

SUN KINGS AND HIEROPHANTS:
GEOCOSMIC ORIENTATION AND
THE CLASSIC MAYA

BY
JANE CAROLINE ARIE, B.A.

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“Sun Kings and Hierophants: Geocosmic Orientation and the Classic Maya,” a thesis prepared by Jane Caroline Arie in partial fulfillment of the requirements for the degree, Master of Arts, has been approved and accepted by the following:

Timothy J. Pettibone
Dean of the Graduate School

Lisa J. Lucero
Chair of the Examining Committee

Date

Committee in charge:

Dr. Lisa J. Lucero, Chair

Dr. Amanda Cobb

Dr. William H. Walker

DEDICATION

First, to my husband, James R. Baldwin, for unwavering support and for the beginning of a new life atop Temple IV.

Second, to my father, Dr. James C. Arie, and the ongoing quest for self-actualization.

Finally, to the memory of my grandfather, Sterlin N. Thompson; and my father-in-law, Noland Yantis Baldwin; and to the spirit of discovery and exploration in everyone.

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VITA

January 11, 1970	Born in Dallas, Texas
1988	Graduated from A&M Consolidated High School, College Station, Texas
1992	B.A., Latin American Studies, Institute of Latin American Studies, University of Texas, Austin
1995-2001	Field Crew Member of archeology projects in Texas, New Mexico, Colorado, and Belize, Central America

PROFESSIONAL AND HONORARY SOCIETIES

Alpha Chi

Gamma Beta Phi

Society for American Archaeology

PUBLICATIONS AND PAPERS PRESENTED

Hawkins, Bill, Jane C. Arie, Lawrence L. Loendorf, and Leo Karpinski
1997 Lessons Learned: Recording Sites and Assigning Ages to Rock Art Panels, Steven M. Freers, ed., *American Indian Rock Art* 23:103-110.

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ABSTRACT

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The purpose of this research is to examine characteristics of site planning and monumentality at four different site types and draw conclusions to the relevance of these characteristics in regional politics.

In order to accomplish the objectives of this research, this study proposes a model that will compare differences in orientations of structures, site layout, and degree of monumentality at nine different sites in the Maya area during the Classic period (A.D. 250-850).

Findings reveal that the four different site types: community centers (Type 1), local centers (Type 2), regional economic capitals (Type 3), and regional economic/ideological capitals (Type 4), reflect different degrees of site planning and monumentality and subsequently indicate various degrees of socio-political power.

Community centers have the least evidence for formal layout of structures and for large monumental structures, and therefore, they have the least evidence for power. In contrast, regional capitals have the greatest evidence for formal layout of structures and for monumentality, and therefore they reflect the greatest evidence for power. Of the two types of regional capitals, regional economic/ideological capitals reflect the greatest evidence for power in site layouts, suggesting a strong correlation between ideology and political power.

The results and interpretation of this research reveal variable patterns for local centers, which resemble an array of characteristics reflecting both economic regional capitals and economic/ideological regional capitals. The variability of these characteristics illustrate the

need for further study of the differences and similarities among local centers.

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CHAPTER 1

INTRODUCTION

In the past, minor Maya centers have not been the focus of attention of research on Maya political history because they are small and ostensibly insignificant. However, “If we are to press forward with our understanding of Maya politics, we need to know more about the functions of...lesser centers, their relationships to each other, and their relationships to the major centers” (Willey 1997:8). Even though centers are located on different landscapes in the Maya area and have varied political histories, similarities exist (Sharer 1994:464). Patterns of similarities in architecture include the presence of ceremonial centers and temples, orientations of buildings, and site planning. The purpose of this research is to examine characteristics of site planning and monumentality at nine different sites encompassing four different site types and draw conclusions to the relevance of these characteristics in regional politics.

In order to accomplish the objectives of the research, this study will: (1) introduce the concepts of site planning and monumentality, (2) explore characteristics of site planning and monumentality in the Maya area during the Classic period (A.D. 250-850), (3) propose a model that illustrates the incremental variation of site planning and monumentality at different site types, (4) present relevant case studies

to examine differences in site planning and monumentality at different site types, and (5) assess characteristics of site planning and monumentality based on results from the case studies and the model. The conclusion will include an examination of the implications of site planning and monumentality on sociopolitical power.

Only a limited amount of research has examined characteristics of site planning and monumentality (Ashmore 1986, 1991). This study is significant because it examines site differences in site planning and monumentality at different types of centers. Specifically, this study analyzes the Maya's use of orientations of structures, and this analysis will help researchers understand differences between sites.

CHAPTER 2

SITE PLANNING, MONUMENTALITY, AND SOCIAL POWER

Economic and ideological manipulations are crucial to the development of sociopolitical power (Mann 1986). Leaders with political power are able to organize site planning and the construction of large monuments. These construction projects reinforce the legitimacy of both the political power of the leaders and the legitimacy of religion by incorporating local beliefs into site planning and monumentality.

Differential access to labor and the control of material resources results in the subsequent emergence of an elite group (Webster 1990:338). At larger centers leaders organize and manage labor through the institutionalization of a social hierarchy. In effect, labor-intensive activities, which represent status and social power, are found at sites with great social stratification. The ruling party wields political power from a central polity that manages the function of the center and its territories. Political power may be defined as, “centralized and institutionalized territorial regulation” (Mann 1986:11). The center integrates small villages into areas of social, political, and economic activity (Zucker 1959:26).

Wirth (1938) outlines three major features of a city: (1) large population, (2) dense nucleated population, and (3) high internal

heterogeneity (related to differences in occupation, wealth, and power). Planned cities usually consist of a formality in the layout that can include straight roads, rectangular street patterns, axial growth, and standard sizes of buildings (Marcus 1983:197). The nucleus of a city usually reflects the development of political authority. This observation is not always the case however. For example, the early acropolis of ancient Greece (to the 6th century B.C.) had an irregular layout. Reconstructions of ancient acropolises including Athens, Corinth, and Thera indicate a focus on the form and design of individual structures, but not in their sense of spatial distribution. After the 5th century B.C., the Roman agora illustrates an awareness of spatial development as the focal point of the city and also the center for political and economic activity (Zucker 1959:27-31).

By reproducing the cosmos on earth (through architecture) leaders linked the human realm with the celestial realm, thereby creating sacred space. Association of the rulers with the supernatural legitimized the authority of their leadership (Hadingham 1984:5). Site planning, therefore, may express representation of beliefs on the landscape. Rykwert (1976) for example, suggests that the layout of ancient towns displays symbolic patterns expressed in mythical and ritual terms that consisted of four elements: (1) the acting out at the founding of a temple or settlement a dramatic show of the creation of

the world, (2) the incarnation of the creation of the world in the plan of the settlement and its social and religious institutions, (3) the achievement of this incarnation by aligning the temple or settlement axes with those of the universe, and 4) the rehearsal of the foundation cosmogony in regularly recurrent festivals at specific monuments (Rykwert 1976:194).

Site planning may also represent a harmonizing of local space. Wheatley (1971), for example, suggests that site plans in ancient Chinese cities incorporate a set of beliefs that mirror the order of the city with the cosmic or supernatural order. Using the geomantic art of *feng-shui* (the art of adjusting features within the environment congruently so as to minimize adverse influences and maximize positive effects [Wheatley 1971:419]) city planners may adjust features within the landscape to harmonize cities with the cosmos. Geomantic alignment has been suggested for the construction of ancient Mesoamerican cities (Carlson 1977:67).

Leaders use religious authority, via ritual and ceremonial activity, to achieve “autonomous political goals...using religion as a means to gain political control” (Wheatley 1971:315). Ceremonies integrate populations and legitimize the agenda of the ruling political body (Bourdieu 1977:183-184). According to DeMarrais et al. (1996), leaders reinforce social power through the materialization of ideology

in the form of rituals and ceremonies, symbolic objects, monuments, and writing systems. Social power may be defined as the ability to “control and manage the labor and activities of a group to gain access to the benefits of social action” (DeMarrais et al. 1996:15-16).

Materialization is a way for symbols and the ideas and meanings behind the symbols to be manipulated so that they may become important sources of social power. For example, socio-politically powerful urban centers such as Cuzco, with buildings crafted from cut-stone masonry and designed to monumental proportions, attest to the importance of the presentation of the material aspects of social power (DeMarrais et al. 1996:29).

Orientation, a method of architectural programming and also a feature of site planning, measures the location and directional alignment of individual structures, groups of structures, and entire sites (Werneke N.d.:49). Teotihuacan, the largest and one of the oldest ceremonial centers in the Americas, is located in the Central Valley of Mexico. Teotihuacan reflects characteristics of formal site planning in a grid-like orientation of its structures. Rectangular configurations of streets align in two directions: (1) 15° 28' east of north (Street of the Dead), and (2) 16° 30' south of east (Millon 1973). Many complexes in the city follow the first orientation while others follow the second resulting in the site plan appearing balanced. The architecture also

displays balance and harmony by offsetting structures such as the monolithic Pyramid of the Sun with the almost concave Ciudadela that opposes it (Aveni 1990:223). Like Teotihuacan, the main axes of many cities in central Mexico exhibit an orientation between 15° and 20° east of north. Centers that fall within in this range are often referred to as part of the “17° family.” An axial orientation within this range is said to be oriented to “Teotihuacan north” (Aveni 1990:237; Flannery 1998:28).

The concept of time in the ancient world is represented by the presence of a calendar system. The system is important for marking the passage of the seasons and for determining hunting and planting periods. Knowledge of time could be useful for leaders in predicting annual events (i.e., the solstice and equinox).

Passage of the sun along the horizon can be marked at three different points. The sun stops at opposite ends of the horizon twice a year--at solstice points--on June 21 and December 22. The sun stops in the middle of the horizon--at the equinox--on March 21 and September 22 (Aveni 1990:61). Ancient buildings often correspond to the solstice and equinox orientations and also to the cardinal directions of the compass. For example, at Chaco in the American southwest, a circular structure nearly 64 feet in diameter, Casa Rinconada, is oriented on a north-south axis. The remains of four large columns that

once supported a roof are oriented on the four cardinal directions. On the day of the equinoxes, the sun passes directly through a window in the structure (Williamson et al. 1975:69). Other alignments are thought to correspond with astronomical observances. At Teotihuacan for example three pecked-cross petroglyphs aligned with the setting of the Pleides star group and may explain the precise grid plan of the city (Aveni 1975:189).

Large-scale site planning and monumentality, therefore, are generally contingent upon developed organization of social, economic and political powers. Site planning principles (e.g., formality of layout, orientation, and spatial distribution) may reflect cosmological representations on earth, such as those exhibited at Teotihuacan or Casa Rinconada, or they may reflect a harmonizing of local beliefs, such as the geomantic art of *feng-shui* practiced in China.

Representations of cosmology and of local beliefs in the layout and orientation of the architecture are forms of materialization of local ideology. Leaders may use representations of local ideology to reinforce and legitimize the agendas of the ruling powers, thereby reinforcing social power. It should therefore be possible to apply these principles to ancient Maya site planning and monumentality.

CHAPTER 3

ANCIENT MAYA SITE PLANNING AND POWER

Many Mayanists define a center based on the quality and complexity of, “developed open space,” which refers to artistic elaboration and monumentality of architecture (Ashmore 1981b:56; Turner et al. 1981; Marcus 1976; Morley 1946). According to Willey et al. (1965:13), “all agree that the ceremonial center was the religious, political, and, probably, commercial nucleus of Maya society and that these nuclei held some sort of sovereignty over specified territories.” Fox (1977) considers Maya sites as regal-ritual centers that developed based on ideology rather than on commerce and trade (i.e., a mercantile city), or on a strong tradition of government (i.e., an administrative city). In regal-ritual centers, ideological control is achieved through elaborate ritual display and expression.

General characteristics of orientation in the Maya area tend to focus on the significance of the path of the sun in the passing of time and, consequently, the representation of the cosmos on the landscape (Ashmore 1986; Coggins 1980; Fox 1987, 1991; Friedel 1986; Schele 1977; Tate 1985). Cosmology may have played a role in large-scale territorial organization as illustrated in the association of the glyph for the four world directions with emblem glyphs of regional capitals

(Marcus 1976). Ethnographic accounts show that Maya of Chamula describe their cosmos according to the path of the sun. East is the primary orientation, north is the sun at the zenith, and both south and west represent the sun in the underworld (Gossen 1974:232-245). Coggins (1980) suggests that although the east-west axis is the most prominent, the north point is the most divine since this direction represents the sun at its zenith, closest to the celestial realm. A ruler's title, Ah Kin ("He of the Sun") suggests a close association with the calendar and astronomy (Coe 1991:168). Changes in the sun and moon guided annual hunting and planting cycles and also the staging of religious ceremonies.

A recent model by Lucero (N.d.) distinguishes between four different center types: community, local, economic regional and economic/ideological regional. These types are described below and summarized from Lucero. Center types do not function independently from each other but build on and interact with one another. Distribution of resources is secondary to how people in an area use local available resources for political gain suggesting that sociopolitical power may be influenced by, but not determined by, the environment.

Community centers, also called minor centers (Type 1), typically are located on rivers in areas with extensive alluvium. The unrestricted nature of both land and water results in a relatively low

settlement density as people dispersed to areas with good soil. At minor centers such as Saturday Creek and Barton Ramie, variability in structure types and the types of goods (e.g., prestige and ceremonial artifacts) found attest to the presence of economic differences. Elite members of the community (i.e., owners of critical resources) compensated laborers by providing them with food and access to resources and prestige goods obtained from interaction with regional elites. Events and ceremonies, including building small-scale religious structures, sponsored by elites served to integrate the community. Because of their independent nature, community centers may or may not have participated in the larger regional system.

Local centers (Type 2), are found along the river in hilly uplands on both dispersed and limited (circumscribed) agricultural soil (e.g., Piedras Negras and Yaxchilan). They are similar to community centers with additional characteristics that allow a greater exercise of political power. Typically local centers have a greater settlement density at the site center and population extends into the hinterland or to trade ports and trade routes. Local elites and political leaders monopolize nearby agricultural land to gain wealth and power. Economic relations were differentiated enough that leaders could collect some tribute from non-elites but compensation for labor was also practiced. Hierarchical relations developed in regional economic centers, which included

alliances, inter-site marriages, warfare, and exchange of trade goods. Rulers commissioned ballcourts, palaces, funerary temples, stelae, and emblem glyphs, which encouraged interaction between elites and royals. Besides community events and ceremonies, strategies to integrate people from the center and hinterlands included some royal rites (e.g., elaborate carvings of royal rites from Piedras Negras and Yaxchilan).

Economic regional capitals (Type 3), are located on rivers with circumscribed alluvium and other critical resources. Leaders gain power as competition from population pressure increases the pressure on resources. Leaders gain power by controlling access to resources that can be effectively centralized (i.e., the restricted alluvium at Copán and Palenque). Regional political rulers and royals expressed power by collecting tribute from local and community leaders, which integrated them into the regional political sphere. Large-scale political and ceremonial events reinforced regional capitals where rulers built large palaces and administration facilities, ball courts and temples.

Economic/ideological regional capitals (Type 4), are located away from rivers in upland areas. Large tracts of agricultural land and extensive water management systems facilitate the consolidation of economic power. The economic/ideological regional centers have high settlement density near the centers and in the outlying hinterlands.

Similar to economic regional centers, they maintain tribute and other hierarchical relationships with the other center types. But rulers at economic/ideological centers such as Tikal and Caracol use large-scale ritual events and ceremonies associated with the purification of water to attract people to the center. Characteristics of an ideological regional capital that support large-scale events (e.g., the largest and most well constructed temples, a formal layout of plazas, ballcourts, and administrative palaces) foster competition among different leaders to attract and keep followers.

CHAPTER 4

EXPLORING SITE PLANNING AND MONUMENTALITY

Site planning refers to the adherence of preconceived norms based on the arrangement of structures and is most easily recognized through repetitious patterns (Ashmore 1981b; Pollock 1965:389). According to the hypothesis of this study, centers with the most evidence of sociopolitical power will have the greatest evidence of site planning and monumentality. Conversely, centers with the least evidence of sociopolitical power will have the least evidence of site planning and monumentality. Table 1 illustrates the expectations of the hypothesis based on the Classic Maya center types outlined by Lucero (N.d.). Five features are used to determine the degree of site planning and monumentality for each center type. These features are: Individual structure orientation, group orientation, specialized group orientation, site layout, and degree of monumentality.

Individual structure orientation refers to individual structures and whether they correspond with the path of the sun or with some other astronomical alignment. Individual structure orientation is assessed by structure alignment. Alignments correspond to one of three orientation categories: (1) cardinal orientations (90° east, 240° west, 0° north, and 180° south) correspond with the path of the sun, (2) patterned

orientations appear grouped but not according to the path of the sun, or (3) orientations that have no pattern are not cardinal and are not patterned.

Group Layout refers to groups of structures and their relationships in terms of alignments to one another. Group layout is assessed by whether a group is a (1) cardinal plaza or plazuela, (2) patterned plaza or plazuela, or (3) plaza or plazuela with no pattern. Plazas are defined by groups of structures that share “central ambient space,” but do not necessarily enclose space. The term plaza generally refers to a group (aggregates of 2 to 6 structures) but on a grand scale (Ashmore 1981a:48-49). Plazuela refers to groups arranged around a small plaza (Ashmore 1981a:49). Plazas consist of developed open space or artistically elaborate and monumental features, whereas plazuelas do not. Groups are directional when a majority of the structures align with each other.

Special-Purpose Complex Orientation refers to groups of structures that may have served a function that represents cosmological significance. The alignments of special purpose groups suggest that their designers had knowledge of astronomy or in some cases at least created geomantic copies. For example, Frans Blom (1924) identified an assemblage of structures that may have functioned as an astronomical observatory. Originally discovered at Uaxactun, the E-

Table 1.--Classic Maya Types: Site Planning and Monumentality

Type	Minor Center	Local Center	Economic Regional Center	Economic/Ideological Regional Center
Location	River	Upland River	River	Upland Non-River
Individual Orientation	Less than half cardinal or patterned	Less than majority cardinal or patterned	Greater than majority Cardinal or patterned	Total cardinal
Group Orientation	Plazuelas with no pattern	Plazas and plazuelas with no pattern	Cardinal or patterned plazas	Cardinal or patterned plazas
Special-Purpose Complex Orientation	None or Non-functional	Possible one Special-Purpose Complex	One Special-Purpose Complex	Possibly more than one special - purpose structure
Site Layout	Non-formal	Semi-formal	Formal	Formal
Degree of Monumentality	Small	Moderate	Great	Greatest
Examples	Saturday Creek, Barton Ramie	Piedras Negras, Yaxchilan, Yalbac	Copan, Palenque	Tikal, Calakmul

Group complex consists of a pyramidal structure that looks east toward an open plaza. On the other side of the plaza, three small buildings on a single platform orient north-south. The sun rises over the northern building at the summer solstice, over the southern building at winter solstice, and over the central building at the equinoxes (Ricketson and Ricketson 1937; Aveni 1978). Ruppert (1977) identified non-functional copies of the E-Group complex at lesser centers within a 100-kilometer radius of Uaxactun (e.g., Benque Viejo, Cahal Pichik, and Dzibilchaltún) suggesting these sites may align to copy the complex architectural assemblages from greater sites.

Special-Purpose Complex identification is determined by the presence or absence of “special-groups” (Ashmore 1981a:57). These types of structures include Twin-pyramid groups (Jones 1969)--which will henceforth be termed by the more current name--Twin-Pyramid Complexes. Special-Purpose Complexes also include E-Group Complexes and ballcourts. Ballcourts are not considered in this study because they are more common than Twin-Pyramid Complexes and E-Group Complexes and therefore would not help distinguish differences between the four site types.

Site Layout refers to the investment of labor used to create the design of the site. Rectangular pathways require planning (planned thoroughfares) and facilitate the movement of large groups.

Rectangular pathways are associated with the presence of rectangular plazas. Modification of topography requires transporting and reshaping the landscape for the construction of the center (Hammond 1972:84).

Site layout is distinguished by (1) the presence or absence of rectangular pathways (straight roads, right angles, paths between monumental architecture) and (2) modification of the local topography to develop the site center (determined by whether platforms modify single structures, single plazas, or entire groups of plazas). Site layout is defined by non-formal (none), semi-formal (some), and formal (extensive) layouts of the site center.

Degree of Monumentality refers to grandness of architecture. Monumental architecture represents the process of energy investment expressed in “the division of labor of planners, architects, overseers, laborers, financiers, materials suppliers, judiciary, etc.” (Barbara Price 1978:165).

Degree of monumentality is defined by small, moderate, great, and greatest and is determined by the presence or absence of small versus large temples, based on height (small--less than ten meters, moderate--less than twenty meters, great--less than thirty meters, greatest--greater than thirty meters). Height designations represent arbitrary numbers chosen by personal observation of temples at centers. Degree of monumentality is also defined by the presence or

absence of palaces and administration structures, and by the presence or absence of funerary temples. Palace and administration structures are identified as “multi-room and multistory residential structures arranged around a series of internal courtyards” (Sharer 1994:164).

Typically, it is difficult to distinguish between palace and administration structures in the Maya area. Satterthwaite (1937:22) suggests that palaces were “audience chambers for a considerable number of dignitaries...such as courthouses.” But Satterthwaite doubted these structures served as residences because they did not contain “cooking fires” (Satterthwaite 1937:20). However, since artifacts are typically not found in these structures, and benches identified in them could be beds or seats, it is hard to distinguish between palace and administrative structures.

CHAPTER 5

EXPECTATIONS AND METHODS FOR THE ANALYSIS OF POWER

Minor centers (Type 1) should have less to none than the majority of individual structures oriented non-directionally because the local elite did not have the power to organize and manage construction of planned and monumental structures. Groups should have non-directional plazuelas, and no Special-Purpose Complexes, or in the case of the presence of a Special-Purpose Complex, it should be a non-functional copy. Site layout should be non-formal with little to no rectangular pathways and little to no modification of the local topography. Degree of monumentality should be small with small temples (less than 10m) and no palace or administration structures.

Local centers (Type 2) should have less than the majority of individual structures oriented non-directionally because secondary leaders had the power to organize and manage construction, but only at a local level as they did not have a strong economic footing. Groups should have non-directional plazas and plazuelas, with possibly one Special-Purpose Complex. Site layout should be semi-formal with some rectangular pathways and some modification of the local topography. Degree of monumentality should be moderate, consisting

of several temples over 10m high, some possible palaces and administrative structures and also possible funerary temples.

Economic regional capitals (Type 3) should have greater than the majority of individual structures oriented directionally because royal leaders had strong economic and sociopolitical power. Groups should have directional and non-directional plazas without more than one Special-Purpose Complex. Site layout should be formal with rectangular pathways and modification of the local topography. Degree of monumentality should be great, consisting of large temples (over 20m), palace and administrative structures, and also funerary temples.

Economic/Ideological regional capitals (Type 4) should have all individual structures oriented directionally because royal leaders had strong economic power and ideological power. Groups of structures should have directional plazas with one and possibly more than one Special-Purpose Complex. Site layout should be formal with well-defined rectangular pathways and intensive modification of the local topography. Degree of monumentality should be greatest, consisting of many of the largest temples (up to 75m), funerary temples, palaces and administration structures.

CHAPTER 6

CASE STUDIES: THE FOUR CENTER TYPES

Orientation data was collected directly from two case studies, the ancient centers of Saturday Creek and Yalbac, during the summer of 1999. The two centers are located in the Valley of Peace Archaeology area (Figure 1) in central Belize. Barton Ramie, also located in Belize comprises the third case study (Figure 2). The remaining six case-study centers are located throughout the Maya area--in Mexico, Guatemala, and Honduras (Figure 3). These nine sites provide comparison data that can define an understanding of differences between sites.

Data was collected from individual structures by placing a string at the angle of orientation, securing the string with a line level, and measuring the string with a compass. Group orientation was determined by a map created by the pace and compass method. Site layout was determined by identifying possible rectangular pathways and noting modifications of the topography. Degree of monumentality was determined by measuring height--by using a line level and ruler to measure the slope of the angle and also by observing the area for indications of palace and administration structures, and funerary temples.

Test pits, trenches made by looters, bulldozers, or naturally eroding architecture revealed exposed walls for measuring. Exposed walls from test pits displayed uniformity in orientation over time. However, associated pottery could not provide a reliable chronology because of the complications of dating pottery taken out of context (i.e., those from looter's trenches, bulldozer cuts, and naturally eroding structures). Therefore, issues relating to a study of site planning chronology must be left for future examination.

For all sites except Saturday Creek and Yalbac, previously published maps and literature were consulted. The following sections will first describe orientation, site layout, and degree of monumentality and then discuss the implications for sociopolitical power for each type of center.

Type 1

Type 1 sites will focus on orientation of individual and group orientation, site layout, monumentality at two sites--Saturday Creek and Barton Ramie.

Saturday Creek

Saturday Creek is a river settlement located on unrestricted alluvium on the north side of the Belize River. The site consists of over

100 structures of a variety of structure types including small temple structures, plazuela groups, and single mounds. The core area is located on a natural platform with two distinct plaza groups. Surface ceramics collected at Saturday Creek indicate an occupation from Middle Preclassic (1000-300 B.C.) through the Postclassic Period (A.D. 1100-1400) (Lucero 1999:6-7).

Regional topography consists of the limestone upland of the Vaca Plateau and the Belize River, which drains the northwestern slopes of the Maya Mountains and flows east to the Caribbean (Hammond 1981:170). The quasi-rainforest landscape is vegetated predominantly with deciduous broadleaf forests and mixed intermittently with high marsh forests.

The largest structure at Saturday Creek, SC-43, is oriented directionally on the north side of Plaza B (Table 2). SC-43 is aligned parallel to SC-64, also aligned directionally. Other measurements taken at the site vary in orientation from the cardinal directions. In the Carr Plaza (Figure 4), two measurements taken at different levels of SC-3 are oriented non-directionally. Interestingly, all non-directional alignments are 15° east of north. Of the two mapped plazas at Saturday Creek, Plaza B has a directional orientation and Carr Plaza does not. Special-Purpose Complexes are not present at Saturday Creek. Rectangular pathways are not present at the site. Modification

Table 2.--Individual Structure Orientation

T y p e	Site	Structure and Orientation					
		1	Saturday Creek	SC-64 0°	SC-43 90°	SC-18 345°	SC-3 285°
Barton Ramie	BR-1 345°		BR-123 345°	BR-147 0°	BR-260 0°	BR-180 255°	BR-19 90°
2	Yalbac	Str. A-1 0°	Str. A-1 90°	Str. A-1 0°	N/A* 0°	N/A* 0°	N/A* 0°
	Yaxchilan	Str. 1 345°	Str. 7 30°	Str. 13 118°	Str. 24 118°	Str. 30 14°	Str. 33 54°
	Piedras Negras	Str. O-13 215°	Str. O-12 125°	Str. R-16 145°	Str. R-5 125°	Str. R-10 125°	Str. R-3 35°
3	Copan	10L-26 1°	Great Plaza 353°	10L-16 5°	10L-22 7°	East Court West Side 8°	
	Palenque	Temple Inscription 21°	Temple Sun 119°	Temple Cross 211°	Temple Foliated 312°	North Group 0°	
4	Tikal	Temple I 90°	Temple II 90°	Temple III 90°	Temple IV 90°	Temple V 0°	
	Calakmul	Str. 1 90°	Str. II 0°	Str. III 90°	Str. IVb 90°	Str. VI 90°	Str. VII 0°

* Structures have not yet been named

of the landscape is minimal. Plaza B is build up on a platform that tapers off before Carr Plaza. Another partial platform is located to the south of Carr Plaza. Three temple structures are greater than 9m in height (SC-1, 10.2m; SC-4, 9.76m; SC-43 5.38m) not including the 5.72m platform.

Barton Ramie

Barton Ramie, like Saturday Creek, is located on unrestricted alluvium in the Belize Valley, surrounded by dense rainforest jungle. The site consists of over 200 mounds of “simple perishable structures” (Willey et al. 1965:16). Structure types include small temple structures, plazuela groups, and single mounds. The core area, located on a raised platform, has one distinct plaza group formed by three structures (BR-180, BR-181, and BR-182) (Figure 5). Pottery indicates occupation from the Preclassic Period (1000-300 B.C.) into the Postclassic Period (A.D. 1100-1400) (Willey et al. 1965:17).

Orientations at Barton Ramie (see Table 2) were taken from three structures that indicate directional alignments (BR-147, BR-260, and BR-19), and three that indicate non-directionality. The three non-directional structures measure 15° off directional points (e.g., BR-1, 345°; BR-123, 345°; BR-180, 255°). The single plazuela group at Barton Ramie has a non-directional orientation that is not a Special-

Purpose Complex. There are no distinct rectangular pathways and minimal modification of the topography (e.g., the BR-180 complex, which has a platform 5m in height). Degree of monumentality is small. BR-180, the only temple structure at Barton Ramie, stands at 12m including platform. It is the tallest structure at the site.

Type 2

Type 2 will focus on individual and group orientation, site layout, and monumentality for three sites--Yalbac, Yaxchilan, and Piedras Negras.

Yalbac

Yalbac is located in an upland area northwest of Saturday Creek and the Belize River. Only preliminary investigation of the site has been completed. A small portion of the site has been traversed and mapped. More investigation is needed at Yalbac to determine a complete assessment of the site's contents.

All individual structures measured at Yalbac orient to directional points (see Table 2). Structure A-1 is adjacent to two unnamed structures, one to the east and one to the west of Str. A-1 that abut it at a perpendicular angle to form a plaza (Figure 6). Plaza layout is directional at least at two of the plazas that have been identified. No

Special-Purpose Complexes have been identified from the preliminary investigations. Rectangular pathways form around the two plazas. Structure A-1 rests on a series of bi-level platforms and at 18.62m with platform is the tallest structure identified thus far at the site.

Yaxchilan

Yaxchilan is located on the southwest bank of the Usumacinta River in an area of rugged limestone hills. The central core of the site extends in a linear chain of plazas that follow the bank of the river in two irregular rows (Figure 7). The site is best known for its well-preserved stone carved lintels and stelae (Sharer 1994:236). Inaccessibility to the site has prevented a full-scale investigation of the site's contents.

The site consists of a long narrow plaza divided into three smaller groups of plazas and no notable plazuelas. Platforms supporting temple structures project into the central plaza at right angles to the river. Individual orientations all vary from directional points (see Table 2).

Because of the long narrow landscape and the perpendicular platforms, the site's pathways appear rectangular. In addition to the manmade platforms, terraces provide natural means of building up the landscape. The smaller group at the northwest end of the long plaza is

bound by a series of rising terraces that culminate in a large temple structure that orients toward the long axis of the plaza (Andrews 1975:141). Structures in the plazas consist of temples. However, there are no palaces or administration structures. No heights were identified.

There are no Special-Purpose Complexes at the site. However, Tate (1992) identified 5 groups of alignments at Yaxchilan: (1) a 6°-14° orientation group, (2) a 20°-30° orientation group, (3) a 51°-54° orientation group, (4) a 108°-124° group, and (5) a 220°-345° orientation group. Two very prominent orientations (53° and 118°) correspond to the sun at the summer solstice and the sun at winter solstice respectively. According to Tate, rulers used the solstice axes to create architectural-solar hierophanies. Hierophanies may be defined as “appearance of the sacred” (Ross 2000). For example, the illumination of the sun through the central doorway of Str. 33 onto a statue of the leader Bird Jaguar at the summer solstice is a solar hierophany identified at Yaxchilan.

Piedras Negras

Piedras Negras is located 40 km down river from Yaxchilan in rugged limestone hills 100m above the river (Figure 8). The natural topography is very irregular with a series of hills rising close to the

river. Structures at the site face inward toward the three main plazas with no particular affinity to facing the river. Many of the structures are badly deteriorated since they were built without masonry vaults as supporting elements and instead were constructed of thatch and beam. But the site is best known for its superb sculpture (Satterthwaite 1943:3).

The site consists of three main plazas with rectangular pathways (the Northwest Group, the East Group, and the South Group) and no plazuela groups. Most of the individual structures in the plazas are non-directional but consistently orient 35° off a directional point (see Table 2). Andrews suggests that the orientations might be determined by the shape of hills, with the builders choosing orientations which required the least earth moving (Andrews 1975:136).

According to Houston (1997) Piedras Negras contains a palace or administrative structure at the north position of the West Group. The West Group is terraced so as to be located on a naturally formed higher elevation than the other two plazas and has a “temple” at its highest point (Andrews 1975:137). Temple structures are located in each of the three plazas. Some are supported by platforms, most notably those in the South Group. There are no Special-Purpose Complexes. No heights were identified.

Type 3

Type 3 sites will focus on individual and group orientation, site layout, and monumentality for two sites--Copan and Palenque.

Copan

Copan is located in a rich, fertile valley on the bank of the Copan River (Sharer 1994:297). Part of the eastern acropolis has been washed away by the river over time. However, the site has maintained some of the most well preserved intricate carvings on stelae, altars, and architecture.

The site consists of two main groups, the Great Plaza in the north, and the Principle Group or Acropolis in the south (Figure 9). The Great Plaza contains two smaller plazas (the Middle Plaza and the Court of the Hieroglyphic Stair). It is a large open area enclosed by steps on three sides (east, north, and west), and bordered on the south side by a small temple. The Middle Plaza has a horizontal pathway that bisects the Great Plaza and the Court of the Hieroglyphic Stairway. Structure 10L-11, is positioned in such as way that it gives access to the south side of the Court of the Hieroglyphic Stairway and the north side of the West Court. The structure is oriented at 1° (see Table 2), almost due north and is approximately 40m in height (including the platform), the tallest at the site. Structure 10L-26, an

elaborate funerary temple, meets structure 10L-11 on the south and a ballcourt on the north at a nearly right angle and faces the Court of the Hieroglyphic Stairway. Besides the ballcourt, no other Special-Purpose Complexes are located at the site.

The area east of the Middle Plaza consists of a lower platform that supported a large series of multi-chambered palace or administrative structures that have been eroded away by the river. Excavations have revealed the three courts as having an east-west alignment (Sharer 1994:311).

The Acropolis contains a series of steps defining its north and east sides, similar to those of the Great Plaza. The entire plaza is supported by an artificial platform upon which many structures and at least two large temples are located. The East and West Courts have rectangular configurations and are divided by Structure 10L-16. This structure is oriented 5° east of north and is located on the east side of the West Court. Aveni (1990) acknowledges three sets of axes for the structures in central core of Copan: (1) a 6° west of north orientation in the Great Plaza, (2) a 1° east of north orientation in the Court of the Hieroglyphic Stairway, and (3) 5°-9° east of north orientation in the Eastern and Western Courts.

While no Special-Purpose Complexes exist at Copan, an interesting feature is the Stelae 12-10 base line. Stela 12 is located on

the east side of the Copán Valley. Stelae 10 on the west side of the valley is oriented 9° north of west. A 7-kilometer-long base line skirts the base of Structure 10L-16 in the Acropolis, aligning the two stelae. Sunsets along the Stela 12-10 base line occur midway in time between the equinox and the Copán solar zenith passage, twenty-one days after the vernal equinox and nineteen days before the zenith passage. This feature divides the Copán tropical year into 20-day blocks, suggesting it served as an important measurement tool for keeping the calendar (Aveni 1990:240-243).

Palenque

Palenque is located at the foot of the Chiapas highlands on a major tributary of the Usumacinta River. The site lies on a natural platform that has been developed into smaller artificial terraces. Palenque has two distinguishing features, a funerary temple (Temple of Inscriptions) with an elaborate sarcophagus and a three-story square tower rising out of the centrally located palace.

The central area of the site consists of a large Palace Group that occupies a central position atop a platform (Figure 10). To the north is a series of structures on two stepped terraces. The lower terrace contains a small building whose central doorway is aligned to the central doorway of the Temple of Inscriptions to the south. On the

higher level terrace is the North Group which consists of a low platform that supports a row of five structures at the northern position in the plaza and is oriented to 0° due north (see Table 2). The Temple of the Count, at a right angle to the North Group, faces the plaza.

The Temple of Inscriptions is located southwest of the Palace Group. The temple and the Palace Group form a nearly right angle thus enclosing the plaza east of the Palace. The Temple of Inscriptions, rising 25m on a terraced platform, has an orientation of 15° east of north (Aveni 1990:314). On the winter solstice the setting sun, viewed from the tower, beams through the doorways of the temple. The angle of the sun is approximately the same as the stairway leading down to the tomb (Aveni 1990:284). According to Schele, the hierophany signifies the transfer of power from father (Pacal) upon his death to his son Pacal (Schele 1977:49).

Southeast of the Palace Group, the Cross Group is situated on a terrace. Although the Cross Group has not been mentioned previously in the literature as one of the Special-Purpose Complexes, the configuration of structures suggests differently. The Cross Group consists of three structures. The Temple of the Cross occupies the north position of the plaza has an orientation of 211° east of north. The Temple of the Foliated Cross occupies the east position and has an orientation of 312° east of north. This temple is located on the

eastern periphery of the site, and is built on the hillside that has been reshaped to make it the highest structure of the group (Andrews 1975:172). The Temple of the Sun occupies the west position and has an orientation of 119° east of north.

The Temple of the Cross may be another winter solstice hierophany. According to Schele, when the sun sets on the winter solstice, an advancing shadow covers the site. A deep depression in the western ridge allows the sun at the same time to shine fully on the the Cross Group, having an effect very much like a spotlight. Because of the placement of the Temple of the Cross, this is the only time of year that direct sunlight hits the temple or its interior (Schele 1977:49-50).

Site layout is formal with distinct rectangular pathways and greater than average modification of topography, especially around the Palace, the Temple of Inscriptions, and the Cross Group. According to Andrews (1975:172), great effort was made to connect the Cross Group and the main plaza. The land has been modified between the two areas to cover up a stream that divided them thereby extending the plaza as an unbroken surface.

Degree of monumentality is great. Both Pacal's tomb and the Palace tower measure over 20m.

Type 4

For type 4 sites I will discuss individual and group orientation, site layout, and monumentality for two sites--Tikal and Calakmul.

Tikal

Tikal, the largest known Maya center, is located in an upland area near large seasonal swamps but away from major rivers or tributaries. The site consists of at least a hundred structures and plazas that are connected by three causeways that form a large triangle. A fourth causeway runs in a southeasterly direction from the eastern apex of the triangle to the Temple of Inscriptions (Figure 11). The largest temples, plazas, palace complexes occupy a high broken ridge that runs generally east and west. The smaller structures occupy smaller ridges in low areas (Andrews 1975:83).

Individual orientation is nearly consistent with directional alignments at all buildings connected by the causeways in the central area (see Table 2). The five largest temple structures (Temples I-V) have directional orientation. Three of the five have an orientation east-west, and face east (Temple II, III, and IV). Temple I has an east-west orientation but faces west, toward Temple II into the Great Plaza. Temple V has a north south orientation and faces north.

Group orientation is directional. The Great Plaza, located at an apex of the causeway triangle, is flanked on the outside by two smaller plazas, the east and west plazas. The Great Plaza, considered to be a microcosm (Ashmore 1991), consists of Temple I and Temple II occupying the west and east positions respectively. To the north, the North Acropolis, with its royal tombs, is the single most complex feature at the site and is believed to have been an important ritual and ceremonial complex (Coe 1988:44). Across the plaza in the southern position is the Central Acropolis, the main palace complex. The largest temples (Temples III and IV) and also Temple V are located in large open plazas with no other buildings enclosing space around them.

Special-Purpose Complexes are present at Tikal. The site consists of seven Twin-Pyramid Complexes unique to Tikal (Figure 12). Like the Great Plaza, these complexes are thought to represent a microcosm or map of the universe. These Special-Purpose Complexes have low, flat pyramids flanking the east and west sides of a large plaza, perhaps used to follow the sun's daily path (Guillemin 1968). A single-room building that occupies the south position has nine doorways, thought to represent the Nine Lords of the Night and the underworld. Opposite this building, on the north position is an unroofed structure that encloses a stela with the carving of a ruler and an associated altar. Since this configuration is located in the north

position with an unroofed structure, it is thought to represent the ascent of the ruler into the celestial realm to be equated with the ancestors (Ashmore 1991:201).

Site layout is rectangular. There are rectangular pathways throughout and the causeways also are pathways that control traffic flow. Besides taking advantage of the natural topography and placing large structures in higher positions on the landscape, modification of the landscape is commonplace in the construction of the causeways and structures of the site center.

The tallest structure at the site (Temple IV) measures 74m and the lowest of the great temples (Temple II) measures 47m. Other large temple structures are situated within and outside the central core. Monuments at Tikal define monumentality, all types of structures from funerary temples and palaces to Special-Purpose Complexes are represented.

Calakmul

Calakmul is located in an upland area away from rivers, and like Tikal, the site is situated on high ground near large seasonal swamps. The site consists of seven causeways connecting the site (Folan et al. 1995:313). However, only two have been mapped that connect with

the central core. Within the site core there are at least a hundred structures that define courts and plazas (Figure 13).

The orientation of individual structures follows directional points (see Table 2). Two of the largest structures orient north-south (structures II and VII) and three orient east-west (structures III, IV, and VI). The structure with the greatest mass, Structure II, faces north. Structure 4 faces west, Structure VI faces east, and Structure VII faces south.

Groups are oriented directionally. The majority of groups form rectangular plazas. The Central Plaza has four structures enclosing it (structures II, IV, VI, and VII). Also Structures V and VII occupy positions that define the plaza but are not oriented directionally. East of the Great Plaza is the North Court, bisected by a structure that separates it from the southeast court. Both have rectangular alignment. Structures VI and IV form a Special-Purpose Complex, which is of the same form as E-Group Complex at Uaxactun (see Figure 12).

Site layout conforms to rectangular alignment and therefore has rectangular pathways. Modification of topography includes causeways and platforms on major structures. The tallest structure at the site, Structure II is 55m in height and is one of the tallest in the Maya area. Structure II is believed to have functioned as a palace (Folan et al.

1995:317). Structure VII delimits the north end of the Central Plaza and is 24m in height. Below this structure is a vaulted tomb. Structure III located west of Structure II also has an elaborate tomb.

CHAPTER 7

DISCUSSION

Results of the orientation of individual and groups of structures and also of Special-Purpose Complexes yielded results quite different from expectations. Of the nine sites surveyed, three have a patterned orientation, three have non-patterned orientations, and three sites have a cardinal orientation. Type 1 sites are patterned which differs from the expectations that a site with the least power will have the least patterns or cardinal directions. Type 2 sites are expressed in all three categories, which reflects the diversity of Type 2 sites. Type 3 sites did not have a pattern at all which differs from the expectations that a site with more power will have more patterns and more cardinal orientations. Type 4 sites corresponded to the expectations that a site with the most power will have the most structures and will have the most structures oriented toward cardinal directions. In contrast to the results from orientations, results from site layout and monumentality correspond to expectations and reveal differences between each of the four types.

Minor centers (Type 1): of the structures measured at Barton Ramie and Saturday Creek, half oriented in cardinal directions. The largest structure at Saturday Creek (SC-43) is located at the north

position in Plaza B, and also on a natural terrace, which suggests that leaders placed the structure in a position to represent the celestial realm and veneration of ancestor. There are no plazas at Saturday Creek or Barton Ramie, but only small plazuelas, and no Special-Purpose Complexes, functional or non-functional. However, Plaza B at Saturday Creek has a cardinal orientation, while another, the Carr Plaza does not. The plazuela at Barton Ramie also does not have a cardinal orientation. There is more evidence for rectangular pathways at Saturday Creek than at Barton Ramie, which has mainly clusters of structures and winding pathways suggesting that leaders did not have the labor necessary to create platforms at Saturday Creek and Barton Ramie and instead relied on natural terraces to support temples. Leaders had the ability to manage the construction of only small monumental structures (10m or less), and no palace or administration structures.

Saturday Creek and Barton Ramie clearly conform to the expectation of a minor center and appear to have the least power of all four types, suggesting that the local elite did not have the power to organize and manage construction of planned and monumental structures. An interesting feature of Type 1 sites is the patterned orientation of all structures in the study measuring 15° off cardinal directions. Furthermore, each of the orientations connects to a

corresponding orientation at a 90° angle (e.g., 0° and 90°, 285° and 15°, 345° and 255°). These orientations comprise 3 groups of structures: (1) an east-west oriented group, (2) a 15° east of north oriented group, and (3) a 15° west of north oriented group. The orientations suggest that 15° off cardinal directions may be a characteristic of minor river centers. The 15° east of north may be part of the 17° family of Teotihuacan since the orientation falls between 15° and 20° east of north. Orientations at the site of Chichen Itza that fall within these compass points are associated with Late Classic Toltec occupation suggesting that Type 1 sites, which have the longest occupation histories of the four types may date to the Late Classic and may consequently have been influenced by the Toltecs. The 90° angle of various couples of structures may reflect a reorientation of the main axes of the center during different times of the lengthy occupation of minor centers.

Plazuelas at Type 1 sites are both cardinal and not cardinal. The presence of cardinal orientation of the main plazuela, Plaza B, at Saturday Creek suggests a greater ability of leaders to manage the development of minor ceremonial centers than at Barton Ramie where the largest plazuela does not have a cardinal orientation. The absence of Special-Purpose Complexes suggests that leaders did not have the

knowledge or the power to develop groups of structures that could measure time.

Site layout and monumentality at Type 1 centers reflect the expectations of socio-political organization at minor centers. Type 1 centers have non-formal layout and the smallest monumentality with no structures greater than ten meters. The lack of palace and administration structures and no funerary temples suggests that local elite and not royalty oversaw minor centers, resulting in less religious/ceremonial activity and less political activity. Instead, these centers experienced more local and independent organization related to their strong agricultural background. These factors may have also contributed to longer occupation histories at minor centers than at other types of centers.

Local centers (Type 2): Yaxchilan has less than the majority of its structures oriented in cardinal directions or patterned. Piedras Negras has the majority of its structures patterned. At Yalbac, all individual structures have cardinal orientation, as well as all plazas. Yalbac has no known plazuelas and no known Special-Purpose Complexes. Similarly, Yaxchilan and Piedras Negras do not have plazuelas or Special-Purpose Complexes. Rectangular pathways are located at Yalbac around the plazas and also at Piedras Negras. Because of the linear alignment of structures at Yaxchilan, the

pathways are not as rectangular. The varying patterns of orientation and layout at the three sites suggest different levels of ability of the leaders to manage building construction.

The diversity in orientation and site planning of Type 2 sites reflect the individuality of local centers, operating independently of each other within their own niche and with differing focuses. The majority of structures at the core of Piedras Negras have a patterned orientation 35° off cardinal directions. These alignments may be a deliberate attempt to orient the site plan in congruence with a predetermined number, suggesting that the number 35 may have had significance locally, or may be found to have significance elsewhere in the Maya area. The 35° orientation may instead be simply coincidental, a product of orienting the site along the river. If so, then why would Yaxchilan not be oriented toward the river?

Perhaps the leaders of Piedras Negras had a niche in the local community as a political authority. Evidence for Piedras Negras political power derives from the presence of the palace structure, the only one identified at a Type 2 site. The location of the palace structure at the north position of the highest natural promontory in the West Group suggests that leaders placed the palace and administrative structures at a position to equate them with the celestial realm and the ancestors. At Yaxchilan, orientations of individual

structures vary. However, according to Tate (1992), this variation is based on solar alignments as a mechanism the Maya used to facilitate site planning and to highlight hierophanies left by influential rulers such as Bird Jaguar, suggesting local focus on a cult of personality over institutionalized authority. In contrast to results at Piedras Negras and Yaxchilan, the cardinal orientation of Yalbac conforms more to the expectations of a Type 4 site. Orientations suggest that Yalbac may have had more religious activity associated with alignment of structures along the path of the sun and therefore may have been vying more for ideological power.

Special-Purpose Complexes are not found at any Type 2 sites. However, Uaxactun, the type-site for the E-Group Complex, is categorized as a Type 2 site which suggests that secondary royalty and Type 2 leaders had access to cosmological and astronomical knowledge. Sites such as Uaxactun may have specialized in the making of the Maya calendar or marking the days of the year.

Site layout and monumentality at Type 2 centers reflects the expectations of sociopolitical organization at local centers. Semi-formal layout and moderate monumentality suggest a local level construction of monuments and local level events with secondary royalty. A comparison of the presence of a palace structure at Piedras Negras but the lack of one at Yaxchilan suggests that Type 2 sites

varied in their amount of political activity and power. In addition, the absence of funerary temples at Type 2 sites suggests that these sites lacked the ability to achieve the levels of ancestor veneration found at larger centers. However, the presence of the solar hierophany highlighting Bird Jaguar at Structure 33 at Yaxchilan reflects the use of ancestor veneration where funerary temples may not be found.

Economic Regional centers (Type 3): Copan and Palenque have less than the majority of structures oriented directionally. Groups are located in plazas oriented directionally at Copan. At Palenque the focus conforms more to open spaces around the Palace. No Special-Purpose Complexes have been identified at either site. Site layout is formal with rectangular pathways at Copan and Palenque and obvious modification of the local topography. Both sites have great monumentality with structures over 20 meters in height and the presence of temples, palaces, administration structures and funerary temples. Interestingly, both Copan and Palenque are peripheral sites, which may account for their positions as economic regional capitals. These sites could have served as go-betweens for trade with non-Maya areas. Palenque may have been the economic capital of trade for the people to the north and also for those of the Pacific coast region. Copan may have served in the same capacity for the people to the south and the Caribbean Islands.

In contrast, Economic Regional/Ideological centers (Type 4): Tikal and Calakmul have greater than the majority of structures oriented directionally. Plazas at Tikal and Calakmul have palaces and funerary temples in primary directional positions (east or north). Tikal has seven Twin-Pyramid Complexes and Calakmul has an E-Group Complex, suggesting that leaders had the knowledge to follow cosmological alignments and the Maya calendar. Rectangular pathways form at Tikal and Calakmul and these sites also have intensive modification of the local topography, well as temples, palaces, administration structures and funerary temples of the greatest heights (the highest structure at Calakmul is 55m and at Tikal 74m).

Tikal and Calakmul conform to the expectations of an economic regional/ideological capital and have the strongest power of all four site types. Groups are directional plazas that have one but no more than one Special-Purpose Complex. Site layout is formal with well-defined rectangular pathways. Intensive modification of the topography includes the largest and most well-developed causeways of all four types. Monumentality is the greatest with the largest temples and funerary temples, palaces and administration structures at Type 4 sites. Site layout, causeways, and monumentality attest to the importance of the presentation of material aspects of social power and

give an example of the labor-intensive activities that represent status and social power and indicate social stratification.

Differences in orientation of individual structures and groups of structures at Type 3 and Type 4 sites suggests that leaders at Type 4 centers used cardinal alignment of plazas as the materialization of an ideology imbedded in cosmology and ancestor veneration. The ideology incorporated local beliefs, which reinforced the legitimacy of the leaders and of the religion. Solar hierophanies at Palenque and Copan, and also at the Type 2 site of Yaxchilan suggest that leaders had an awareness of the predictability of light and the movement of the sun and that these elements could be important sources of power. However, none of these sites, except for Type 4, have a predominance of cardinal orientations of plazas which suggests a relationship between cardinal directions and ideological power. The presence of E-Group Complexes and Twin-Pyramid Complexes at Type 4 sites and not at Type 3 sites may reflect the importance of these structures in maintaining ideological control--through the annual marking of time and of planning solstice and equinox events and feasts. Furthermore, lesser centers with E-Group Complexes, such as Uaxactun, may aspire to become ideological centers, or may have been built where leaders vied for ideological control.

Differences in layout and monumentality at Type 3 and Type 4 sites may also be linked to the role of ideology at Type 4 centers. The formal layout of the Central Plaza of Tikal, for example, consists of temple structures in cardinal positions, along the path of the sun, with the palace structure in the south position. The formal layout of Palenque, in contrast, consists of the Temple of Inscriptions and the Palace. These structures do not align in the cardinal directions but are linked to solar hierophanies. Layouts of both Tikal and Palenque suggest the linking of human and celestial realms; however, cardinal orientation of structures is not as subtle a materialization of ideology as an annual hierophany and may reflect a daily awareness of the ideology and ultimately of political and religious authority.

CHAPTER 8

CONCLUSION

An examination of the orientations of structures, site layout and monumentality reveals that the nine Maya sites reflect different degrees of site planning and monumentality thereby indicating different degrees of socio-political power at different types of sites. Minor centers (Type 1) have the least evidence for power, elite leaders did not have the ability to organize large-scale site planning based on cardinal orientation and solar hierophanies and therefore lacked a formal site layout and monumentality. Economic/ideological regional centers (Type 4), however, have the most evidence for power, expressed through cardinal orientations, solar hierophanies, formal layouts and grand-scale monumentality. Economic regional centers (Type 3) have strong evidence for power in formality of layout and monumentality but less so in orientation of structures. Local centers (Type 2) have the most diversity in characteristics of site planning and monumentality, resembling various characteristics of economic regional capitals and economic/ideological regional capitals and illustrating the need for further study of the differences and similarities among Type 2 sites.

Research into characteristics of site planning and monumentality at the four site types should include the sizes of sites and population estimates for a better overall picture of each site. The parameters for site layout should have been based on orientation and the form the orientation makes (i.e., rectangular vs. non-rectangular) rather than including modification of topography as criteria for determining site layout. Modification of topography is a varied and important indicator of people's manipulation of the landscape and should have been its own category. The presence of rectangular pathways is too subjective and is not a good defining feature of the landscape. Instead, the category would have been better defined based on the proximity of structures to one another rather and the kind of space that relationship creates.

Future research should include the dating of structures at minor centers to understand the 15°-orientation pattern and its possible relationship to Late Classic Toltec occupation. Also, an orientation data base should be developed that would 1) collect data from structures that align at 90° angles, such as those at Type 1 sites, and 2) identify different patterned orientations like that found at the Type 1 sites or at Piedras Negras. Finally, more information on the role of orientation in site planning may shed light on the cosmological knowledge of hierophants and the power of sun kings and will

ultimately help researchers understand the nuances of ancient Maya politics.

APPENDICES

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