53). The Sun and Venus are seen as a duality, conceptually related to the tale of the Hero Twins: “The twins rescued the bones of their sacred father Maize and his twin brother and managed, with the help of the shaman Itzamnaaj, to bring their father back to life. Just as dry maize kernels go into the ground like bones and reemerge as beautiful green plants, so too the Maize God resurrected and the Sun and Venus cycle through the underworld and heavens” (Freidel 2005:52).

In sum, although the interpretation of the Cerros masks has changed over time, it is clear that the masks are associated with celestial symbols and solar imagery is most prominent in the lower masks. Previous studies did not consider the actual local lagoon environment or the historical experience of the site in their analysis. As previously mentioned, Schele and Miller (1986:106-1) associated the masks to the general path of the sun without considering how the Sun’s path changes seasonally, which seems significant because the Sun only appears to rise from the water in Corozal Bay during brief period of the year (beginning in May and ending in August). Schele and Freidel (1990:114, fig. 3.13) only alluded to the zenith in terms of daily cycle of the Sun and the related solar rituals at 5C-2nd, never considering how the solar zenith represents a seasonal aspect of solar movement that would be visible in a variety

of ways at the site. Recently Reese (1996) and Freidel et al. (2002) considered the relationship to ritual and the wider landscape in association in the seasonally changing constellations.

We argue that the solar imagery is especially important in the context of the architecture and the landscape itself. As will be seen, an important astronomical alignment that situated Structure 5C in the context of an unusual feature of landscape that may have imparted a special significance to the solar imagery in subsequent architectural construction at the site. It was the landscape that gave meaning to the solar imagery, as seen in Figure 3, which shows the view of the zenith sunrise from the location of Structure 5-C^{2nd} before there was any building constructed. Specific symbols and places would have gained significance as people observed celestial patterns in the sky, and they built architecture while continually reflecting upon the changing seasonal aspect of the landscape. The materiality-based landscape perspective allows us to propose that the site of Structure C5 was specifically selected because it marked an important observation point for marking the sun passage from land to water at the time of the first solar zenith in May, when the sun “bathed” in the water at the onset of the rains. This could be seen as a skyscape construction linking the sun’s position over water to the onset of rainfall.

Structure 4: The East-West Outlier

Before embarking on discussion of the astronomical orientations associated with Structure 5C, we should explore a second structure that seems to be one of the most significant buildings at the site (Figure 3). At Cerros, the built environment included monumental landscape that changed dramatically over a relatively short period. The pinnacle of monumental construction was reached with the construction of Structure 4 and its surrounding plaza.

Structure 4 is the largest and tallest structure at the site of Cerros, measuring 21 meters high, and 68 long and 58 meters wide at the base (Freidel 1986). Its immensity even today allows it to be seen, above the entire coast of the Corozal Bay. Unlike the other structures in monumental construction zone, which are generally aligned north-south, Structure 4 faces east. Two small platforms on the northern and southern corners are Postclassic additions and originally the structure featured a wide basal platform and a narrower pyramidal superstructure on top with a vaulted room (Reese 1996:7).

Stairways lead up from the basal structure to the top of the pyramidal temple. The presence of symbolically charged masks lead Reese (1996:167) to conclude that ritual performances upon Structure 4 would have paralleled those performed in front of Structure 5C-2nd, but they would have increased in magnitude because the size of the structure would have provided a much larger stage and viewing area for the audience in the plaza below. Reese identifies Structure 4 as the cumulating point of a ritual circuit where ritual offerings were made.⁸

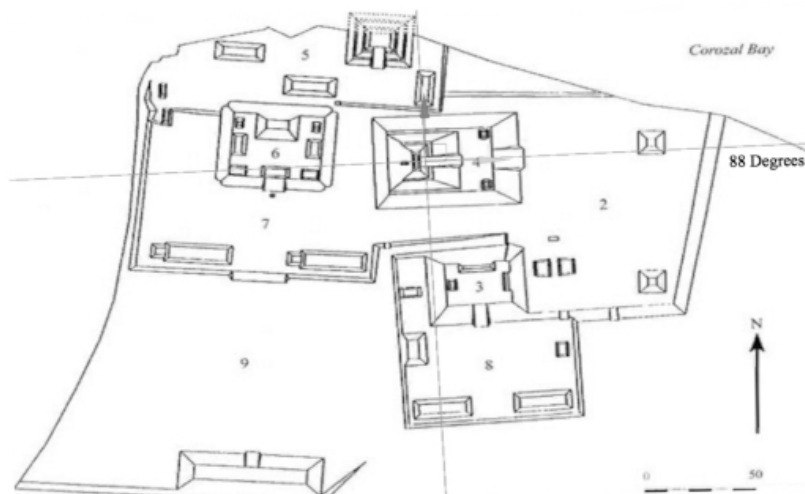


FIGURE 3. 88 degree azimuth on structure 4 pointing to sunrise just after spring equinox

Reese (1996:168-169) notes, “a leader in an agriculturally based economic system needs to demonstrate his mastery of the forces of nature, and at Cerros this

mastery was obtained through communication with the supernatural.” This would have symbolically imbued the ruler with enough cosmological power to

maintain his hierarchal position. She also interprets Structure 4 in the context of creation cosmology as a symbolic representation of the “House of the North,” the residence of “First Father” and the ancestors. Structure 4, much like Structure 5C-2nd, is considered to be a symbolic stage. This stage would have been activated by through the ritual actions of the divine king, which may have involved blood-letting.⁸ Reese (1996:25) argues that the blood offerings were symbolically tied to creation events. These rituals symbolized “a metaphoric death,” which allowed “the ruler to enter the heavens and communicate with his ancestors,” and also reinforced hierarchical positions within the community.

At this point we still have no understanding of the social processes could that led to the creation of such a powerful narrative. To understand where such narratives may have originated, we will look to the landscape, considering the experiential viewpoint of not only the elites but the commoners as well. We would argue that the roots of this cosmological ideology lies in the landscape, and that the shared experience of the landscape between elites and commoners conveyed an ideology that eventually was manifested in the creation of the ritual stages embodied in the monumental architecture of Cerros.

Archaeoastronomy and Landscape Analysis

We initiated our analysis by looking for architectural alignments that may have focused the observer’s viewpoint on the changing seasonal position of the sun, especially from the perspective of elites who stood on top of these large platforms. It should be noted that Structure 4 was built after most of the other structures in the civic center so the site plan was virtually complete at this time (Walker 2005). The viewer standing on top of Structure 4 would have a direct view of the sun rising over the

relatively flat terrain along the coast. Analysis of the Cerros map indicates an approximate alignment to the spring equinox date (March 27), only five days after the true equinox (March 21). This alignment could have served as an equinox indicator to those observing from on top of this structure. The movement of the sun along the horizon at the equinox is fairly rapid, so it may be that they were only able to approximate the equinox alignment. In Preclassic E-Groups, the inclusion of two structures aligned to the solstice allowed the Maya to simply bisect the trajectory of the sun’s movement along the horizon marked by these two horizon extremes, thereby determining the approximate equinox position of the sun (counting 182 days between the December 21 Solstice and the June 21 Solstice is 182 days, and half of that number of days brings you to March 22, an approximation of the equinox. Structure 4 lacked these solstice markers, so it may have made it more difficult for the architects to measure the equinox by means of bisecting the half year between the solstices. The structure’s large size would have allowed for an easy view of the horizon over tree cover. Structure 4 would have been ideally located to fix upon the rising equinox sun, because, in the absence of mountains, the structure would have acted as a reference point allowing precise measurement of the sun’s azimuth at the equinox (measured clockwise on a 360° circle from the horizon at true north). The apex of Structure 4 would have held a very privileged view of the rising equinox sun, allowing the elite few to be the first to witnesses the rising sun.

Structure 5C-2nd, built earlier than Structure 4, has an alignment more inherently linked to landscape. As illustrated by the leftmost point on the vector line in center of Figure 4, Structure 5C-2nd sits prominently on the northern most edge of the small promontory. The diagonal line over the water in the figure illustrates the

view-shed along the coast. This creates an alignment at 70° azimuth at the place where the land meets the watery horizon. This

azimuth marks where the sunrise would move from the peninsula to the open water.



FIGURE 4. The Peninsula where Cerros is located with a projected vector of a 70 degrees.

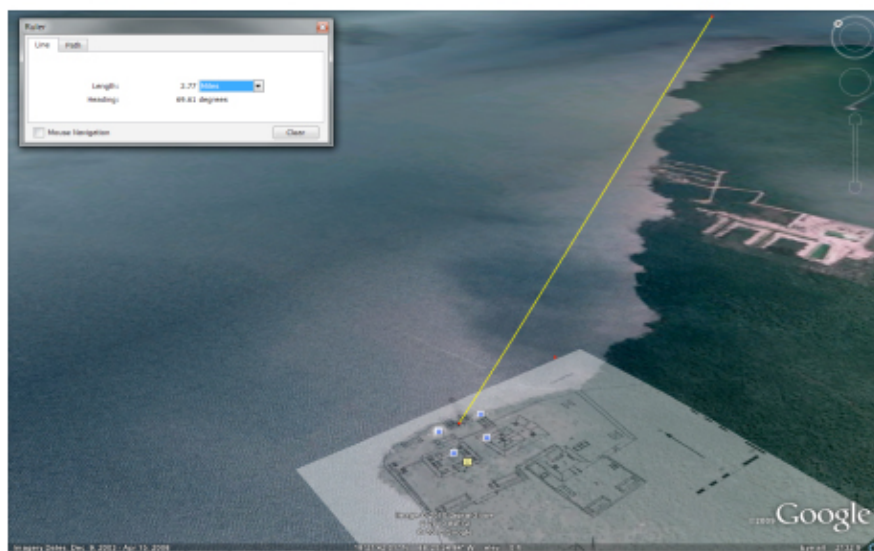


FIGURE 5. Direct line of sight from Structure 5C-2nd to a Solar Zenith Sunrise.

The promontory itself becomes a reference point on the horizon. Figure 4 illustrates a direct line site from Structure 5C-2nd along the coast to the place where the sun first rises out of the ocean on May 15, the day of solar zenith at Cerros. This first solar event coordinates with an important seasonal event, marking the onset of the rainy season in May (see above, and also; Iwaniszewski 2002:505).

Although Structure 5C-2nd faces south, the observer at the summit would have had a view of the zenith sunrise lining up with the eastern coastline. As previously mentioned, the presence of a Preclassic dock near Structure 5C-2nd indicates the shoreline would have only been slightly extended from lower sea levels, and the dock itself predates the construction of Structure 5C-2nd (Cliff 1982:396). There is evidence that this pyramid was built over some earlier structures, interpreted as residential (Freidel and Schele 1988a:47; Iwaniszewski 2002:508; Schele and Freidel 1990:103-104). The location itself on a promontory may have been significant for observing the zenith sunrise from the inception of construction (Figure 3). This is further indicated by the alignment of residential structures towards the space on the promontory that 5C-2nd was eventually built upon (Walker Personal communication; Cliff 1982:479).

We would argue that the two astronomical alignments discussed reveals changes in the focus of seasonal observations at the site. The May 15 solar zenith rising is linked to the earliest monumental structure. It is an obvious phenomenon, moreover, it would require no architectural construction to make this observation every year. The coastline would have acted as a reference point at this time of year. The zenith sun would have been easy to track and monitor closely, especially, during Cerros' initial phase of occupation.

The equinox alignment at Structure 4 required building construction with a viewing perspective of as reference point. Structure 4 was built after Structure 5C-2nd, perhaps to provide reference points for developing the agricultural calendar, using the solar year as a basis in tandem with the 260-day calendar used to prognosticate auspicious dates for agricultural activities. It also predates the equinox and solstice alignments of the Group E structure at Uaxactun, Guatemala, which was constructed in the Late Preclassic and continued to be functional as an E-Group until the end of the Terminal Preclassic (Aveni et al. 2003:161). Recently, earlier E-Groups have been identified in Guatemala, some possible dating to the Middle Preclassic (Aimers and Rice 2006; Hansen 2000). but Structure 4 at Cerros may represent the earliest equinox alignment along the Caribbean coast Perhaps the March equinox became a focus because it coincides with the time that preparations are made for planting in many different areas of the Maya lowlands (Milbrath 1999).

Transmissions of Worldview and Shared Beliefs

The ritual architecture at Cerros was more than a political stage developed from an elite ideology to illustrate the king's divinity, it also seems to have served to integrate architecture into a unified sacred landscape. It was built in part as an ideological reference to Maya mythology, but it also enunciated a point of shared experience in the dynamic landscape. Acting as a stage, Structure 5C-2nd would have provided a powerful ritual space for the rulers because of its association with symbolic architecture and images, and ritual performance, but also it expressed a purposeful connection with the landscape and local history through its unique connection with the zenith sunrise event.

The solar zenith would have been an important to Maya farmers because it coordinates with the onset of the rains in May. By looking to the solar movements that were essential to their understanding of seasonal cycles, the ancient inhabitants pragmatically grounded themselves in their landscape. The zenith date marks the planting season in the context of the Maya area, and the Maya fix dates for sowing and harvesting by observing the two annual zenith passages of the sun (Milbrath 1999:13). Noting the importance of agricultural planning and understanding seasonality, Ivan Šprajc (2010:2041) argues that, "It was particularly due to its practical utility that astronomy, intertwined with religious ideas and practices, had such an important place in the worldview and, consequently, in the cosmologically substantiated political ideology of Mesoamerican societies."

The original construction of Structure 5C may have commemorated this important zenith date and its relationship to the planting season. The main south-facing axis does not align with this solar event, but observance of a zenith event may not have required an architectural context, because the area where Structure 5C is located is the only area at the site where such a landscape alignment could be viewed. And before Structure 5C was built, the area on which Structure 5C rests would have likely been a unique location for viewing solar events in alignment with natural landscape features, combining observations of land, water, and sky, much in keeping with the patterns in the greater Caribbean area. At the same time, if we consider the solar imagery in the masks of Structure 5C-2nd, we have further evidence that solar phenomena likely played an important role in the lives of Cerros' ancient inhabitants. Instead of viewing Structure 5C-2nd only as a symbolic stage, or a seat of power, we should view it as a material manifestation of meaning, human

experience, political power, time, and ritual practices.

After Structure 5C-2nd was constructed, other structures were built up around it, and the plaza space was elaborated. As the civic center changed over time, the ritual landscape shifted to a new astronomical orientation. Structure 4 was built facing the equinox sunrise, possibly reflecting a new focus on the equinox and calendar rituals involving blood-letting at this time of year. We would argue that a new social pattern is also demonstrated by the break in the architectural tradition of primarily north-south axially aligned architecture that had remained constant until Structure 4 was built. Reese (1996) identified Structure 4's plaza as a place for large public gatherings, but we should also consider that the equinox could be best seen on the summit of structure where space was extremely limited. A viewing structure on top of the summit was likely used for such observations. This implies that elites had special privileges related to solar observations commemorating the beginning of the agricultural cycle. This privileged location gave the elites special knowledge that was probably shared with commoners who partook in elite ideologies.

We can see here that the symbolic properties of the architecture gained meaning through a specific relationship with the local environment and horizon-based astronomy. Both elites and commoners alike shared in the experience of the natural and cultural landscape. These shared experiences created and maintained the conduit through which ideology could flow. The cosmological narrative that helped organize the community to build these temples was realized and transmitted only through these conduits of shared experience. The equinox architectural orientation of Structure 4 served also a pragmatic function, helping to keep track of the agricultural calendar. In the case of Structure 5C, the alignment's

significance lies beneath the structure itself. The building seems to mark a sacred location where observations of the zenith sunrise would have been made in the past. The architecture of Cerros embodied the ritual significance of solar imagery in the set of masks on the structure's facade and in the orientation of Structure 4 both help make a compelling case of the importance of the sun and seasonal cycles to the people of Cerros.⁹ In this case, we can see how ideological networks may have been framed but also developed. Furthermore, by considering a *total landscape*-- one full of temporalities, and free of western preconceptions about the division between nature and culture-- we argue that the relationships that people maintained and developed through the experience of observing were not only enhanced but also given a material reality in the way they built ritual architecture in areas at the site that were significant in terms of astronomical alignments. As, previously

mentioned abundant evidence suggests the importance solar observations within Caribbean cultural systems, we venture that future studies in the Caribbean area could consider how systems of solar observation, religious ritual, and ideology were developed, maintained and transmitted between each unique experienced *total landscape*. Linking the astronomy of coastal sites in the Maya area with some of the more general astronomical practices of the Caribbean islands is a first step to understanding the way astronomy, culture, and the landscape intersect in the greater Caribbean, sharing a watery horizon punctuated by land masses that include islands and promontories on the land. It is hoped that future studies by Caribbeanists can see patterns that reflect some communalities relevant to understanding the religious and cultural systems that share the landscape of the greater Caribbean area.

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Notes

1. The sun god known as Ahaw Kin is sometimes conflated with a solar jaguar known as GIII at Palenque (Schele and Freidel 1990:117). This jaguar is often interpreted by Maya scholars as a nocturnal sun deity, embodying K'inich Ahaw, but there is also evidence that it represents the moon as the "night sun" the sun god at night, (Milbrath 1999:95-96).
2. The ear-flares on both upper and lower panels on the eastern side contain a YAX glyph that has been translated by Schele as "first" or "green" in Yucatec Maya (Freidel and Schele 1998:552). Significantly the western masks lack this YAX symbol (Figure 2B; Schele and Miller 1986: Fig. II.1). Reese (1996:98) argues that the presence of the YAX glyph on the aforementioned ear-spools denote a starting point to the east. More recently, these glyphs on the eastern side have been read as AJAW ("lord") rather than YAX (Freidel et al. 2002:61).
3. Even though the Jester God headdress is not clearly visible in the drawing originally published in *The Blood of Kings*, Schele and Miller (1986:108) identify this feature on the upper

masks at Cerros, noting the headdress is worn by contemporary kings at Tikal and Uaxactún. In subsequent illustrations these symbols have been added to reconstruction drawings of the masks.

4. Reese (1996:99) finds this odd placement on the upper left set of masks difficult to interpret, but she notes that variations in the frames may illustrate the different conceptual locations of the deities represented by the masks. The placement of the earthband on the west can be compared with Chalcatzingo where a petroglyph of an earth maw frames the left side of the ruler and places the ruler in the “jaws” of the earth monster (Grove 1984:25-26, Fig. 5; 1987:429-430, Fig. 27.6; Pool 2007:39). The single upper “earth band” may serve a similar function at Cerros as representative of an earth maw on the western side of the mask array, which would frame the ruler in a fashion similar to Chacatzingo.

5. Reese (1996:22) further reads the masks as personifying certain characters described by the Maya in the *Popul Vuh* as the progenitors of creation. Reese (1996:118-119) identifies the jaguar on the western side of the lower tier as Yax Balam and alludes to Hun Ahaw on the eastern panel, even though the masks look exactly the same, except for the YAX symbols located on the eastern mask (see Figure 2B). These characters are related to a variety of symbolic elements, including the exploits of the Hero Twins, the sacrifice of mythic deities, and First Father’s rebirth. In her interpretation narrative tells a cosmic story that would have conceptually linked together seasonality, creation, life, death, birth and rebirth.

6. Ritual performance also further illustrated and reiterated cyclical temporalities that may have been related to the seasonal duality of wet and dry periods of the year (Reese 1996:25-26). February 5th would have been highlighted by the first rise of Wakah Kan (the Maize God constellation) at dawn. She proposes that the rise of the Wakah Kan was metaphorically linked to order, succession, war, and sacrifice. August 13th would have been related to the morning rise of Na Te’K’an, another constellation that was metaphorically connected to concepts of rebirth and agriculture. Reese (1996:120) argues that the movement of these asterisms display a narrative of Wakah Kan transforming to Na Te’ K’an which illustrates “cyclical dualities that pervades all aspects of Maya ideology and embody the essence of Late Formative rulership in the Maya lowlands.”

7. Reese (1996:20-24) suggests that the movement and alignment of these constellations at both times of the year helped in reenact the cosmic narrative of creation. By performing on a stage situated and oriented in relation to this astronomical play, rulers would be endowed with a certain political power. Reese proposes that performing on a stage of cosmic creation, the ruler acted as a divine being and transformed himself into a shamanic king who could bring order from disorder, thus alleviating social anxiety at the time of a new ruler’s accession.

8. Caches found within Structure 4 seem related to cosmological power. At the apex of Structure 4’s superstructure, a cache vessel was located that contained jade beads arranged in triadic formation. This cache vessel was found in a trench located in the northern end of the vaulted room. The southern end of the same room contained Hubul censer ware vessels. Reese (1996:168-169) notes that the cache artifacts reveals this space was likely viewed as something of a portal into “into other realms,” where auto-sacrifice may have been offered.

9. Walker (personal communication, 2013) notes that Belize’s National Institute of Archaeology

now refers to the site as Cerro Maya, and it is so designated in an exhibit installed at the site. Here we retain the name Cerros because much of the literature referenced here uses that name. Although excavations have not continued at the site, on-going reconstruction has included renovations to the monumental masks on Structure 5C-2nd in 2005, during which Belizean workers detected the edge of a round structure abutting Structure 5C.

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