

The Distribution and Significance of E Groups

A Historical Background and Introduction

ARLEN F. CHASE, ANNE S. DOWD, AND DAVID A. FREIDEL

Over the past century, Maya architectural groups composed of a raised eastern platform that supported three structures and faced one western pyramid across a public plaza have come to be recognized as nearly ubiquitous in the Southern Lowlands. These complexes, which are called “E Groups,” have been correlated with archaeoastronomical alignments and features related to horizon-based calendar observation, measurement, and seasonal celebration. Similar to the patterning evident in other culture’s city or town centers, the early Maya had an ideal in mind for their main squares, recalling cosmologically based myth and ritual, with permutations or custom designs that made each community’s ritual architecture unique and awe-inspiring. Like colonial (1675–1775 CE) New England town squares, where escaped livestock were corralled in a central pasture and a number of the administrative or religious buildings faced this “green,” Maya centers were organized around an open plaza with origins in their agricultural community life. This chapter examines the historiography of scholarly work on E Groups, from 1924 onward, in an effort to provide a proper context for the rich and varied data on the distribution and significance of this important architectural type.

E Groups embody far more than simply a record of the sun’s solstices, equinoxes, and zenith passages. Research over the last twenty-five years increasingly supports the view that they form the earliest identifiable architectural plan at many Maya centers. Reconnaissance and site survey shows that they are widely distributed throughout the Maya Lowlands. E Groups are distinctly clustered in the traditional Maya heartland of Guatemala’s Petén, presaging the Late Classic period (550–800 CE) florescence in this same region (Figure 1.1). The adjacent parts of Mexico north of the Guatemalan border and the frontier lands of Belize to the east of Petén also have

Beginning	End	Period Name	MAJOR EVENTS	Symbol
CE 1958	2000	Post-IGY	International Geophysical Year Earth System observations	IGY
1920	1958	Instrumental observation	Carnegie Institution of Washington research	Inst
1550	1920	Historic	Maya integrated into modern nation-states	Hist
1250	1550	Late Postclassic	Northern Lowlands heavily occupied	Lpo
1000	1250	Early Postclassic	florescence of eastern Yucatec coastal sites	Epo
900	1000	Terminal Classic 2	florescence of Chichén Itzá in Northern Lowlands	T2
800	900	Terminal Classic 1	political collapse in the Southern Lowlands	T1
700	800	Late Classic 2	regional polities dominate the lowlands	L2
550	700	Late Classic 1	florescence of regional centers in Southern Lowlands	L1
450	550	Early Classic 3	transition to stratified regional polities	E3
350	450	Early Classic 2	vaulted buildings and Teotihuacán-like elite pottery	E2
250	350	Early Classic 1	widespread appearance of polychrome ceramics	E1
1 BCE/CE	250	Late Preclassic b	changes potentially reflective of a mini-collapse	Plb
300	1	Late Preclassic a	large vertical monumental constructions	Pla
800	300	Middle Preclassic	large horizontal monumental constructions	Pm
2000	800	Early Preclassic	first recognizable Maya peoples	Pe
3500 BCE	1500	Archaic	Paleo-Indian lithic points	Ar

Figure 1.1. Chronological overview of the Maya area (from Chase et al. 2014c:14).

important sites with E Groups that are often as ancient and enduring as those found in the heartland. Intriguing outliers exist farther afield, with examples being noted from the Mexican sites of Chiapa de Corzo, Chiapas, and Comalcalco, Tabasco.

This volume is an opportunity for many of the researchers engaged in the study of E Groups and the origins and development of Lowland Maya civic-religious architecture to take comparative stock of what is known and to chart a course for future investigation. This is a rapidly expanding area of inquiry in Maya studies, in part because of a current emphasis on early centers and communities in the Lowlands. This volume represents a renewed

effort to systematize and synthesize perspectives on the origins and development of Lowland Maya ceremony and centers. Through an examination of E Groups, it potentially becomes possible to understand how the Maya harnessed their beliefs and insights about the natural world to the tasks of living in increasingly complex societies.

Background

If we look at Frederick Law Olmsted's design for Central Park in New York City (Rogers 1972; Rosenzweig and Blackmar 1992), how many of us recognize its origins in small New England farming towns as a place for loose livestock to be penned up while waiting for their owners to reclaim them? Speaking of New York City, with its streets oriented on a strict grid aligned with the cardinal directions, how many of us have watched the hierophantic sun rise or set along those urban canyons and recalled our Julian system of calendar reckoning and its seasonal links to an agricultural past? Similarly, even archaeologists with the benefit of hindsight grapple with seeing a clear picture of the origins of E Group architecture from the Maya region. For this reason, the researchers represented in this book have all wrestled with a large corpus of literature that is available on Maya ceremony in general and on E Groups in particular. The conscious attempt is to situate these architectural complexes in time and space to communicate their meaning and significance better. This introduction provides a background to E Group investigations and introduces readers to their distribution and significance. First, a section on the historiography of the study of Group E-type architecture is presented, following its initial identification at Uaxactún (Blom 1924:218) and ending with current information on E Group research across the Lowland Maya region. Next, reasons are posited for the significance of these architectural complexes and for their function and meaning within Maya societies. This meaning may have changed over time (a subject treated in greater detail in the chapters that follow).

As the first shared form of Maya public architecture, E Groups must have been important. The centrality of ritual and symbolism in the organization of ancient Maya space is reflected in modern Maya society as well. The Tzotzil Maya speakers of Zinacantán see the small mound in their ceremonial center as the navel of the world or earth, *mishik* or *mixik' balamil* (Hanks 1990; Vogt 1976:7, 13, 33; Tate 1992:26; Zaro and Lohse 2005:93). To a large extent, the earliest E Groups must have represented a similar concept to the ancient Maya who constructed them.

During the nearly one hundred years of scholarship preceding this book, many changes in approaches to the archaeology of the region have taken place. For example, settlement pattern archaeology has given us a wealth of cartography and mapping data as well as detailed information about how the Maya distributed themselves over the landscape (Chase et al. 2014a, 2014b). Yet, ironically, these efforts to document the hinterland have brought us back to a consideration of the public architecture found in Maya centers. We now realize that ancient Maya centers, once described as “vacant” by J. Eric S. Thompson (1954) and others like Gordon Willey (1956) before the 1960s (and reinforced by William Bullard’s [1960] original settlement pattern interpretations), were far more complex in their internal composition and variable in terms of their sizes. We also recognize that these centers have undergone developmental changes over time. The majority of larger centers in the Southern Maya Lowlands share a profusion of public spaces that conform to an E Group layout. When tested, this architectural plan is always the earliest public architecture at any given Maya site, in some cases going back to almost 1000 BCE (Inomata et al. 2013, 2015).

This volume has an explicit focus on public architecture, the kind that is usually found in the center of Maya sites. It also urges further research within such venues to increase our knowledge of early Maya civilization. In some ways, this brings the Maya field full circle, for in the 1970s there was a backlash against an exclusive focus on monumental architecture by “new archaeologists,” like Kent Flannery (2009:16–24), in favor of household archaeology. With continued work, however, we have realized the importance of returning to the excavation of larger central architecture for a better contextualization of Maya residential groups. While archaeologists have documented the importance of the broader populace in terms of agricultural labor and community infrastructure, further excavation data from public architecture are necessary for a more balanced treatment of ancient Maya societal structure and its development.

When considering differences between those people who exerted power and control over others and those who followed or sustained them, it is logical to think about the social processes that led to Maya formal institutions, such as kingship and state-sponsored religion. What cultural adaptations made it possible to create an anthropogenic landscape filled with agriculture terraces, irrigate vast stretches of raised fields for maize agriculture, trade in semiprecious stones like jadeite (but also more quotidian items like obsidian and salt), and build stone edifices reaching high above the

jungle canopy? Mayanists now have an opportunity to speak with authority about exactly how, where, and why civilizations took hold and changed, in order to make fruitful comparisons with other Mesoamerican cultures like the Olmec, the Teotihuacanos, or the Zapotec. The underlying assumption made in this volume is that more than one solution for urban growth or collapse was available to Maya peoples. Furthermore, the study of E Group architecture is pivotal to investigating dynamic change and variability in sociocultural organization, in conjunction with other categories of data, such as those from written records, art, astronomical considerations, settlement patterns, artifacts, architecture, caches, and burials.

Many anthropologists and archaeologists recognize that early states arose in Mesoamerica (Fagan and Durrani 2013). Monte Albán, Oaxaca, home of the Zapotec, was the location of one of these primary or first-generation states (Redmond and Spencer 2012; Service 1975; Wright 1977:383). Elsa Redmond and Charles Spencer (2012:30) argue that the Zapotec state came to fruition somewhere between 300 and 100 BCE. Significant societal inequalities existed in the Oaxacan area by about 1200 BCE, however, and there is evidence between 630 and 560 BCE for the first stone monument with writing (Monument 3 from San José Mogote) in Mesoamerica (Spencer 2003:11186–11187, 2009:152). Once the Monte Albán state emerged, it is likely that it was engaged with other complex societies elsewhere in Mesoamerica.

When states appeared, they would have done so in a milieu that included other peer development. Thus, before the Christian era, it is likely that contemporary states were operating not only in Oaxaca but also elsewhere in Mesoamerica (Chase et al. 2009), such as in the Veracruz/Tabasco Lowlands (Clark 2007; Cyphers 1997), in central Mexico (Teotihuacán, presumably by 100 BCE [Nichols 2015]), and in the Maya area (El Mirador, possibly by 300 BCE [Dahlin 1984; Hansen 2001]). Social complexity and development are difficult to define in the archaeological record, and this volume has the potential to contribute important new interpretations to how this was accomplished in the past. Archaeologists have begun to move in new directions on the topic of social complexity to offer a richer appreciation for variable societal groups within or beside complex political groups. Through focusing on E Groups, it is possible to incorporate the nuanced views that agency and other theoretical approaches offer on activities that ran counter to normative trends (McGuire 1983; Paukutat 2007; Yoffee 2005).

A significant goal of this volume is directly to address where and when complex societies emerged in the Maya region, what form they took, their

tempo and mode, and how they changed and developed or devolved, while keeping in mind that increased political complexity was not inevitable or necessary. Groups resisting trends existed beside people embracing popular, enforced, or coerced solutions (Inomata et al. 2015). The ancient Maya exhibited great variability, both environmental and social (Chase et al. 2014c). Yet there was cultural standardization centered on the E Group. As the earliest recognized form of public architecture in the Maya area, E Groups had to have been central to the social and political transformations that took place.

The ancient Maya were clearly interested in both history and place. While most hieroglyphic texts generally postdate the earliest E Groups, E Groups are the locus for the erection of the earliest stelae known at Uaxactún (Proskouriakoff 1950; Ricketson and Ricketson 1937) and the only one known at Cenote (Chase 1983). The Maya were firm believers in deep mythic time, as is evident in the inscriptions of both Palenque (Lounsbury 1980) and Naranjo (Grube and Schele 1993). Their fascination with time is also presumably conjoined with their rituals, which would have included the original construction and rebuilding of E Groups (Chase and Chase 2013). Because of the lack of a historical record associated with these early constructions, it remains for archaeologists to illuminate the meaning and importance of this architecture relative to Maya ritual, power, and social integration. Understanding the role that E Group architecture played in ancient Maya society is necessary to frame their path(s) to complexity and their later evolution.

Historiography of E Group Research

1924–1954

Credit for the discovery of the first astronomical observatory among the ancient Maya belongs to Frans Blom (1924, 1926), who was mapping Uaxactún's Group E when he realized that the architectural alignments matched the sun's solstice and equinox points. The Ricketsons' (Ricketson 1928; Ricketson and Ricketson 1937) work excavating the Uaxactún Group E prototype soon followed (Figure 1.2). Karl Ruppert (1977; Ruppert and Denison 1943) identified the thirteen other complexes that exhibited the same plan, as well as six others that varied somewhat. Prior to this, Thompson unknowingly had conducted excavations in two E Groups at Hatzcap Ceel

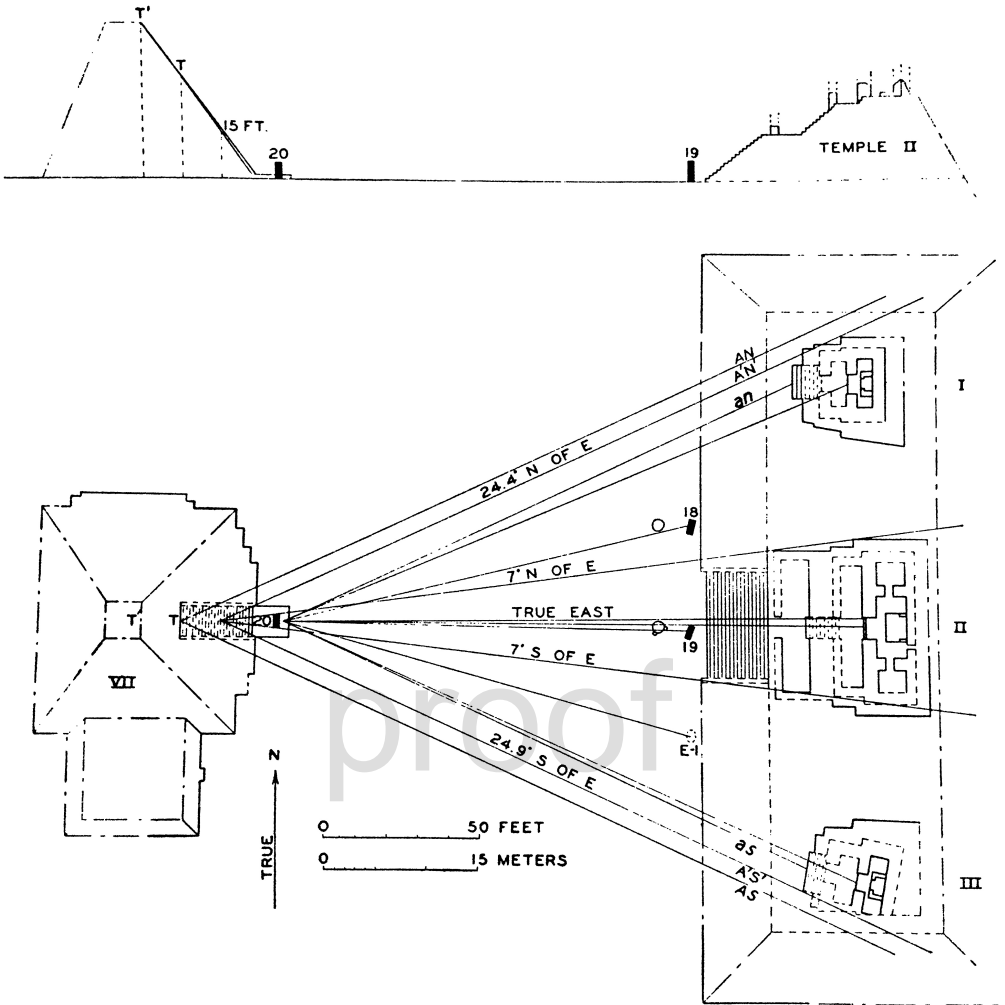


Figure 1.2. Plan of the latest (Early Classic) version of Uaxactún Group E, the prototype for all E Group analysis, showing what Oliver Ricketson and Edith Ricketson (1937:107) referred to as “astronomically important elements.”

and Cahal Pichik in 1928 and 1929 (described at length in Chase 1983:90–154, 1985; Chase and Chase 1995; Thompson 1931).

Twenty-five architectural groups resembling Uaxactún’s Group E were identified between 1924 and 1954 at twenty-two sites. Most were within a 110 km radius of Uaxactún. Of these known E Groups, four had been excavated (16 percent of the known E Groups at that time). The E Groups

that had been excavated prior to 1954 occurred at the sites of Hatzcap Ceel (Belize), Cahal Pichik (Belize), Uaxactún (Guatemala), and San José (Belize) (Aveni and Hartung 1988, 1989; Aveni et al. 2003; Chase 1983:90–154, 1985; Chase and Chase 1995; Ricketson 1927, 1928, Ricketson and Ricketson 1937:107; Ruppert 1934:94, 1977:223, 225, 226, 227, 229, 231; Ruppert and Denison 1943:5–6, 13–23, Plate 61; Smith 1950; Thompson 1931:240, 250, 1939:9). Additional site maps illustrating E Groups (at Acanceh [Mexico], Balakbal [Mexico], and Xunantunich [Belize]) were also presented in a variety of other sources, some of which predate the formal definition of this architectural assemblage (Marquina 1951; Maudslay 1889–1902; Morley 1933, 1937–1938:Plates 218, 191a; Seler 1915; Tozzer 1913).

1955–1984

Between 1955 and 1984, archaeologists reported E Groups at ten additional sites: Baking Pot (Belize), Caracol (Belize), Ceibal (Guatemala, also spelled Seibal), Cenote (Guatemala), Dzibilchaltún (Mexico), Dzibilnocac (Mexico), El Mirador (Guatemala), Lamanai (Belize), Paxcamán (Guatemala), and Tayasal (Guatemala). Four more E Groups had been excavated: Ceibal in 1970, Cenote in 1971, Lamanai in 1981, and Dzibilchaltún in 1983, making the excavation sample equal to 24 percent of the thirty-three known examples (Andrews 1980:15; Chase 1983; Willey 1970). Not included in this discussion is the early excavation of a triadic shrine at Baking Pot (Bullard and Bullard 1965). Publications that included information relevant to E Groups, either mapped or published, included Robert Carr and James Hazard's (1961:11, 19) Great Plaza Quadrangle (1959) map for Tikal, where the Lost World Complex is recorded; Anthony Aveni (1978) on Uaxactún; Clemency Coggins (1983) and Edward B. Kurjack (1979; Kurjack et al. 1979) on Dzibilchaltún; David M. Pendergast (1981) on Lamanai; and Bruce Dahlin (1984) on El Mirador. Arlen Chase (1983) presented a detailed record of the Cenote E Group excavations and also contextualized this E Group through reanalyzing the data presented in Ruppert's (1977) earlier publication. Chase (1983, 1985; Chase and Chase 1995) defined two specific kinds of E Groups: the Cenote Style E Group (Figure 1.3), an early variant of Preclassic period (1000 BCE–250 CE) date, characterized by a long eastern platform usually supporting a much larger central structure; and the Uaxactún Style E Group, a later architectural variant of Early Classic period (250–600 CE) date, characterized by a shorter eastern platform supporting three structures. Marvin Cohodas (1980) discussed the relationship of E Groups to celebrating agricultural cycles, an idea that was developed

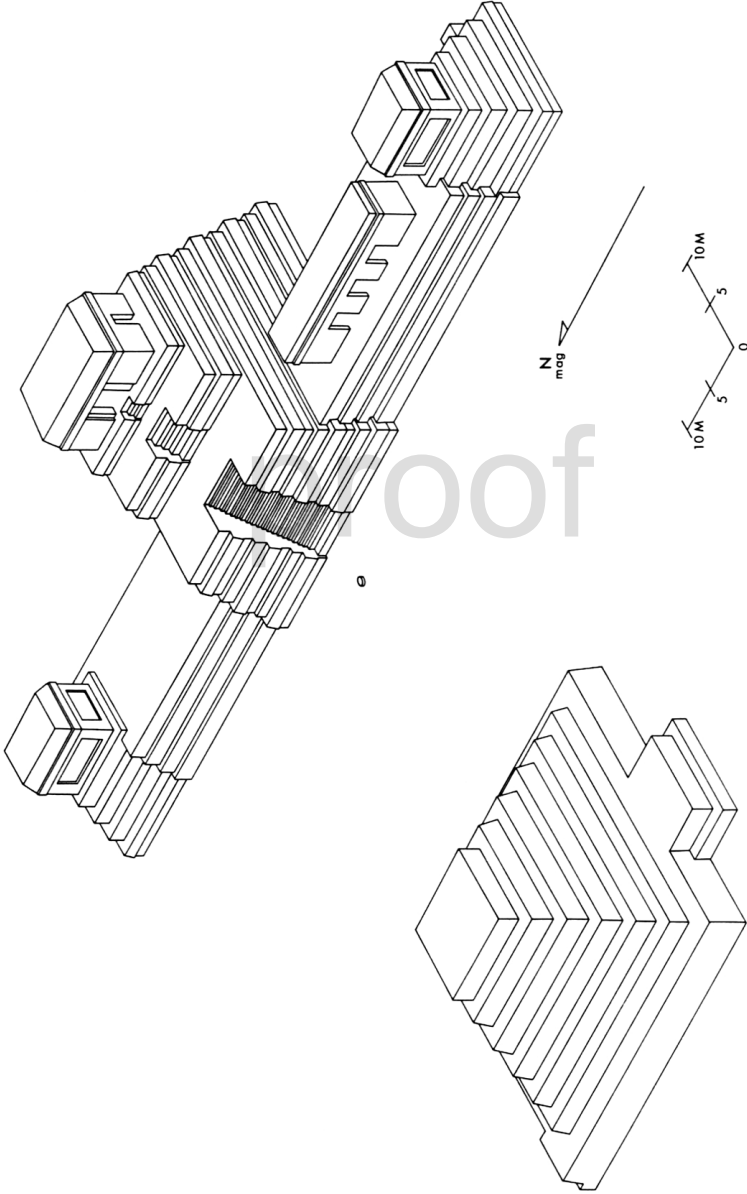


Figure 1.3. Isometric reconstruction of the Cenote E Group (after Chase and Chase 2012:258).

further by James Aimers (1993:171–179), as well as Travis Stanton and David Freidel (2003), who referred to E Groups as “maize theaters.” The cosmological landscape of E Groups discussed by Cohodas (1980) has also been viewed as related to origin places for the sun and moon (Chinchilla Mazariegos et al. 2015).

1985–2016

With the explosion in fieldwork that has been carried out in the Maya area between 1985 and 2016, more than 142 additional E Groups have been documented during this time. Many of these E Groups occurred in the southeast Petén and were documented by one project (Laporte 2001:141; Escobedo 2008; see Chapter 2 in this volume). Given the archaeology accomplished to date, at least 33 E Groups have seen some excavation, roughly 20 percent of the known examples (Figures 1.4, 1.5). Calakmul’s E Group was excavated and reconstructed in 1994 (Carrasco 1999; Carrasco et al. 1995; Dowd et al. 1995:6; Dowd and Aveni 1998). Other reported E Group assemblages excavated from 1985 through 2014 include Cahal Pech (Belize; Awe 2013), Caracol (Belize; Chase and Chase 1995, 2006), Chan (Belize; Robin et al. 2012), Cival (Guatemala; $n = 2$; Estrada-Belli 2002, 2003a, 2003b), Nakbé (Guatemala; Hansen 2000), Pacbitún (Belize; Micheletti 2016), and Ceibal (Guatemala; Inomata et al. 2013). Partial excavations of E Groups also have taken place at Nadzca’an (Mexico) in 1994–1995, as well as at Yaxhá (Guatemala; $n = 2$) and Xunantunich (Belize). The E Group at Dzibilchaltún has also been described (Coggins and Drucker 1988). Tikal’s E Group was initially excavated in 1987 (Laporte and Fialko 1987, 1990). Not included in this discussion are two triadic shrines investigated at Cahal Pech (Awe 2013) and Pacbitún (Healy 1990).

Chase’s (1985:37) summary pointed out the existence of E Groups at Cenote, Paxcamán, and Tayasal in the area surrounding Lake Petén (Petén-Itzá) in Guatemala. Anthony Aveni and Horst Hartung (1988, 1989) resurveyed Uaxactún’s Group E complex to test the hypothesis that it functioned as a solar observatory, with positive results. As of 1989, at least 27 examples had been evaluated for archaeoastronomical alignments (Aveni and Hartung 1988, 1989). Gareth Lowe (1977, 1981, 1995) and Michael Blake (2013) demonstrated that Middle Preclassic examples of E Groups are known from the upper Grijalva River area in highland Chiapas (Chiapa de Corzo, Finca Arizona, San Isidro), Mexico. The study of E Groups continued unabated in the 1990s with a series of scholars examining this architectural form (Aimers 1993:Figures 13–15 [45 examples]; Becquelin et al. 1997; Carrasco

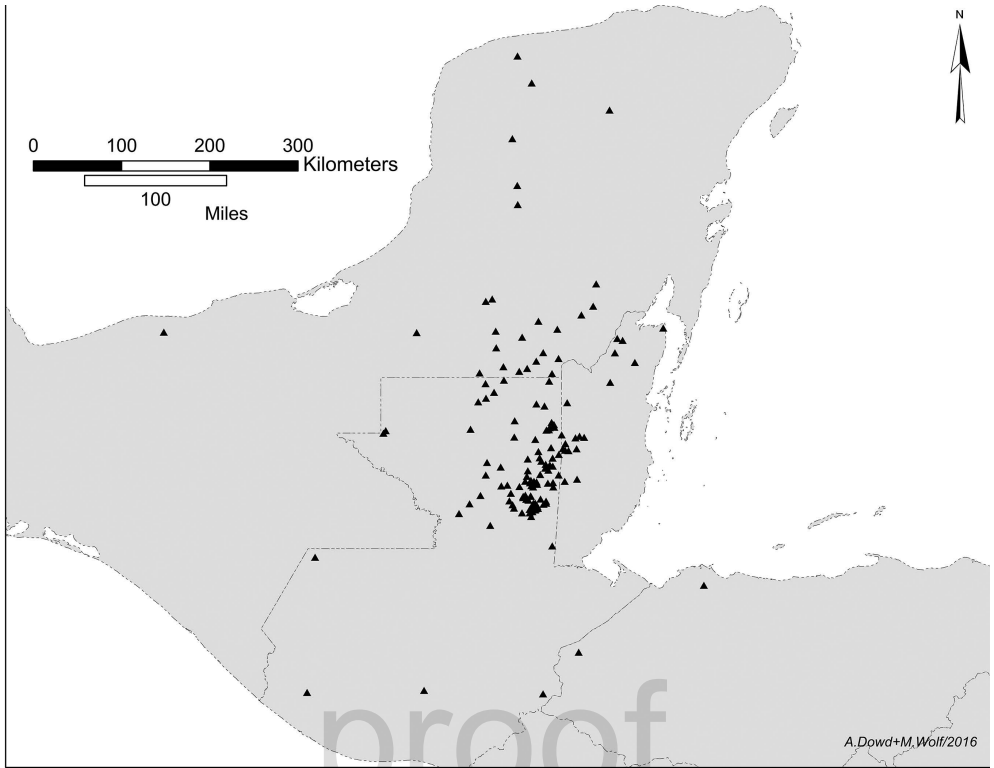


Figure 1.4. Distribution of E Group-type complexes (cartography by Marc Wolf). See Chapter 2 for information on the heavy concentration of E Groups in the southeast Petén.

and Wolf 1996; Chase and Chase 1995:90 [34 examples]; Dowd and Aveni 1998:Table 1 [65 examples]; Hansen 1991a, 1991b; Laporte and Fialko 1987, 1990, 1995; and Šprajc et al. 1997). Nicholas Dunning (1992:143–144) further reported on E Groups at Northern Lowland sites such as Yakalxiu, Yaxhom, and Uxmal.

Juan Pedro Laporte (2001:141) mapped a sample of 177 sites from southeast Petén and concluded that 85 percent or 150 of these had Group E complexes present. An additional 13 E Groups occupy the area around the Machaquilá, Cansís, and Pusilhá rivers, bringing his total to 163 known examples from this zone (which may overlap somewhat with the examples that others have mentioned in their publications). Laporte (2001:142) noted that three or more sites had two Group E-type complexes each: Rosario 1, La Unión 1, and Santa Ana–Zamir. While most E Groups occupy the central part of the site ($n = 153$), of the sample that do not ($n = 10$), all are found

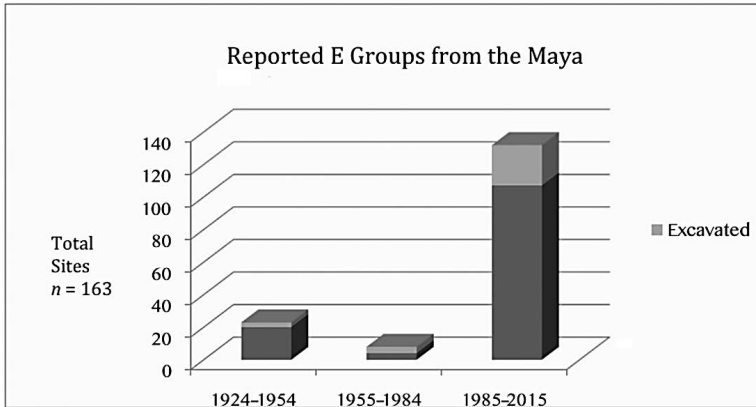


Figure 1.5. Reported E Groups from the Maya region. From 1924 to 1954, E Groups were reported in Belize at Cahal Pichik (excavated 1928–1929), Hatzcap Ceel (excavated 1928–1929), San José (excavated 1939), and Xunantunich (Benque Viejo); in Mexico at Acumal, Balakbal, Calakmul, La Muneca, Oxpemul, Río Bec II, Río Bec III, and Uxul; in Guatemala at El Mirador, El Paraíso, Ixkún, Naachtún, Nakum, Tikal, Uaxac Canal, Uaxactún (excavated 1923–1937, 1993), Ucanal ($n = 2$), Xultún, and Yaxhá ($n = 2$). From 1955–1984, E Groups were excavated at Ceibal (1970, 2012–2014), Cenote (1971), and Lamanai (1981, 2002). Other excavated E Groups include Calakmul (1994), Caracol (1985–ongoing), Cival (2011), Cohune (1991), El Mirador (1990, 1998, 2006), El Palmar (2011), Holtún (2010, 2012), Ix Ek' (2007), Ixkún (2005), Ixtontón (1995), K'axob (2004), Mucanncah (2009–2012), Nadzca'an (1994), Nakbé (1992, 1998), Nakum (2002, 2008), Naranjo (2004–2008), Punta de Chimino (1989–1991, 1995–1996, 2004–2005), San Bartolo (2008), Tikal (1995), Wakna (1994), Xunantunich (2013), Yaxhá (2000, 2008), Yaxnohcah (2009–2012), and Yaxuná (2013). Approximately 20 percent ($n = 34$) of known E Groups have seen some excavation. E Group–like architectural complexes have also been excavated in Belize at Chan (see Chapter 11 in this volume) and at Baking Pot, Cahal Pech, and Pacbitún (see Chapter 13 in this volume).

in the periphery of a given site (and 5 of those already have an E Group occupying the site center). Laporte (2001:142) mentioned that many of the sites containing peripheral E Groups were in a relatively constricted zone north of the Salsipuedes River. The 5 sites without central E Groups are El Chilonché, La Amapola, Los Lagartos, El Chal, and Calzada Mopán.

Laporte (2001:142) observed that, besides being centrally located, most E Groups provided the largest open plaza space at a given site, with dimensions ranging from 500 to 5,000 m²; he further estimated that about 75 examples (about 46 percent) had plazas smaller than 1,000 m² and that another 77 (about 47 percent) had plazas between 1,000 to 3,000 m². Laporte (2001:143) suggested that a site's location either in hillier regions or in flatter

riverine areas affected the plaza size allotted to the E Groups. Another 7 sites (4 percent) contained E Groups with plazas in excess of 3,000 m²; at least 3 of these sites were more properly parts of larger sites. The remaining 3 percent of his sample lacked size estimates. In the Guatemalan Highlands, sites such as Takalik Abaj also have been noted to have Group E architecture (Estrada-Belli 2012a, 2012b:3; Popenoe de Hatch 2002). Pacific Coast examples have also been noted.

Alignment patterns from 40 E Groups for which good maps were available were analyzed in 2003 (Aveni et al. 2003:162, Table 1). As a result of this analysis, the authors asserted that E Group-type complexes functioned as non-Western observatories and further documented a shift from solstice/equinox to zenith passage dating to within the late part of the Early Classic period or about CE 350–550, attributing the shift to influence from Teotihuacán (Aveni et al. 2003:171). Controversy over the reasons why orientations of other recognized examples of E Group-type structures do not line up with the cardinal directions and/or solstice or equinox positions on the horizon were addressed (Aveni et al. 2003). The authors pointed out that at some sites other periods in the calendar were commemorated, such as 20-day Winals (Maya months) anchored to the zenith and nadir passages of the sun. The precise mode of use changed through time to replace or augment solar solstice/equinox dates with zenith passage dates, meaning that E Group design was tailored to individual site contexts. Regardless, some authors have continued to promote nonastronomical ritual functions for E Groups, a debate that is still evident in the following chapters (Aimers and Rice 2006:82, 86). Rather than being an either/or proposition, both functions are possible simultaneously, and the excavated examples warrant careful study.

Grant Aylesworth (2004:Table 1, 2015) broadened the functional definition of E Group complexes and discussed 50 examples. James Aimers and Prudence Rice (2006: Table 1, 81) reviewed E Group-type complexes and listed 64 examples. Thomas Guderjan (2006:97–103) suggested that there were about 100 examples, citing Gary Savoie (2004), but also discussed 4 “pseudo-E-groups” that lacked a western and a central eastern structure at the Belize sites of Blue Creek, Chan Chich, San José, and Quam Hill. Another possible analog may be at Pusilhá (Structures IV, V, and VII). Recent publications also cover Yaxhá and other sites, like El Mirador (Hansen 1991b; Šprajc et al. 2009).

Current Research

The current volume, resulting from two working sessions at the Santa Fe Institute in August 2012 and August 2013, has produced several insights into the interpretation of E Groups. The earliest known E Groups start by clearing the landscape to bedrock; the bedrock then was modified to produce building-like features that were later encased within rebuilt E Group construction fills (Chase 1983; Estrada-Belli 2002, 2003a, 2003b, 2006, 2011, 2012a:4, 2012b; Robin et al. 2012:Figure 6.3). This focus on bedrock modification is found at other important religious sites throughout the ancient Americas, such as the later Aztec rock sanctuary at Malinalco, Mexico (Jaramillo and Nieto 1998) and the later Inca sites of Quillarumiyoc (Anta Province, Peru) and Saywite (Apurímac Province, Peru) (Aveni 2008). The scraping and shaping of bedrock is part of a long tradition of earth, mountain, or cave (and water) worship in Central and South America (Broda 2015:223–226; Dowd 2015:214).

A second observation was that E Group architecture varied in size and location, possibly cross-cutting several forms of community organization. One E Group variant, a triadic shrine like that found at Chan, Belize (Robin et al. 2012), occurs in a small complex of public architecture that was presumably associated with a single family. Others, like those found at Uaxactún and Calakmul, were parts of larger planned groupings of public architecture that would have served sizable populations; however, later occupation in the immediate region of these plazas precludes fully understanding the size and density of the original communities.

Further insights were also gained about the relationships between E Group locations and trade routes. E Groups tend to be concentrated along trade routes in both the Southern Lowlands (see Chapter 2 in this volume) and the Northern Lowlands (see Chapter 14 this volume). New E Groups continue to be located by researchers (Chase et al. 2014b). Recent excavation of the earliest-known E Group in the Southern Lowlands at Ceibal has raised questions about general Mesoamerican connections in the Middle Preclassic period (1000–350 BCE) (Inomata et al. 2013), calling for more investigation of Middle Preclassic E Groups. Yet our understanding of E Groups has been augmented by the ongoing excavation and analysis carried out at a large number of sites covered within this volume: Calakmul, Mexico (Dowd); Caracol, Belize (Chase and Chase); Ceibal, Guatemala (Inomata and Sabloff); Chan, Belize (Robin); Cival, Guatemala (Estrada-Belli); El Palmar, Guatemala (Doyle); San Bartolo, Guatemala (Saturno, Beltrán, and

Rossi); Tikal, Guatemala (Doyle); Xunantunich, Belize (Brown); Yaxnocah, Mexico (Reese-Taylor); and Yaxuná, Mexico (Stanton and Freidel). Finally, E Group architectural complexes can be situated in terms of the broader Maya cosmos through framing them with relevant information pertaining to the astronomical, calendrical, ritual, and sociopolitical traditions underlying their construction (Chapters 3, 4, 5, and 6 in this volume; see also Broda 1989; Carlson 1981; Dowd and Milbrath 2015; and Freidel 1986, 2008).

Distribution and Significance of E Group Complexes

The Maya archaeological record provides important information about how E Groups helped to shape societal development. While the original inspiration for E Groups will remain a matter of debate, whether indigenous or borrowed (Clark and Hansen 2001), early versions of these architectural complexes had surely appeared in the Southern Maya Lowlands by 1000 BCE in the Middle Preclassic period (Inomata et al. 2013). By the early part of the Late Preclassic period (400 BCE–225 CE), these layouts were being used to establish a site as a formal Maya place. This can be inferred from the number, spacing, and dating of these groups within the Petén of Guatemala, west-central Belize, and the southern part of the Yucatán Peninsula of Mexico. The idea that these units would have spread along trade routes presumably accounts for their distribution both in the southeastern Petén and in the Yucatán Peninsula.

Time was an important conceptual element for the ancient Maya. It is likely that E Groups were built at auspicious points within the Maya calendar, possibly in concert with events and ceremonies relating to larger temporal cycles that were partitions of the Bak'tun (400-year period). Based on the archaeology and radiocarbon dates, one version of the E Group in the site epicenter at Caracol, Belize, was constructed at the beginning of Bak'tun 8 in 41 CE (Chase and Chase 2006). Given the standardization of the architectural form, it is likely that temporal principles were also incorporated into construction practices elsewhere. Using Caracol as a guide, early special deposits associated with Late Preclassic E Groups appear to have been involved in using elaborate caches to “center” the central eastern E Group structure relative to the Maya cosmos (Chase 1988; Chase and Chase 1998; Freidel et al. 1993).

Several researchers in this book have discovered important expressions of the material symbol-systems deployed by ancient Maya to express what

they were doing with early E Groups. Takeshi Inomata and his colleagues (2013) have found the earliest celt caches in the Maya Lowlands defining the sun path at the Ceibal E Group. These caches of precious and labor-intensive greenstone axes anticipate the formally arranged deposits at La Venta and resonate with earlier formal celt caches at Laguna Manatee, both in the Olmec Gulf Coast heartland. David Freidel and F. Kent Reilly (2010) have suggested that such arrangements may reference divination rituals that even today use spatially patterned material tokens among Maya day-keepers. Francisco Estrada-Belli's (2006) project at Cival discovered a remarkably rich later Middle Preclassic cache associated with the E Group there. That cache included the cruciform layout of fine greenstone celts over a bed of greenstone pebbles (Estrada-Belli 2006). Again, as Estrada-Belli suggests in his chapter, the pebbles might represent casting and divining tokens, an artifact category that might prove pervasive in Mesoamerica if we start looking for it (Freidel and Rich 2015). Small stone or shell tokens in conjunction with stick-shaped artifacts were likely used for the calculation of calendar time, especially given the bar and dot positional numeration of Mesoamerica. David Stuart (personal communication, September 16, 2014) reiterates his view that the Maya only used bar and dot numeration for calendar dates and used names for numbers applied to other things like bags of cacao beans. Whether or not the categorical dissociation of bar and dot notation from big number calculation of things other than days proves to be the case, it seems quite possible that the laying out of formal bar and dot inscriptions on public monuments was a way of declaring that the given historical date was also a divination performance anchoring the future to the past on that occasion. Thus, caches associated with Middle Preclassic E Groups might presage such practice.

Public monumental architecture and plazas were places for such ceremony along with more prosaic activities. For all of the contributors to this book who deal with Preclassic material symbols, performance is a thematically central concern. Performance, depicted in the spectacular Pinturas building murals at San Bartolo or implied as in the architecture of the Pinturas Complex (as discussed by Saturno, Beltrán, and Rossi in Chapter 10) or Structure 5C at Cerros, naturally segues to agency: how did the E Group phenomenon bear on the advent and development of rulership? The association of time reckoning with rulership comes as naturally as breathing to Maya archaeologists, and this book is in part a quest for the source of this link. We are some way from consensus on how performance, as manifest in symbols, declared a particular institutional expression of kingship and the

relation of kings to gods. Most of the participants in this book accept divine kingship as an institutional reality in the Preclassic Maya world. Some of our colleagues now think that the Maya largely innovated this institution in their own terms, although the iconography of the Late Preclassic Maya Maize God Prototype King is clearly Olmec in stylistic inspiration, as documented at San Bartolo, Cival, Cerros, and elsewhere.

Was Maya kingship always dynastic and based upon principles of primogeniture or some variant of this kin-based method? Simon Martin (2005) is beginning to question this assumption, as have others (Chase et al. 2009; Freidel 2018). In the Preclassic Maya record, there are only a few kings or carved stone monuments depicting kings. While we anchor our premises regarding social development into those that we have, none are associated with genealogical statements such as become common in the Southern Maya Lowlands in the Classic period (250–950 CE). So it is possible that kingship itself evolved significantly in the Late Preclassic–Early Classic transition or the Terminal or Protoclassic period at about 0–250 CE in conjunction with E Groups, something potentially reflected in the archaeological record associated with these complexes (Chase and Chase 1995).

With the advent of the Early Classic period, the centering principles were both altered and elaborated. The E Groups that have been excavated demonstrate some of this variability. All three Early Classic buildings situated upon the eastern platform of Uaxactún's E Group appear to have been centered with caches (Ricketson and Ricketson 1937). As human skull caches were used in this centering, it possibly implies a more individualistic aspect than had previously been seen in the associated rituals. Yet the focus on “three” is found elsewhere in Maya art and iconography and may indicate that each eastern building was associated with one of a given site's three founders (Chase and Chase 2012) or with the three items held in the bowl of the Quadripartite Badge (Robertson 1974). Estrada-Belli (2011) discovered three massive postholes, likely the placement of tall posts, organized as a triangle around a Preclassic stela set in front of the eastern range of the E Group at Cival.

Like the Uaxactún E Group, the Cenote E Group was also associated with early Maya monuments, and a skull cache and an elaborate interment were included within the last phase of the central building on the eastern platform in the early part of the Early Classic period (Chase 1983). At Tikal, the E Group goes back to the Middle Preclassic period, but in the early part of the Early Classic period elaborate burials were included in the eastern

buildings (Laporte and Fialko 1995). At Caracol, early carved monuments and a late Early Classic tomb were placed in front of the eastern platform; another late Early Classic tomb was included in one of the eastern structures. The association both of early stone monuments and of elaborate early burials in E Groups is suggestive of the conflation of these architectural complexes with dynastic founding and development. Thus, it is likely that E Groups were important places for the establishment of ruling elites at any given site. Even though the buildings in many E Groups were largely left untouched once the dynasties had been established, in an E Group variant found in west-central Belize the three eastern buildings continued to be stocked with important interments throughout the Late Classic period (Awe 2013).

Conclusion

Ancient architectural plans like E Groups are an important form of data that permit an exploration of cultural similarities and differences as well as external connections. When such plans can be joined with their archaeological records, they offer a rich base for interpreting ancient ritual. As the earliest form of public architecture in the Maya area, E Groups facilitate the identification of a shared Maya cultural base; the archaeology of these units provides a window to their ancient ritual world. Recognizing how E Groups both were used and were transformed over a lengthy period permits insight into the changes that occurred in ancient Maya society. E Group plazas are still recognizable at most ancient sites (many largely unchanged in form for nearly two thousand years), which suggests that these complexes must be viewed as cultural hallmarks that held deep evocative meaning to the people who used them and that they can be used to frame our understanding of the ancient Maya.

Acknowledgments

The authors in this volume thank the Santa Fe Institute, Jerry Sabloff, and Jerry Murdock for supporting the sessions that helped to produce these chapters.

References Cited

- Aimers, James J.
 1993 A Hermeneutic Analysis of the Maya E-Group Complex. M.A. thesis, Department of Anthropology, Trent University, Peterborough, Ontario.
- Aimers, James J., and Prudence M. Rice
 2006 Astronomy, Ritual, and the Interpretation of Maya “E-Group” Architectural Assemblages. *Ancient Mesoamerica* 17(1):79–96.
- Andrews, E. Wyllys V.
 1980 *Excavations at Dzibilchaltun, Yucatan, Mexico*. Middle American Research Institute, Publication 48. Tulane University, New Orleans.
- Aveni, Anthony F.
 1978 Old and New World Naked-Eye Astronomy. *Technology Review* 81(2):60–72.
 2008 *People and the Sky: Our Ancestors and the Cosmos*. Thames and Hudson, New York.
- Aveni, Anthony F., Anne S. Dowd, and Benjamin Vining
 2003 A Statistical Approach to the Astronomical Efficacy of Group E-Type Structures. *Latin American Antiquity* 14(2):159–178.
- Aveni, Anthony F., and Horst Hartung
 1988 Archaeoastronomy and Dynastic History at Tikal. In *New Directions in American Archaeoastronomy*, edited by Anthony F. Aveni, pp. 1–16. BAR International Series 454. British Archaeological Reports, Oxford, United Kingdom.
 1989 Uaxactún, Guatemala, Group E and Similar Assemblages: An Archaeoastronomical Reconsideration. In *World Archaeoastronomy*, edited by Anthony F. Aveni, pp. 441–461. Cambridge University Press, Cambridge.
- Awe, Jaime A.
 2013 Journey on the Cahal Pech Time Machine: An Archaeological Reconstruction of the Dynastic Sequence at a Belize Valley Maya Polity. *Research Reports in Belizean Archaeology* 10:33–50.
- Aylesworth, Grant R.
 2004 Astronomical Interpretations of Ancient Maya E-Group Architectural Complexes. *Archaeoastronomy* 18:36–66.
 2015 E-Group Arrangements. In *Handbook of Archaeoastronomy and Ethnohistory*, edited by Clive L. N. Ruggles, pp. 783–791. Springer, New York.
- Becquelin, Pierre, Dominique Michelet, Charlotte Arnaud, and Eric Taladoire
 1997 Proyecto de Investigación Arqueológica del Clásico Temprano al Clásico Reciente en Balamkú, Mo Hopelchen, Campeche. *Informe de los trabajos de campo realizados del 5 de febrero al 29 de marzo de 1996*. Centro Francés de Estudios Mexicanos y Centroamericanos (CEMCA) y Centre National de la Recherche Scientifique (CNRS) de Francia (Grupo de Investigación 312), Distrito Federal, México.
- Blake, Michael
 2013 Solar Orientations and Formative Period Site Layouts in SE Mesoamerica: Sunrise and Sunset Alignments during the Equinoxes and Solstices. Paper

presented at the 78th Annual Meeting of the Society for American Archaeology, Honolulu, Hawaii.

Blom, Frans

1924 *Report on the Ruins of Uuaxactún and Other Ruins in the Department of Petén, Guatemala*. Carnegie Institution of Washington, Guatemala Expedition, Washington, D.C.

1926 El observatorio más antiguo del continente americano. *Anales de las Sociedades de Geografía e Historia* 2(3):335–338.

Broda, Johanna

1989 Significant Dates of the Mesoamerican Calendars and Archaeoastronomy. In *World Archaeoastronomy*, edited by A. Aveni, p. 494. Cambridge University Press, Cambridge.

2015 Political Expansion and the Creation of Ritual Landscapes: A Comparative Study of Inca and Aztec Cosmivision. *Cambridge Archaeological Journal* 25(1):219–238.

Bullard, William R. J.

1960 Maya Settlement Pattern in Northeastern Peten, Guatemala. *American Antiquity* 25:355–372.

Bullard, William R. J., and Mary R. Bullard

1965 *Late Classic Finds at Baking Pot, British Honduras*. Occasional Paper 8. Royal Ontario Museum, Toronto.

Carlson, John B.

1981 A Geomantic Model for the Interpretation of Mesoamerican Sites: An Essay in Cross-Cultural Comparison. In *Mesoamerican Sites and World Views*, edited by E. P. Benson, pp. 143–215. Dumbarton Oaks, Washington, D.C.

Carr, Robert, and James Hazard

1961 *Tikal Reports*. University Museum, University of Pennsylvania, Philadelphia.

Carrasco Vargas, Ramón

1999 Actividad ritual y objetos de poder en La Estructura IV de Calakmul, Campeche. In *Land of the Turkey and the Deer*, edited by Ruth Guber, pp. 69–84. Labyrinthos, Lancaster, Pennsylvania.

Carrasco Vargas, Ramón, Sylviane Boucher, Anne S. Dowd, Armando Paul, Emyly González, and María Elena García

1995 *Informe sobre el Proyecto Arqueológico de la Biósfera Calakmul*. Consejo de Arqueología, Instituto Nacional de Antropología e Historia, Mérida, Yucatán.

Carrasco Vargas, Ramón, and Marc Wolf

1996 Nadzca'an: Una antigua ciudad en el suroeste de Campeche, México. *Mexicon* 18(4):70–74.

Chase, Arlen F.

1983 *A Contextual Consideration of the Tayasal-Paxcaman Zone, El Petén, Guatemala*. Ph.D. dissertation, University of Pennsylvania, Philadelphia. University Microfilms/ProQuest, Ann Arbor.

1985 Archaeology in the Maya Heartland: The Tayasal-Paxcaman Zone, Lake Peten, Guatemala. *Archaeology* 38(1):32–39.

- Chase, Arlen F., and Diane Z. Chase
 1995 External Impetus, Internal Synthesis, and Standardization: E-Group Assemblages and the Crystallization of Classic Maya Society in the Southern Lowlands. *Acta Mesoamerica* 8:87–101.
- 2006 Before the Boom: Caracol's Preclassic Era. *Research Reports in Belizean Archaeology* 3:41–57.
- 2012 Complex Societies in the Southern Maya Lowlands: Their Development and Florescence in the Archaeological Record. In *Oxford Handbook of Mesoamerican Archaeology*, edited by D. L. Nichols, and C. A. Pool, pp. 255–267. Oxford University Press, New York.
- 2013 Temporal Cycles in the Archaeology of Maya Residential Groups from Caracol, Belize. *Research Reports in Belizean Archaeology* 10:13–24.
- Chase, Arlen F., Diane Z. Chase, Jaime J. Awe, John F. Weishampel, Gyles Iannone, Holley Moyes, Jason Yaeger, and M. Kathryn Brown
 2014a The Use of LiDAR in Understanding the Ancient Maya Landscape: Caracol and Western Belize. *Advances in Archaeological Practice* 2(3):208–221.
- Chase, Arlen F., Diane Z. Chase, Jaime J. Awe, John F. Weishampel, Gyles Iannone, Holley Moyes, Jason Yaeger, M. Kathryn Brown, Ramesh L. Shrestha, William E. Carter, and Juan Fernandez Diaz
 2014b Ancient Maya Regional Settlement and Inter-Site Analysis: The 2013 West-Central Belize LiDAR Survey. *Remote Sensing* 6:8671–8695.
- Chase, Arlen F., Diane Z. Chase, and Michael E. Smith
 2009 States and Empires in Ancient Mesoamerica. *Ancient Mesoamerica* 20:175–182.
- Chase, Arlen F., Lisa J. Lucero, Vernon Scarborough, Diane Z. Chase, Rafael Cobos, Nicholas Dunning, Joel Gunn, Scott Fedick, Vilma Fialko, Michelle Hegmon, Gyles Iannone, David L. Lentz, Rodrigo Liendo, Keith Prufer, Jeremy A. Sabloff, Joseph Tainter, Fred Valdez Jr., and Sander van der Leeuw
 2014c Tropical Landscapes and the Ancient Maya: Diversity in Time and Space. In *The Resilience and Vulnerability of Ancient Landscapes: Transforming Maya Archaeology through IHOPE*, edited by Arlen F. Chase and Vernon L. Scarborough, pp. 11–29. AP3A Paper 24(1). American Anthropological Association, Arlington, Virginia.
- Chase, Diane Z.
 1988 Caches and Censerwares: Meaning from Maya Pottery. In *A Pot for All Reasons: Ceramic Ecology Revisited*, edited by Luanna Lackey and Charles Kolb, pp. 81–104. Laboratory of Anthropology, Temple University, Philadelphia, Pennsylvania.
- Chase, Diane Z., and Arlen F. Chase
 1998 The Architectural Context of Caches, Burials, and Other Ritual Activities for the Classic Period Maya (as Reflected at Caracol, Belize). In *Function and Meaning in Classic Maya Architecture*, edited by Stephen D. Houston, pp. 299–332. Dumbarton Oaks, Washington, D.C.
- Chinchilla Mazariegos, Oswaldo, Vera Tiesler, Oswaldo Gomez, and T. Douglas Price
 2015 Myth, Ritual, and Human Sacrifice in Early Classic Mesoamerica: Interpreting

- a Cremated Double Burial from Tikal, Guatemala. *Cambridge Archaeological Journal* 25:187–210.
- Clark, John E.
 2007 Mesoamerica's First State. In *The Political Economy of Ancient Mesoamerica: Transformations during the Formative and Classic Periods*, edited by Vernon L. Scarborough and John E. Clark, pp. 11–46. University of New Mexico Press, Albuquerque.
- Clark, John E., and Richard D. Hansen
 2001 The Architecture of Early Kingship: Comparative Perspectives on the Origins of the Maya Royal Court. In *Royal Courts of the Ancient Maya: 2. Data and Case Studies*, edited by Takeshi Inomata and Stephen D. Houston, pp. 1–45. Westview Press, Boulder, Colorado.
- Coggins, Clemency
 1983 *The Stucco Decoration and Architectural Assemblage of Structure 1-SUB, Dzibilchaltun, Yucatan, Mexico*. Publication 49, Middle American Research Institute. Tulane University, New Orleans.
- Coggins, Clemency C., and R. David Drucker
 1988 The Observatory at Dzibilchaltun. In *New Directions in American Archaeoastronomy*, edited by Anthony F. Aveni, pp. 17–56. BAR International Series 454. British Archaeological Reports, Oxford, United Kingdom.
- Cohodas, Marvin
 1980 Radial Pyramids and Radial Associated Assemblages of the Central Maya Area. *Journal of the Society of Architectural Historians* 39(3):208–223.
- Cyphers, Anne M.
 1997 *Población, subsistencia y medio ambiente en San Lorenzo Tenochtitlán*. Instituto de Investigaciones Antropológicas y Universidad Nacional Autónoma de México, Mexico City.
- Dahlin, Bruce
 1984 A Colossus in Guatemala: The PreClassic Maya City of El Mirador. *Archaeology* 37(5):18–25.
- Dowd, Anne S. (editor)
 2015 Cosmovision in New World Ritual Landscapes. Special Section. *Cambridge Archaeological Journal* 25(1):211–297.
- Dowd, Anne S., and Anthony F. Aveni
 1998 The Maya Time-Space Continuum: Calakmul's Group E Complex. Paper presented at the 63rd Annual Meeting of the Society for American Archaeology, Seattle, Washington, March 26, 1998.
- Dowd, Anne S., Anthony F. Aveni, and Ramón Carrasco V.
 1995 Solar Observatory or Allegory? Calakmul's Group E-Type Complex. Paper presented at the 60th Annual Meeting of the Society for American Archaeology, Minneapolis, Minnesota, May 4, 1995.
- Dowd, Anne S., and Susan Milbrath (editors)
 2015 *Cosmology, Calendars, and Horizon-Based Astronomy in Ancient Mesoamerica*. University Press of Colorado, Boulder.

Dunning, Nicholas P.

1992 *Lords of the Hills: Ancient Maya Settlement in the Puuc Region, Yucatán, Mexico*. Monographs in World Archaeology, No. 15. Prehistory Press, Madison, Wisconsin.

Escobedo, Héctor (editor)

2008 *Registro de sitios arqueológicos del sureste y centro-oeste de Petén*. Monografías Atlas Arqueológico de Guatemala. Dirección General del Patrimonio Cultural y Natural, Guatemala.

Estrada-Belli, Francisco

2002 Archaeological Investigations at Holmul, Peten, Guatemala: Preliminary Results of the Third Season, 2002. <http://www.bu.edu/holmul>, accessed September 10, 2013.

2003a Holmul, Peten, Guatemala, 2003 Post-Season Interim Report. <http://www.bu.edu/holmul>, accessed September 10, 2013.

2006 Lightning Sky, Rain, and the Maize God: The Ideology of Preclassic Rulers at Cival, Peten, Guatemala. *Ancient Mesoamerica* 17(2):57–78.

2011 *The First Maya Civilization: Ritual and Power in the Maya Lowlands before the Classic Period*. Routledge, New York.

2012a Early Human-Environmental Interactions in the Maya Lowlands: Archaeological and Paleoenvironmental Explorations at Dos Aguadas and Holmul, Peten, Guatemala. <http://www.bu.edu/holmul>, accessed September 10, 2013.

2012b Investigaciones arqueológicas en la región de Holmul, Péten: Holmul y Dos Aguadas. Informe Preliminar de la Temporada 2012. <http://www.bu.edu/holmul>, accessed September 10, 2013.

Estrada-Belli, Francisco (editor)

2003b Archaeological Investigations in the Holmul Region, Peten Results of the Fourth Season, 2003. <http://www.bu.edu/holmul>, accessed September 10, 2013.

Fagan, Brian M., and Nadia Durrani

2013 *People of the Earth: An Introduction to World Prehistory*. 14th ed. Pearson, New York.

Flannery, Kent V.

2009 *The Early Mesoamerican Village*. Reprinted. Left Coast Press, Walnut Creek, California. Originally published 1976, Academic Press, New York.

Freidel, David A.

1986 The Monumental Architecture. In *Archaeology at Cerros, Belize, Central America: 1. An Interim Report*, edited by Robin A. Robertson and David A. Freidel, pp. 1–22. Southern Methodist University Press, Dallas.

2008 Maya Divine Kingship. In *Religion and Power: Divine Kingship in the Ancient World and Beyond*, edited by Nicole Brisch, 191–206. Oriental Institute Seminars No. 4. Oriental Institute of the University of Chicago.

2018 Maya and the Idea of Empire. In *Pathways to Power*, edited by M. Kathryn Brown and George Bey, in press. University Press of Florida, Gainesville.

Freidel, David A., and F. Kent Reilly III

2010 The Flesh of God, Cosmology, Food, and the Origins of Political Power in Southeastern Mesoamerica. In *Pre-Columbian Foodways: Interdisciplinary*

- Approaches to Food, Culture, and Markets in Mesoamerica*, edited by John E. Staller and Michael D. Carrasco, pp. 635–679. Springer, New York.
- Freidel, David A., and Michelle E. Rich
 2015 Pecked Circles and Divining Boards, Calculating Instruments in Ancient Mesoamerica. In *Cosmology, Calendars, and Horizon-Based Astronomy in Ancient Mesoamerica*, edited by Anne S. Dowd, and Susan Milbrath, pp. 249–264. University Press of Colorado, Boulder.
- Freidel, David A., Linda Schele, and Joy Parker
 1993 *Maya Cosmos: Three Thousand Years on the Shaman's Path*. William Morrow, New York.
- Grube, Nikolai, and Linda Schele
 1993 *Naranjo Altar 1 and Rituals of Death and Burials*. Texas Notes on Precolumbian Art, Writing, and Culture No. 54. University of Texas, Austin.
- Guderjan, Thomas H.
 2006 E-Groups, Pseudo-E-Groups, and the Development of the Classic Maya Identity in the Eastern Petén. *Ancient Mesoamerica* 17:97–104.
- Hanks, William F.
 1990 *Referential Practice: Language and Lived Space among the Maya*. University of Chicago Press, Chicago.
- Hansen, Richard D.
 1991a The Maya Rediscovered: The Road to Nakbe. *Natural History Magazine*, May 8, p. 14.
 1991b *An Early Maya Text from El Mirador, Guatemala*. Research Reports on Ancient Maya Writing, No. 37. Center for Maya Research, Washington, D.C.
 2000 Arquitectura e ideología de los antiguos mayas. In *Memoria de la Segunda Mesa Redonda de Palenque*, pp. 72–108. Instituto Nacional de Antropología e Historia, Consejo Nacional Para la Cultura y las Artes, Mexico City.
 2001 The First Cities: The Beginnings of Urbanization and State Formation in the Maya Lowlands. In *Maya: Divine Kings of the Rain Forest*, edited by Nikolai Grube, Eva Eggebrecht, and Matthias Seidel, pp. 50–65, Ullmann, Cologne, Germany.
- Healy, Paul F.
 1990 Excavations at Pacbitun, Belize: Preliminary Report on the 1986 and 1987 Investigations. *Journal of Field Archaeology* 17(3):247–262.
- Inomata, Takeshi, Jessica MacLellan, Daniela Triadan, Jessica Munson, Melissa Burham, Kazuo Aoyama, Hiroo Nasu, Flory Pinzon, and Hitoshi Yonenobu
 2015 Development of Sedentary Communities in the Maya Lowlands: Coexisting Mobile Groups and Public Ceremonies at Ceibal, Guatemala. *Proceedings of the National Academy of Sciences* 112(14):4268–4273.
- Inomata, Takeshi, Daniela Triadan, Kazuo Aoyama, Victor Castillo, and Hitoshi Yonenobu
 2013 Early Ceremonial Constructions at Ceibal, Guatemala, and the Origins of Lowland Maya Civilization. *Science* 340:467–471.
- Jaramillo Luque, Ricardo, and Rubén Nieto Hernández
 1998 Valle de Malinalco. In *Historia general del estado de México: 1. Geografía y arqueología*, edited by Yoko Sugiura Yamamoto, pp. 95–117. Gobierno del Estado de México y el Colegio Mexiquense, Mexico City.

- Kurjack, Edward B.
 1979 *Introduction to the Map of the Ruins of Dzibilchaltun, Yucatan, Mexico*. Middle American Research Institute Publication 47. Tulane University, New Orleans.
- Kurjack, Edward B., George E. Stuart, John C. Scheffer, and John W. Cottier
 1979 *Map of the Ruins of Dzibilchaltun, Yucatan, Mexico*. Middle American Research Institute Publication 47. Tulane University, New Orleans.
- LaPorte, Juan Pedro, and Vilma Fialko C.
 1990 New Perspectives on Old Problems: Dynastic References for the Early Classic at Tikal. In *Vision and Revision in Maya Studies*, edited by Flora Clancy and Peter Harrison, pp. 33–66. University of New Mexico Press, Albuquerque.
 1995 Re-encuentro con el Mundo Perdido, Tikal, Guatemala. *Ancient Mesoamerica* 6(1):41–94.
- LaPorte, Juan Pedro, and Vilma Fialko C. (editors)
 1987 La cerámica del Clásico Temprano desde Mundo Perdido: Una reevaluación. In *Maya Ceramics: Papers from the 1985 Maya Ceramic Conference*, part 1, edited by P. Rice and R. Sharer, pp. 123–182. BAR International Series 345. British Archaeological Reports, Oxford, United Kingdom.
- LaPorte Molina, Juan Pedro
 2001 Dispersión y estructura de las ciudades del sureste de Petén, Guatemala. In *Reconstruyendo la ciudad maya: El urbanismo en las sociedades antiguas*, edited by A. C. Ruiz, M.J.I. Ponce de León, and M.d.C.M. Martínez Martínez, pp. 136–162. Sociedad Española de Estudios Mayas, Meso Redonda, Valladolid, Spain.
- Lounsbury, Floyd G.
 1980 Some Problems in the Interpretation of the Mythological Portion of the Hieroglyphic Text of the Temple of the Cross at Palenque. In *Third Palenque Round Table, Part 2*, edited by Merle G. Robertson, pp. 99–115. University of Texas Press, Austin.
- Lowe, Gareth W.
 1977 The Mixe-Zoque as Competing Neighbors of the Early Lowland Maya. In *The Origins of Maya Civilization*, edited by R.E.W. Adams, pp. 197–248. University of New Mexico Press, Albuquerque.
 1981 Olmec Horizons Defined in Mound 20, San Isidro, Chiapas. In *The Olmec and Their Neighbors*, edited by E. Benson, pp. 231–255. Dumbarton Oaks, Washington, D.C.
 1989 The Heartland Olmec: Evolution of Material Culture. In *Regional Perspectives on the Olmecs*, edited by Robert Sharer and David Grove, pp. 33–67. Cambridge University Press, Cambridge.
 1995 Presencia maya en la cerámica del Preclásico Tardío en Chiapa de Corzo. In *Memoria del Segundo Congreso Internacional de Mayistas*, pp. 321–341. Centro de Estudios Mayas, Universidad Nacional Autónoma de México, Mexico City.
- Marquina, I.
 1951 *Arquitectura prehispánica*. Instituto Nacional de Antropología e Historia, Mexico City.

Martin, Simon

2005 Of Snakes and Bats: Shifting Identities at Calakmul. *PARI [Precolumbian Art Research Institute] Journal* 6(2):5–13.

Maudsley, Alfred P.

1889–1902 *Biologia Centrali-Americana: Archaeology*. 5 vols. R. H. Porter and Dulau, London.

McGuire, R. H.

1983 Breaking Down Cultural Complexity: Inequality and Heterogeneity. *Advances in Archaeological Method and Theory* 6:91–142.

Micheletti, George

2016 Excavation of a Triadic Shrine E Group at Pacbitun, Belize. M.A. thesis. Department of Anthropology, University of Central Florida, Orlando.

Morley, Sylvanus G.

1933 *The Calakmul Expedition*. Supplementary Publication No. 6. Carnegie Institution of Washington, Washington, D.C.

1937–1938 *The Inscriptions of Peten*. 5 vols. Publication 427. Carnegie Institution of Washington, Washington, D.C.

Nichols, Deborah L.

2015 Teotihuacan. *Journal of Archaeological Research*. 24:1–74.

Paukakat, Timothy R.

2007 *Chiefdoms and Other Archaeological Delusions*. Altamira, Lanham, Maryland.

Pendergast, David M.

1981 Lamanai, Belize: Summary of Excavation Results, 1974–1980. *Journal of Field Archaeology* 8:29–53.

Popenoe de Hatch, Marion

2002 Evidencia de un observatorio astronómico en Abaj Takalik. In *XV Simposio de Investigaciones Arqueológicas en Guatemala*, edited by Juan Pedro Laporte, Bárbara Arroyo, and Héctor L. Escobedo, pp. 437–458. Museo Nacional de Arqueología y Etnología, Guatemala.

Proskouriakoff, Tatiana

1950 *A Study of Classic Maya Sculpture*. Publication 593. Carnegie Institution of Washington, Washington, D.C.

Redmond, Elsa M., and Charles S. Spencer

2012 Chiefdoms at the Threshold: The Competitive Origins of the Primary State. *Journal of Anthropological Archaeology* 31:22–37.

Ricketson, Oliver G., Jr.

1927 Report on the Uaxactún Project. *Carnegie Institution of Washington Year Book* 26:256–263.

1928 Astronomical Observatories in the Maya Area. *Geographical Review* 18(2):215–229.

Ricketson, Oliver G., Jr., and Edith Bayles Ricketson

1937 *Uaxactún, Guatemala, Group E, 1926–31*. Publication 477. Carnegie Institution of Washington, Washington, D.C.

Robertson, Merle Green

1974 The Quadripartite Badge: A Badge of Rulership. In *Primera Mesa Redonda de*

- Palenque Part I*, edited by Merle Robertson pp. 129–137. Robert Louis Stevenson School, Pebble Beach, California.
- Robin, Cynthia, James Meirhoff, Caleb Kestle, Chelsea Blackmore, Laura J. Kosakowsky, and Anna C. Novotny
2012 Ritual in a Farming Community. In *Chan: An Ancient Maya Farming Community*, edited by Cynthia Robin, pp. 113–132. University Press of Florida, Gainesville.
- Rogers, Elizabeth Barlow
1972 *Frederick Law Olmsted's New York*. Praeger, New York.
- Rosenzweig, Roy, and Elizabeth Blackmar
1992 *The Park and the People: A History of Central Park*. Cornell University Press, Ithaca, New York.
- Ruppert, Karl
1934 Explorations in Campeche. *Carnegie Institution of Washington Year Book* 33:93–95.
1977 A Special Assemblage of Maya Structures. In *The Maya and Their Neighbors*, edited by Clarence L. Hay, Ralph L. Linton, Samuel K. Lothrop, Harry L. Shapiro, and George C. Vaillant, pp. 222–231. Dover Press, New York. Originally published in 1940 by Harvard University Press, Cambridge, Massachusetts.
- Ruppert, Karl, and John Denison
1943 *Archaeological Reconnaissance in Campeche, Quintana Roo, and Peten*. Publication 543. Carnegie Institution of Washington, Washington, D.C.
- Savoie, Greg
2004 The Spatial and Temporal Distribution of Maya E-Group Complexes. M.A. thesis, Department of Archaeology, University of Leicester, England.
- Seler, Eduard
1915 *Gesammelte Abhandlungen zur Amerikanischen Sprach- und Alterthumskunde*, Vol. 5. A. Asher, Berlin. Reprint 1961 by Akademische Druck und Verlagsanstalt, Graz, Austria.
- Service, E. R.
1975 *Origins of the State and Civilization*. Norton, New York.
- Smith, A. Ledyard
1950 *Uaxactún, Guatemala: Excavations (1931–1937)*. Publication 588. Carnegie Institution of Washington, Washington, D.C.
- Spencer, Charles S.
2003 War and Early State Formation in Oaxaca, Mexico. *PNAS* 100(20):11185–11187.
2009 Testing the Morphogenesisist Model of Primary State Formation: The Zapotec Case. In *Macroevolution in Human Prehistory*, edited by Anna M. Prentiss, Ian Kuijt, and James C. Chatters et al., pp. 133–155. Springer, New York.
- Šprajc, Ivan, Florentino García Cruz, and Héber Ojeda Mas
1997 Reconocimiento arqueológico en el sureste de Campeche, México: Informe preliminar. *Mexicon* 11(1):5–12.
- Šprajc, Ivan, Carlos Morales-Aguilar, and Richard D. Hansen
2009 Early Maya Astronomy and Urban Planning at El Mirador, Peten, Guatemala. *Anthropological Notebooks* 15(3):79–101.

Stanton, T. W., and D. Freidel

2003 Ideological Lock-In and the Dynamics of Formative Religions in Mesoamerica. *Mayeb* 16:5–14.

Tate, Carolyn E.

1992 *Yaxchilán: The Design of a Ceremonial City*. University of Texas Press, Austin.

Thompson, J. Eric S.

1931 *Archaeological Investigations in the Southern Cayo District British Honduras*. Field Museum of Natural History Publication 301, Anthropological Series 17(3). Field Museum of Natural History, Chicago.

1939 *Excavations at San Jose, British Honduras*. Carnegie Institute of Washington, Publication No. 58. Carnegie Institute of Washington, Washington, D.C.

1954 *The Rise and Fall of Maya Civilization*. University of Oklahoma Press, Norman.

Tozzer, Alfred

1911 *A Preliminary Study of the Ruins of Tikal, Guatemala*. Memoirs of the Peabody Museum 5(2). Peabody Museum, Harvard University, Cambridge, Massachusetts.

1913 *A Preliminary Study of the Ruins of Nakum, Guatemala*. Memoirs of the Peabody Museum 5(3). Peabody Museum, Harvard University, Cambridge, Massachusetts.

Vogt, Evon Z.

1976 *Tortillas for the Gods: A Symbolic Analysis of Zinacanteco Rituals*. Harvard University Press, Cambridge, Massachusetts.

Wiley, Gordon R.

1956 The Structure of Ancient Maya Society: Evidence from the Southern Lowlands. *American Anthropologist* 58(5):777–782.

1970 Type Descriptions of the Ceramics of the Real Xe Complex, Seibal, Peten, Guatemala. In *Monographs and Papers in Maya Archaeology*, edited by William R. Bullard Jr., pp. 313–355. Papers of the Peabody Museum of Archaeology and Ethnology, Vol. 61. Harvard University, Cambridge, Massachusetts.

Wright, Henry T.

1977 Recent Research on the Origin of the State. *Annual Review of Anthropology* 6:379–397.

Yoffee, Norman

2005 *Myths of the Archaic State: Evolution of the Earliest Cities, States, and Civilizations*. Cambridge University Press, Cambridge, Massachusetts.

Zaro, Gregory, and Jon C. Lohse

2005 Agricultural Rhythms and Rituals: Maya Solar Observation in Hinterland Blue Creek, Northwestern Belize. *Latin American Antiquity* 16(1):81–98.